Laparoscopic Surgery
in Gynaecology
and
Common Diseases in Women
Surgery with Minimal Scars and Maximal Benefits

Dr. S. Selva FRCOG

About the author

Dr S. Selva (Sevellaraja Supermaniam) is a Consultant Obstetrician and Gynaecologist and a subspecialist in Reproductive Medicine at a private hospital in Melaka, Malaysia. He heads the O&G unit and the IVF Centre at the hospital.

Dr. S. Selva obtained his undergraduate degree from the University of Malaya in 1985. After working in various hospitals in Malaysia and the United Kingdom, he became a member of the Royal College of Obstetricians and Gynaecologists, United Kingdom, in 1991. He then served as a specialist and later a consultant OBGYN in Johor Bahru. In 1994, he left the public service and joined a private hospital in Melaka and has been there since. Dr. S. Selva obtained his Masters in Reproductive Medicine from the University of Western Sydney in 2003. He also became a Fellow Of the Royal College of Obstetricians and Gynaecologists, United Kingdom and a Fellow of the International College of Surgeons, in 2003. He then obtained the Bachelor of Endoscopy from Belgium in 2013.

Dr S. Selva received his initial training in laparoscopic surgery under Prof. Soong Kwei Yong and Dr. Lee Chyi Long at the Chang Gung Memorial Hospital, Taipeh in 1994. He has been a dedicated laparoscopic surgeon since then, having performed about 5000 laparoscopic surgery cases so far. The types of cases that he performs involve advanced techniques such as single incision laparoscopic surgery, laparoscopic surgery for rectovaginal endometriosis, laparoscopic sacrocolpopexy and laparoscopic radical hysterectomy. He has also trained many national and international gynaecologists in laparoscopic surgery. He recently started a fellowship in laparoscopic surgery and infertility, the first of its kind in Malaysia. So far he has trained 3 Fellows. Dr. Selva has been performing 3D laparoscopy since 2013.

Dr S. Selva is the immediate past President of the Asia Pacific Association of Gynaecological Endoscopy (APAGE). He is also a reviewer of the Journal of APAGE (GMIT- Gynaecological Minimally Invasive Therapy). Dr. S. Selva is a board member of the International Society of Gynaecological Endoscopy. He is a Past President of the Obstetrical and Gynaecological Society of Malaysia and currently chairs its endoscopic subcommittee and is involved in promoting gynaecological endoscopic surgery in Malaysia. He was the organizing chairman of the International Society of Gynaecological Endoscopy Congress in Kuala Lumpur in 2004. He was also the organizing chairman of the annual congress of the Asia Pacific Association Of Gynaecological Endoscopy (APAGE 2014). He has organized numerous workshops in laparoscopic surgery and has also been the preceptor for many laparoscopic surgery workshops in Malaysia and abroad. Dr. S. Selva has also won numerous awards for video presentations in laparoscopic surgery, at the annual Malaysian Congress of O&G. He has written a chapter entitled "Polycystic Ovarian Syndrome" in the book, Obstetrics and Gynaecology for Postgraduates. He has also written a chapter entitled " Single Incision Laparoscopic Surgery using Common Laparoscopic Instruments" in the book, Practical Endoscopy Tips by Experts.

Besides laparoscopy, Dr. Selva is also an IVF specialist having obtained his training at King's College in London in 1997. In 1997, he started the IVF Centre at the hospital he currently works in.

Introduction

Although laparoscopic surgery in gynaecology has been in existence for over 30 years, the public is still unaware of its benefits. It is frequently perceived as dangerous and risky surgery. The aim of this book is to educate the public on the availability and benefits of laparoscopic or "keyhole surgery" for different gynaecological diseases.

In order to understand laparoscopic surgery in gynaecology, it is important to understand common gynaecological conditions. The first part of this book is dedicated to the explanation of common gynaecological diseases in women. In the second part, I will deal with how laparoscopic surgery is performed, its advantages and disadvantages and all the different types of gynaecological conditions for which laparoscopic surgery can be performed.

Although this book is entitled laparoscopic surgery in gynaecology, I have included the other component of minimally invasive surgery in gynaecology which is hysteroscopy, covered in Part 3. Endoscopic surgery or minimally invasive surgery, which is the term that encompasses both laparoscopic and hysteroscopic surgery should have been the correct title for this book, but I decided on "Laparoscopy" because it is the more commonly known term to the general public. I have also included interesting facts and cases in some of the chapters to further augment the understanding of the topic.

There are many medical terms and abbreviations used throughout this book. I have added a glossary of some of these medical terms at the end of this book. When the symbol (g) appears after a word, it means that an explanation of that word can be obtained in the glossary. I have also included a list of medical abbreviations used in this book. Please refer to them when necessary.

I have spent a considerable amount of time creating videos for many of the chapters in this book. They cover many of the chapters in the written format with videos of surgeries. I have given the URL (on vimeo) where these videos can be viewed. I have also given QR codes for each videos, so that it will be easy for you to access these videos. The QR code to get to the channel on vimeo, which contains all the videos is:

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Another way of viewing these videos through your mobile devices is to download an app that can be obtained for free from my webpage www.selvaapps.com.

If you would like these videos in DVDs or a thumbdrive you can purchase them by writing to me at info@melakafertility.com. Readers will benefit most by reading a chapter and then watching the accompanying video on that chapter. This will give a better understanding of the topic discussed. My own experience has taught me that one can learn much more from a video than from merely reading a book, (especially if it concerns technical issues such as those discussed in this book).

I hope you will enjoy reading this book and watching the videos, as much as I have had in preparing this book.

Dr. S. Selva
(Sevellaraja Supermaniam)

Melaka, Malaysia

November 2016

Dedication

To my wife Sarojini and my children: Ashmeera, Amita and Ainesh.

Foreword

Foreword By Dato' Dr. Alex Mathews

Laparoscopic surgery, also known as minimally invasive surgery, has come a long way and has revolutionised the performance of a large number of surgical procedures. It is now utilised in most surgical specialities.

Laparoscopic surgery in gynaecology has developed into a highly sophisticated and precise form of surgery. Today many advanced gynaecological procedures can be performed safely and effectively using laparoscopic techniques.

In surgeries, there are usually 2 separate steps; the first, an incision (a cut) through the skin layer of the body and the second, the actual surgery deeper inside the body. In these conventional "open" surgeries, the cut on the skin layer is fairly large. This is to ensure good visibility and manoeuvrability for the surgery to be done effectively. The pain and discomfort after surgery, in most cases, is mainly from the cut on this skin layer.

In laparoscopic surgery one difference is that the cut on the skin layer is much smaller. The surgery is performed through small cuts using specially designed instruments that can be manipulated through these incisions. The internal structures are clearly visible to the surgeon because of highly specialised small cameras placed inside the body that transmit the image onto a high-definition video screen. The surgeon operates while looking at the screen. The assistant and observers can follow the entire surgery on the screen.

Major advantages of laparoscopic surgery include less tissue damage, clearer vision, and often better access to hidden structures. Several procedures never before possible with conventional surgery are now being done laparoscopically with great efficiency and minimal damage to surrounding tissues. The recovery period is shorter and return to work is much quicker without compromise on outcome.

However, the training of a laparoscopic surgeon is a long and intensive process. Basic training is done first on laboratory models. Then, there is a process of watching and assisting senior surgeons. The trainee surgeons then perform surgeries under direct supervision. Only then do surgeons embark on surgery independantly.

Surgeons continually update their skills through advanced training. As in all surgeries, complications can occur, but with due care and proper training these can be reduced to a minimum.

One of the pioneers of advanced laparoscopic gynaecological surgery in Malaysia is the author if this book, Dr. S. Selva.

Dr. Selva started laparoscopic surgery early. Initially, there was only very basic equipment available. However, Dr. Selva quickly advanced his skills, training in some of the best centres overseas.

Today Dr. Selva is an acknowledged expert and trainer and innovator in advanced techniques. He has a busy schedule providing training to surgeons who want to improve their skills.

Dr. Selva has another passion, i.e. a long standing desire to help patients and other lay-persons understand gynaecological laparoscopic procedures. He does this in his book using clear descriptions, pictures, and videos of actual surgeries. He, thus, helps lay-persons to participate meaningfully in making decisions in consultation with their doctors.

This book with the accompanying videos is an excellent contribution to public medical education.

I have no doubt it will be useful for many. Even medical practitioners of other disciplines will find this book interesting and informative.

To all who have any interest in knowing more about this subject I can heartily commend this remarkable publication.

Dato' Dr. Alex Mathews FRCOG
Consultant Obstetrician and Gynaecologist,
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Case Studies

Case Studies

Interesting Facts

Videos that accompany this book

All videos can be obtained at this channel:
https-//vimeo.com/channels/1005699

Videos in Each Chapter

Video 1.1   Normal female pelvic anatomy - https://vimeo.com/149588511

Video 2.1   Uterine fibroid - https://vimeo.com/149599112.

Video 3.1   Endometriosis - https://vimeo.com/149606168

Video 4.1   Adenomyosis - https://vimeo.com/149611964

Video 5.1   Ovarian cyst - https://vimeo.com/149616411

Video 5.2   Twisted ovarian cyst Laparoscopic Right
             Salpingoophrectomy - https://vimeo.com/149700129

Video 5.3   Laparoscopic surgery for bleeding ovarian
             cyst - https://vimeo.com/159002671

Video 6.1   Endometrial Polyp - https://vimeo.com/159004117

Video 7.1   Ectopic pregnancy - https://vimeo.com/149705868

Video 8.1   Tubal block and hydrosalpinx – https://vimeo.com/159005056

Video 9.1   Pelvic inflammatory disease - https://vimeo.com/159011692

Video 10.1   Uterovaginal prolapse - https://vimeo.com/149728206

Video 11.1   Congenital uterine abnormalities - https://vimeo.com/159012013

Video 11.2   Excision of non communicating uterine horn
             - https://vimeo.com/159012375

Video 15.1   Laparoscopic Surgery in Gynaecology an
             overview - https://vimeo.com/149733613

Video 17.1   Complications of laparoscopic surgery -
             https://vimeo.com/149741703

Video 18.1   Laparoscopic tissue removal – https://vimeo.com/155090018

Video 19.1   How is single incision laparoscopic surgery
             performed - https://vimeo.com/149741718

Video 19.2   Single incision bilateral tubal ligation with Filshie's
             clip - https://vimeo.com/149741716

Video 19.3   Single incision laparoscopic salpingoophrectomy for
             ovarian cyst - https://vimeo.com/149741720

Video 19.4   Single incision laparoscopic cystectomy
             - https://vimeo.com/149741715

Contents

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PART 1
Common Gynaecological Diseases

Chapter 1

The Normal Female Pelvic Anatomy

Chapter 1 : Basic Anatomy

In order to understand gynaecological diseases and gynaecological laparoscopic surgery, it is important to first understand the normal female pelvic anatomy.

The female reproductive system consists of 4 major parts: the uterus, vagina, fallopian tubes and ovaries.

Figure 1.1 Female body showing the female reproductive system

Uterus

The uterus, or womb, is a hollow, pear-shaped organ with a thick muscular wall. It is subdivided into two parts: the corpus (body), and the cervix (neck).

• The corpus comprises the fundus, which is the top portion of the uterus; and the cavity of the uterus. The cavity is where the embryo/foetus develops during pregnancy. The inner layer or the lining of the uterus, is called the endometrium. Every month, it thickens in preparation for potential pregnancy and sheds during menstruation if pregnancy does not occur. The middle layer of the uterus is known as the myometrium. It is mainly composed of smooth muscle cells, which collectively give the uterus the strength to contract and expel the foetus during childbirth. The outermost layer of the uterus is the serosa, also known as the perimetrium.

• The cervix is the lower constricted segment of the uterus that joins the upper part of vagina. The small cervical opening into the vagina is called the external os while the one in the uterine cavity is called the internal os. They allow the sperm to enter the uterus during sexual intercourse and the menstrual fluid to flow out of the uterus during menstruation. The cervix can be visualised from the vagina.
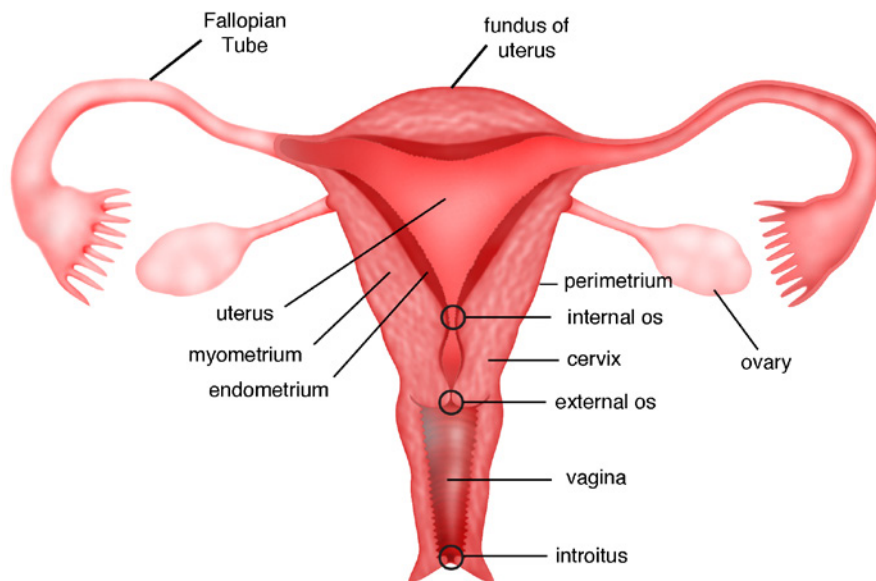
Figure 1.2 Front section of female reproductive sysem

Vagina

The vagina is a muscular, narrow canal that extends from the vaginal opening called introitus, to the cervix. It is also known as the birth canal due of the fact that the foetus passes through it to be born during natural childbirth. The inner wall of the vagina is surfaced with numerous folds of soft elastic mucous membrane called vaginal rugae. This allows the vagina to expand considerably during sexual intercourse or childbirth. During menstruation, the vagina provides a channel for the menstrual fluid to flow out of the body.

Ovaries

The ovaries are small, oval-shaped paired glands that are attached to each side of the uterus via a thin, fibrous ovarian ligament. The pair is responsible for storing and nurturing immature egg cells to become mature eggs. Every month, one of the ovaries releases a mature egg into its neighboring Fallopian tube. In addition to producing eggs, the ovaries produce two main female sex hormones: the oestrogen and progesterone, which are vital in regulating menstrual cycles.

Fallopian tubes

The fallopian tubes, sometimes simply called tubes, are the two channels that connect the ovaries to the uterus. They are the main structures that facilitate fertilization. Each tube is divided into 5 main portions:

1) Fimbriae
The fringe-like structure located at the end of the tube that captures an egg released from the ovary and draws it into the tube.

2) Infundibulum
The funnel-like structure of the tube, which is margined by the fimbriae.

3) Ampulla
The longest portion of the tube with a thin wall (almost muscle-free) and wide lumen (g). It is usually the portion where fertilization takes place.

4) Isthmus
The almost straight portion of the tube with a relatively thick muscular wall and with the narrowest lumen(g).

5) Interstitium
The portion of the tube that is closest to the uterus. It is sometimes known as the uterine portion of the tube for the fact that it lies within the uterus.

The inner lining of the fallopian tube is made up of fine finger like projections called the cilia.
These cilia are important in assisting the movement of the eggs towards the uterine cavity and the sperms into the ampulla of the fallopian tube.
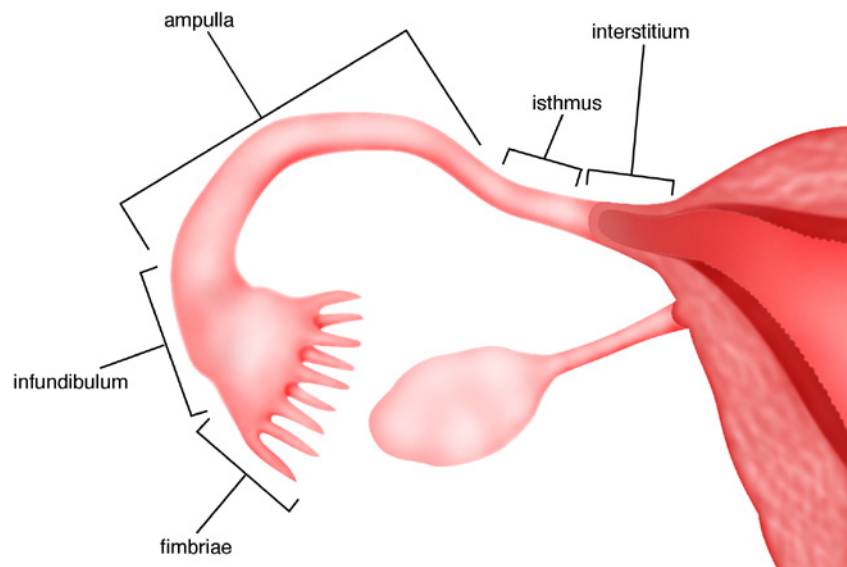
Figure 1.3 Anatomy of the Fallopian Tube.

Figure 1.4 is a different view of the female pelvis. It is how the pelvis looks when a gynaecologist looks at the pelvis either through a laparotomy (large incision on the abdomen) or through a laparoscope (key hole surgery).

The uterus is in the centre. In front (anterior) of the uterus is the urinary bladder. Behind (posterior) to the uterus is the rectum. A slippery membrane called the peritoneum(g) covers the whole pelvis and abdomen. Beneath the peritoneum, on either side of the pelvis, run the ureters. The ureter is a small tube that carries urine and runs from the kidney to the bladder. Large blood vessels are present on both sides of the pelvis. These blood vessels carry blood from the heart to both the legs and back.

Figure 1.4 Superior view of the pelvic organs
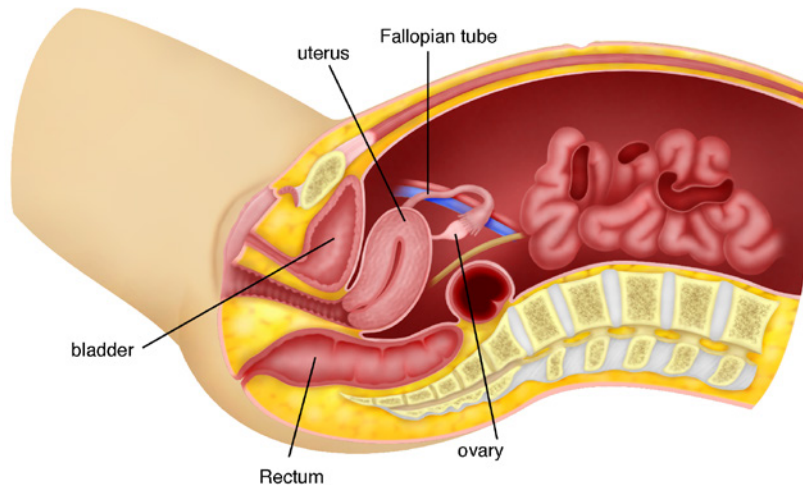
Figure 1.5 Side view of the abdomen and pelvis

Figure 1.5 is a side view of the abdomen and pelvis. The uterus is in the centre. On the side and behind the uterus are the fallopian tubes and the ovaries. In front of (anterior to) the uterus is the urinary bladder and behind it (posterior to) is the rectum.
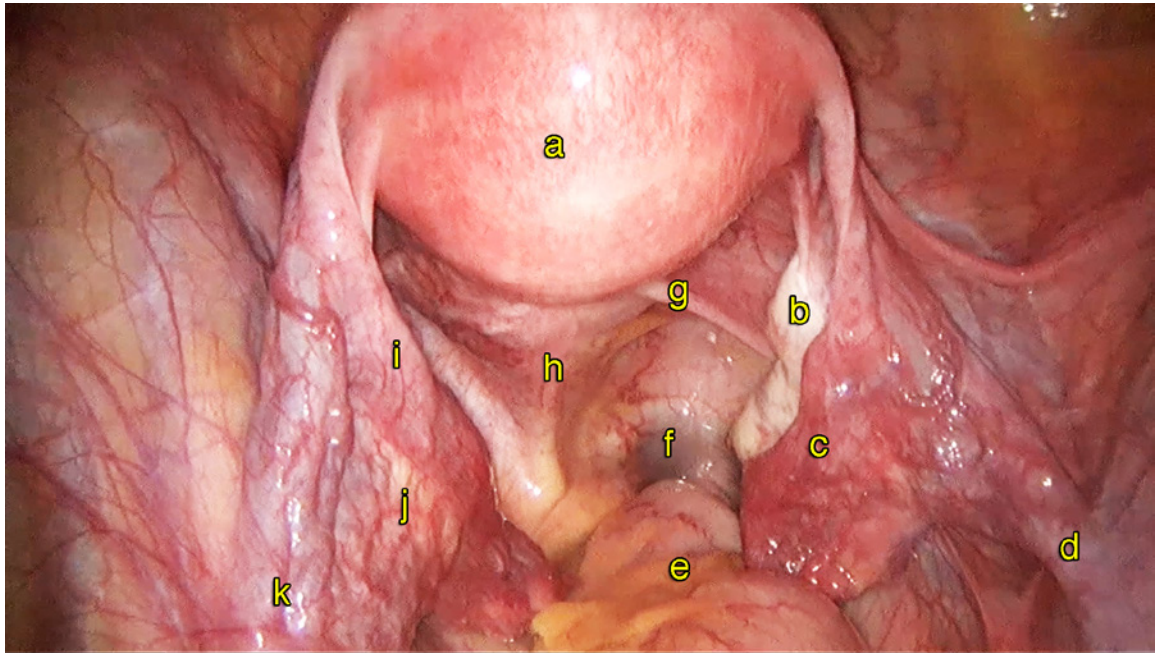
Figure 1.6 Laparoscopic view of a normal pelvic

Figure 1.6 Laparoscopic view of a normal pelvis
(a) Uterus,
(b) Right ovary,
(c) Right fallopian tube,
(d) Right infundibulopelvic ligament,
(e) Rectum,
(f)   Pouch of Douglas,
(g) Right uterosacral ligament,
(h) Left uterosacral ligament,
(i)   Left fallopian tube,
(j)   Left ovary,
(k) Left infundibulopelvic ligament.
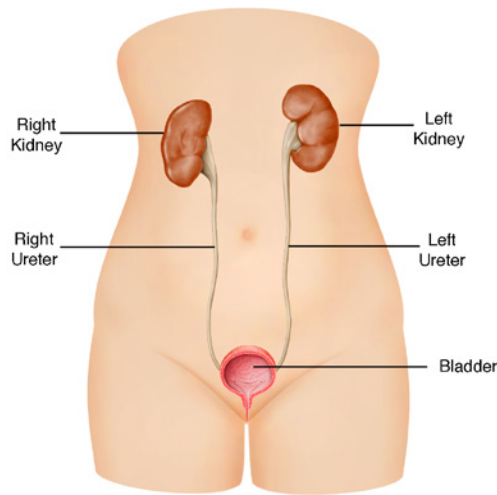
Figure 1.7 Urinary system

Figure 1.7 shows the urinary system. Ureters connect the kidneys to the urinary bladder. Ureters are found behind the peritoneum on the pelvic sidewalls. They run below the ovaries and on the side of the cervix under the uterine arteries before entering the bladder via the ureteric tunnel. Ureters are important structures to identify during gynaecological surgeries.

Scan Me

Watch Video 1.1
Normal female pelvic anatomy.

https://vimeo.com/149588511

Summary

It is important to understand the normal female anatomy before proceeding to learn about common gynaecological diseases and laparoscopic surgery for gynaecological diseases.

Chapter 2

Uterine Fibroid

Chapter 2 : Uterine Fibroid

Uterine fibroids, medically termed leiomyoma, fibromyoma or myoma but commonly known as fibroids, are benign (non-cancerous) tumours that grow within the muscular layer of the uterus. Fibroids are composed of muscle and fibrous tissue, which give them a firm texture.

Fibroids are the most common of benign tumours found in women. They usually occur during the middle or late reproductive years of a woman (over the age of 30), although some young women in their 20s also develop fibroids. These tumours usually come in multiples (can be up to a hundred), and can vary hugely in size: from tiny pea-sized to larger than a melon.

Types of Fibroids

Fibroids are classified according to the location where they grow within the uterus. There are three main types of fibroids:

1) Submucous fibroids
Fibroids that grow towards or just beneath the lining of the uterus (endometrium).

2) Intramural fibroids
Fibroids that grow deep within the muscular wall of the uterus.

3) Subserous fibroids
Fibroids that grow towards or just beneath the outer layer of the uterus (perimetrium).

Some fibroids are attached to the uterus by a thin stalk called the peduncle. These fibroids are generally known as pedunculated fibroids.

Fibroids that grow within the cervix (which are relatively rare) are known as cervical fibroids.
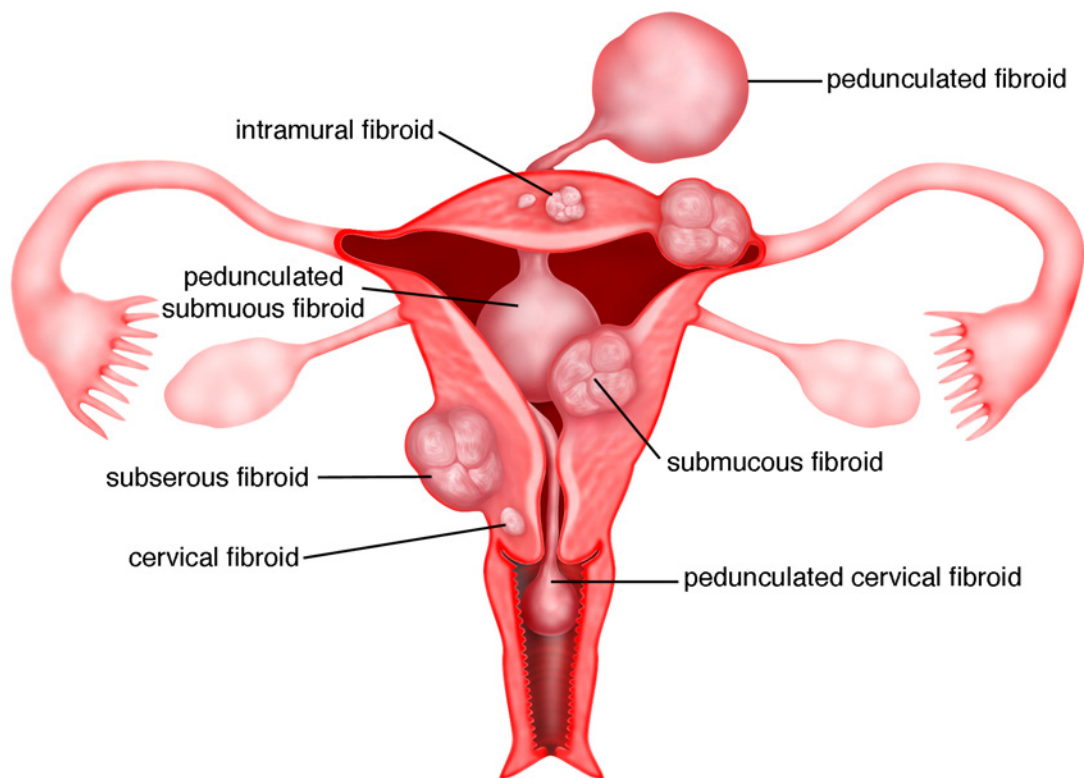
Figure 2.1 Types of fibroids

Cause

The actual cause of fibroids cannot be completely determined. Factors such as heredity, race, and oestrogen level, however, are conclusively linked to the disease.

1) Heredity

It has been found that many women with fibroids have a family history of the disease. It is believed that fibroid arises from the mutation of a single muscle cell, which exists from birth.

2) Race

Researchers have suggested that women with African-American ethnicity are 2-3 times more likely than other women to develop uterine fibroids. Although the actual reason behind the heightened likelihood is unknown, it has been speculated that the genetic predisposition could play a role in it, since it is common for African-American women to develop fibroids at a younger age. These women also tend to have multiple and large-sized fibroids.

3) Oestrogen Level

Many women who develop fibroids are also found to have elevated oestrogen levels. While it is unclear how oestrogen contributes to the origin of the disease, it has been confirmed that fibroids do depend on the hormone to grow, just like endometriosis. This also explains why some women experience worse symptoms of fibroid during perimenopause (menopause transition years), as their oestrogen levels are abnormally high at this stage. The symptoms, however, settle down naturally after menopause due to a significant decline in oestrogen levels. Under oestrogen deficiency, fibroids usually shrink, and sometimes disappear without treatment.

Case 2.1 : 5 of 6 sisters with fibroids

Miss LSP was a 46 year old single lady who came to see me in June 2003 with a problem of abdominal distension. Her menses was regular but heavy with occasional clots. Examination revealed a pelvic mass that reached up to 4 cm above the umbilicus (g), (24 gestational weeks size – like a 6 month pregnancy). Abdominal ultrasound showed an enlarged uterus with multiple huge fibroids. She underwent a laparotomy and myomectomy. 24 fibroids of varying sizes the largest 13 cm in longest diameter were removed (see Figure: 2.9). Postoperatively, she was well. She is on regular follow up. Her fibroids have recurred since 2005. However, the largest has remained the same size (4.5 x 4.6cm) for many years. She attained menopause in 2008 at the age of 51.

Miss LSL saw me in 2003 after her sister was diagnosed with fibroids. She was 37 years old and single. Her periods were regular and not heavy. Examination revealed a large pelvic mass reaching 2 cm above the umbilicus (22 gestational weeks size). Ultrasound showed multiple uterine fibroids. She also underwent a myomectomy. 20 fibroids were removed and the total weight of the fibroids was 3.9kg (see Figure 24.8). The largest measured 25 cm in the longest diameter. Postoperatively she was well and was on regular follow up. The fibroids recurred. In 2010, there were again numerous fibroids and the uterus reached 4 cm below the umbilicus (16 gestational weeks size). She was 44 years old at that time and was still single. She was advised a hysterectomy but decided to do another myomectomy. 40 fibroids were removed size ranging from 15 mm to 8 cm in diameter with a total weight of 1.01 kg. Postoperatively she has been well and on regular follow up.

Miss LTH first saw me in 2004 at the age of 45 years. She could not pass urine for a few days. Examination and ultrasound showed multiple uterine fibroids with a large cervical fibroid measuring 9cm in diameter. She underwent a total abdominal hysterectomy.

LTB was 44 years old in 2006 when she saw me for a routine gynaecological examination. She was married with no children. Ultrasound showed multiple small uterine fibroids the largest measuring 1.57 cm. in diameter. She was asymptomatic and the fibroids remain small till today.

LSF has 2 children and she saw me in 2007 at 38 years of age for a routine gynaecological examination. Examination and ultrasound showed 2 small fibroids the largest measuring 2.69 cm. She was seen again in 2013 at the age of 44. She was asymptomatic but her fibroids have increased in number and size, the largest being 3.26 x 3.79 cm. She was seen again in December 2014. Her fibroids had increased in size and the largest was 3.85 x 5.63 cm. However, she was asymptomatic and is on follow up.

Signs and Symptoms

Many women with fibroids do not experience unusual signs or symptoms and mostly only discover the existence of the fibroids incidentally, during a routine pelvic or ultrasound examination. However, the appearance of symptoms is certainly possible and can sometimes be highly troubling. The most common symptoms of fibroids are as follows:

1) Heavy and prolonged menstrual bleeding

Women with fibroids are likely to experience abnormally heavy and prolonged menstrual bleeding (7 or more days), which can lead to iron-deficiency anaemia. This symptom is widely believed to be caused by the inability of the muscles of the uterus to contract effectively to reduce menstrual flow, due to the presence of fibroids within the muscular wall of the uterus.

2) Pelvic pressure

Women with large fibroids may feel a sense of fullness or pressure in the pelvic area, as the fibroids press against the surrounding organs, such as the bladder and rectum. This pressure may even damage the organs. Symptoms of this kind of pressure are:

a) Difficulty in urinating

When the fibroid presses on the bladder, the bladder capacity is reduced. Consequently, the subject may have the urge to urinate more frequently or feel incomplete bladder emptying. In rare cases where the urethra (g) is blocked, the subject will experience acute urinary retention (sudden inability to urinate).
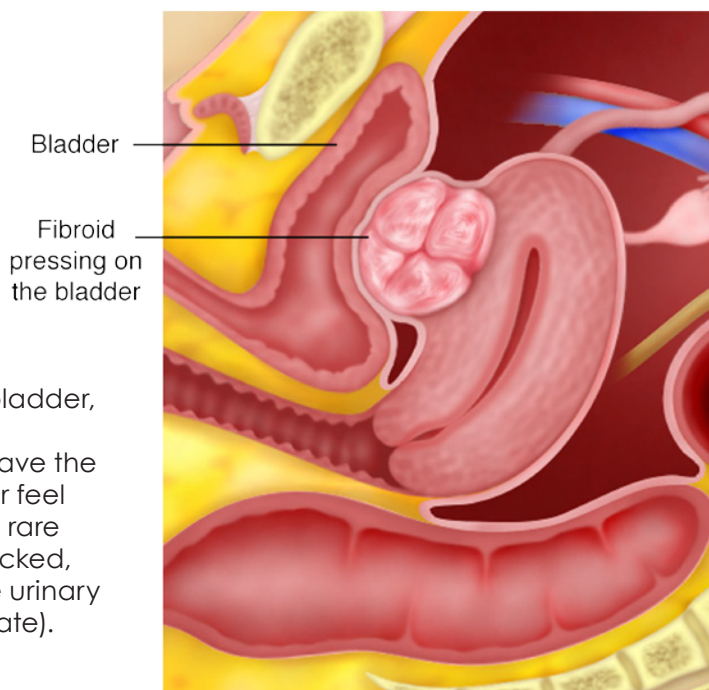
Figure 2.2 Fibroid pressing on the bladder

Case 2.2 : Fibroids that cause sudden inability to urinate

MS, a 43 year old lady, married with no children, came to see me in August 2014 with a problem of several episodes of inability to pass urine requiring catheterization. She also complained of needing to go to the toilet up to 12 times a day. Examination revealed a large 14 x 8 cm posterior cervical fibroid and another fundal fibroid measuring 8 x 6 cm. She could not decide whether to undergo a myomectomy or a hysterectomy. She finally decided to undergo a hysterectomy. A total laparoscopic hysterectomy (g) was performed in October 2014. Postoperatively, she still could not pass urine. She was sent home with a catheter. The catheter was later removed and even though she could pass urine after removal of the catheter, she could only pass in small amounts. She was taught self-catheterization. Every time after she passed urine, she had to catheterize by herself and to measure the amount of urine that came out (residual urine). Her residual urine became lesser with time.

Discussion

Fibroids can press on the bladder and can cause frequent urge to pass urine. It can sometimes cause retention of urine. Chronic retention of urine as a result of fibroids can cause difficulty in passing urine even after the fibroid is removed. Patients who develop sudden retention of urine because of a fibroid should remove the fibroid or the uterus as soon as possible.

b) Constipation due to pressure on the rectum.

Fibroid pressing on the rectum
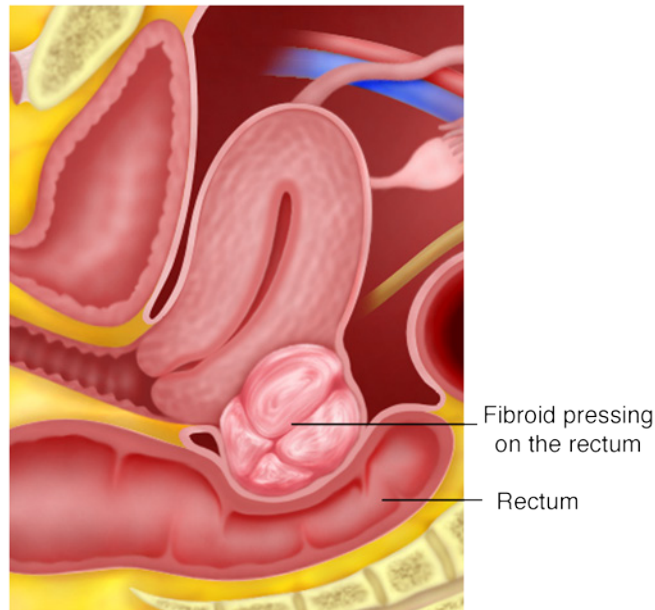
Rectum

Figure 2.3 Fibroid pressing on the rectum

Right kidney

Dilated right ureter

Fibroid compressing on the right ureter
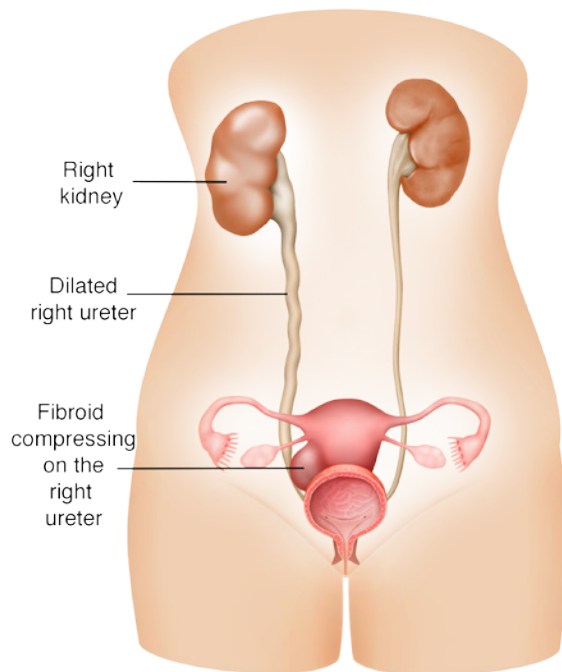
c) Dilation of the kidney with urine (hydronephrosis)

Occasionally, the fibroid presses on the ureter and obstructs the passage of urine from the kidney to the bladder. Urine will start accumulating behind the obstruction and eventually distend the entire kidney. This is known as hydronephrosis and can result in urinary tract infection and/or even cause permanent damage to the kidney.

Figure 2.4 Dilatation of the right ureter due to compression of a fibroid

3) Pelvic pain

There are a few reasons why fibroids cause pain in the pelvic area.

a) Fibroid degeneration

When a fibroid grows to a size that its blood supply is no longer sufficient and blood can no longer reach the fibroid's central area, it will start to degenerate from inside. In other words, the muscle tissue that makes up the fibroid dies due to lack of oxygen. The process will cause severe pain that usually lasts between several days to a week or even more.
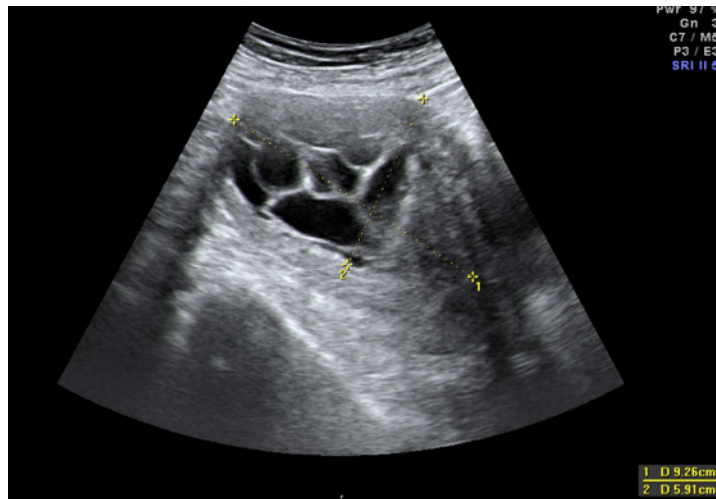
Figure 2.5 (a) Ultrasound showing a cystic degeneration of a fibroid

Figure 2.5 (b) Laparoscopic myomectomy specimen

b) Twisted peduncle

When a pedunculated fibroid becomes twisted, it can cause excruciating pain to the sufferer that an immediate surgery to remove the fibroid is required. Another situation that can occur is when the twisted peduncle blocks the essential blood supply to the fibroid causing fibroid degeneration, which in itself, is very painful.
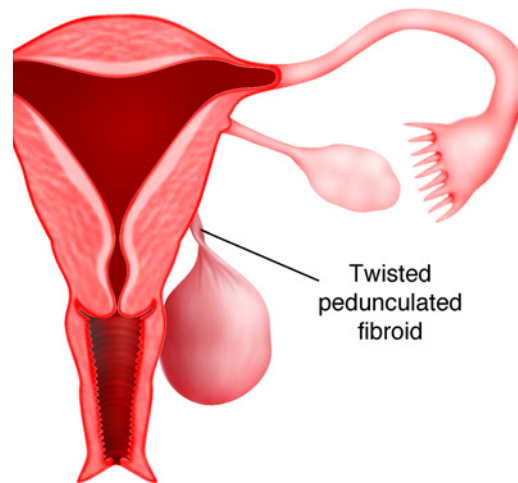
Figure 2.6 (A) Twisted Pedunculated fibroid
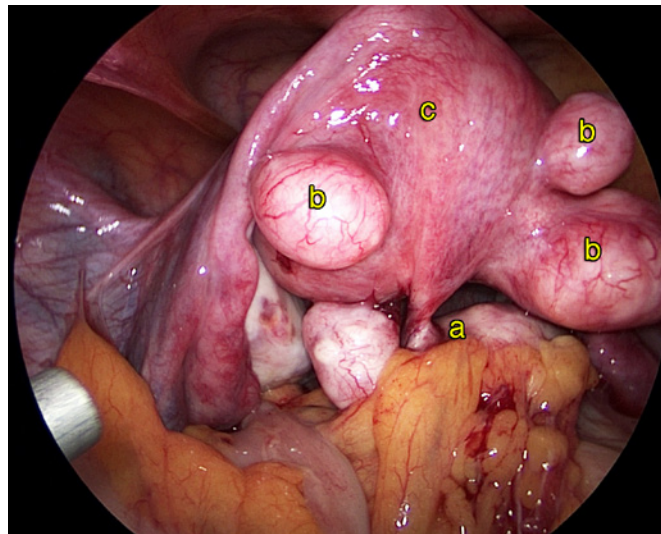
Figure 2.6 (B)
(a) twisted pedunculated fibroid,
(b) subserous fibroids, (c) uterus

c) Fibroid infection

Occasionally, a degenerating or dying fibroid can infect the surrounding uterine tissue, causing pain.

d) Malignant change in fibroid

Very rarely does a fibroid evolve into a malignant (cancerous) tumour called leiomyosarcoma. There is a one –in –a thousand chance of this occurring. When this does happen however and the malignant tissue starts to invade the surrounding uterine tissue, it can result in intense pelvic and abdominal pain, which may be accompanied by abnormal vaginal bleeding.

Can the diagnosis of a uterine sarcoma (cancer of the fibroid) be made without surgery?

Fibroids are very common and are mostly benign. They are usually suspected during an abdominal and a pelvic examination and confirmed on an ultrasound examination. There is no conclusive test that can be done to confirm if a fibroid is a cancer (sarcoma). In postmenopausal women where fibroids are growing, a cancer can be suspected but it still cannot be confirmed until surgery is done to remove the fibroid or the uterus. There are ongoing studies to diagnose a uterine sarcoma before surgery. One such study looked at performing MRI using a dye called Gadolinium and a LDH blood test to predict whether a fibroid is a sarcoma. However, this test is still not commonly available.

4) Infertility

Fibroids growing in the Fallopian tubes can compress and block the passage of the egg and sperms, making fertilization impossible. Fibroids growing within the muscular wall of the uterus may also severely distort the uterine cavity, especially the endometrium (the lining of uterus) and interfere with the blood supply to it, making implantation difficult or impossible.

Fibroid blocking the left fallopian tube
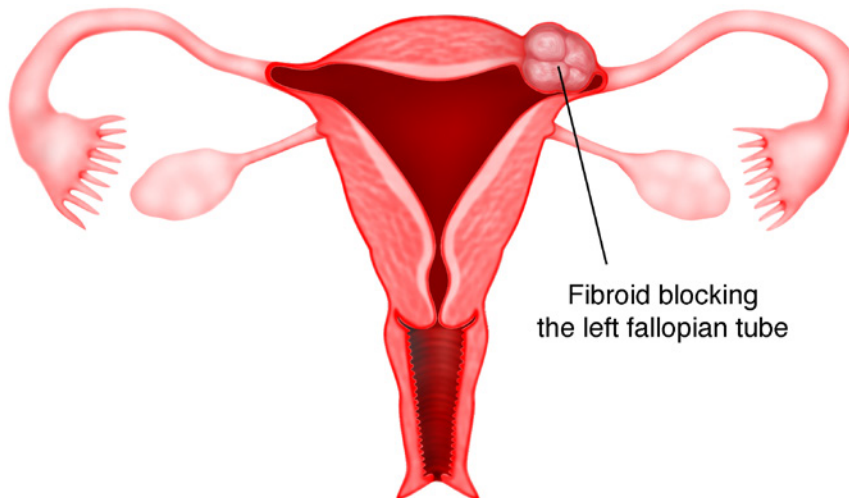
Figure 2.7 Fibroid blocking the left fallopian tube

Diagnosis

1) Family Medical History

Since fibroids tend to run in families, a patient's family medical history is significant in helping a gynaecologist determine the likelihood of fibroids.

2) Pelvic Examination

Fibroids of asymptomatic patients are usually discovered during their routine pelvic examinations, when their gynaecologists find round and lumpy masses in their lower abdomen. However, the presence of fibroids cannot be confirmed via pelvic examination alone as other diseases, such as adenomyosis or ovarian cysts (if lumps are felt on the sides of the lower abdomen) can be mistaken for fibroids or the other way round. Other assessment techniques such as reviewing a patient's family medical history, ultrasound scanning and magnetic resonance imaging (MRI) are required to corroborate the diagnosis.

3) Ultrasound scanning

Most fibroids are easily detectable with ultrasound. The scanning can be performed either abdominally or transvaginally (through the vagina). A transvaginal ultrasound can provide greater clarity of the size and location of each fibroid because the probe is closer to the uterus. The ultrasound results combined with the findings from the pelvic examination are usually sufficient to diagnose fibroids.
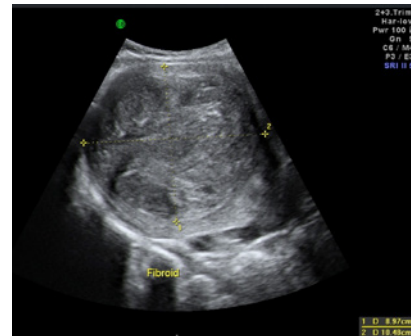
Figure 2.8 Ultrasound picture of a fibroid

4) Magnetic Resonance Imaging (MRI)

Sometimes MRI may be required for definite confirmation. MRI is so far, the most accurate diagnostic tool for fibroids. It provides far more detailed images of fibroids than the ultrasound, enabling a gynaecologist to determine the exact number of fibroids, their size and position as well as the degree of anatomical distortion of the uterus and its surrounding organs caused by these fibroids.

5) Hysteroscopy

Hysteroscopy is a technique that allows a gynaecologist to directly view a patient's uterine cavity by inserting a narrow tube-like telescopic camera (hysteroscope) into the uterus through the cervix. It is very useful for assessing submucous fibroids (Figure 41.5) and the overlying endometrium. This technique is usually necessary for patients who claim to have abnormal vaginal bleeding and/or recurrent miscarriage (see page 417).

Treatment Options

Surgery is considered the standard treatment for women suffering from fibroids. Two most common procedures to surgically remove fibroids are hysterectomy and myomectomy. Transcervical resection of the fibroid can be performed in small submucous fibroids. An alternative to surgery is uterine artery embolization (UAE).

1) Hysterectomy

Hysterectomy is the procedure of removing the entire uterus including the cervix. This can be performed either with the help of a laparoscope (see chapter 33) or by laparotomy. Hysterectomy is usually an option for women who have completed their family and are above 40 years of age. The advantage of hysterectomy over myomectomy is that it eliminates the possibility of fibroid recurrence and puts an end to all symptoms including heavy menstrual bleeding, which may persist even after a myomectomy is done.

2) Myomectomy

Myomectomy is the procedure of removing the fibroids without removing the uterus. It can be performed either laparoscopically (see chapter 24) or by laparotomy. The main advantage of myomectomy is that it allows a patient to conceive in future. One disadvantage of the procedure is that, it may cause considerable blood loss during surgery that blood transfusion may be necessary. Other disadvantages are the possible recurrence of fibroids and the possible persistence of heavy menstrual bleeding after surgery. In cases of recurrence, subsequent myomectomy will be more complicated as the previous one may have led to the formation of adhesions (scar tissue) (g).

Figure 2.9 Myomectomy specimen showing multiple uterine fibroids

3) Transcervical resection of fibroid

In submucous fibroids, hysteroscopic resection of the fibroids can be performed (see chapter 41). This is usually done when the submucous fibroids are small. An instrument called a resectoscope is used to cut the fibroid into small pieces until the base of the fibroid is reached. The small chips of the fibroids are then removed through the vagina.

Scan Me

Watch Video 2.1
Uterine fibroid -
https://vimeo.com/149599112
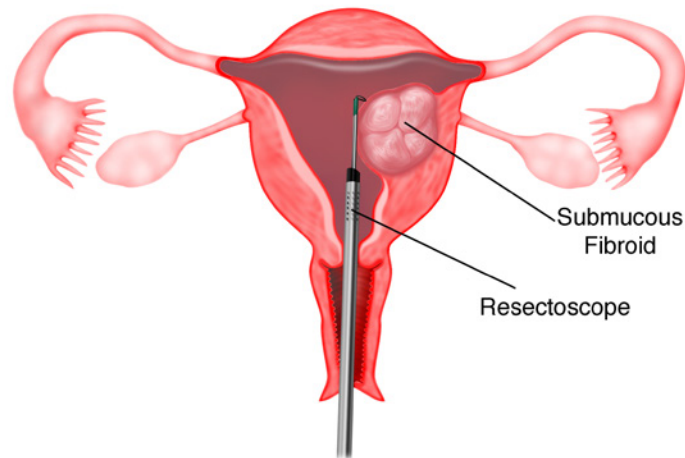
Figure 2.10 Transcervical resection of fibroid

4) Uterine Artery Embolization (UAE)

UAE is conducted under a moving X-ray (fluoroscopy) by an experienced interventional radiologist. It is a procedure where a tiny tube called catheter is inserted through an incision in the groin area into the femoral artery and then threaded to the uterine arteries. Some tiny sand-like gelatinous particles will be injected into the uterine arteries through the catheter in order to block the blood supply to the fibroids.
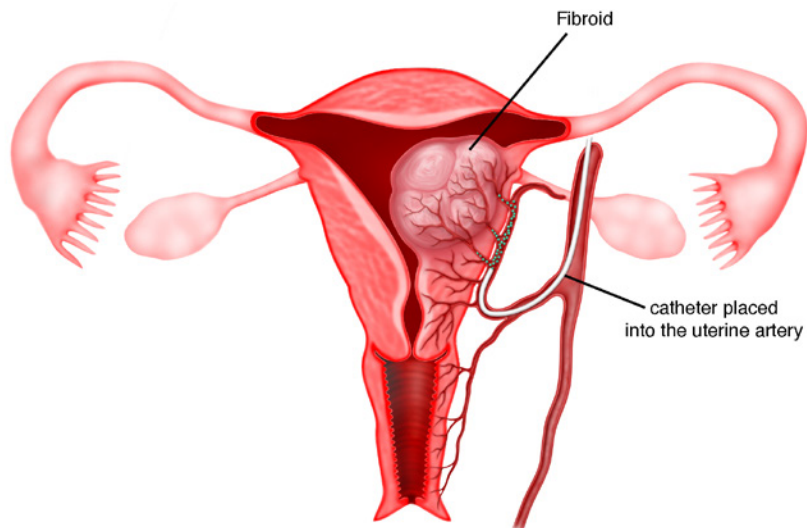
Figure 2.11 Transcervical resection of fibroid

The blockage or embolization will eventually result in the degeneration of the fibroids. The advantages of UAE are minimal blood loss, fertility is not affected and the recovery period is short. The disadvantages are that patient may experience post-embolization syndrome (PES) such as severe pelvic pain and cramping, as well as nausea and vomiting that lasts for several days following the procedure. Embolization may cause damage to the uterus and uterine infection may also occur. When the fibroids begin to degenerate, they can cause severe pain to the patient.

As fibroids normally will lyse by themselves (self-destruct) after menopause, surgery is usually not recommended for small (less than 5 cm) and asymptomatic fibroids. For these fibroids, no treatment except constant surveillance of their growth is required.

Summary

Fibroids are common benign tumours in women. They are usually asymptomatic and do not require treatment.
When they become symptomatic, surgery may be necessary

Chapter 3

Endometrosis

Chapter 3 : Endometriosis

Endometriosis is a disease in which the endometrial tissue, or the lining of the uterus, grows outside the uterus to its surrounding areas and even to distant parts of the body. This displaced endometrial tissue is influenced by female hormonal changes and responds to them in a similar way like the inner lining of the uterus, such as thickening, breaking down and even bleeding during menses. The ongoing process causes inflammation (g) in the surrounding areas and the formation of scar tissue, which usually distorts the anatomy of the surrounding organs and interferes with their functions.
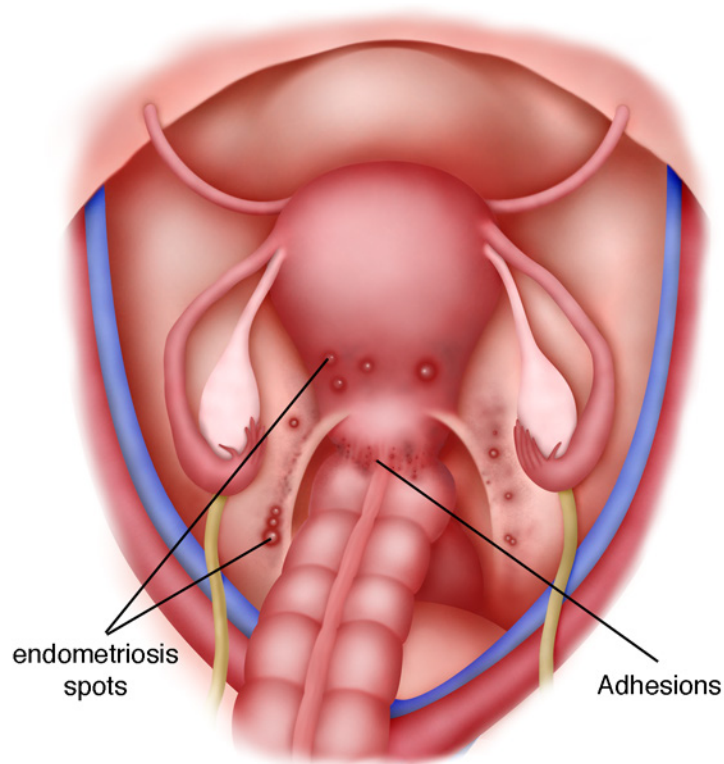
Figure 3.1 Endometriosis on the uterus and uterosacral ligaments
with adhe-sions of the sigmoid colon to the uterus

Endometriosis is highly prevalent and can be found anywhere in the body. The most common sites are the ovaries, the fallopian tubes, the pelvic sidewall, the uterosacral ligaments (g), the Pouch of Douglas (g) and the rectovaginal septum (g). Other less common sites are on the Caesarian section, laparoscopy or laparotomy scars, the bladder, bowel, intestines, colon, appendix, and rectum. In rare cases, endometriosis can invade the vagina, bladder, skin, lung, spine and even the brain.

Types of lesions

There are different types of lesions of endometriosis

1) Peritoneal endometriosis

Endometriotic lesions are seen on the peritoneal surface. It can be seen as many different lesions.

a) Black or bluish lesions

This is the most common type of lesion recognised at laparoscopy

Figure 3.2 Black and bluish lesions of endometriosis

b) White lesions

White opacification of the peritoneum that looks like peritoneal scarring or patches. Some lesions will look yellowish brown while others appear as circular peritoneal defects.
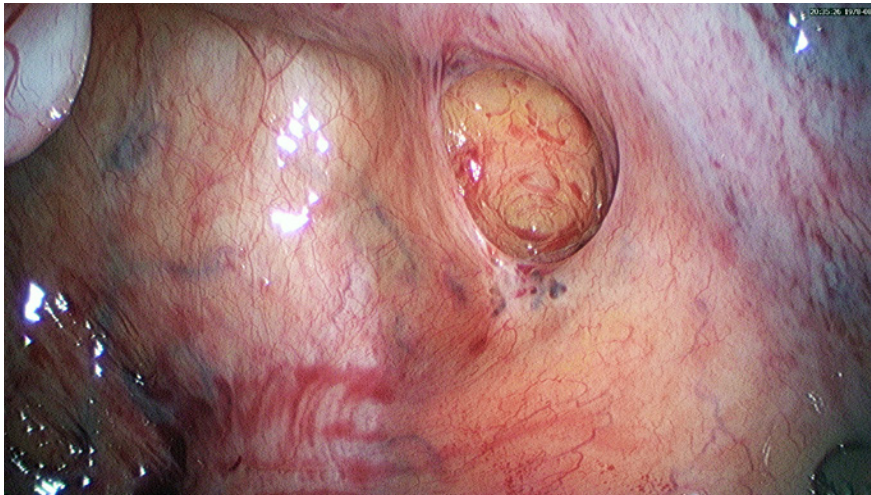
Figure 3.3
Peritoneal defect seen behind the left uterosacral ligament
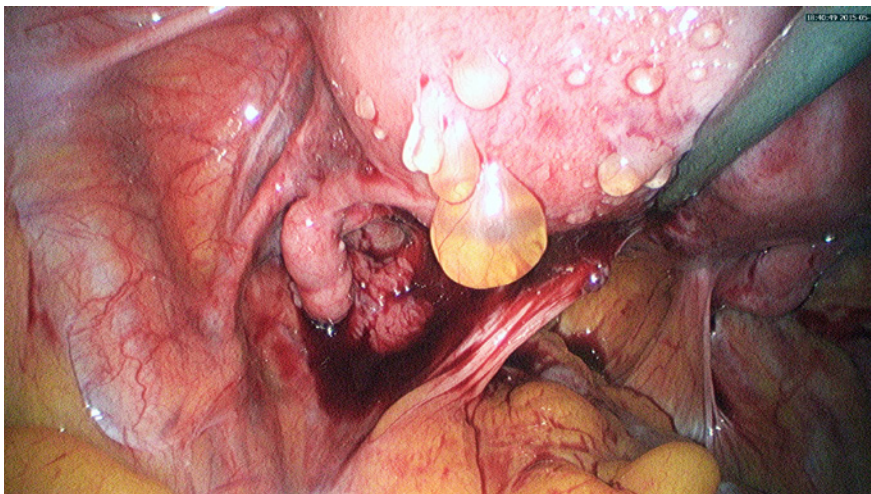
Figure 3.4 Yellowish endometriosis

c) Non-visible endometriosis

Some endometriotic lesions may not be seen in laparoscopy but only confirmed by biopsy

2. Ovarian Endometrioma

These are cysts seen in the ovaries. Their size may range from a few millimeters to several centimeters
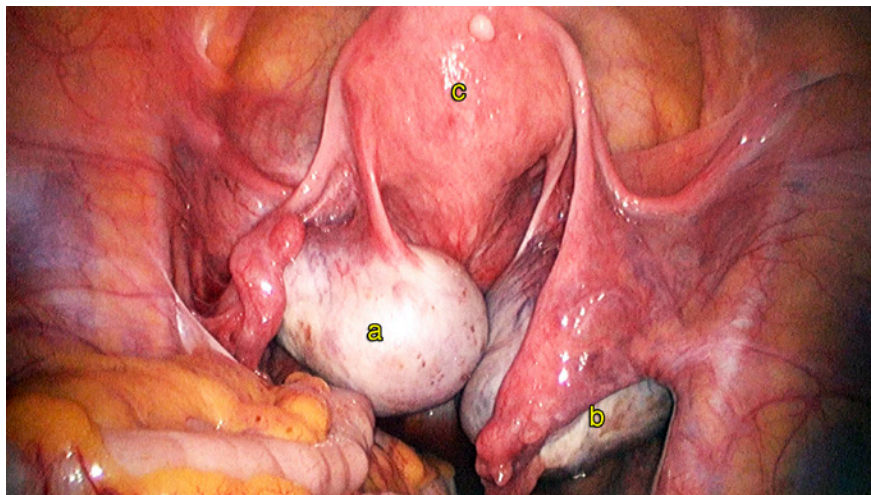
Figure 3.5 Bilateral endometrioma (a) left endometrioma, (b) right endometrioma (c) uterus

3. Rectovaginal Endometriosis

This type of endometriosis obliterates the Pouch of Douglas
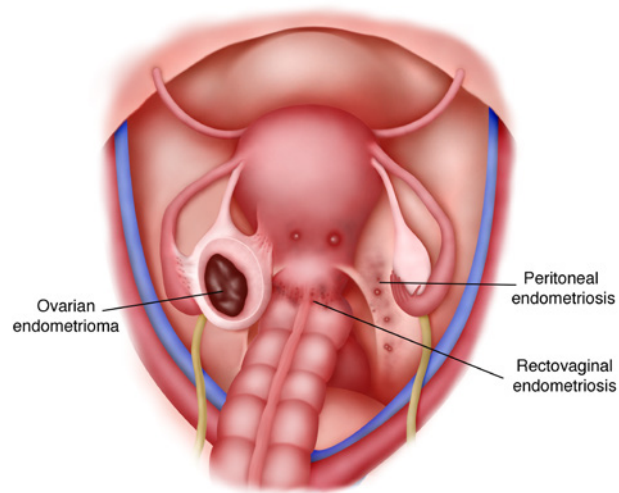
Figure 3.6 Endometrioma, rectovaginal endometriosis
and peritoneal endometriosis
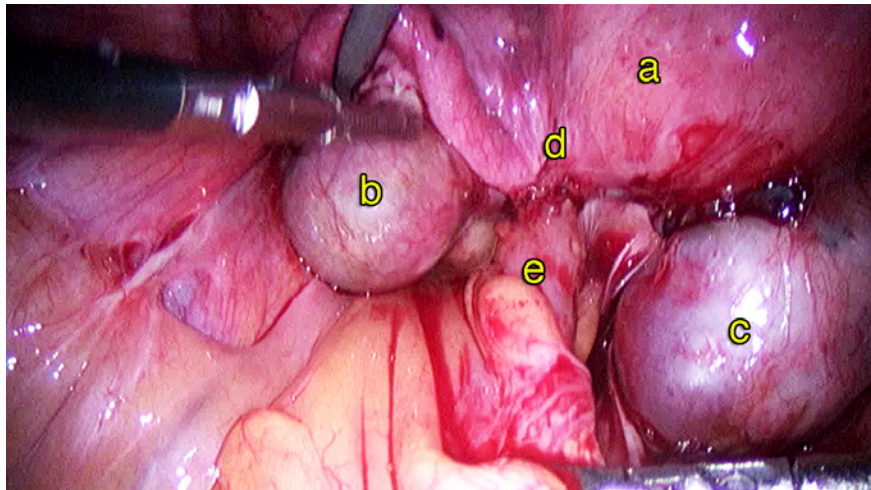
Figure 3.7 rectovaginal endometriosis
(a) uterus, (b) left endometrioma, (c) right endometrioma,
(d) rectovaginal endometriosis, (e) rectum

Cause

There is no accurate explanation as to what causes endometriosis. Many theories have been formed to explain the origin of the disease. One of the most popular and widely believed theories is Sampson's Theory of Retrograde Menstruation, postulated by Dr. John Sampson in the 1920's. According to the theory, during menstruation each month, a certain amount of menstrual fluid (consisting of blood, endometrial tissue, etc.) in the uterus is forced backwards through the fallopian tube into the abdominal cavity. The body usually responds to this kind of spilling by reabsorbing the menstrual fluid back into the circulatory system. However, in some women, possibly due to an immune system dysfunction, the fluid (particularly the endometrial tissue) is not reabsorbed but instead implants itself and grows on the pelvic and abdominal organs as endometriosis.

Signs and Symptoms

1) Pelvic pain

Most women with endometriosis experience severe pelvic pain, lower back pain and cramps before and during menstruation. This is called dysmenorrhea. The pain is typically described as aggravating as the menstruation progresses (e.g. the pain on day 4 of the menses is worse than that on day 1). Some women may also experience intense pain around the time of ovulation. There may be other signs that do not correlate with the menstrual cycle such as dyspareunia, (pain during intercourse), and dysuria (painful urination). For dysuria, blood may be occasionally seen in the urine.

2) Heavy or irregular vaginal bleeding

Women with endometriosis may experience excessive menstrual bleeding (menorrhagia) or bleeding between periods (menometrorrhagia).

3) Infertility

Some women with endometriosis may experience little or no pain at all but are unable to conceive and are usually first diagnosed with endometriosis while seeking treatment for infertility. These are usually cases where the formation of scar tissue (adhesions) due to endometriosis, has somehow distorted the reproductive organs and therefore results in inability to conceive.

4) Painful bowel movements

Some women may experience bowel pain followed by abdominal bloating, constipation, or diarrhoea. The pain may intensify during menstruation.

5) Rectal bleeding during menstruation.
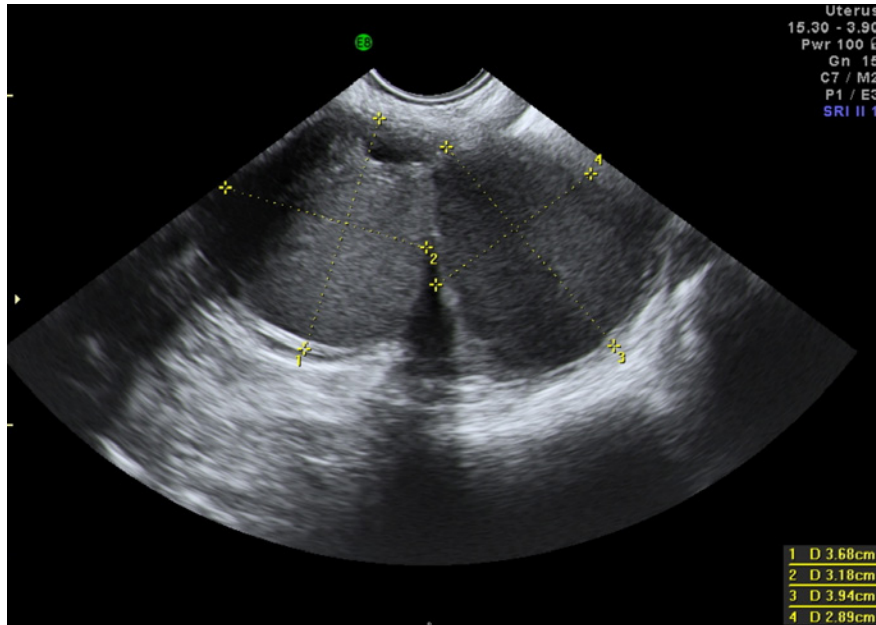
Figure 3.8 Ultrasound picture showing two bilateral endometriomas

Diagnosis

There are no specific tests to assess whether a woman has endometriosis. Exploring a patient's medical history may give the doctor some clue to the presence of this disease, and it is usually corroborated by a pelvic examination. The pelvic examination may reveal nodularity in the Pouch of Douglas; uterine enlargement or irregularity: pelvic masses or pelvic tenderness. In cases of ovarian endometrioma (chocolate cyst), the ultrasound can detect ovarian cysts that appear in the form of black bubbles. Sometimes, the doctor may order a CA-125 test for the patient as it has been suggested that women with endometriosis are likely to have an elevated level of CA-125 (a cancer antigen) in their blood (see chapter 14). In any case, it is possible for endometriosis to be mistaken for other gynecological conditions that have similar symptoms and vice versa. The only reliable way to confirm and verify the suspected diagnosis of endometriosis is through laparoscopy.

Treatment Options

Due to the fact that the exact cause of endometriosis remains unknown, there is currently no absolute cure for this disease. There are, however, several treatment options that aim to relieve the pain of endometriosis and reduce its growth.

They are:

a) Pain medication

b) Surgery

c) Hormone therapy

a) Pain medication

Some women may experience pain for a short duration. For these patients, painkillers may be sufficient to relieve their symptoms. The types of painkillers administered range from simple analgesics such as paracetamol and aspirin, as well as nonsteriodal anti-inflammatory drugs (NSAIDS) for example Ponstan® and Syn-Flex®; to narcotic analgesic (drugs that are similar to morphine).

b) Surgery

Surgery is the main treatment option for women with endometriosis. Laparoscopic surgery can be performed to diagnose as well as, treat endometriosis at the same time. The aim of surgery is to diagnose the endometriosis as well as remove as much of the diseased areas as possible.

It is important to do all the necessary investigations to determine the severity of the disease prior to the surgery. The patient should discuss with her gynaecologist the extent of surgery that needs to be performed. One must understand that the more extensive the surgery, the greater the risk of complications. Success of the surgery depends on the skill of the surgeon. An experienced laparoscopic surgeon will be able to excise all the endometriotic lesions in a single surgery. On rare occasions, a laparotomy may be necessary to excise extensive endometriosis.

Case 3.1 : Spontaneous pregnancy immediately after laparoscopic cystectomy for an endometrioma

SSP, a 29 year old lady who had been married for 1 year, came to see me in June 2014 for her inability to conceive. She was asymptomatic. Examination and ultrasound showed 2 right clear cysts measuring 4.22 x 6.66 cm and 3.09 x 3.76 cm and there were 2 left endometriomas measuring 2.05 x 1.89 cm and 1.75 x 2.25 cm. She underwent a laparoscopic cystectomy. Postoperatively, she was well. She was encouraged to conceive without any delay. She missed her menses in December and conceived spontaneously.

Scan Me

Watch Video 25.2
Laparoscopic cystectomy for endometrioma and ovarian cysts

http://vimeo.com/149998620

Discussion

Endometriosis and endometrioma cause infertility. Laparoscopic surgical removal of endometriosis and endometrioma, if performed well, can result in spontaneous pregnancy.

c) Hormone therapy

Endometriosis is known to be exacerbated by the hormone oestrogen. Oestrogen is produced by the growing oocytes in the ovaries. Whenever there is menstruation the endometriotic lesion will also bleed, causing pain and the formation of adhesions.

Therefore, one way to suppress endometriosis growth and relieve its symptoms, is to lower oestrogen levels by preventing menstruation.

Hormonal therapies are usually given after laparoscopic surgery.

Some of the therapies available are:

i) Gonadotropin-releasing hormone (GnRH) agonist
ii) Combined oral contraceptive pills
iii) Progestogens
iv) Danazol
v) Dimetriose
vi) Mirena® coil
vii) Aromatase inhibitors

i) Gonadotrophin - Releasing hormone (GnRH) agonist

Ovulation is controlled by 2 hormones that are produced by the pituitary gland.

The pituitary gland is located in the brain. Above the pituitary gland is the hypothalamus. The hypothalamus produces a hormone called the Gonadotrophin Releasing Hormone which stimulates the pituitary gland to produce FSH and LH. The FSH and LH stimulate the oocytes or eggs in the ovaries to grow and the developing oocytes will produce oestrogen. Gonadotrophin Releasing Hormone agonist will block the stimulation of the pituitary gland by the gonadotrophin releasing hormone. This will cause the pituitary gland to stop producing any FSH and LH thus preventing the growth of the oocytes in the ovaries. As no oocytes are growing, oestrogen production will cease. The patient will stop menstruating. She will be in a menopausal state called pseudomenopause. GnRH agonist are given in either monthly or 3 monthly injections.

Disadvantage of GnRH agonist

The side effects of GnRH agonist are:

a) Menopausal symptoms such as hot flushes, sweating, dry vagina, mood swings

b) Osteoporosis – Thinning of the bones called osteoporosis can occur especially if the injections are given for a duration exceeding 9 months.

c) These injections are also expensive.

Advantages of GnRH analogues

GnRH agonist is an effective treatment in all women. Menstruation will cease. Since it is a monthly or 3 monthly injection there is also no need to remember to take tablets everyday.

ii) Oral Contraceptive pills (OCP)

The oral contraceptive (OCP) pill contains low doses of oestrogen and progesterone. It works by preventing ovulation and so prevents the ovaries from producing oestrogen. Each pack of oral contraceptive pills contain 21 tablets of active pills. Oral contraceptive pills are usually taken for 3 weeks with a 1 week break to induce menstruation. However 3 packs can be taken continuously for 9 weeks followed by a 1-week break. In this way the number of menstruation cycles in a year can be reduced from 12 to 4.

Oral contraceptive pills may be prescribed immediately after a laparoscopic surgery or after GnRH agonist treatment. Since oral contraceptive pills are cheap and with minimal side effects, they can be taken for many years until the patient is ready to conceive.

The advantages of OCP's

The advantages of OCP's are that they are cheap with less side effects and can be taken for a long duration of time.

The disadvantages of OCP's

A tablet has to be taken everyday and it may cause irregular breakthrough bleeding while being taken everyday.

Case 3.2 : Successful spontaneous pregnancy after taking Oral Contraceptive Pills to decrease the recurrence rate of endometrioma

GRR saw me in July 2009 for a problem of dysmenorrhea. She was 36 years old and was still single. Examination and ultrasound showed a fibroid measuring 4.48 x 5.91cm on the fundus of the uterus and a left ovarian cyst resembling endometrioma measuring 5.72 x 4.29 cm. She underwent a laparoscopic cystectomy and myomectomy in October 2009. Postoperatively, she received 3, monthly doses of GnRH agonist injections. She was on regular follow up after that and in December 2010, a small uterine fibroid measuring 1.85 x 1.84 cm was noted. She was advised to take oral contraceptive pills (OCPs) continuously for 3 months with a 1-week break. She took the OCPs continuously (3 months continuously with a 1 week break in between) until she got married in March 2014. The fibroid remained small and there was no recurrence of endometrioma. She spontaneously conceived in November 2014 at the age of 41 yrs.

Discussion

Patients who have endometriosis and are not keen to conceive should receive treatment to prevent the recurrence of the disease. The cheapest and most convenient mode of treatment is Oral Contraceptive Pills taken continuously. This will decrease the number of menses in a year. As endometriosis is dependent on menstrual bleeding, less bleeding during menstruation will reduce the chances of recurrence of the disease.

iii) Progestogens

Progestogens are synthetic progesterone. They are given to prevent ovulation. Progestogens are usually given continuously. There are many types of progestogens available in the market.

An injectable progestogen available in the market is Depoprovera® (medroxy-progesterone acetate). This is a 3 monthly injection that prevents ovulation. The advantage of Depoprovera® is that it is a 3 monthly injection and the patient need not remember taking tablets. The disadvantage is that it causes intermittent bleeding. It may not be suitable for women intending to conceive in the future because it takes a long time for a women to start ovulating after cessation of the injection. It can also lead to osteoporosis.

The newest oral progestagen in the market is dienogest called Visanne®. One of the side effects of oral progestogen such as dienogest is that it can cause irregular per vaginal bleeding. It is usually recommended for 6 to 9 months. Due to the absence of oestrogen, continuous progesterone therapy may lead to osteroporosis.

iv) Danazol and Gestrinone

Danazol and Gestrinone suppress endometriosis by making oestrogen levels lower and androgens (testosterone) (g) levels higher. They were commonly used in the 1980's but are rarely used now. Danazol is usually given in high doses of 600 to 800mg a day for 6 to 12 months. Gestrinone is given at doses of 2.5 to 5mg twice a week for the same duration.

> *The side effects of danazol are:*
>
> Due to high androgen levels the side effects are namely weight gain, bigger muscles, oily skin, increased body hair and cramps.
>
> Due to low oestrogen levels the side effects are namely low libido, hot flushes and smaller breasts.

v) Mirena®

Mirena® is an intrauterine contraceptive device (IUCD) that contains a progesterone called levonogestrel. The uterus will absorb the progesterone causing a decrease in menstrual blood flow. When there is less menstrual blood flow, bleeding from the endometriosis will also decrease thus, suppressing the growth of the endometriosis. The Mirena can be left in the uterus for 5 years. The advantage of Mirena® is that the patient need not take daily medication. The amount of progesterone required to suppress menstruation is also very low because it is directly absorbed into the uterus. As only a small amount of progesterone reaches the rest of the body, the side effects of progesterone is minimal. The disadvantage of Mirena is that it may cause annoying irregular and prolonged spotting in some women. It is also not suitable for women who have not had sexual intercourse.
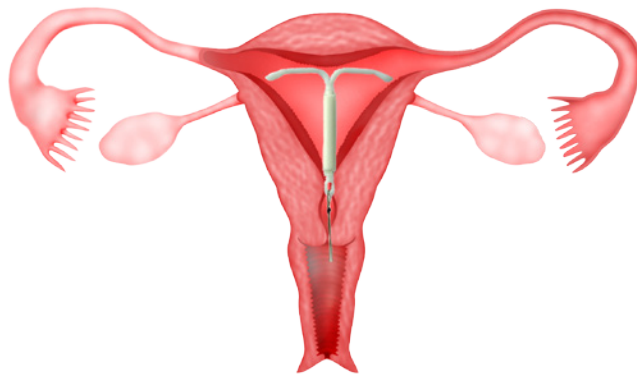
Figure 3.9 Mirena® Intrauterine contraceptive Device

vi) Aromatase inhibitors

Aromatase is the hormone that converts testosterone to oestrogen. Aromatase inhibitors such as anastrozole and letrozole are drugs which inhibit the hormone aromatase. This will lead to a decrease in oestrogen production especially in the endometriotic lesions. The side effect of this medication is that it may lead to osteoporosis or bone thinning, tiredness and menopausal symptoms.

The choice of treatment for endometriosis depends on the patient's age and individual needs, such as the desire to conceive and the severity of the symptoms. Some doctors prescribe hormonal treatment just based on the suspicion of endometriosis by history, examination and ultrasound. This is not recommended because most of the treatments have side effects and it is better to perform a laparoscopic surgery to confirm the disease before commencing medical treatment.

Can endometriosis recur after surgery?

Endometriosis can recur after surgery and medical treatment. The chances of recurrence are higher if an inexperienced surgeon performs the surgery and if most of the endometriotic lesions are not excised. If the patient is not contemplating pregnancy immediately after the surgery, continuing medical therapy is essential to suppress any endometriotic lesion that has not been excised. The cheapest treatment is Oral Contraceptive Pills.

Fact 3.1

Use of oral contraceptive pills in young unmarried women

Many young unmarried girls/women and their parents are worried when oral contraceptive pills (OCPs) are prescribed for endometriosis. Many have this fear that taking OCPs will lead to the inability to conceive in the future. This concept is wrong. The aim of prescribing OCPs in women who have undergone laparoscopic surgery for endometriosis, is to reduce the chances of a recurrence of the endometriosis. Endometriosis leads to infertility and by preventing its recurrence; OCPs actually increase the chances of pregnancy in the future

Summary

Endometriosis is a common gynaecological problem

It usually presents with pelvic pain especially during menses and during sexual intercourse. It also causes infertility

It can be suspected by taking a good medical history, performing a pelvic examination and a pelvic ultrasound scan.

Laparoscopy is the gold standard for the diagnosis and treatment of endometriosis.

Laparoscopic surgery for endometriosis can be difficult because endometriosis frequently involves vital structures such as the bowel, bladder and ureter. It is important for laparoscopic surgery to be performed by an experienced laparoscopic surgeon.

There are many medical treatments that can be prescribed after laparoscopic surgery to prevent the recurrence of the disease.

Scan Me

Watch Video 3.1

Endometriosis

https://vimeo.com/149606168

Chapter 4

Adenomyosis

Chapter 4 : Adenomyosis

What is adenomyosis?

Adenomyosis is a condition whereby the inner lining of the uterus called the endometrium is found in the muscular layer or myometrium of the uterus.

How does adenomyosis occur?

When the endometrium penetrates the myometrium, endometrial tissue gets deposited in the myometrium. It causes the myometrium to enlarge and adenomyosis occurs. The endometrial tissue in the myometrium can grow and bleed. Adenomyosis may focally only involve one part of the uterus. When this occurs, the nodule formed is called adenomyoma

Adenomyosis usually involves the back or posterior part of the uterus. Sometimes the whole uterus can be enlarged with adenomyosis.
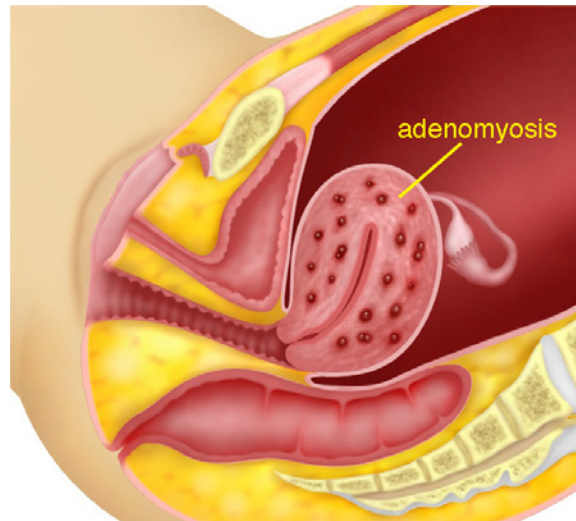
Figure 4.1 Side view showing adenomyosis involving the whole uterus
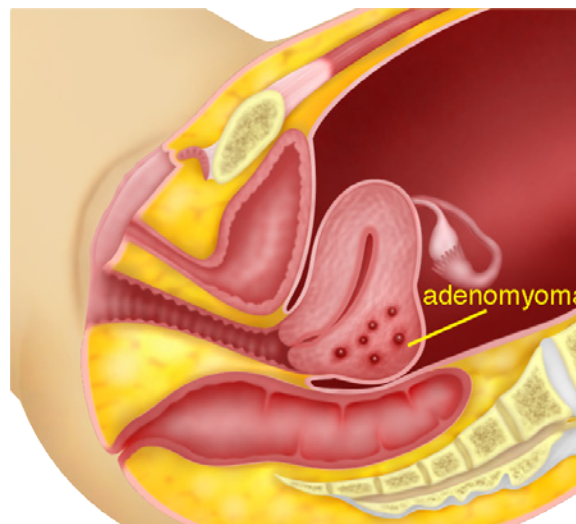
Figure 4.2 Side view showing adenomyoma involving the posterior wall

Why does adenomyosis occur?

The cause of adenomyosis is unknown. It has been associated with anything that causes uterine trauma, such as caesarean section, pregnancy termination and even pregnancy itself. These may cause the barrier between the endometrium and the myometrium to be broken.

Symptoms

Some women may not experience any symptoms at all while others may have severe, debilitating symptoms. Symptoms include increasing pain during menstruation and ovulation, pain during sexual intercourse, heavy and prolonged menses, passing out blood clots during menses, and bleeding in between menses.

Diagnosis

Adenomyosis can be diagnosed during pelvic examination, ultrasound or MRI (Magnetic Resonance Imaging).

Adenomyosis is often confused with fibroids. Both adenomyosis and fibroids cause enlargement of the uterus. However, fibroids usually do not cause pain during menstruation. In adenomyosis, a pelvic examination may reveal an enlarged uterus and tenderness of the uterus, as well as, the Pouch of Douglas (g). The uterus is usually uniformly enlarged in adenomyosis, whereas in fibroids the uterus may feel lobulated (g). Abdominal and transvaginal ultrasound may show an enlarged uterus. When performing ultrasound, it is important to try to distinguish fibroids from adenomyosis. Ultrasonography will show that the texture of a fibroid is different from the myometrium. It is usually easy to see the demarcation line between the myometrium and the fibroid. In adenomyosis there will not be any definite demarcation line between adenomyosis and myometrium. Magnetic Resonance Imaging (MRI) can assist in confirming the diagnosis of adenomyosis. Often, adenomyosis coexists with fibroids and endometriosis. However, the diagnosis can only be confirmed after a hysterectomy has been performed and a pathologist examines the uterus.
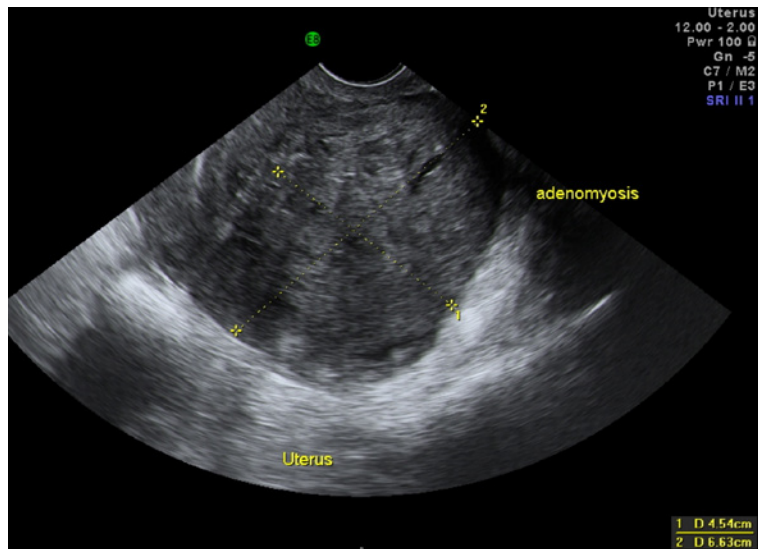
Figure 4.3 Ultrasound picture showing adenomyosis involving the posterior part of the uterus. Note: the edges are not well defined
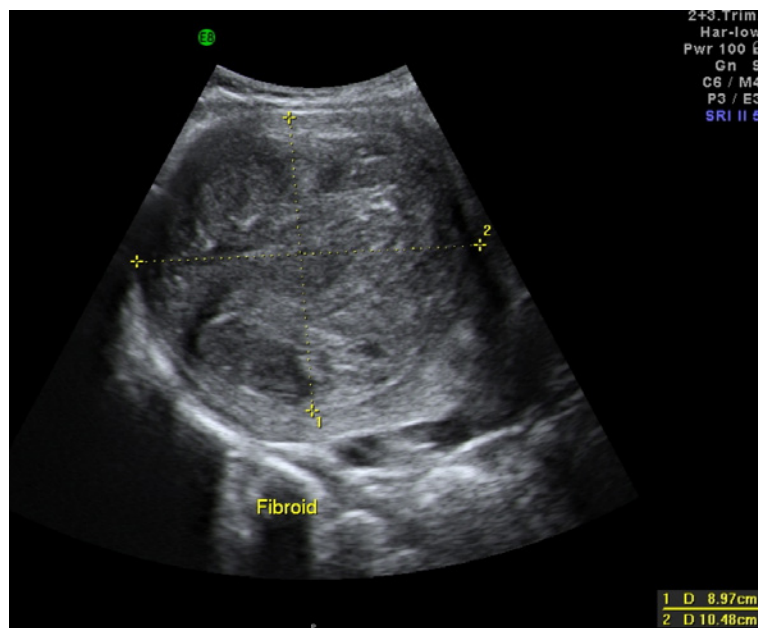
Figure 4.4 Ultrasound showing a uterine fibroid with its edges well defined

Treatment

Treatment will depend on the symptoms of the patient and whether pregnancy is desired. Women with adenomyosis have a lower chance of conceiving because the uterus is "hostile" for implantation of the embryo. They may need to undergo Assisted Reproductive Techniques such as IVF (invitrofertilization).

In women who want to retain their uterus there are several options. Pelvic pain can be relieved with painkillers or analgesics called non steroidal anti-inflammatory drugs (NSAIDS). There are many NSAIDS in the market such as: Mefenemic acid (PONSTAN®), Naproxyn (SYNFLEX®), Celecoxib (CELEBREX®) and Etoricoxib (ARCOXIA®). The pain of adenomyosis is caused by menstruation. When menstruation occurs, there is bleeding in the adenomyosis. Therefore one of the strategies to reduce pain and heavy menses is to reduce menstrual bleeding.

Case 4.1 : Successful IVF in a patient with adenomyosis

WCD, a 31-year-old lady, married for 6 years, came to see me in 2013. She had not conceived prior to this. She had undergone a laparoscopic cystectomy for bilateral endometrioma (by another gynaecologist) and was given Gonadotrophin Realising Hormone (GnRH) (g) agonist for 6 months after the surgery. She had also undergone a failed intrauterine insemination (IUI) (g) cycle earlier. Examination and ultrasound showed an enlarged retroverted uterus (g). The back (posterior) part of the uterus was thickened with an adenomyoma measuring 2.61 x 3.57 cm (Figure 4.3). The ovaries appeared small. She was counseled about her low chances of pregnancy because of the adenomyosis and she decided to undergo a cycle of Invitrofertilization (IVF). This was performed in 2014 and it was a successful cycle. She delivered a baby boy by Caesarean section in May 2015, in another country.

Discussion

Adenomyosis is perhaps the most difficult condition to have for a woman who is trying to conceive. However, pregnancy can still occur as shown by this example. It is important to attempt to conceive at an earlier age because in older women besides the adenomyosis, age will be another factor that will reduce the chances of pregnancy.

Menstrual bleeding can be reduced with synthetic progesterone called progestogens;, oral contraceptive pills taken continuously or cyclically; Depoprovera injections or Mirena®.

Oral contraceptive pills are usually taken for 3 weeks with a 1-week break to induce menstruation. However, 3 packs can be taken continuously for 9 weeks and then a break is taken for 1 week. In this way the number of incidences of menstruation in a year can be reduced from 12 to 4 and so the number of episodes of pain can be reduced as well. Decreasing menstrual bleeding is also believed to reduce the speed of growth of the adenomyosis.

Depoprovera is an injection that is given as a contraception. It contains a synthetic progesterone, medroxy-progesterone acetate. This injection is given once every 3 months and just like taking oral contraceptive pills continuously for 3 months, it aims at reducing menstrual bleeding. The problem with this injection is that it may cause irregular menses.

Another option is to use the progesterone releasing intrauterine contraceptive device called Mirena®. The progestogen in the Mirena®, levonogestrel, is absorbed by the uterus and this leads to a decrease in menstrual bleeding thus causing less pain and reducing the rapid growth of the adenomyosis. (see Figure 3.9)

Adenomyoma may be excised either laparoscopically or by laparotomy and this is called adenomyomectomy. This may give some relief of symptoms. However, it is impossible to excise all the adenomyoma because it's margins are not well defined.

In patients with severe symptoms and have completed their family, or have failed in all other treatments, hysterectomy will alleviate all symptoms.

Prognosis

Adenomyosis is oestrogen dependent and menopause will be a natural cure. It does not increase the chances of cancer development. However, as the endometrial lining has invaded the myometrium, this endometrial tissue may progress to endometrial cancer on rare occasions.

Case 4.2 : Severe dysmenorrhea caused by endometriosis and adenomyosis treated with Depoprovera® injection

Miss SGC, an unmarried lady, saw me in 2001 at the age of 35 years. She had undergone a laparotomy for endometrioma in 1991. She complained of dysmenorrhea and heavy menses. Examination and transabdominal ultrasound showed multiple uterine fibroids. The largest fibroid measured 3.7 x 4.3 cm. She was on regular follow-up and the fibroids continued to grow. In 2004 the largest fibroid measured 6.71 x 5.29 cm. She also had a small ovarian cyst. She was suffering from severe dysmenorrhea and took analgesics during her menses. She underwent a laparotomy. Multiple fibroids were removed and adhesiolysis and cystectomy was also performed. Postoperatively, she received 3 doses of monthly Gonadotrophinc Releasing Hormone (GnRH) agonist (g) injections. She suffered from headaches while on this medication and so the medication was changed to dimetriose for 2 months. After that, she stopped all medication. She came for consultation again in May 2006, complaining of severe pain during her menses (dysmenorrhea) over the previous few months. Examination and ultrasound showed an endometrioma measuring 3.09 x 5.47 cm. Her uterus was also bulky resembling adenomyosis. She was given the options of either a hysterectomy or Depoprovera® injection. The advantages and disadvantages of both were discussed. She opted for the injection. She has been receiving the injection, 3 monthly, since then. Her periods were irregular at first but for the last 6 years she has not been menstruating. She does not suffer from any pain. Her uterus is now of normal size and the ovarian cyst has disappeared. She is now 49 years of age. I am planning to stop the injection next year (2016) when she is 50 years of age.

Discussion

Dysmenorrhoea caused by adenomyosis can be very troublesome for patients. Hysterectomy is the definitive treatment. However, in women who are not keen to undergo hyseterectomy, medical therapy is an option. This patient has been well on Depoprovea® injection for 9 years. She has avoided a hysterectomy

Summary

Adenomyosis is one of the most difficult conditions to treat. It is also a difficult disease to diagnosis. Women with adenomyosis will have difficulty in conceiving and menstrual pain will be difficult to control. In patients who have completed their family, hysterectomy will alleviate all symptoms.

Scan Me

Watch Video 4.1

Adenomyosis

https://vimeo.com/149611964

Chapter 5

Benign Ovarian Cysts

Chapter 5 : Benign Ovarian Cysts

An Ovarian Cyst is a sac or pouch that develops in the ovary. The cyst may contain liquid, or solid material or a combination of both. The fluid within the cyst can range from thin and watery to thick and paste-like. The wall that covers the cyst can be thin or thick.

Ovarian cysts are very common, particularly in women between the ages of 30 and 60. They may be single or multiple and can occur in one or both ovaries. Most are benign (non-cancerous), but a small percentage can be malignant (cancerous).

The Ovary

The ovary consists of several parts. The covering is call the epithelium, the central part is call the stroma and there are cells in the centre called the germ cells, which produce the eggs. Cysts can form from any part of the ovary.
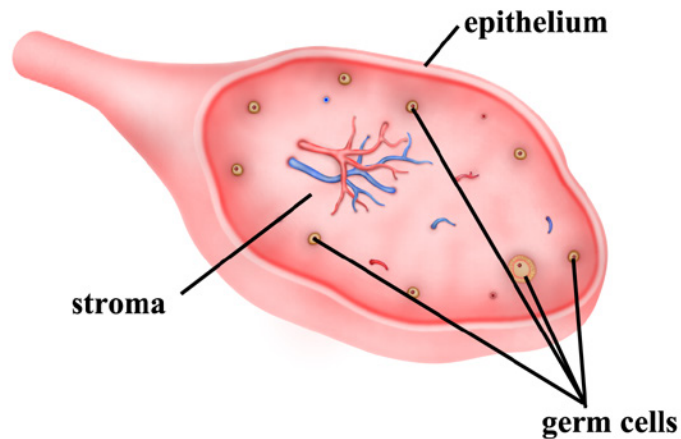
Figure 5.1 Parts of an ovary

Types of cysts

There are several different kinds of ovarian cysts, which are categorised as either:

> **1) Functional cysts (the most common type):**
> harmless cysts that form as part of the menstrual cycle, or
>
> **2) Pathological cysts:**
> tumours in the ovaries that are either benign (harmless) or malignant (cancerous).

Functional cysts

There are two types of functional ovarian cysts:
the Follicular cyst and the Luteal cyst.

a) Follicular cysts

Follicular cysts are the most commonly seen ovarian cysts. During the early part of the menstrual cycle, a follicle develops in the ovary. The follicle contains fluid to protect the egg as it grows. During ovulation the follicle bursts and releases an egg. After that, it becomes a corpus luteum and shrinks. Sometimes, a follicle does not release an egg and does not shed its fluid. If this happens, the follicle can get bigger as it swells with fluid. This becomes a follicular ovarian cyst. Usually, only one cyst appears at a time. Sometimes, however, more than 1 follicular cyst may be present if medication to induce ovulation (fertility drugs) are taken. It normally goes away without treatment after a few weeks.
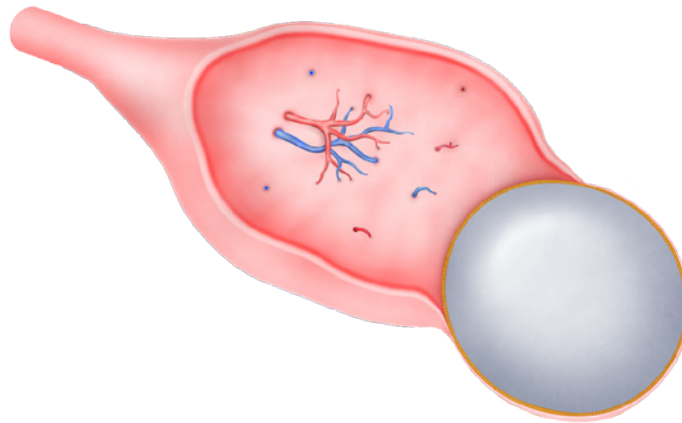
Figure 5.2 Follicular cyst

b) Luteal cysts

Luteal cysts are less common. They develop when the tissue that is left behind after an egg has been released (the corpus luteum), fills with blood. Luteal cysts usually disappear on their own within a few months, but can sometimes rupture, causing internal bleeding and sudden pain.
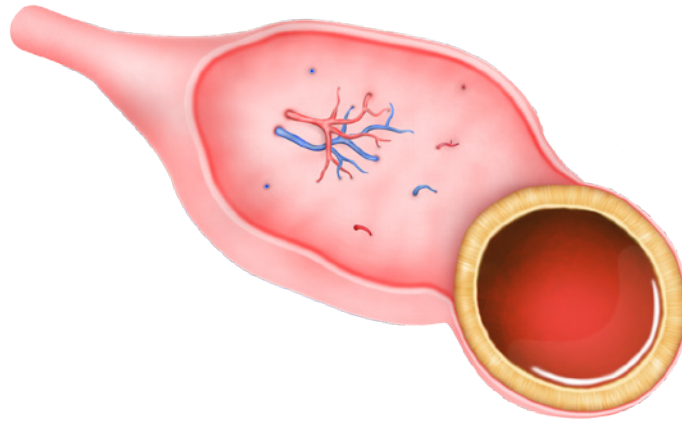
Figure 5.3 Luteal cyst

Pathological cysts

Cysts can develop from different parts of the ovary. The most common cysts that develop from the germ cells that form the eggs are the dermoid cysts. The most common cysts that develop from the epithelium (covering of the ovary) are called cystadenoma. Cysts can develop from the stromal layer as well but they are rare. In women under the age of 30, dermoid cysts are the most common type of pathological cysts. Past the age of 40, tumours called cystadenomas are the most common type of pathological cysts.

a) Dermoid cysts
(sometimes called benign mature cystic teratomas)

Dermoid cysts tend to occur in younger women. These cysts are present at birth but are not noticed until adulthood They can grow to be quite large - up to 15 cm across. Dermoid cysts often contain odd contents such as hair, parts of teeth or bone, fatty tissue, etc. This is because these cysts develop from the ovary's germ cells, which make eggs in the ovary. These cells have the potential to develop into any type of cell and so can make different types of tissue. In about 1 in every 10 cases, a dermoid cyst develops in both ovaries. Dermoid cysts can be hereditary. They could occasionally become malignant (cancerous) and may need to be surgically removed. Dermoid cysts can be removed by laparoscopy (see Chapter 27).
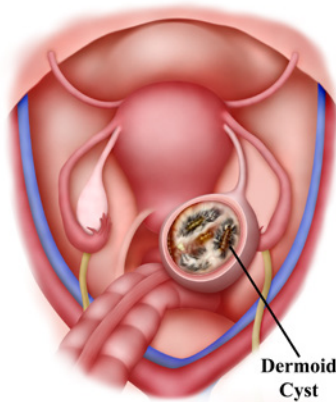
Figure 5.4 (a) Dermoid cyst

Figure 5.4 (b) Dermoid cyst showing hair and sebaceous material

b) Cystadenomas

Cystadenomas develop from cells that cover the outer part of the ovary (epithelium). Cystadenomas are often attached to an ovary by a stalk rather than growing inside the ovary itself. This means that they can grow to a large size. They are not normally cancerous, but need to be surgically removed.

There are two (2) types of cystadenomas - serous and mucinous. A serous cystadenoma is filled with a thin watery fluid. A mucinous cystadenoma is filled with a sticky, thick gelatinous material.

Figure 5.5 (a) Bilateral cystadenoma
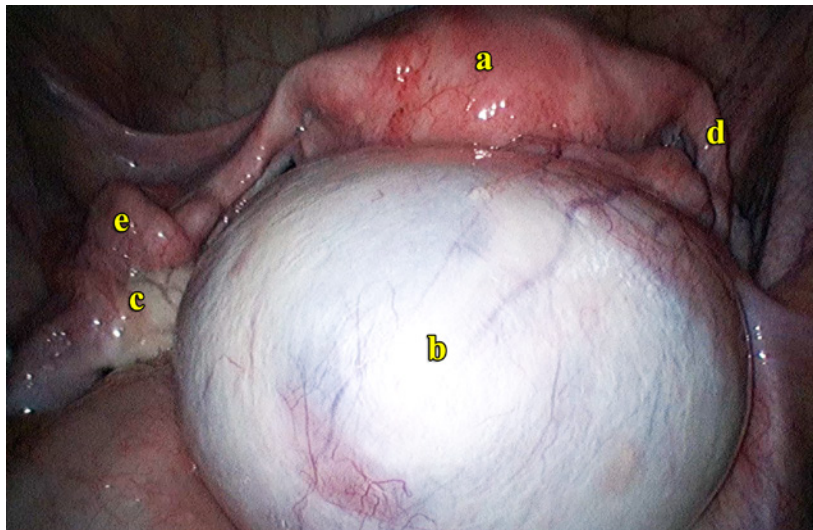
Figure 5.5 (b) right cystadenoma (a) uterus, (b) right cystadenoma,
(c) left normal ovary, (d) right fallopian tube, (e) left fallopian tube

Conditions causing Cysts

1) Endometriosis

Patients with endometriosis may develop ovarian cysts called endometrioma or "chocolate cyst". (see Chapters 3 and 25)

2) Polycystic Ovarian Syndrome

In this condition, many small, harmless cysts develop in the ovaries. The cysts develop because of an imbalance of hormones produced by the ovaries (see Chapter 23).
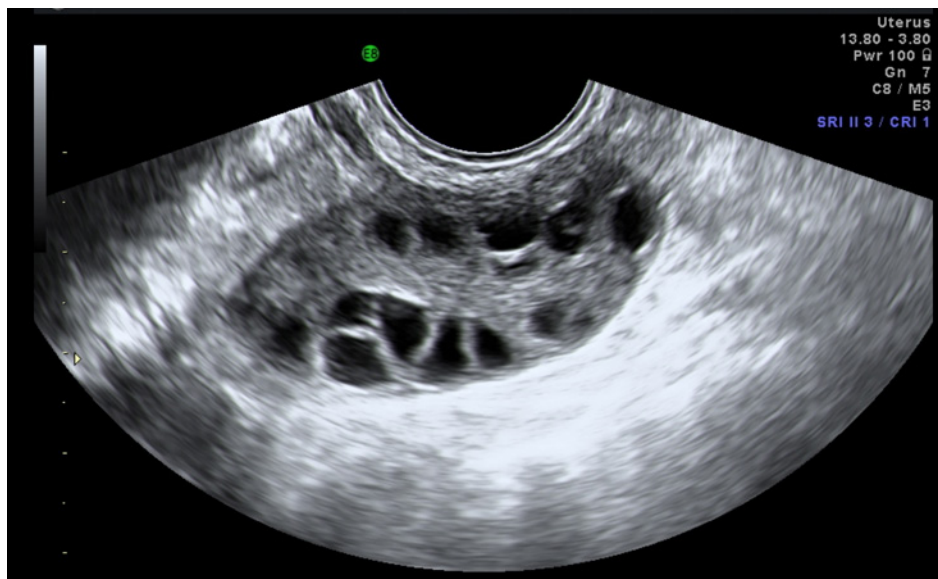
Figure 5.6 Ultrasound picture showing Polycystic Ovarian Disease

Symptoms

Most ovarian cysts are small, benign (harmless) and do not cause any symptoms. Large cysts may cause problems and the symptoms may be as follows:

1) **Pain and discomfort in the abdomen**
   This may come and go, but it may last for long periods of time. Some women notice it more after sex.

2) **Bloating or swelling in the abdomen.**

3) **Changes to Periods**
   They may become irregular, painful, heavier or lighter than normal.

4) **Needing to visit the toilet more often**
   Depending on where the cyst is and its size, it may put pressure on the bladder or bowels. It may also cause pain during bowel movement.

5) **Changes in the way breasts and body hair grow**
   In rare cases, ovarian cysts can cause abnormal amounts of hormones to be produced. These can speed up or change the way breasts and body hair grow.

Some medical conditions may cause additional symptoms:

1) **Endometriosis may cause pelvic pain and lower back pain.**

2) **Polycystic Ovarian syndrome**
   (multiple cysts in the ovaries) may cause weight gain and acne.

Symptoms of complicated cysts

Sometimes, ovarian cysts can cause more serious problems. These are outlined below.

1) Torsion

If a cyst is growing on a stem from an ovary, the stem can become twisted. This is called torsion. Torsion stops blood supply to the cyst and causes a lot of pain in the lower abdomen.

Figure 5.7 (a) Torsion of the left ovarian cyst
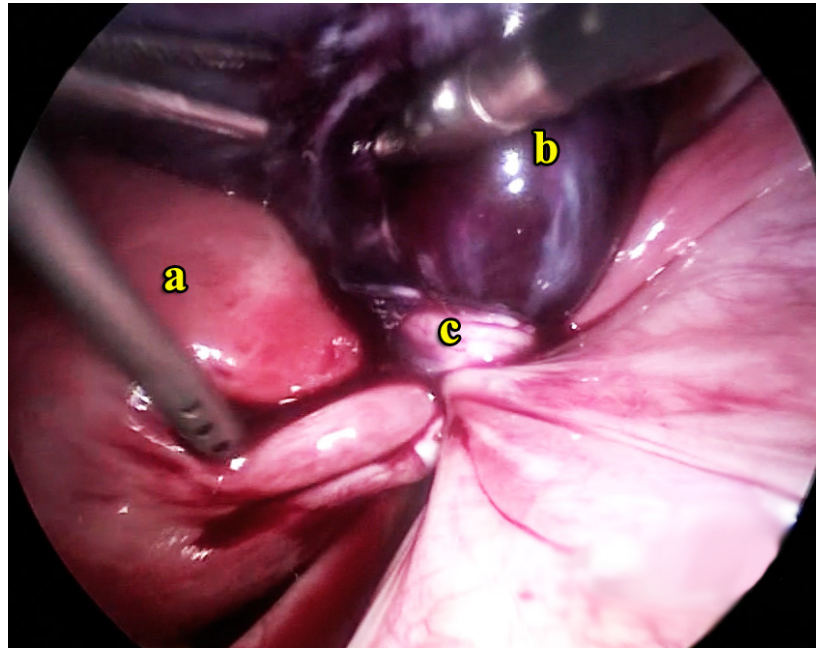
Figure 5.7 (b) Torsion of the right ovarian cyst. (a) uterus,
(b) gangrenous right ovary, (c) twisted pedicle

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Twisted ovarian cyst laparoscopic
right salpingoophrectomy

https://vimeo.com/149700129

Case 5.1 : Twisted gangrenous ovarian cyst

ZH came to see me in November 2013 with a problem of lower abdominal pain. She had missed her periods for 3 months. Examination and ultrasound showed an intrauterine gestational sac with a fetus measuring 10 gestational weeks but with no foetal heart activity, indicating miscarriage. She also had 2 large right ovarian cysts with solid and cystic components in them. The cysts measured 5.55 x 6.98 and 4.28 x 3.81 cm. The patient felt pain on palpation of the cysts. Her tumour markers showed a raised serum CA 125 (97.6 mIU) , normal serum alpha feto protein (3.42mIU) and raised serum beta HCG (121550 miu/ml).

She underwent a suction curettage to remove the miscarriage. This was followed by a laparoscopy which showed a twisted ovarian cyst which was gangrenous. Laparoscopic right salpingectomy was performed. Postoperatively she has been well.

Discussion

Pelvic pain in a patient with an ovarian cyst is a surgical emergency. This is because if the twisted ovarian cyst is still not gangrenous, it can be untwisted. If the blood flow to the ovary is restored, the ovary can be saved by just removing the cyst (cystectomy). However, as in this case, if the cyst is gangrenous, the ovary has to be removed.

2) Bursting

The cyst may burst, causing sudden severe pain in the lower abdomen. The pain felt depends on what the cyst contains, whether it is infected and whether there is any bleeding.

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Watch Video 5.3

Bleeding ovarian cyst

https://vimeo.com/159002671

3) Cancer

Occasionally, an ovarian cyst is an early form of ovarian cancer. However, ovarian cysts are very common and about 95% are non-cancerous.
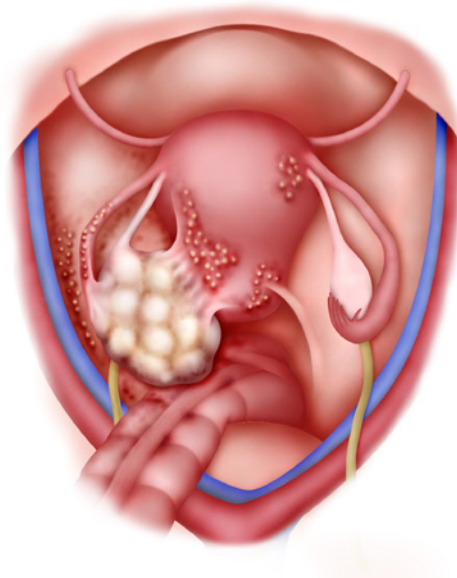
Figure 5.8 Ovarian cancer

Diagnosis of ovarian cyst

As most ovarian cysts cause no symptoms, many cysts are diagnosed by chance. It may be diagnosed during a routine examination or when an ultrasound is done for other reasons. If a patient has symptoms suggestive of an ovarian cyst, an abdominal and vaginal examination may be done. The doctor may feel an abnormal swelling which may be a cyst. Tests that may be done are as follows:

1) Ultrasound

An ultrasound scan can confirm an ovarian cyst. An ultrasound scan is safe and painless. It uses sound waves to create images of organs and structures inside the body. The probe of the scanner may be placed on the abdomen to scan the ovaries. A small probe is also often placed inside the vagina of the patient to scan the ovaries to obtain more detailed images. With an ultrasound, the doctor can see the cyst's shape, size, location and its contents (fluid-filled, solid, or mixed).
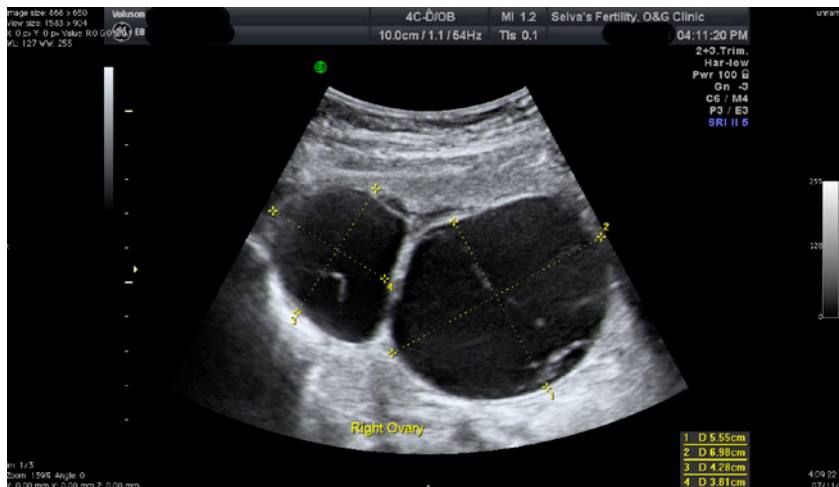
Figure 5.9 Ultrasound picture showing 2 cysts in the right ovary

2) A pregnancy test

This test may be done to rule out pregnancy.

3) Hormone level tests

Hormone levels may be checked to see if there are hormone-related problems.

4) A blood test

This test is done to find out if the cyst is cancerous. The test measures a substance in the blood called Cancer-Antigen 125 (CA-125). The amount of CA-125 is higher with ovarian cancer. Some ovarian cancers do not make enough CA-125 to be detected by the test. Some noncancerous diseases such as endometriosis also have raised CA-125 levels. Noncancerous causes of higher CA-125 are more common in women younger than 35 years old. Ovarian cancer is very rare in this age group. The CA-125 test is most often done on women who are older than 35, as they are at high risk for ovarian cancer or have a cyst that is partly solid.

Treatment for Ovarian Cysts

Treatment will depend on factors such as age, menopausal status, the appearance and size of the cyst from the ultrasound scan and whether there are symptoms.

1) Observation

For functional cysts a "watch and wait" approach is taken. Functional cysts tend to dissolve over time and treatment is not needed. A repeat ultrasound may be done usually after two menstrual cycles to ensure that the cyst has disappeared. In some patients, if the cyst recurs, birth control pills may be prescribed. These pills reduce the hormones that promote the growth of cysts and prevent the formation of large cysts.

Operation

Removal of an ovarian cyst may be advised, especially if there are symptoms or if the cyst is large. Sometimes removal of the cyst may be necessary to ensure that it is not cancerous. Most cysts can be removed by laparoscopic surgery ('keyhole' surgery). Some cysts, especially if cancer is suspected, may require a laparotomy. The type of operation depends on factors such as the type of cyst, the age, complications encountered such as bleeding, rupturing and twisting of the cyst, and whether cancer is suspected or ruled out. In some cases, just the cyst is removed (cystectomy) and the ovarian tissue preserved. In other cases, the cyst, ovary and the fallopian tube are removed (salpingooopherectomy). In a worse scenario, the cyst with the ovary, as well as, the other ovary and uterus are all removed (hysterectomy and bilateral salpingoopherectomy). All these surgeries can be performed either by laparoscopy or laparotomy (see chapters 27 and 33).

Summary

Ovarian cysts are common in women. There are many types of ovarian cysts. Most ovarian cysts are benign and uncomplicated. Surgery is indicated if cysts are persistent, become bigger or cause symptoms. Most ovarian cysts can be removed by laparoscopic surgery

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Ovarian Cyst

https://vimeo.com/149616411

Chapter 6

Endometrial Polyps

Chapter 6: Endometrial polyps

Endometrial polyps also known as uterine polyps, are outgrowths of the inner lining of the uterus (endometrium) protruding into the endometrial cavity. They may be attached to the endometrial cavity by a thin stalk (pedunculated polyps) or a broad base (sessile polyps). Pedunculated polyps are more common than sessile polyps. Their sizes range from a few millimetres to a few centimetres. There may be one or several polyps. Sometimes a pedunculated polyp can protrude through the cervix and into the vagina. Small blood vessels may be found especially on large polyps. Endometrial polyps are usually benign (non-cancerous) but sometimes they can turn malignant (cancer).
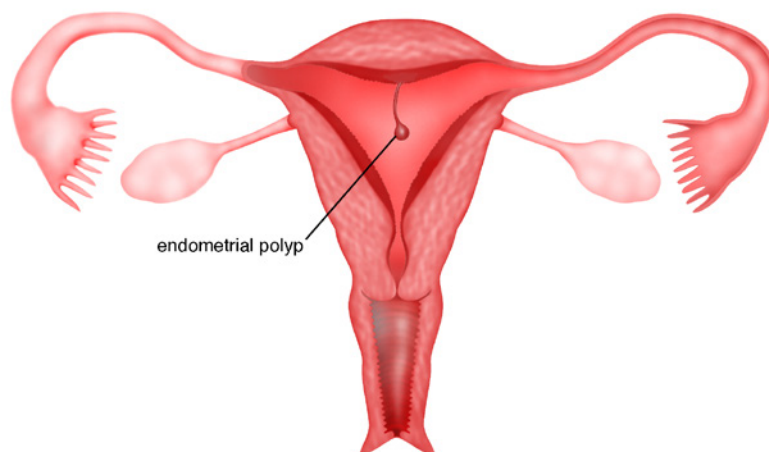
Figure 6.1 Endometrial polyp
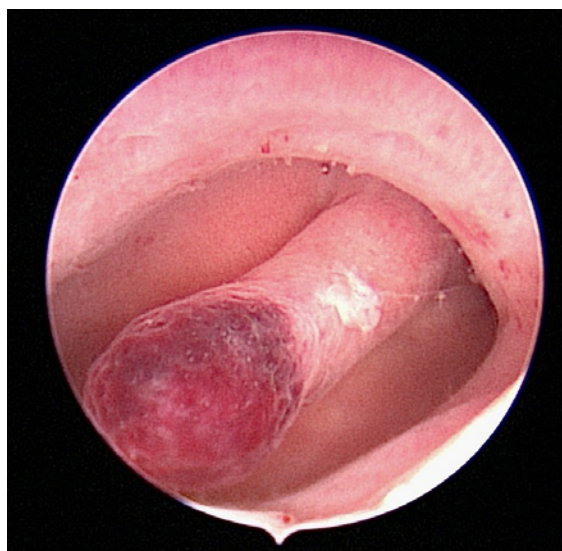
Figure 6.2 Endometrial polyp

Causes

The cause of the formation of a polyp is unknown. The endometrium is under the influence of the hormone oestrogen and excessive oestrogen may cause the development of polyps.

Risk factors

Endometrial polyps are more common in women in their 40's and 50's. These polyps can form in postmenopausal women but rarely in women younger than 20 years of age. It is also more common in women who are overweight or obese with high blood pressure. Women who are on tamoxifen (a drug used to treat breast cancer) and on Hormone Replacement Therapy are also at increased risk of developing endometrial polyps.

Symptoms

Endometrial polyps can be asymptomatic and only detected during a routine ultrasound examination. Other symptoms are:

1) **Bleeding or spotting in between periods** (intermenstrual bleeding)

2) **Bleeding after sexual intercourse** (post coital bleeding)

3) **Heavy menses**

4) **Painful menses** (dysmenorrhoea)
   This may occur when the polyp protrudes through the cervix and into the vagina

5) **Inability to conceive** (infertility)
   The presence of a polyp may be the cause of the inability to conceive. A polyp may prevent the implantation of an embryo. Sometimes a polyp may increase the risk of miscarriage.

6) **Bleeding or spotting after menopause**

Case 6.1 : Endometrial polyp that was a cancer

Madam LPH was a 52 year old lady who had her last normal menstrual periods on April 2013. She presented to me in October 2014 with a problem of postmenopausal per vaginal menstrual spotting. Transvaginal ultrasound done showed a bulky uterus with multiple small uterine fibroid, the biggest measuring 2.56 x 2.23 cm. There was a cystic endometrial polyp measuring about 1 cm (Figure 6.4). She underwent an office hysteroscopy and the polyp was removed (Figure 6.5). Histopathology showed that the polyp was hyperplastic with suspicion of adenocarcinoma. She underwent a total laparoscopic hysterectomy, bilateral salpingoopherectomy and pelvic lymph node sampling in November 2014. Histopathology of the uterus did not show any residual cancer of the endometrium.

Discussion

Bleeding after menopause requires investigation. This is especially so when the endometrium is thickened or if a polyp is seen in the endometrial cavity. In this patient the endometrial polyp removed was malignant but fortunately the endometrial cavity was not involved. Removal of the uterus cured her cancer.

Case 6.2 : Removal of an endometrial polyp in a subfertile lady leads to a natural pregnancy

Madam LSY saw me in November 2013 with a problem of inability to conceive. She had a child 7 years of age and was trying to conceive again the past 5 years. On examination and ultrasound, several small fibroids were seen in the uterus. The endometrial cavity was thickened. She underwent an office hysteroscopy and a large endometrial polyp was seen. The polyp was cut into 3 pieces and removed. She missed her periods in February 2014 and pregnancy test taken was positive. She delivered a healthy baby girl in October 2014.

Discussion

Endometrial polyp could be one of the cause of infertility. When the endometrium is thick, a hysteroscopy can assist in the diagnosis and removal of the polyp.

Diagnosis

Endometrial polyps can be suspected when a patient has the symptoms discussed above. Investigations will include:

1) Transvaginal Ultrasound

This is a procedure whereby an ultrasound probe is placed into the vagina to visualise the uterus and the endometrial cavity. Any irregularities in the endometrial cavity may indicate an endometrial polyp. However, in some women who have a thickened endometrial lining, a polyp may be missed.
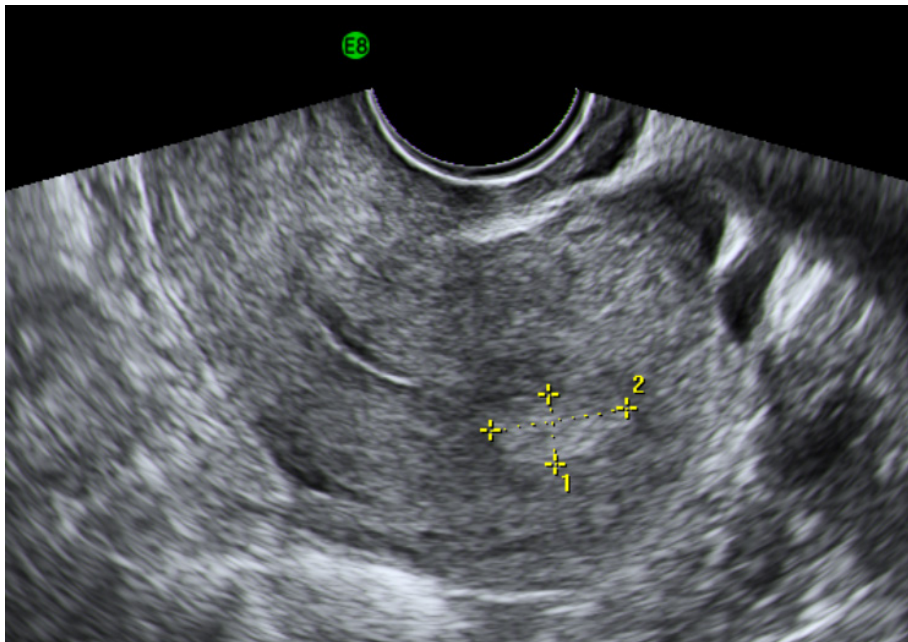
Figure 6.3 Transvaginal ultrasound showing an endometrial polyp
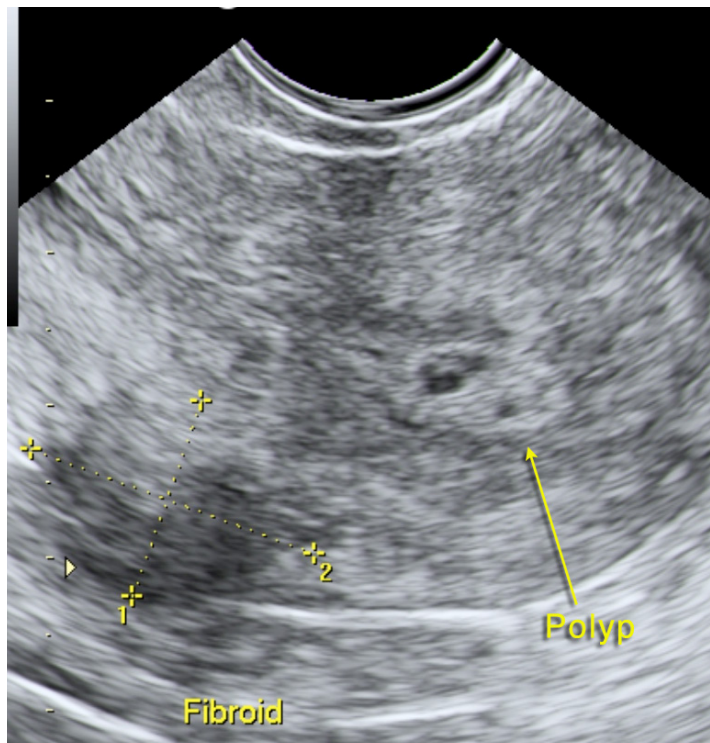
Figure 6.4 Transvaginal ultrasound showing a cystic endometrial polyp

2) Sonohysterography

A thin tube is introduced into the uterine cavity and sterile fluid (saline - salt water) is injected to distend the cavity. A transvaginal or transabdominal ultrasound scan is performed at the same time. The presence of fluid in the endometrial cavity will be able to provide a clearer picture of any growth within the endometrial cavity (see Figure 41.6).

3) Hysteroscopy

This procedure is performed by placing a thin telescope (hysteroscope) through the cervix and into the uterine cavity via the vagina. It is usually done in the clinic without any anaesthesia. The hysteroscope is attached to a camera system and the endometrial cavity can be visualised on a monitor. Any polyp present can be seen and even removed simultaneously (see chapter 38).
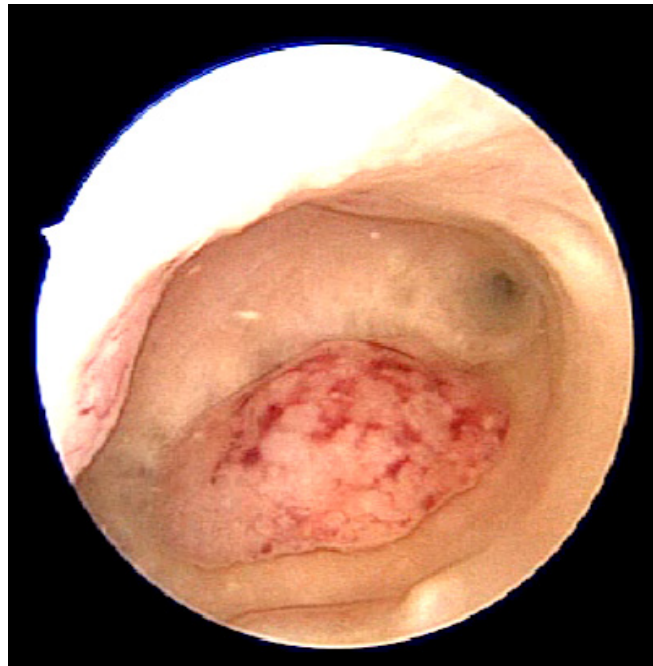
Figure 6.5 Malignant polyp

Treatment

The following treatment may be recommended

1) Watchful waiting
Asymptomatic polyps may resolve on their own.
A repeat ultrasound can be done after 3 to 6
months to see whether the polyp is still present.

2) Medication
Hormones such as progestin (g) may be given to
shrink the polyps. Even if the polyp shrinks, it may
reappear when the hormones are stopped.

3) Hysteroscopy and removal of the polyp
This minor surgery is usually performed under anaesthesia.
A hysteroscopy is performed and the polyp can be excised
using slender instruments such as graspers and scissors.

4) Curettage
A slender instrument is placed into the endometrial cavity
and the inner lining of the uterus is scraped to remove all
the polyps. This may be performed with the assistance
of a hysteroscope to ensue that all the polyps have
been removed and the endometrial cavity is empty.

Postoperative Management

If the histopathology (g) reports states that the polyp is benign, then regular follow-up is necessary to ensure that it does not recur. Rarely, do endometrial polyps recur. However, if the polyps are pre-cancerous or malignant (cancer) then further treatment will be necessary (see chapter 33)

Prevention

There is no way of preventing the occurrence of endometrial polyps. All women, especially those women with the risk factors mentioned above, will need regular gynaecological examination and transvaginal ultrasound scans.

Scan Me

Watch Video 6.1

Endometrial Polyps

https://vimeo.com/159004117

Summary

Endometrial polyps, also known as uterine polyps, are outgrowths of the inner lining of the uterus (endometrium,) protruding into the endometrial cavity. They can vary in size and number. They usually present with intermenstrual bleeding. Diagnosis is made by transvaginal ultrasound, sonohysterography and hysteroscopy. Treatment includes watchful waiting, medication to shrink the polyps, hysteroscopic removal of the polyp or curettage.

Chapter 7

Ectopic Pregnancy

Chapter 7: Ectopic Pregnancy

An ectopic pregnancy occurs when a fertilised egg settles and grows as a pregnancy in any location other than the inner lining of the uterus. As these other locations are not expandable as the uterus, when the pregnancy grows, it may cause these areas to rupture and bleed. The most common site for an ectopic pregnancy is the fallopian tube (98%) and so it is commonly called a tubal pregnancy. Tubal pregnancies can grow in the infundibular and fimbrial end (5% of all ectopics), the ampullary section (80%), the isthmus (12%), and the cornual and interstitial part of the tube (2%). However, they can also occur in other locations such as the ovary, cervix, and abdominal cavity. An ectopic pregnancy occurs in about one in 50 pregnancies.
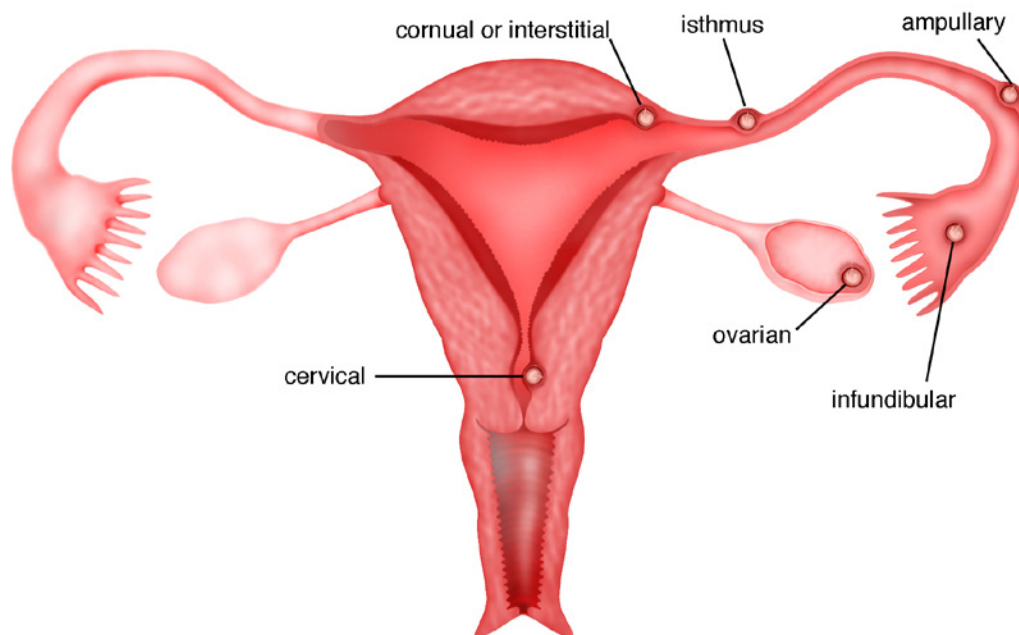
Figure 7.1 Common sites of ectopic pregnancy

Ectopic Pregnancy is a medical emergency and can be life threatening. It can rupture leading to internal bleeding. Ectopic pregnancy must be diagnosed and treated early because severe bleeding can lead to death. The pregnancy itself rarely survives and it cannot be moved into the uterus. Ectopic pregnancy remains the leading cause of pregnancy-related deaths in the first trimester of pregnancy.

In rare cases, an ectopic pregnancy may occur at the same time as an intrauterine pregnancy. This is referred to as heterotrophic pregnancy.
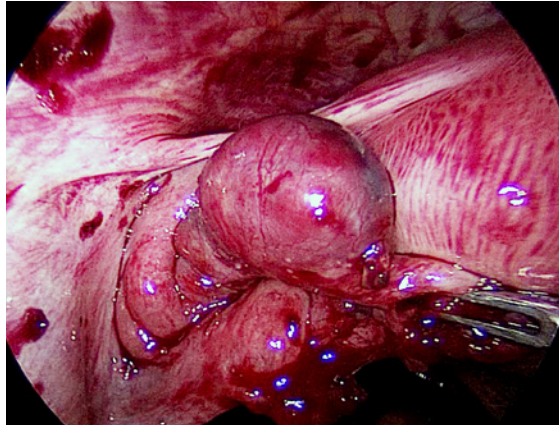
Figure 7.2 Left tubal pregnancy
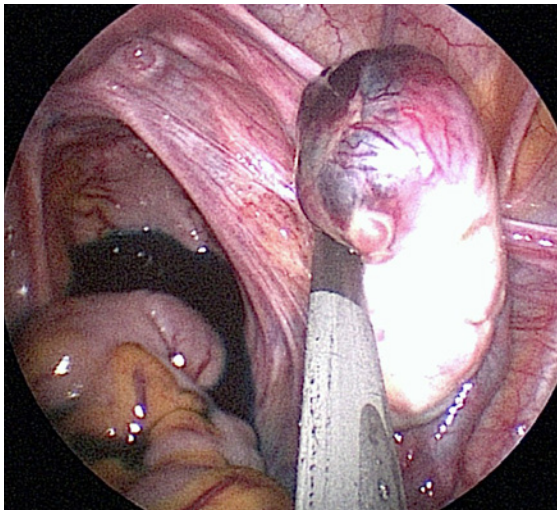
Figure 7.3 Right ovarian pregnancy
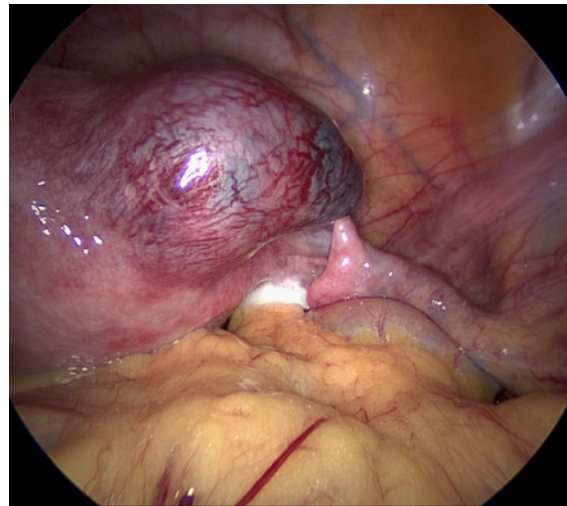
Figure 7.4 right cornual pregnancy

Risk factors for ectopic pregnancy

A normal pregnancy occus when the egg and sperm meet in the fallopian tube. The resulting embryo needs to travel to the uterus before implanting on the lining of the uterus. Anything that interferes with this can cause an ectopic pregnancy.

Ectopic pregnancy occurs when there is a disruption in the normal anatomy of the fallopian tubes. The inner lining of the fallopian tube is coated with hair-like projections called the cilia. Transport of the oocytes (eggs) and the embryo, from the fimbrial end to the uterine cavity is aided by these cilia. If these cilia are damaged, proper transport will be disrupted, and this may lead to an embryo not being able to reach the uterine cavity and therefore may attach itself to the fallopian tube leading to an ectopic pregnancy. Some risk factors involved are:

1) Patients who have had ectopic pregnancies before have the highest risk of developing more ectopic pregnancies.

2) Congenital abnormalities of the fallopian tube can cause abnormal implantation of the embryo leading to an ectopic pregnancy.

3) Surgery to the fallopian tube such as tubal ligation and repair of the fallopian tubes can lead to scarring and disruption of the normal anatomy of the tubes and increases the risk of an ectopic pregnancy.

4) Infection in the pelvis (pelvic inflammatory disease) is another risk factor for ectopic pregnancy. Sexually-transmitted diseases such as gonorrhoea and clamydia can cause damage to the inner lining of the fallopian tube leading to an ectopic pregnancy. Women with multiple sexual partners have a higher risk of sexually transmitted diseases and so may have a higher incidence of ectopic pregnancy.

5) The presence of endometriosis, fibroids and pelvic adhesions (scar tissue) can cause narrowing of the fallopian tubes. This may lead to disruption of the transport of an embryo, leading to implantation in the fallopian tube.

6) Intrauterine contraceptive device (IUCD) is effective in reducing the incidence of intrauterine pregnancy but not ectopic pregnancy. As such, if a patient were to conceive with an IUCD, she would have a higher chance of having an ectopic pregnancy. However, the incidence of pregnancy with IUCDs is very low.

7) Cigarette smoking around the time of conception can affect ciliary movement and has also been associated with an increased risk of ectopic pregnancy. This risk was observed to be dose-dependent, which means that the risk is dependent upon the individual woman's habits and increases with the number of cigarettes smoked.

However, it is important to note that ectopic pregnancy may occur in women with none of the risk factors above.

Signs and Symptoms

The classic signs and symptoms of ectopic pregnancy include:

1) The Absence of Menstrual Periods (amenorrhoea)

2) Unusual Vaginal Bleeding
   The bleeding can be either heavier or
   lighter than the usual menses

3) Abdominal Pain
   The pain is usually one sided and in the lower abdomen

The woman may not be aware that she is pregnant. The signs and symptoms of an ectopic pregnancy typically occur six to eight weeks after the last normal menstrual period, but they may occur later if the ectopic pregnancy is not located in the Fallopian tube. Other symptoms of pregnancy (for example, nausea and breast discomfort, etc.) may also be present in ectopic pregnancy.

If the ectopic pregnancy has ruptured,
then the symptoms are as follows:

1) Sudden, severe lower abdominal pain
   spreading across the whole abdomen

2) Sweating, light headedness or feeling faint

3) Collapse or shock as a result of internal bleeding

4) Shoulder tip pain - this occurs as a result of internal
   bleeding that irritates the diaphragm (g).

Diagnosis of Ectopic pregnancy

Diagnosis of ectopic pregnancy is made by first taking a good history from the patient followed by a pelvic examination and a transvaginal ultrasound. Due to irregular pervaginal bleeding, some patients may not even know that they are pregnant. The patient may have abdominal tenderness (tummy pain). Pelvic examination may reveal tenderness and bogginess (sponginess due to high fluid content) at the posterior part of the cervix. A pelvic mass may be felt during pelvic examination. A urine pregnancy and/or a serum beta HCG test (the beta subunit of human chorionic gonadotrophin) is necessary to confirm pregnancy. Transvaginal ultrasound is the most useful test to visualise an ectopic pregnancy. In this test, an ultrasound probe is inserted into the vagina, and pelvic images are visible on a monitor. Usually there will not be a gestational sac in the uterine cavity leading to a suspicion of an ectopic pregnancy. Transvaginal ultrasound may reveal an ectopic gestational sac near the ovary or in most situations, it may simply reveal a mass in the area of the fallopian tube raising the suspicion of an ectopic pregnancy. Some fluid will usually be seen in the posterior part of the uterus (Pouch of Douglas). When ectopic pregnancy is confirmed, then appropriate treatment will be suggested. However, when all the tests done are not confirmatory, a diagnostic laparoscopy may be necessary to visualise the structures in the abdomen and pelvis, thereby revealing the site of the ectopic pregnancy.
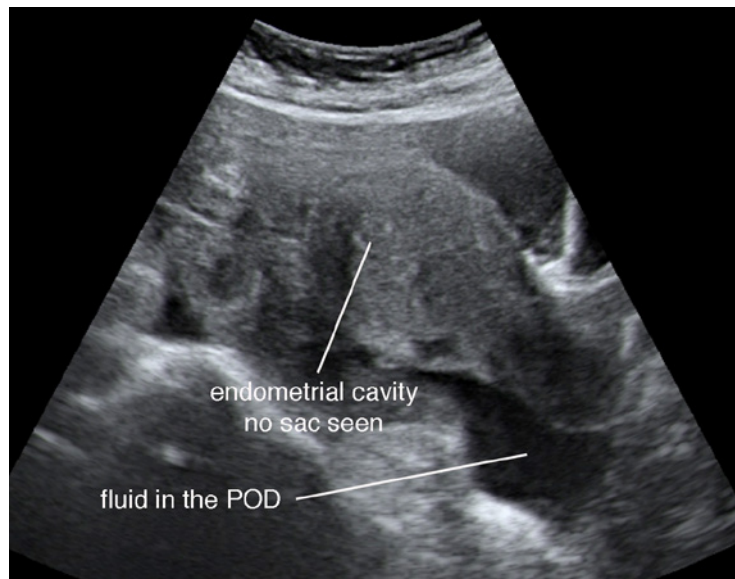
Figure 7.5 Ultrasound picture showing no gestational sac in the uterine cavity and fluid in the Pouch of Douglas.
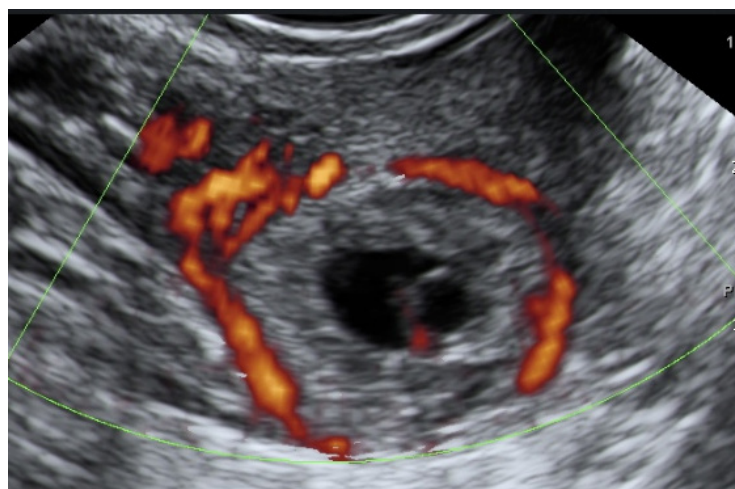
Figure 7.6 Ultrasound showing an ectopic pregnancy with a gestational sac and a fetal echo in the fallopian tube. There is blood flow around the fallopian tube

Health risk of an ectopic pregnancy

Spontaneous reabsorption of an ectopic pregnancy may occur. However, the true incidence of this occurring is unknown. It may not be possible to know in which patient the ectopic pregnancy may resolve spontaneously. Since ectopic pregnancy is located in places not intended for proper implantation of the embryo, rupture of the ectopic pregnancy may occur. The ectopic pregnancy may invade a vein or an artery, which can lead to bleeding. This can be life threatening and will require immediate surgery to remove the ectopic pregnancy. Another health risk is that blood in the pelvis can lead to adhesions and the scar tissue can lead to difficulty in conceiving in the future or increase the likelihood of future ectopic pregnancy.

Treatment options

Treatment options for ectopic pregnancy include observation, laparoscopy, laparotomy, and medication. Some ectopic pregnancies will resolve on their own without the need for any intervention. However, because of the risk of rupture most women who are diagnosed with ectopic pregnancy are treated with medication or surgery.

1) Surgery

There are 2 ways of performing surgery namely laparotomy and laparoscopy. Laparoscopy is the preferred method. However, in certain situations such as women with massive pelvic adhesions or when there is excessive bleeding, laparotomy may be performed. There are several ways of removing the ectopic pregnancy. In early unruptured ectopic pregnancies, a salpingostomy can be performed. Here, an incision is made in the fallopian tube and the ectopic pregnancy is removed, leaving the fallopian tube intact. However, if the tube has ruptured, it may be difficult to save the fallopian tube and removal of the fallopian tube (salpingectomy) may be necessary (see chapter 26).
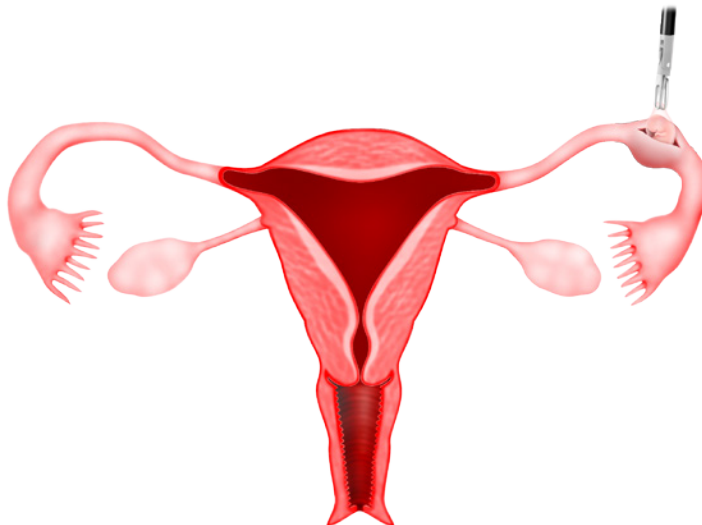
Figure 7.7 Salpingotomy

Case 7.1 : Pregnant after laparoscopic surgery for ectopic pregnancy

Madam NM, a 32 year old lady, first saw me in May 2013. She was 7 weeks pregnant. Ultrasound showed 2 well formed intrauterine gestational sacs but no foetal heart activities were seen in either of the sacs, indicating that it was a miscarriage. She underwent an evacuation of the product of conceptus. Two months later she conceived again. Unfortunately, it was a left ectopic tubal pregnancy and she underwent a laparoscopic left salpingotomy in August 2013 (see video 26.2). She underwent a hysterosalpingogram (HSG) in November 2013. The right fallopian tube was patent (not blocked). Contrast (g) was seen in the left Fallopian tube but no spillage of contrast was seen from the fimbrial end. She could not conceive spontaneously after that and underwent an intrauterine insemination (IUI) (g) in April 2014. She conceived and delivered a baby girl.

2) Medical therapy

Medical treatment involves the use of an anti-cancer drug called methotrexate. This drug acts by killing the growing cells of the placenta, thereby inducing miscarriage of the ectopic pregnancy. This treatment is usually suggested in patients with early unruptured ectopic pregnancy. While on this treatment, the serial serum beta HCG test must be done. The treatment is considered effective if the levels are on a declining trend. The advantage of medical treatment is that the patient need not undergo surgery and will still have her fallopian tube. The disadvantage is that, in some patients, the ectopic pregnancy may not resolve and the patient may still need surgery. The worry is that rupture of the ectopic pregnancy may occur while on medication and this may require emergency surgery. A hysterosalpingography is usually done to assess the patency of the fallopian tube several months after successful treatment using methotrexate.

Prognosis - Future fertility

Fertility following ectopic pregnancy depends upon several factors, the most important of which is whether the patient has a prior history of infertility. The treatment choice, whether surgical or nonsurgical, also plays an important role. For example, the rate of intrauterine pregnancy may be higher following the methotrexate treatment compared to surgical treatment. The fertility rate may be better following salpingostomy rather than salpingectomy.

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Ectopic pregnancy

https://vimeo.com/149705868

Summary

An ectopic pregnancy occurs when a fertilised egg settles and grows in any location other than the inner lining of the uterus. The most common site for an ectopic pregnancy is the fallopian tube. Ectopic pregnancy is a medical emergency. Diagnosis is usually made by a positive pregnancy test with the absence of an intrauterine gestational sac and a mass outside the uterine cavity. Treatment options include surgery and/or medical therapy.

Chapter 8

Tubal Block and Hydrosalpinx

Chapter 8: Tubal block and Hydrosalpinx

One of the investigations performed for an infertile couple is a hysterosalpingography (HSG). HSG is a technique in which a contrast medium (g) (a special dye that can be seen on an X ray) is injected into the uterine cavity. X rays are then performed to see whether the contrast medium flows out through the tubes and out of the fimbrial end, indicating patency of the tube (to see that the Fallopian tube is not blocked).

Tubal blockage can occur in several places.

1) There may be a block at the cornual end of the tube (see chapter 1 on anatomy). In this situation, only the endometrial cavity can be seen but not of the tube (Figure 8.2).

2) Sometimes only part of the tube can be seen. The dye reaches midway into the tube but no fluid is seen coming out of the fimbrial end.

3) The outline of the tube is seen but no dye is seen coming out from the fimbrial end of the tube. Sometimes the fimbrial end of the tube distends like a balloon. This is called a hydrosalpinx (Figure 8.1).
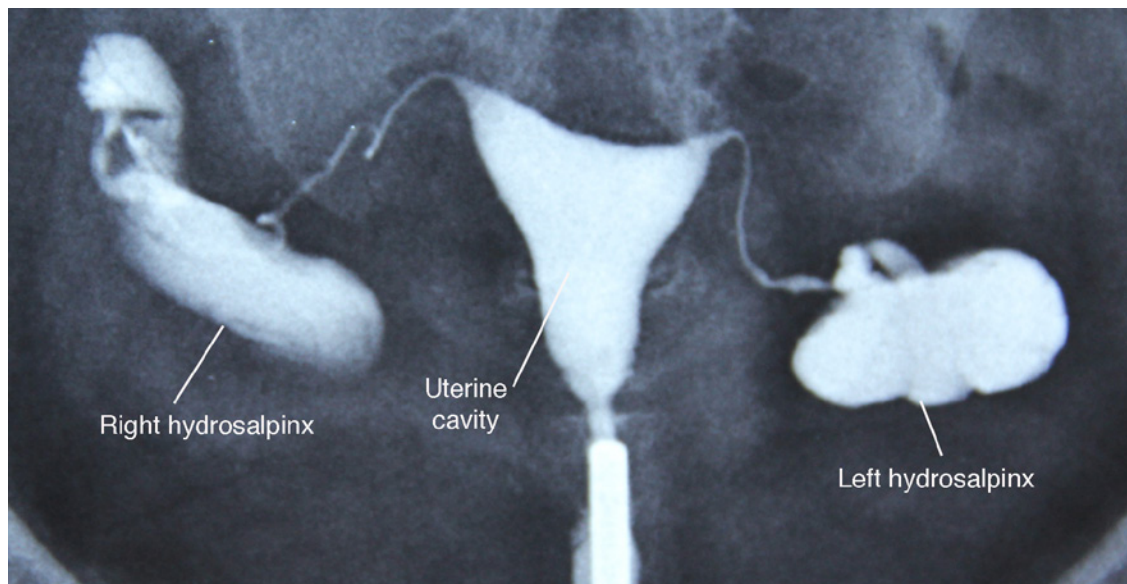
Figure 8.1 Hysterosalpingography showing bilateral hydrosalpinx
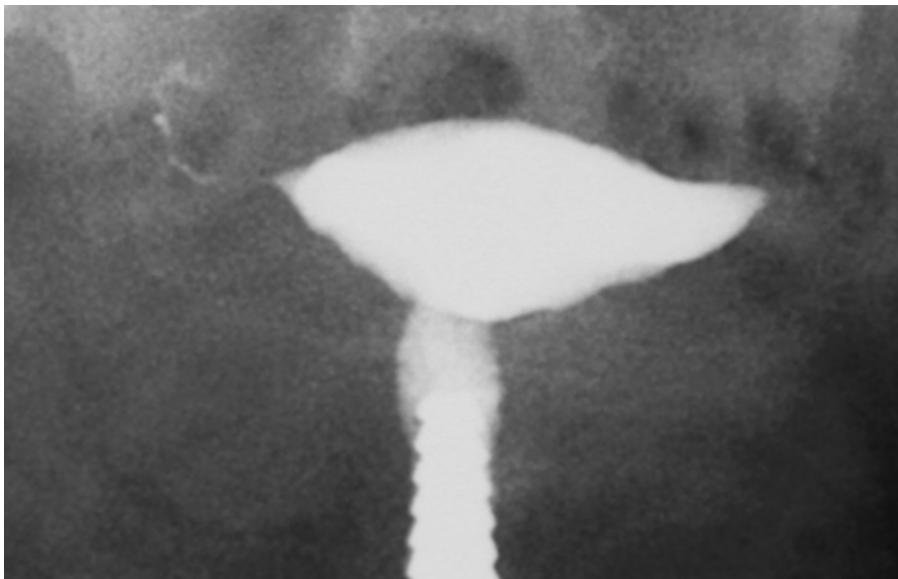
Figure 8.2 Hysterosalpingography showing bilateral cornual block

A hydrosalpinx can sometimes be seen on an ultrasound). This can be seen as a fluid filled elongated cystic structure adjacent to the ovary (Figure 8.3). Tubal block at the cornual end and within the tube cannot be seen on an ultrasound. A large hydrosalpinx can sometimes be mistaken for an ovarian cyst or a broad ligament cyst. A broad ligament cyst is a cyst or fluid collection in the tissue called the broad ligament which is found between the tubes, ovaries and the uterus. Hydrosalpinx are usually filled with water. Sometimes it may be filled with blood (haematosalpinx) or can be infected and filled with pus (pyosalpinx)
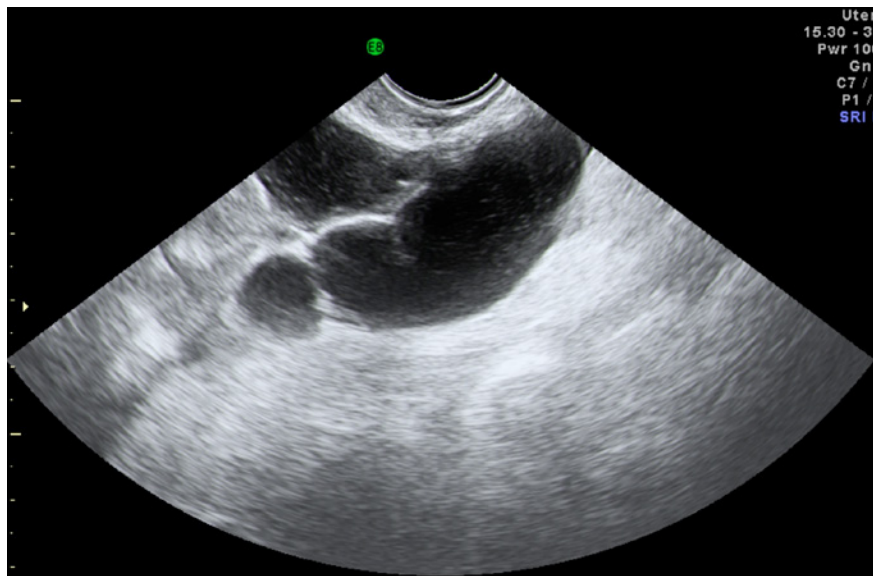
Figure 8.3 Ultrasound picture of a hydrosalpinx
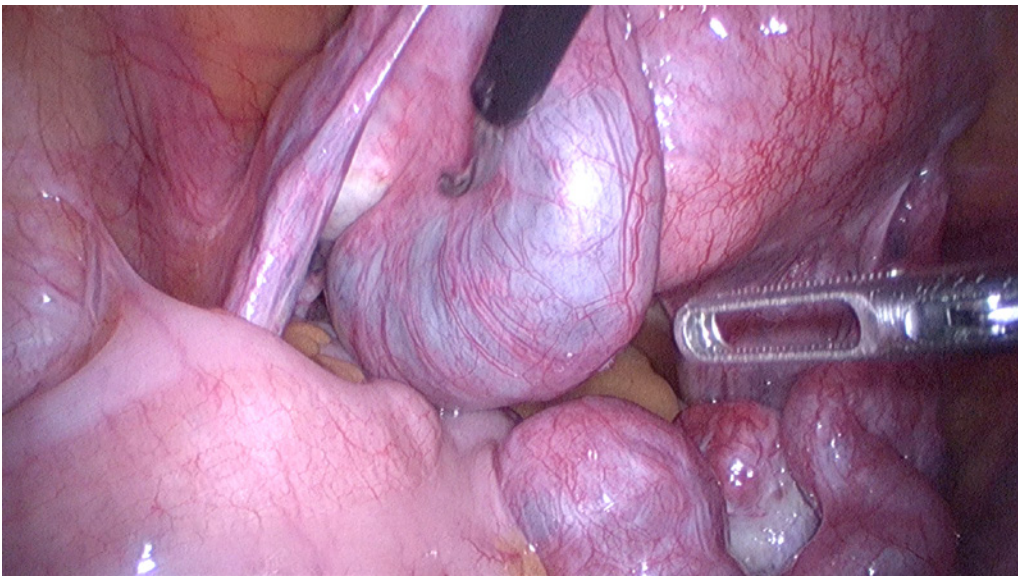
Figure 8.4 Hydrosalpinx of the left fallopian tube

Blocked tubes, including hydrosalpinx, are usually without symptoms (asymptomatic). Some patients with hydrosalpinx may have vaginal discharge. The hydrosalpinx can get twisted, on rare occasions and this can lead to acute abdominal pain requiring emergency surgery.
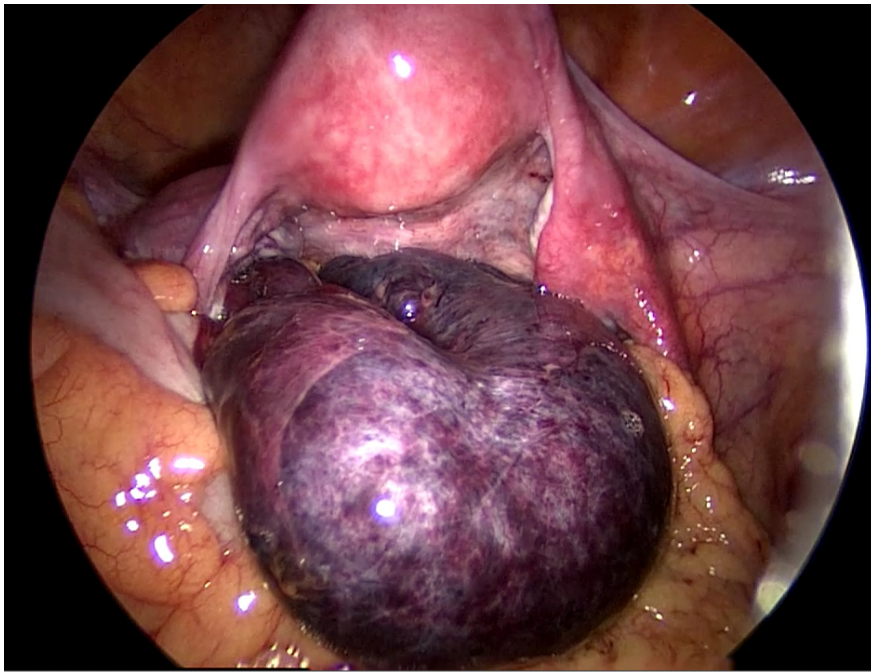
Figure 8.5 Twisted gangrenous left hydrosalpinx

Causes of blocked tubes and hydrosalpinx

The most common cause of a blocked tube is pelvic infection (pelvic inflammatory disease - PID). PID may be a result of sexually transmitted disease. Other causes of blocked tubes are endometriosis, a history of ruptured appendicitis, prior pelvic or abdominal surgery, previous surgery for ectopic pregnancy or a history of uterine infection caused by an abortion or miscarriage.

Treatment

Unless the patient is unable to conceive or there is pain, tubal blocks can be left alone.

Many different surgeries can be performed for these conditions and this will be discussed in Chapter 29. For patients who cannot conceive despite surgery, Invitrofertilization (IVF) is the best option for pregnancy.

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Tubal Block and hydrosalpinx

https://vimeo.com/159005056

Summary

Tubal block can occur at different parts of the fallopian tube. The most common are at the cornual end and at the fimbrial end. When there is a block at the fimbrial end, the tube can become distended (swollen) and this is called a hydrosalpinx. Hydrosalpinx may be diagnosed by an ultrasound or a hysterosalpingogram. Hydrosalpinx are usually asymptomatic and do not require any treatment unless the patient is keen on pregnancy.

Chapter 9

Pelvic Inflammatory Disease

Chapter 9: Pelvic Inflammatory disease

Pelvic Inflammatory disease (PID) is an infection of the reproductive organs of a woman namely the uterus, the fallopian tubes and the ovaries. The PID infection usually originates from the vagina and moves upwards via the cervix to the pelvis. Sometimes PID may be a result of infection from other organs in the abdomen such as appendicitis or sometimes even from blood spread. If PID spreads to the blood, it can be extremely dangerous. Many women with PID will not experience any symptom. It may be detected only when investigations are performed for infertility or chronic pelvic pain.

Causes

The 2 most common causes of PID are gonorrhoea and chlamydia. Other causes include abortion, childbirth and pelvic surgical procedures.

Risk factors

Some of the risk factors for developing PID are:

1) Having sex and being under the age of 25

2) Having sex with more than one person

3) Being in a sexual relationship with a person who has more than one sex partner

4) Unprotected sex

5) Using an intrauterine device (IUCD) to prevent a pregnancy

6) Douching

7) A history of pelvic inflammatory disease

8) Miscarriage, abortion or endometrial biopsy

Symptoms

Some women with PID will not have symptoms at all and it is only discovered during laparoscopy. For others the symptoms are:

1) Pain in the lower abdomen (the most common symptom)

2) Pain in the upper abdomen

3) Fever, fatigue , diarrhoea or vomiting

4) Painful sex

5) Painful urination

6) Irregular menstrual bleeding

7) Lower back pain

8) Heavy vaginal discharge with unpleasant odour

9) Tiredness

Sharp pain associated with vomiting, fainting and high fever, may be an indication that the infection has spread to the blood, and immediate and emergency treatment is necessary.

Diagnosis

A good history from the patient may lead to the suspicion of a PID. Pelvic examination may reveal vaginal discharge usually yellowish in nature and sometimes with a foul smell. Digital pelvic examination may elicit tenderness (pain) of the pelvis especially when rocking (moving) the cervix. Some of the discharge from the cervix may be taken for culture (g) to find out the cause of the infection. A urine test may be necessary to rule out urinary tract infection.

Pelvic transvaginal ultrasound is usually done to visualise the pelvic organs. An ultrasound may reveal enlarged fallopian tubes and ovaries with fluid in them or in the pelvis. A biopsy (g) of the endometrium may be performed. In some patients, a laparoscopy may be necessary to confirm the diagnosis and also to drain any pus collected in the pelvis, especially if it does not decrease with antibiotics.

Treatment

Treatment of PID is usually with antibiotics. In mild cases oral antibiotics will suffice, but in severe PID admission and intravenous antibiotics may be necessary. Sometimes it may not be possible to determine the organism (bacteria) that is causing the pelvic infection. In such situations, empirical treatment with more than 1 type of antibiotic may be necessary.

Rarely, if the pelvic infection is not resolving (g) with antibiotics or there is collection of pus in the pelvis, laparoscopy may be necessary to drain the pus or even remove the affected organs (fallopian tubes and ovaries). This is performed especially in women who have recurrent pelvic infection in the same area.

Men may not exhibit any symptom and can be an asymptomatic carrier of the disease. It is essential for the partner to be treated as well, to prevent subsequent spread of the infection.

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Pelvic Inflammatory disease

https://vimeo.com/159011692

Prevention

The risk of PID can be lowered by:

1) Practicing safe sex
2) Getting tested for sexually transmitted infections and treated if positive
3) Avoiding douches
4) Wiping from front to back, to stop bacteria from entering your vagina

Long term complications

Treatment of PID is essential to prevent long-term complications namely:

1) Infertility
2) Ectopic pregnancy (see chapter 7)
3) Chronic pelvic pain : pain in the lower abdomen caused by scarring of the fallopian tubes or other pelvic organs

Summary

Pelvic Inflammatory disease (PID) is an infection of the reproductive organs of a women. The infection of PID usually originates from the vagina. Treatment of PID is usually with antibiotics. In rare cases, if the pelvic infection is not resolving with antibiotics, laparoscopy may be necessary to drain the pus or even remove the affected organs.

Chapter 10

Utero-vaginal Prolapse

Chapter 10: Utero-vaginal Prolapse

Utero-vaginal Prolapse is a condition whereby the uterus protrudes or descends down the vagina and sometimes out of the vaginal opening (introitus). This condition may occur together with the descent of the bladder (cystocoele), the rectum (rectocoele), the intestines through the back part of the uterus (enterocoele) or the descent of the urethra (urethrocoele). Sometimes the vagina can descend after a hysterectomy. This is called a vaginal vault prolapse.
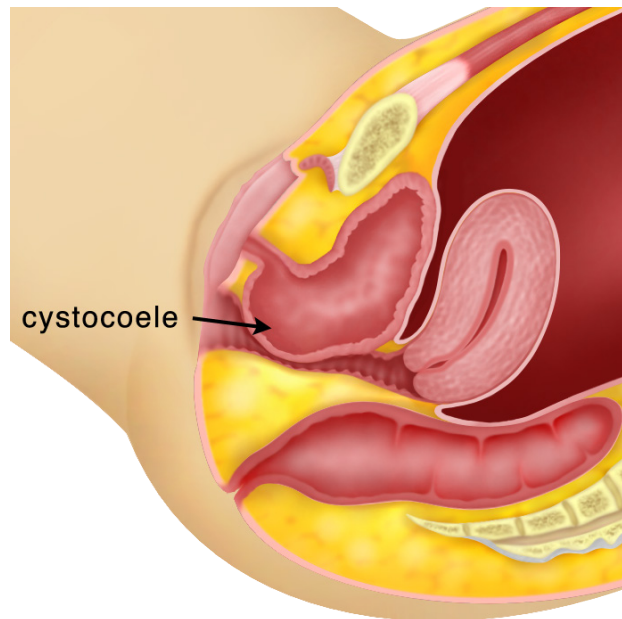
Figure 10.1 Cystocoele
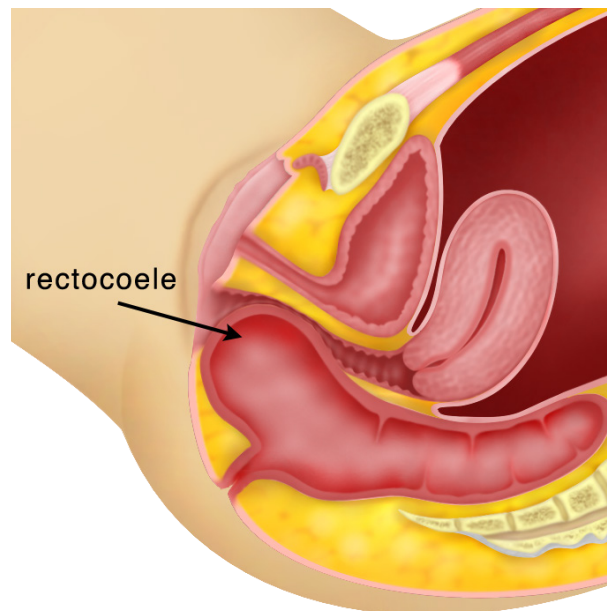
Figure 10.2 Rectocoele
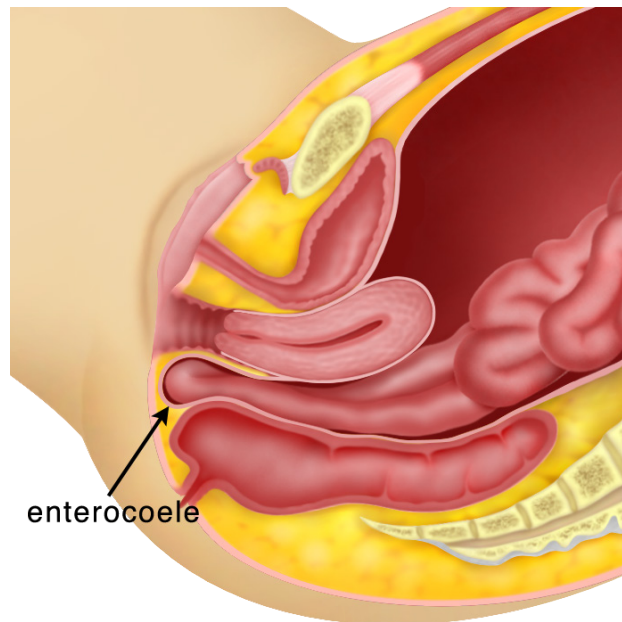
Figure 10.3 Enterocoele
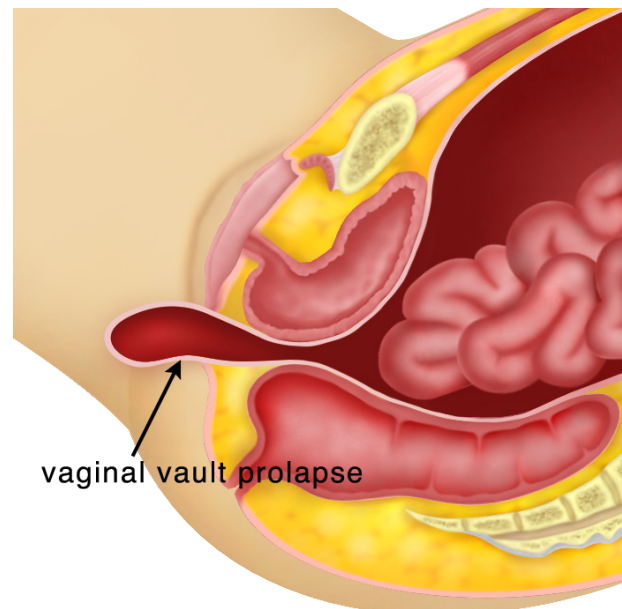
Figure 10.4 Vaginal Vault Prolapse

Degrees of Utero-vaginal Prolapse

The extent of descent of the uterus determines the severity of the prolapse. This is generally divided into 3 degrees:

First degree Utero-vaginal Prolapse

The uterus sags down up to the introitus but remains within the vagina.
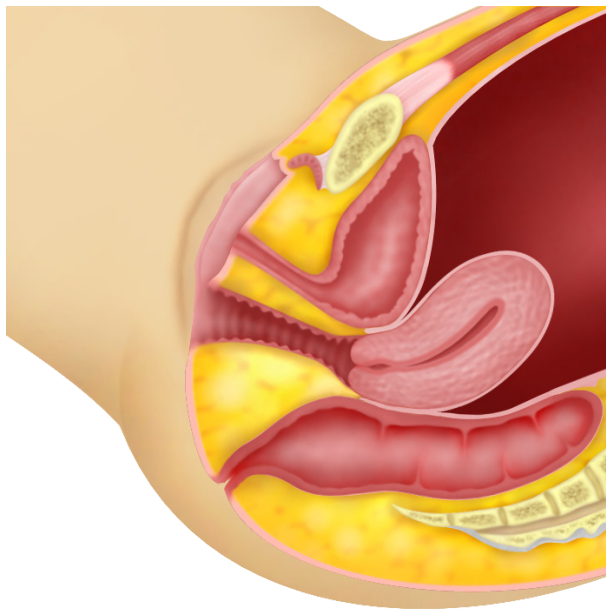
Figure 10.5 First Degree Prolapse

Second degree Utero-vaginal Prolapse

Here, the cervix protrudes out of the vaginal opening but the body of the uterus still remains in the vagina
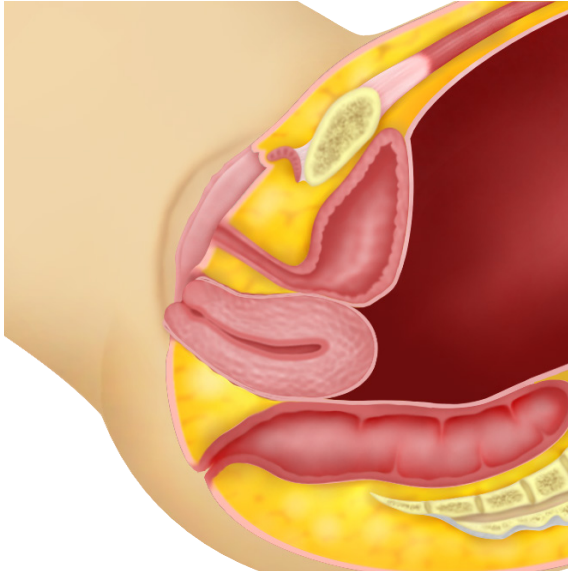
Figure 10.6 Second Degree Prolapse

Third degree Utero-vaginal Prolapse

The whole uterus has protruded out of the vaginal opening
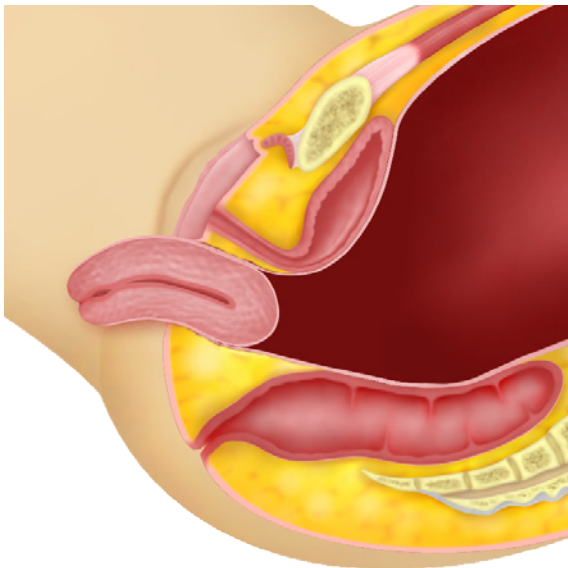
Figure 10.7 Third Degree Prolapse

Causes

Utero-vaginal Prolapse occurs when there is a weakening of the tissues that support the uterus. There are several reasons why utero-vaginal prolapse occurs:

1) Difficult childbirth. Women who have delivered large babies or have had difficult labour, have a higher risk of developing utero-vaginal prolapse. A difficult childbirth can cause muscle weakness and stretching of the tissues supporting the uterus. This could lead to a prolapse in the future.

2) Menopause: After menopause, a lack of the hormone oestrogen causes the loss of muscle tone associated with ageing. This may lead to prolapse.

3) Diseases that increase the intra-abdominal pressure such as chronic cough, severe constipation and pelvic tumours can occasionally lead to or aggravate a prolapse of the uterus.

Risk factors for pelvic organ prolapse include the following:

1) Increasing age

2) Increasing body mass index (obesity)

3) Increasing gravidity (g).

4) Increasing parity (g).

5) Number of vaginal deliveries

6) Macrosomic (big baby) delivery

7) Chronic obstructive pulmonary disease (g).

8) Constipation

9) Strenuous activity, weight bearing, or strenuous labour

Symptoms

Many women may have mild utero-vaginal prolapse and not have any symptoms at all. Some, however, will feel the symptoms below:

1) Feeling of a mass coming down the vagina

2) Dragging sensation or discomfort in the lower abdomen or pelvis

3) Back ache

4) Difficulty or inability to completely move the bowel (constipation)

5) Difficulty or incomplete emptying of the bladder

6) Leakage of urine (incontinence) during coughing, straining or sneezing.

7) Vaginal discharge or bleeding

8) Feeling of loosening of the vaginal tone during sexual intercourse

Prevention

It may be difficult to prevent the occurrence of an utero-vaginal prolapse. However, the following strategies may reduce the incidence of a prolapse:

1) Pelvic floor exercise: Performing pelvic floor exercise on a regular basis will help strengthen the pelvic floor muscles. This is especially important after childbirth.

2) During labour: Avoid bearing down (pushing) before the cervix is fully dilated

3) Treat and prevent constipation. Drink plenty of water and eat high fibre food

4) Control chronic cough

5) Avoid lifting heavy objects. Use your legs instead of your waist and back when lifting.

6) Maintain an ideal body weight

Treatment

There are several treatment options

1) Pelvic floor exercise

In a mild form of utero-vaginal prolapse, pelvic floor exercises may assist in strengthening the pelvic floor muscles. This may not improve the prolapse but may slow down the worsening of prolapse.

2) Pessary

A pessary is a plastic ring that can be placed in the vagina to push the cervix and uterus up. This method is suitable for women who cannot undergo surgery, due to other health problems and those who are not sexually active. The pessary will need to be cleaned and replaced regularly. Most women can lead a healthy life style with the pessary. Oestrogen cream is usually given to keep the vaginal tissue moist and to prevent ulceration of the vagina.

Figure 10.8 (a) Vaginal Pessary
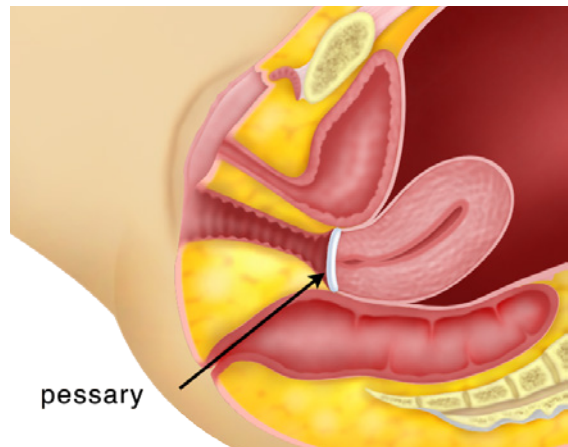
Figure 10.8 (b) Vaginal pessary inserted

3) Surgery

There are many different surgeries that can be performed for utero-vaginal prolapse. Surgery can either be done via the vaginal route or the abdomen. Surgery via the abdominal route can be performed either by a laparotomy or by laparoscopy.

a) Vaginal Route

There are several surgeries that can be performed via the vaginal route (surgery through the vagina). This includes vaginal hysterectomy and pelvic floor repair, Manchester repair and vaginal mesh placement.

i) Vaginal Hysterectomy and Pelvic Floor Repair

This surgery is performed on women who have completed their families (no desire to have any more children) and are not keen on retaining their uterus. This is the most common surgery performed for utero-vaginal prolapse. Vaginal hysterectomy is usually performed under spinal anaesthesia. The entire surgery is performed via the vaginal route. If there is an associated cystocoele (bladder descent), the bladder is separated from the vaginal skin and then the tissues are sutured together so as to push the bladder into the abdomen. This surgery is called anterior colporrhaphy. If there is a rectocoele or enterocoele, these can be repaired as well.

The advantage of this surgery is that it is generally an easy operation that can be performed under spinal anaesthesia. The postoperative recovery is quicker as there are no abdominal incisions (no cut in the tummy). The disadvantage of this operation is that the incidence of recurrence of the prolapse is high especially in women who have poor pelvic tissues for support. Another disadvantage is that the vagina becomes narrow and this may lead to painful sexual intercourse, postoperatively. It is also difficult to remove the ovaries vaginally.

ii) Manchester Repair

This surgery can be performed on patients who have a mild prolapse and wish to retain their uterus. In this surgery, part of the cervix is removed and part of the support of the uterus (namely the cardinal and uterosacral ligaments) are tightened and attached to the cervix to push the uterus into the abdomen.

iii) Vaginal Mesh placement

A mesh is a synthetic, permanent material with many holes in it. The mesh provides additional support by allowing the body's own tissue to grow into it. In utero-vaginal prolapse, the mesh is usually placed after a vaginal hysterectomy. It is placed under the vaginal skin (above the vagina). To keep the mesh in place, the mesh may have "arms " that exit through a few small incisions made additionally at the thigh and/or buttocks. Many different types of mesh are available in the market. The advantage of vaginal mesh placement is that it is placed vaginally and so the operation is relatively simple. The chances of recurrence of prolapse are fewer with meshes as compared to just using sutures to support the vaginal vault. However, there are several possible complications with vaginal mesh placement. This includes mesh exposure, which may lead to vaginal discomfort during sexual intercourse and blood staining or spotting. Some women may suffer buttock and groin pain or chronic vaginal pain. There is also a possibility that the mesh may become infected.
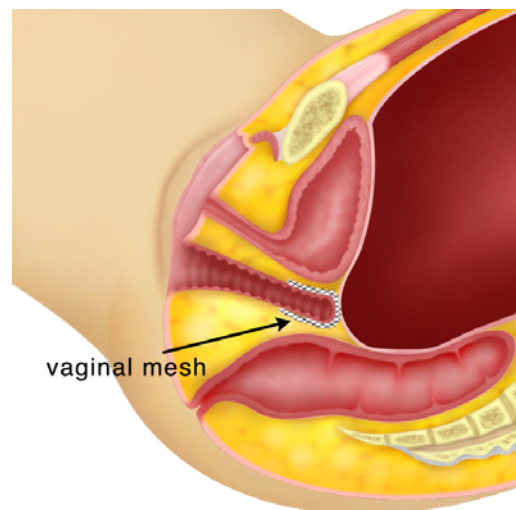
Figure 10.9 Vaginal mesh

b) Abdominal Route

Surgery via the abdominal route can either be by laparotomy or laparoscopy. Laparoscopy is often advised. The laparoscopic route is the preferred choice. Different types of surgery can be performed. There are 2 ways of reinforcing the tissues that support the uterus. The first is to use mesh and the second is to use sutures. Surgery can be done with or without the removal of the uterus. If a mesh is used, it is usually sutured to the uterus, cervix or vaginal vault and then attached to the sacral promontory (g) (sacrocolpopexy).

If sutures are used, usually non-absorbable sutures are used to:

      i) attach the levator ani muscles to the vagina

      ii) attach the sacrospinous ligament to the vagina

      iii) shorten and attach the uterosacral ligaments together and to the vagina.

The different combinations of surgeries are listed below:

      With hysterectomy

      i) Subtotal hysterectomy and sacrocolpopexy

      ii) Total laparoscopic hysterectomy and sacrocolpopexy

      iii) Total laparoscopic hysterectomy and sacrospinous fixation of the vaginal vault

      Without hysterectomy

      i) Plication of the uterosacral ligaments and round ligaments

      ii) Sacrocolpopexy with retention of the uterus

Post hysterectomy; Vaginal vault prolapse

1) Sacrocolpopexy of vaginal vault for vaginal vault prolapse

2) Vaginal vault suspension with sutures

All these surgeries are discussed in detail in chapter 32.

Generally, surgery is not recommended in women who want to conceive again because pregnancy and childbirth will disrupt any repair that has been performed. A pessary may be a better choice for these patients

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Uterovaginal prolapse

https://vimeo.com/149728206

Summary

Utero-vaginal Prolapse is a condition whereby the uterus protrudes down the vagina and sometimes out of the vaginal opening (introitus). There are 3 degrees of utero-vaginal prolapse. It may be associated with a cystocoele (descent of the bladder, a rectocoele (descent of the rectum) and/or enterocoele (descent of part of the intestines through the back part of the uterus). Treatment will depend on the symptoms ranging from just pelvic floor exercises, to using a pessary or surgery. Surgery can be done vaginally or abdominally, with the aid of a laparoscope.

Chapter 11

Congenital Uterine Abnormalities

Chapter 11: Congenital uterine abnormalities

There are many commonly used terms to describe the many different types of uterine abnormalities:

1) Hypoplasia/Agenesis

2) Unicornuate Uterus

3) Uterine Didelphus

4) Bicornuate Uterus

5) Septate Uterus

6) Arcuate Uterus

7) Diethylstilbestrol drug related

Development of the female reproductive tract

Sexual differentiation begins early in the foetal period of pregnancy (while a foetus is still in her mother's womb). The male and female genital systems are identical up until the sixth week of life. There are two pairs of symmetrical genital ducts, the mesonephric (Wolffian) duct and the paramesonephric (Mullerian) ducts. The Wolffian ducts form the male reproductive system and the Mullerian ducts form the female reproductive system. In the female embryo, the Wolffian ducts begin to degenerate but allow the maturation of the Mullerian ducts. The two Mullerian ducts grow and fuse in the centre to become the uterus, ligaments and fallopian tubes. Congenital uterine abnormalities at this point occur because of a failure to complete the bilateral duct elongation, fusion, canalisation or septal resorption of the Mullerian ducts

1) Hypoplasia/Agenesis

Occurs when the uterus is not present. The vagina may or may not be present. This condition is known as Rokitansky-Kuster-Hauser syndrome.

2) Unicornuate Uterus

Can be seen when only one side of the Mullerian duct forms. The uterus has a typical "penis shape" on imaging systems such as ultrasound or MRI. Sometimes it looks like a rudimentary (simple) horn. If this rudimentary horn has a cavity, the patient may have unilateral cyclical pelvic pain, secondary to blood collecting in the cavity and being unable to flow out of the uterus. This condition has a high rate of spontaneous abortions and premature deliveries.
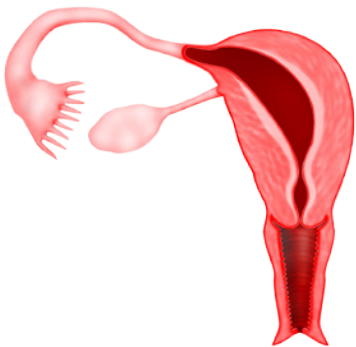
Figure 11.1(a) Unicornuate uterus
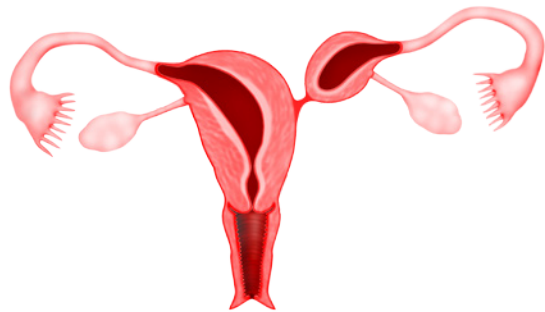
Figure 11.1 (b) Unicornuate uterus with a non-commiunicationg uterine horn

3) Uterine Didephus

Is evident when both the Mullerian ducts develop but fail to fuse, thus the patient has a "double uterus". This may be a condition with a double cervix and a vaginal partition. Patients with this condition also have a higher incidence of spontaneous abortions and premature birth.
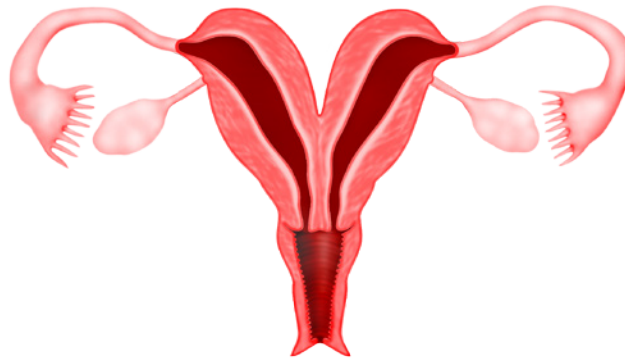
Figure 11.2 Uterine didelphus

4) Bicornuate uterus

Occurs when only the upper part of the Mullerian system (that forms the uterus) fails to fuse, thus the lower part of the uterus is normal, the upper part has 2 parts (bifurcated). The uterus is "heart-shaped". There is a single cervix. This anomaly is a result of incomplete fusion of the uterine horns at the level of the fundus (g).
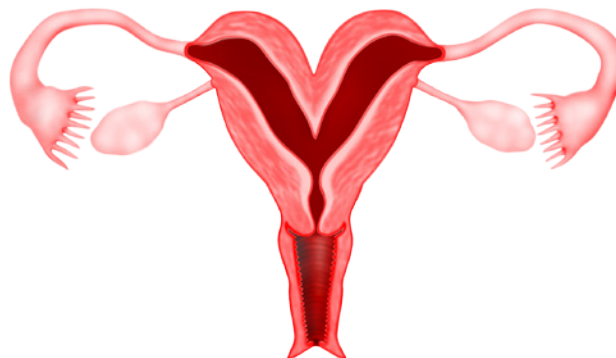
Figure 11.3 Bicornuate uterus

5) Septate Uterus

This happens when the two Mullerian ducts fuse, but the partition between them is still present, splitting the system into two parts. With a complete septum (g) the vagina, cervix and uterus can be partitioned. Usually the septum affects only the upper part of the uterus. A uterine septum is the most common uterine malformation and a cause for miscarriages. This condition can be corrected by hysteroscopy (see Chapter 40)
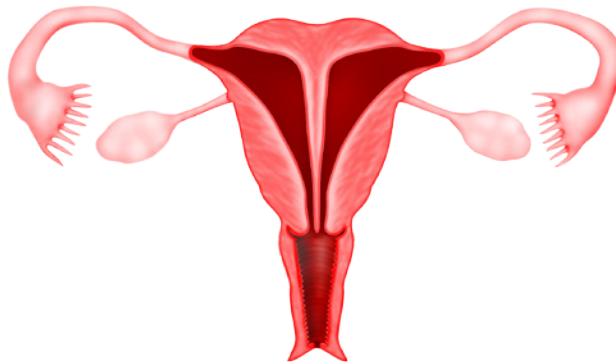
Figure 11.4 Septate Uterus

6) Arcuate Uterus

Occurs when the near-complete resorption of the uterovaginal septum leaves a mild concave indentation of the endometrial cavity, at the level of the fundus, giving the uterus an arcuate (g) configuration.
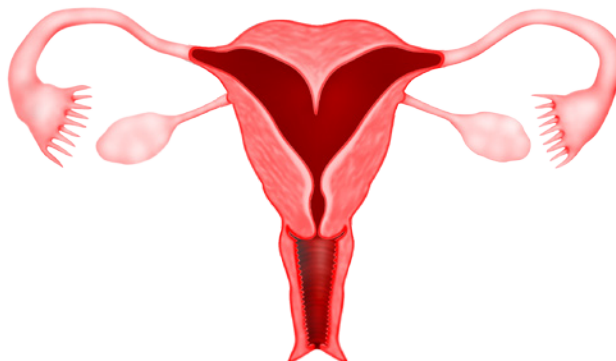
Figure 11.5 Arcuate uterus

7) Diethylstilbestrol (DES) drug related

DES is an orally active synthetic oestrogen that was introduced in the 1940s for the treatment of recurrent pregnancy loss and premature delivery. Women exposed to this medication have children with uterine abnormalities and the most common abnormality is a T-shaped uterine cavity. Other abnormalities include a small uterus, constriction rings and intrauterine filling defects. This drug has been banned in the use in pregnancy since 1971.

Prevalence

The prevalence (incidence) of uterine malformation is estimated to be 6.7% in the general population. It is slightly higher (7.3%) in the infertility population, and significantly higher in the population of women with a history of recurrent miscarriages (16%).

Cause

In a majority of cases, the cause of a congenital uterine anomaly is unknown.

Symptoms

Many women with congenital uterine abnormalities have no symptoms. It is detected during a routine ultrasound examination. However, some symptoms women with uterine abnormalities may experience are:

1) Dysmenorrhoea - Pain during menses

2) Recurrent miscarriages or recurrent preterm deliveries

3) Primary amenorhoea - no menses at all

1) Dysmenorrhoea

Some women with uterine abnormalities may experience with severe pain during menses. There are several causes for this dysmenorrhoea. These women have a tendency to develop endometriosis, with blood in the fallopian tubes (hematosalpinx) and endometriotic cysts. In some women with a rudimentary horn and cavity, there is bleeding in the rudimentary cavity but there is no outlet for the menstrual blood to flow out of the vagina. This may cause pelvic pain during menses.

2) Recurrent miscarriages or recurrent preterm deliveries

Congenital uterine abnormalities are also more often seen in patients with recurrent miscarriages. The septate uterus is the most common abnormality and one with the worst reproductive outcome. However, this abnormality is the one most amenable to hysteroscopic correction.

3) Primary amenorhoea

There are several conditions that can cause a girl to not have her menses at all. Imperforate hymen is a simple condition in which there is no opening in a thickened hymen and menstrual blood collects in the vagina. This is easily diagnosed with an ultrasound scan and the hymen can be cut with 2 incisions like a cross (cruciate incision) to correct this condition. Other conditions are partial or complete absence of the vagina and absence of the cervix. These are more complex problems.

Case 11.1 : Twin pregnancies with IVF in a lady with a complete uterine septum

GWN, a 26 year old lady, saw me in 2001 for infertility. She had been married for 2 years. Examination and ultrasound showed a midline septum in the vagina. She also had double cervix. She underwent a laparoscopy and hysteroscopy. She had a single transversely elongated uterus with a complete vaginal midline septum and double cervix. She also had a complete midline uterine septum (Figure 11.4). Both the uterine cavities could be seen and were of normal size and capacity. Both fallopian tubes were patent (g). Incision of the vaginal septum was done. After the surgery she had difficulty conceiving. She received several courses of clomiphene citrate to induce ovulation but it was without any success. She underwent 2 cycles of intrauterine insemination (IUI) (g) without any success as well. In 2003 she underwent an invitrofertilization (IVF) cycle. One embryo was transferred into each uterine cavity and she conceived twins. She underwent an elective Caesarean section and delivered a pair of twins, a baby boy and a baby girl in 2004.

Discussion

Since this patient had double cervix, a midline complete uterine septum and 2 uterine cavities of normal size and capacity, a decision was made not to cut the uterine septum. If she had had only one cervix and a midline uterine septum, then excision of the uterine septum would have been an option to reduce the incidence of miscarriage.

Case 11.2 : Excision of non-communicating rudimentary horn of the uterus

KV, a 22 year old lady who had not had sexual intercourse before (virgo intacta), presented with a history of pain after menses for 3 months. She attained menarche at the age of 15 and never had dysmenorrhea before. Her menstrual flow was normal and regular. Transabdominal ultrasound showed a cystic mass measuring 2.80 x 3.16 cm on the right side, which appeared like a right endometrioma (Figure 11.11). She underwent a laparoscopy. A globular swelling was found attached to the uterus on the right side (Figure 11.12). The ovaries and fallopian tubes were normal. The right fallopian tube appeared to arise from the uterus and not from the globular mass. There was minimal endometriosis on the back (posterior) aspect of the uterus. A needle was used to aspirate the mass and brownish fluid resembling endometriosis was obtained. She was diagnosed with non-communicating uterine horn. As I did not have any consent to excise the uterine horn I did not proceed with the excision of the rudimentary horn.

The findings were discussed with the patient and her parents. She underwent a magnetic resonance imaging (MRI) scan, which clearly showed that the mass was a non-communicating rudimentary horn. I obtained consent to perform a hysteroscopy during the second laparoscopy. The hysteroscopy was performed without injuring the hymen and a dye was injected directly into the right tubal ostium. The right tube was found to be patent. The uterine horn was then excised and the defect sutured (Figures 11.2 and 11.3). Postoperatively, she has been well with no dysmenorrhea. (watch video 11.2 Excision of non-communicating rudimentary horn)

Discussion

There are many reasons for having pain during menses (dysmenorrhea). In this patient a cystic mass was seen on transabdominal ultrasound. As the right ovary could not be visualised, it was assumed that the lesion was an endometrioma. A transvaginal ultrasound would have clearly shown the right ovary and that this lesion was part of the uterus and not the ovary. When a cystic mass is seen on ultrasound, one must not conclude that it is of ovarian origin. In a virgo inacta patient where a transvaginal ultrasound cannot be done and a transabdominal ultrasound can be misleading, a 3 D ultrasound or MRI can confirm the diagnosis of a non communicating rudimentary horn.

Diagnosis

Diagnosis of uterine abnormalities can be done with a routine ultrasound. Uterine didelpus and bicornuate uterus can be easily seen on a 2D ultrasound. A septate uterus can be more difficult to diagnose with a 2D ultrasound but can be confirmed with a MRI or a 3D ultrasound (especially if addition of fluid in the cavity is done while performing the 3D ultrasound). Sometimes a diagnosis of uterine abnormalities can be made on a routine hysterosalpingogram (HSG). A diagnostic hysteroscopy can also confirm the diagnosis of uterine abnormalities (see Chapter 40). It is important to note that women with uterine abnormalities may also have abnormalities of the renal system such as the absence of one kidney or have abnormal kidneys or abnormally placed kidneys.
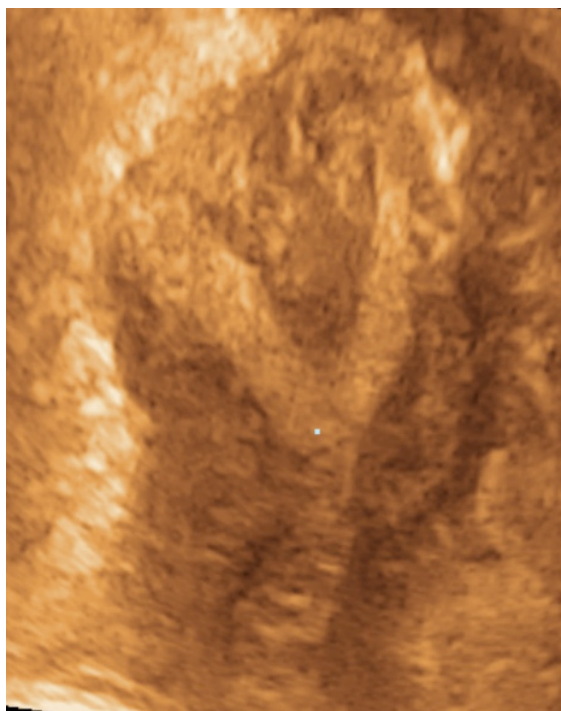
Figure 11.6 3D Ultrasound showing a septate uterus
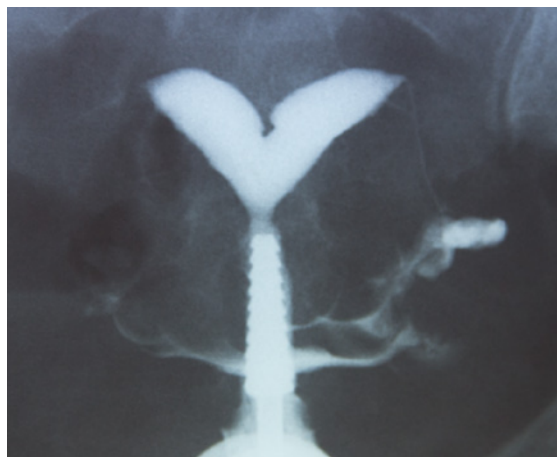
Figure 11.7 3D Ultrasound showing a septate uterus
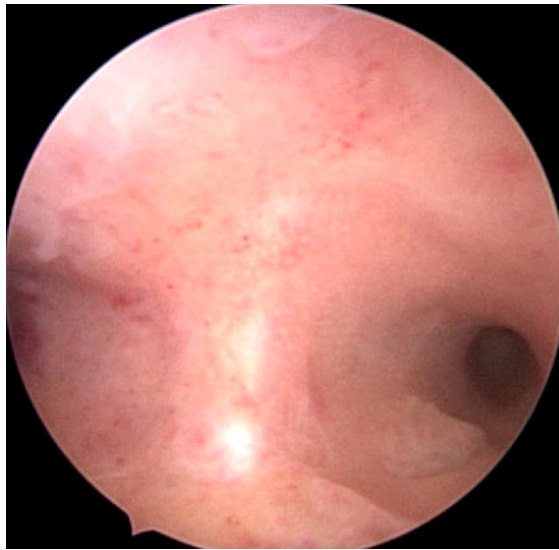
Figure 11.8 hysteroscopy showing a uterine septum
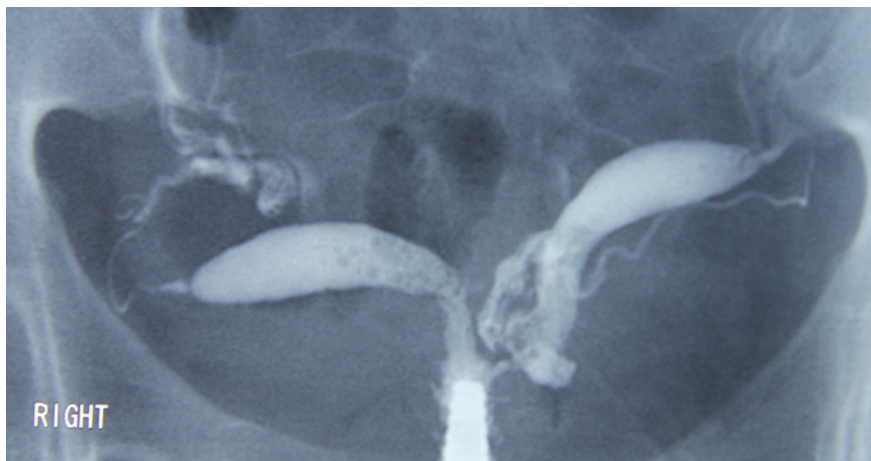
Figure 11.9 HSG showing a bicornuate uterus
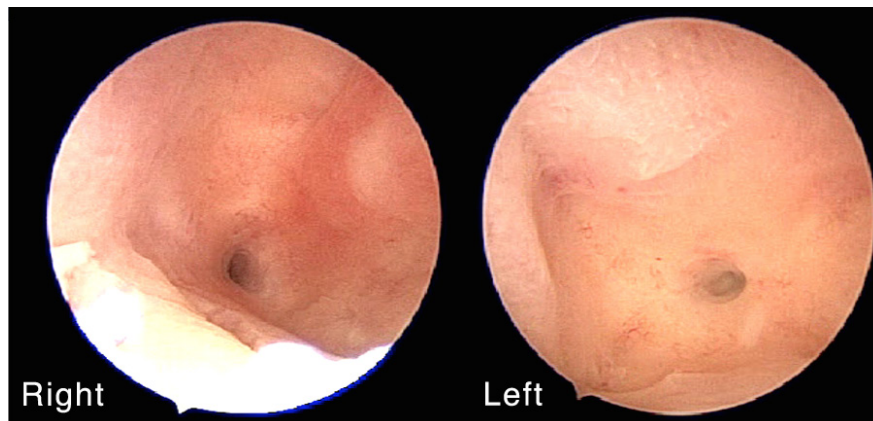
Figure 11.10 Hysteroscopy showing the right and left cornue of a bicornuate uterus
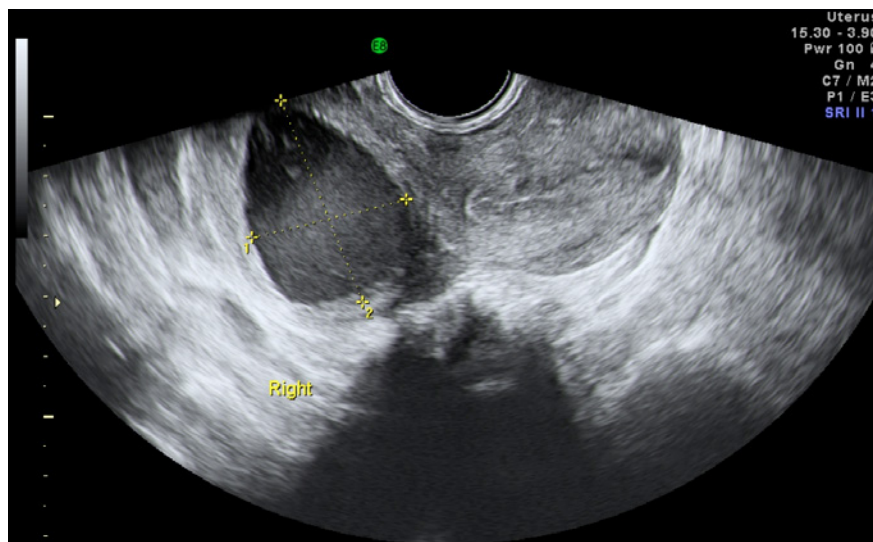
Figure 11.11 Ultrasound showing a non-communicating rudimentary horn

Treatment

Treatment will depend on the symptoms of the patient. Many patients with uterine abnormalities will not require any treatment at all. They will be able to conceive spontaneously and will be able to carry the foetuses to full term and deliver the baby normally. However, surgery may be indicated in the following conditions:

1) Dysmenorrhoea

In patients with a rudimentary cavity, laparoscopic surgery can be performed to remove the rudimentary horn. In patients with a rudimentary horn which is in communication with the fallopian tubes but not the vagina, endometrioma and hematosalpinx, may occur. In these patients removal of the uterine horn will cure the disease.

Scan Me

Watch Video 11.2

Excision of noncommunicating uterine horn

https://vimeo.com/159012375
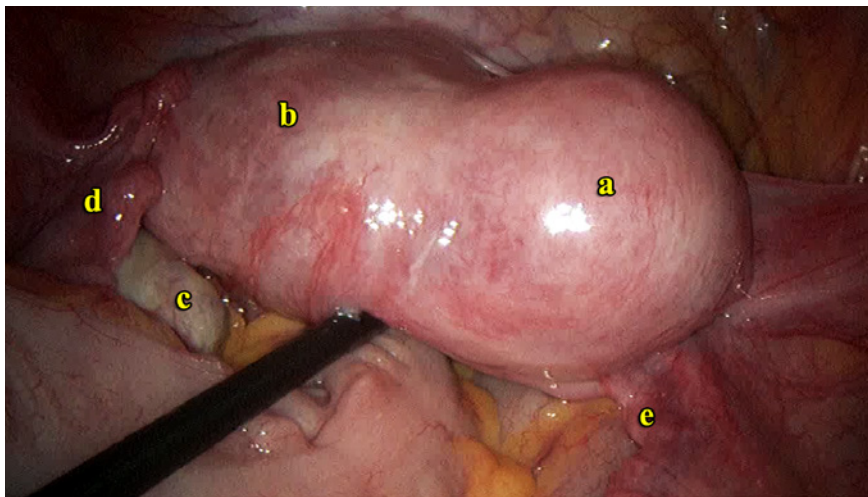
Figure 11.12 (a) non communicating rudimentary horn, (b) uterus, (c) left ovary, (d) left tube, (e) right tube
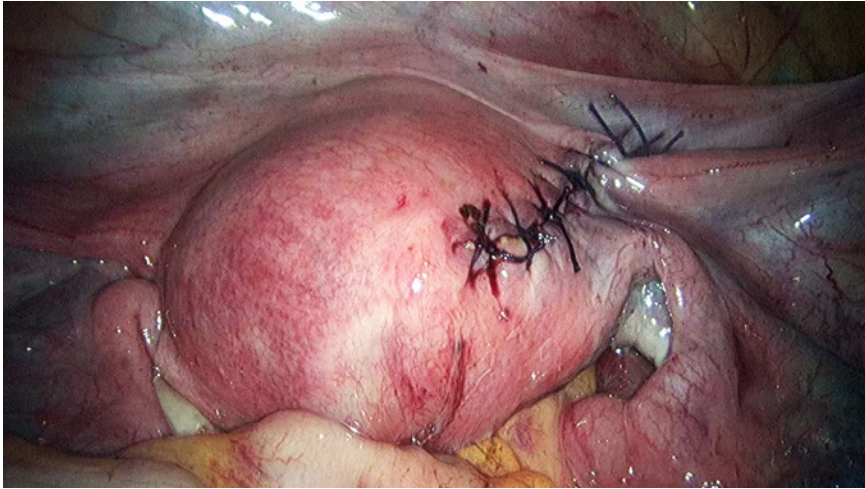
Figure 11.13 Uterus after excision of the rudimentary horn

2) Recurrent abortions or recurrent preterm deliveries

Uterine septum is the most common congenital uterine abnormality that causes recurrent abortions or recurrent preterm deliveries. Other causes are unicornuate uterus or bicornuate uterus. These conditions used to be corrected by a surgery called metroplasty, in which the septum is removed laparoscopically or by laparotomy and the uterine cavity is unified. This surgery is rarely performed now. Hysteroscopic resection of the septum is the operation of choice now (see Chapter 40 - Septoplasty)

Scan Me

Watch Video 11.1

Congenital Uterine Abnormalities

https://vimeo.com/159012013

Summary

Many women with congenital uterine abnormalities do not know that they have this condition. They do not have any medical or gynaecological problems and conceive and deliver their babies normally. These abnormalities may be diagnosed during a routine ultrasound. However in patients with recurrent miscarriages, preterm deliveries or infertility (if such conditions are diagnosed), surgical treatment may be contemplated. The best surgery available now is hysteroscopic resection of a uterine septum. This can be done with the assistance of an ultrasound or laparoscopy.

Chapter 12

Cancer of the Endometrium

Chapter 12: Cancer of the Endometrium

Cancer of the endometrium is a cancer that develops from the inner lining of the uterus (endometrium). The most common endometrial cancer is carcinoma, which arises from the single layer of epithelial cells that line the endometrium, and forms the endometrial glands. Endometrial cancers are sometimes called uterine cancers. Although endometrial cancers are the most common type of uterine cancers, there are other types of uterine cancers as well.
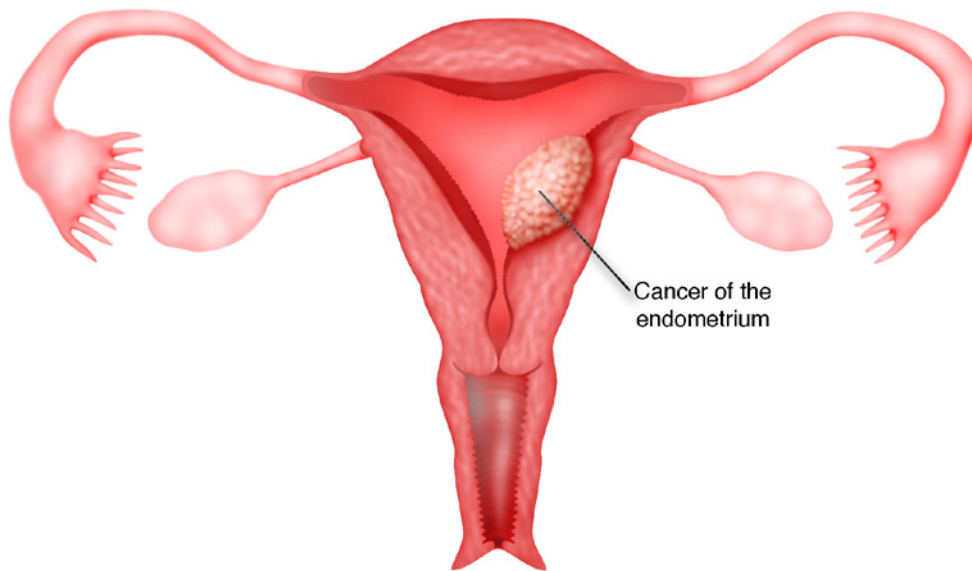
Figure 12.1 Cancer of the endometrium

Endometrial cancer is often detected at an early stage because women usually consult a doctor early when there is abnormal uterine bleeding. If endometrial cancer is discovered early, surgical treatment can cure the disease.

Incidence

The incidence of endometrial cancer is rising all over the world. It appears most frequently in women between the ages of 55 and 65, and is uncommon in women below the age of 40.

Cause

The cause of endometrial cancer is unknown. It may be a result of genetic mutation causing the endometrial lining cells to grow and multiply at an abnormal rate.

Risk factors

1) Increased exposure to oestrogen

The ovaries produce oestrogen and progesterone. An increase in level of oestrogen that is not balanced by progesterone may increase the risk of developing endometrial cancer. This happens to women

  a) with polycystic ovarian syndrome. Oestrogen levels, in patients' with this condition are high and they have a slightly increased risk of endometrial cancer.

  b) who are obese. In obese women, the fat cells is a place for the conversion into oestrogen.

  c) who start menstruation early (before 12 years of age) and/or have late menopause (after 55 years of age). These women have more menses in their lifetime. They are exposed to a longer duration of oestrogen and thus have a higher risk of endometrial cancer.

  d) who have never been pregnant before. Women who have never been pregnant have a higher chance of developing endometrial cancer

2) Older Age

The risk of endometrial cancer is higher in older women than in younger women

3) Tamoxifen treatment for breast cancer

Women who are on tamoxifen for the treatment of breast cancer have a higher risk of endometrial cancer.

4) Diabetes

There is a slightly higher risk of developing endometrial cancer

5) Diet

A western diet high in fat may increase the risk of endometrial cancer

Symptoms

1) Vaginal bleeding and/or spotting after menopause

2) Prolonged periods

3) Bleeding in between periods

4) Lower abdominal pain or pelvic cramping.

5) Abnormal watery or blood stained vaginal discharge

6) Pain during sexual intercourse

Diagnosis

Irregular and prolonged menses are common symptoms around the time of menopause. These do not indicate endometrial cancer and gynecological examination will not reveal many abnormalities. The cervix will be normal and the uterus will also feel normal. There is a misconception that a normal pap smear precludes endometrial cancer. A pap smear is only for the detection of cervical cancer and not for the detection of endometrial cancer.

Other investigations will include:

Transvaginal ultrasound

Ultrasonography will show the thickness of the endometrium. A thick endometrium and/or the presence of endometrial polyps may raise the suspicion of a endometrial cancer.
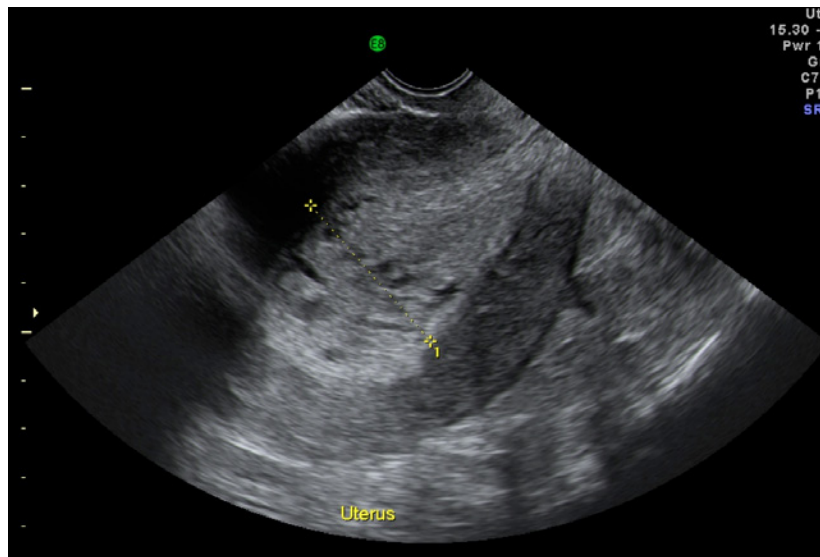
Figure 12.2 Ultrasound of the uterus showing thickened endometrial cavity
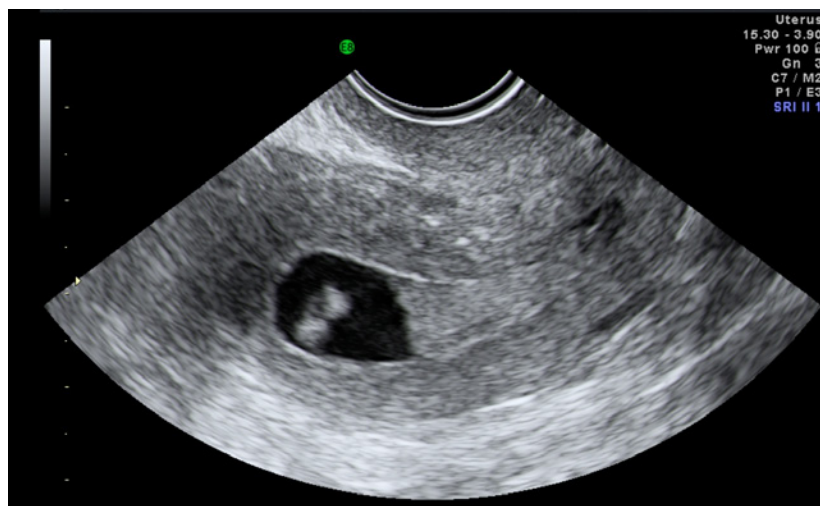
Figure 12.3 Ultrasound showing thickened endometrial cavity with fluid

Endometrial biopsy

In endometrial biopsy, a fine tube is passed into the endometrial cavity (without anaesthesia) to aspirate some of the endometrial tissues for histopathological (g) examination. This procedure is done in the clinic.

Hysteroscopy

In hysteroscopy, a fine telescope is passed through the cervix and the uterine cavity to visualize the endometrial cavity. Biopsies can be taken from abnormal areas (see chapter 36).

Dilatation ad Curettage

A fine instrument is passed into the endometrial cavity to scrape of all the endometrial lining for assessment. This is usually performed under general anaesthesia and can be performed after a hysteroscopy.

Staging

Once the cancer has been diagnosed, tests will be conducted to determine the stage of the disease. These tests may include blood tests, chest X-ray and even a CT (computerized tomography) scan. However, the final staging of the disease is usually made only after surgery.

Stages of endometrial cancer:

Stage I cancer is found only in the uterus.

Stage II cancer is present in both the uterus and cervix.

Stage III cancer has spread beyond the uterus, but hasn't reached the rectum and bladder. The pelvic lymph nodes may be involved.

Stage IV cancer has spread past the pelvic region and can affect the bladder, rectum and more distant parts of your body.

Treatment

Treatment will depend on the stage of the disease and the health of the patient.

Surgery

Surgery is the mainstay of the treatment for endometrial cancer. Surgery will involve the removal of the uterus (hysterectomy) and the ovaries as well as and the fallopian tubes (salpingo-oophrectomy). This surgery can be performed laparoscopically. (see chapter 33 and 34) During the surgery the pelvis and abdomen will be inspected to see whether there are any signs of cancer spread. Lymph nodes may be removed for testing for evidence of spreading of the cancer. In women who are in the early stage of cancer of the endometrium, surgery is sufficient. There is no need for chemotherapy or radiation.

Radiation

Radiation therapy is necessary in patients whose cancer has spread. Sometimes, even in early cancer, radiotherapy may be recommended to reduce the chances of recurrence. In women who are medically unfit to undergo surgery, radiation may be recommended. In advanced cancer, radiation may help in the control of cancer related pain.

Hormone therapy

Hormone therapy may be necessary, especially in women who have advanced cancer. The medication can be synthetic progesterone to increase the amount of progesterone in the body, or medication to reduce the amount of oestrogen in the body.

Chemotherapy

Chemotherapy may be necessary especially in advanced cancer of the endometrium.

Survival rates

The 5-year survival rates for endometrial adenocarcinoma following appropriate treatment are

Stage	5 year survival rate
1	75 - 90%
2	69%
3	47% - 58%
4	0 - 17%

Prevention

1) Maintain a healthy body weight

2) Exercise often

3) Use of birth control pills: Taking oral contraceptive pills even for 1 year decreases the risk of endometrial cancer.

4) Progesterone in Hormone replacement Therapy is important to reduce the risk of endometrial cancer

Summary

Cancer of the endometrium is a cancer that develops from the inner lining of the uterus (endometrium). Cancer of the endometrium is usually detected early because it presents with abnormal per vaginal bleeding. Diagnosis can be suspected during a transvaginal ultrasound and confirmed with a biopsy of the endometrium. Surgery (removal of the uterus and ovaries) is the mainstay of treatment. In advanced stages the patient may require radiotherapy and chemotherapy

Chapter 13

Cancer of the Cervix

Chapter 13: Cancer of the Cervix

The cervix is the lower constricted segment of the uterus that joins the upper part of the vagina. It consists of 2 parts. The part of the cervix that extends into the vagina is called the ectocervix or porto vaginalis. It is about 3 cm long and 2.5 cm wide. It is lined by flat, fish scale-like cells called the squamous cells. The part of the cervix that is above the vagina is called the endocervix. The endocervix is lined by box-like glandular cells called the columnar cells. The junction between these 2 types of cells is called the transformation zone. This is the part of the cervix that is prone to develop cancer of the cervix.
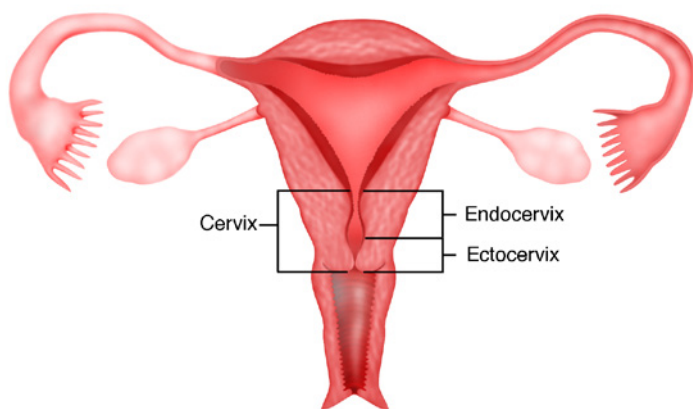
Figure 13.1 Cervix showing ectocervix and endocervix
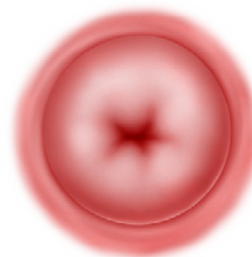
Figure 13.2
Ectocervix seen from the vagina

Types of cancer of the cervix

There are many types of cancer of the cervix
but the 2 most common types are:

1. **Squamous Cell Cervical Cancer**
   which arises from the squamous cells of the ectocervix

2: **Adenocarinoma of the Cervix**
   which arises from the glandular cells of the endocervix.
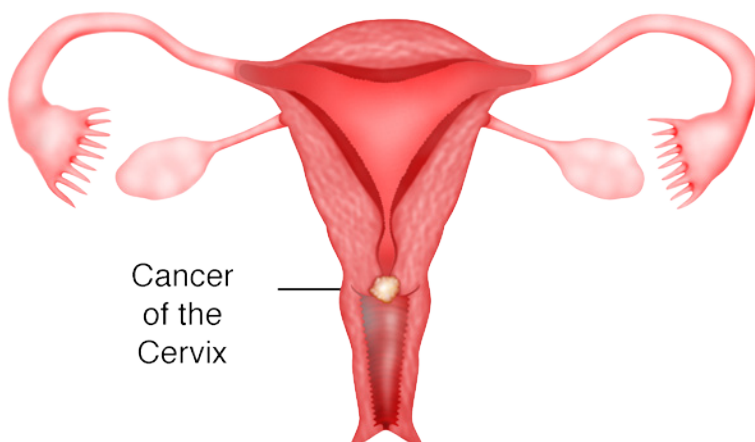
Figure: 13.3 Cancer of the cervix
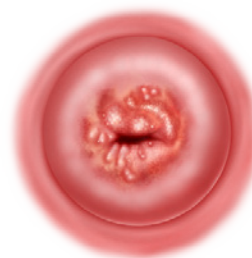
Figure 13.4: Cancer of the Cervix

Incidence

Due to successful implementation of cervical screening programmes (Pap smear), the incidence of cancer of the cervix is declining worldwide. However, the rate is still high in developing countries. The peak age is 45 - 60 years and its incidence decline after that but peaks again at 80 years of age.

Cause

Cancer of the cervix is thought to be caused by the Human Papilloma Virus (HPV). HPV is a sexually transmitted virus. There are over 100 different types of HPVs - 15 types of these can cause cancer of the cervix in 99% of cases. Approximately, HPV 16 and 18 cause 70% of cases of cancer of the cervix.

Risk Factors

1) Women with multiple sexual partners have a higher risk.

2) Becoming sexually active early

3) Smoking

4) Weakened immune system

5) Women with more children (multiparous) have a higher chance of developing cancer of the cervix than women who have never had children

6) Long term use of contraceptive pills increases the risk slightly.

7) Women of lower socioeconomic status have a higher risk of cervical cancer compared to women of upper socio-economic status.

8) Women who are married to men with multiple sexual partners have a higher risk of cervical cancer

9) Women who are infected with other sexually transmitted diseases such as chlamydia, gonorrhoea or syphilis have a higher risk of developing cervical cancer.

Symptoms

1) Vaginal bleeding after sexual intercourse

2) Abnormal watery or blood stained vaginal discharge

3) Bleeding between periods

4) Bleeding in post-menopausal women

5) Pelvic pain

6) Smelly vaginal discharge

7) Some patients may not have any symptoms at all and yet be diagnosed with cancer of the cervix during a routine cervical smear

Diagnosis

In patients with an obvious cervical lesion, a punch biopsy (g) of the lesion can be done for histopathological (g) examination. If the lesion is not obvious, a colposcopy (g) should be performed and biopsies can be taken. Sometimes a cone biopsy (g) may be necessary to confirm the diagnosis.

Staging of cancer of the cervix

Once the diagnosis of cancer of the cervix has been made, staging of the cancer is necessary. Several tests may be necessary to stage the cancer.

1) **Pelvic ultrasound**
Transabdominal and transvaginal ultrasound can give an idea of the size of the uterus and ovaries and whether there is any spread of the cancer.

2) **CT (computerized tomography) scan or MRI (magnetic resonance imaging) scan**
A CT scan or MRI scan can be done to see the size of the tumour and to see the extent of the spread of the tumour

3) **Examination under anaesthesia**
If a patient is under anaesthesia, the doctor can examine the vagina, cervix and rectum more thoroughly. A cystoscopy can be performed to see whether the cancer has spread to the urinary bladder. A rectal examination and a proctosigmoidoscopy may be performed to see whether the cancer has spread to the rectum.

Stages of cancer of the cervix

Stage 1: The cancer is confined to the cervix

Stage 1A   : the cancer can only be visualised through a microscope.

Stage 1A1 : the depth of the cancer is less than 3 mm and the width is less than 7 mm

Stage 1A2 : the depth is between 3- 5mm and the width is less than 7 mm wide

Stage 1B   : the cancer is larger and can be visualised by the naked eye but is confined to the cervical tissue and has not spread

Stage 1B1 : the cancer is no larger than 4 cm

Stage 1B2 : the cancer is larger than 4cm

Stage 2: The cancer has spread to the top of vagina or has reached the tissue around the cervix (parametrium).

Stage 2A   : the cancer has reached the top of the vagina

Stage 2B   : the cancer has reached the tissue around the cervix (parametrium)

Stage 3: The cancer has spread to the lower third of the vagina and/or reached the pelvic wall

Stage 3A   : The cancer has reached the lower third of the vagina, but not the pelvic wall

Stage 3B   : The cancer has grown through the pelvic wall

Stage 4: The cancer has spread to the bladder or rectum or has spread further (lungs, liver and bones)

Stage 4A   : The cancer has reached the bladder or rectum (nearby organs)

Stage 4B   : The cancer has spread further, possibly the lungs, liver or bones

Treatment

Treatment will depend on the stage of the cancer and the health of the patient. Treatment includes surgery, radiotherapy, chemotherapy, combinations of radiotherapy and chemotherapy called chemoradiation or other combination therapies.

1) Surgery

Early cancer of the cervix can be treated by surgery.

Stage 1A1 cancer of the cervix can be treated by just a cone biopsy (g), simple hysterectomy or total laparoscopic hysterectomy (see chapter 33). Cone biopsy is a procedure whereby a cone shaped incision is made around the cancerous tissue and removed.
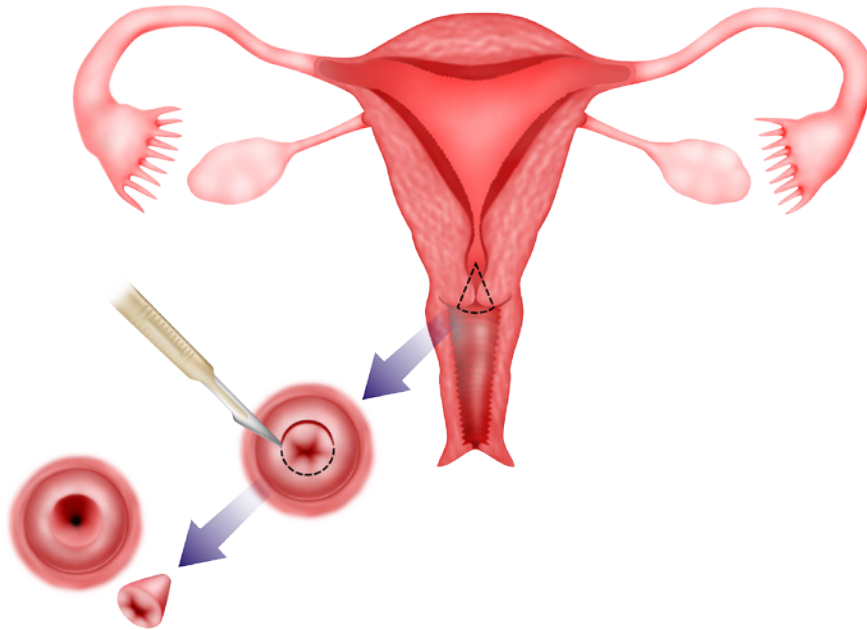
Figure 13.5 Drawing showing how a cone biopsy is performed

Stage 1B to 2A cancer of the cervix will require a radical hysterectomy and pelvic lymphadenectomy. These can be performed either by laparotomy or laparoscopy (see chapter 35). After the surgery, if on histopathological examination, it is found that the cancer has spread, additional chemotherapy and/or radiation may be necessary.

2) Chemotherapy and Radiotherapy

In patients with more advanced disease (stage 2B to stage 4), it is not possible to remove all the cancer by surgery. In these patients and in women who are not medically fit to undergo surgery, the usual mode of treatment is a combination of chemotherapy and radiotherapy.

Survival Rates

The 5-year survival rates for cancer of the cervix following appropriate treatment are

Stage	5 year survival rate
1	81.6%
2	61.3%
3	36.7%
4	12.1%

Prevention

In 70% of cases, HPV 16 and 18 cause cervical cancer. The HPV vaccine aims to reduce HPV infections in women.

Regular cervical screening (Pap smear) aims to pick up precancerous lesions early. Treatment of these precancerous lesions can prevent progression to cancer.

Summary

Cancer of the cervix is a preventable disease. It is thought to be caused by a virus called the Human Papilloma Virus. Early cervical cancer can be treated by surgery. In more advanced cases, however surgery is not possible and the patient will be treated with radiotherapy and chemotherapy.

Chapter 14

Cancer of the Ovary

Chapter 14: Cancer of the Ovary

Anatomy of the ovary

There are 2 ovaries and each ovary is small, oval-shaped and attached to each side of the uterus via a thin, fibrous ovarian ligament (see Chapter 1). A layer of cells called the epithelial cells covers the surface of the ovary. Below the surface of the ovary, embedded in the tissues of the ovary called the stroma, are many minute structures called follicles. These follicles develop during ovulation to release oocytes (eggs). The central portion of the ovary is made up of stroma and blood vessels (Please also see chapter 5 benign ovarian cyst and video 5.1).

Types of Cancer of the Ovary

Cancer of the ovary can arise from the 3 tissues of the ovary namely:

1) **The epithelial layer - Epithelial Cancer of the Ovary**

2) **The follicles of the ovary - Ovarian Germ Cell Tumours**

3) **The stromal layer of the ovary - Ovarian Sex Cord Stromal tumours**

1) Epithelial Cancer of the Ovary

Incidence and mortality

This is the most common ovarian cancer. Its peak incidence is from 70 to 74 years of age. It is rare below the age of 40. Due to its location in the abdomen, this cancer is usually diagnosed at a later stage and so death from this cancer (mortality rate) is the highest among all gynaecological cancers.

Risk Factors

a) Nulliparous (women who have not delivered before) have a higher risk than women who have delivered one or more babies (parous women).

b) Breast feeding reduces the risk of this cancer

c) Tubal ligation reduces the risk of this cancer as well.

d) In women who are infertile, medication to induce ovulation such as clomiphene citrate, if taken for more than 12 months, may increase the risk.

e) Taking oral contraceptive pills reduce the risk.

f) Early menarche and late menopause may increase the risk.

g) Hormone replacement treatment may increase the risk slightly.

h) Patients with a history of breast cancer have a higher risk of this cancer.

i) Risk of ovarian cancer is higher in women who have first degree relatives with ovarian cancer.

j) High intake of meat and animal fat increases the risk.

k) High incidence of ovarian cancer has also been attributed to obesity.

Cause

The cause of epithelial ovarian cancer is not known. It is believed to be due to a defect in the repair process of the surface epithelium after frequent ovulation.

Prevention

a) Oral Contraceptives: Taking oral contraceptive pills for a duration of at least 5 years reduces the relative risk of developing epithelial ovarian cancer by 50%.

b) Tubal ligation and hysterectomy reduce the risk as well.

c) Prophylactic oophorectomy (removing the ovaries) reduces the risk by 80%.

d) Genetic testing in patients with high risk of developing ovarian cancer.

Screening for ovarian cancer

There is no effective screening method to detect early ovarian cancer. The following screening tests have been evaluated:

a) Pelvic examination: This has limited value in detecting ovarian cancer.

b) Transvaginal ultrasound: Transvaginal ultrasound is sensitive in detecting lesions in the ovaries but it is not specific enough to say that the lesions are cancer.

c) CA125 (g) is a tumour marker (g) that is raised in many pelvic and abdominal conditions. It is not a specific marker for cancer of the ovary. This means that if it is raised it does not mean that the woman has ovarian cancer. There are many non-cancer diseases (eg endometriosis) that can cause a rise in CA 125. However, if it is done serially, a rise in its level may indicate ovarian cancer.

d) Multimodal screening: Several studies are ongoing in this area, looking at a combination of transvaginal ultrasound and CA125 to screen the population for ovarian cancer.

Types of epithelial ovarian cancer

a) Serous

b) Mucinous

c) Endometroid

d) Clear Cell

e) Transitional cell

f) Undifferentiated

Symptoms

a) abdominal discomfort, pain, distension

b) nausea,dyspepsia,constipation

c) irregular vaginal bleeding

Diagnosis

a) Abdominal examination: The abdomen may feel distended with fluid. Masses may be felt in the abdomen.

b) Pelvis examination: masses may be felt next to the uterus

c) Abdominal and transvaginal ultrasound: Ovaries may be seen to be enlarged with solid and cystic areas. Fluid may also be seen in the abdomen (ascites)

d) CT and MRI scans of the abdomen and pelvis: This may show ovarian masses with or without ascites. Nodules may be seen in other parts of the abdomen including the omentum and/or liver. Pelvic and/or paraaortic lymph nodes may also be enlarged.

Staging

Stage 1 : Growth limited to the ovary

        Stage 1A   : Limited to one ovary

        Stage 1B   : Limited to both ovaries

        Stage 1C   : Tumour 1A/1B with tumour on the surface or capsule rupture or malignant cell in ascites /peritoneal washout

Stage 2 : Growth involving one or both ovaries with pelvic extension

        Stage 2A   : Extension and/or metastases to the uterus and/or tube

        Stage 2B   : Extension to other pelvic tissues

        Stage 2C   : Tumour stage 2A/2B with tumour on the surface of ovaries or capsule rupture or malignant cell in ascites /peritoneal washout.

Stage 3 : Tumour in one or both ovaries with histologically confirmed extension outside the pelvis

        Stage 3A   : Tumour grossly limited to true pelvis with microscopical seedling

        Stage 3B   : Tumour of one or both ovaries with implants not exceeding 2cm in diameter

        Stage 3C   : Peritoneal metastasis of more than 2 cm

Stage 4 : Growth involving one or both ovaries with distant metastases.

Treatment

Treatment will depend on the stage of the disease, the health of the patient and whether fertility is to be preserved.

a) Surgery

Surgery is the mainstay of treatment in ovarian cancer. Sometimes the stage of the ovarian cancer can only be confirmed during surgery.

In patients with advanced cancer (stage 2 and above) surgery will involve removal of the uterus (hysterectomy), both the ovaries (salpingoophrectomy) and the omentum; a fatty layer of tissue within the abdomen (omentectomy). The lymph nodes in the pelvis and abdomen may also be removed. If the cancer has spread into the abdominal cavity, all visible cancer tissues will be resected.

If the cancer is only in one ovary and is of low malignant potential, than just removal of the ovary may be sufficient (salpingoophrectomy). This will preserve (not affect) fertility.
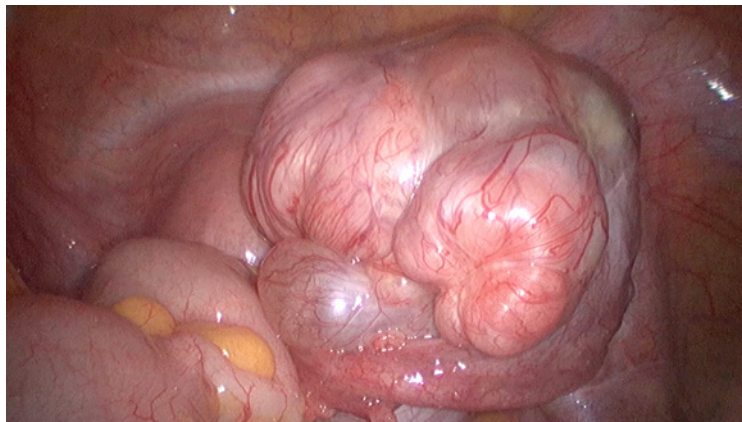
Figure 14.1 Laparoscopy showing
a right ovarian cancer

Figure 14.2 large ovarian tumor
at the time of surgery
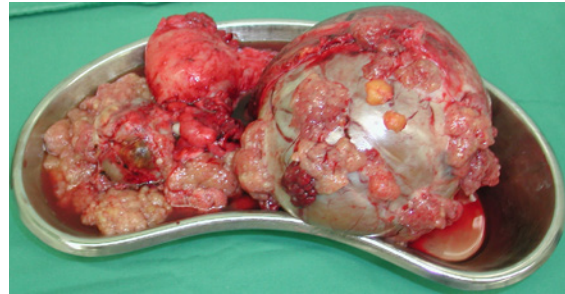
Figure 14.3 Surgery specimen
(Total abdominal hysterectomy and bilateral
salpingoopherectomy and omentectomy)

b) Chemotherapy

Chemotherapy is a procedure using anti-cancer drugs to kill cancer cells. This treatment is often given after surgery. Sometimes, especially in advanced ovarian cancer, chemotherapy may be given before surgery to shrink the tumour so as to make the surgery easier. This is called neoadjuvant chemotherapy.

There are many different drugs that can be given in chemotherapy for cancer of the ovary. Often, a combination is given. The choice of drug, and how and when it is given, depends on the stage of the cancer and how much it has spread. The most common treatment for ovarian cancer is a platinum-containing drug (carboplatin), which is used alone or in combination with other drugs such as paclitaxel.

Chemotherapy is usually given as a drip into the vein, but it is sometimes given as tablets. Some studies have looked into giving chemotherapy directly into the abdomen. This is called intraperitoneal chemotherapy. Most often, chemotherapy is given as outpatient treatment, but sometimes a short stay in hospital may be necessary. It is usually given in cycles, with a period of treatment followed by a period of rest, to allow the body to recover. Most women are given six cycles of chemotherapy.

Monitoring during chemotherapy

During chemotherapy, several things can be done to see whether the treatment is effective

a) If the CA125 is high before surgery or chemotherapy, but decreases after this indicates that the cancer is responding to chemotherapy.

b) If the tumour is visible on a CT or ultrasound scan when diagnosed, repeated scans may be done to see whether it has shrunk

c) Sometimes another operation, known as 'second-look surgery', can be carried out usually by laparoscopy to see whether the cancer has shrunk

If, after chemotherapy, all tests show that the patient is clear of cancer, then the patient is said to be in remission. This means that the cancer is under control.

Side effects of chemotherapy

Chemotherapy not only destroys cancer cells, it also destroys normal cells especially immune cells. Side effects include:

a) Infections

b) Loss of appetite

c) Nausea and vomiting

d) Tiredness

e) Loss of hair

f) Sore mouth

Many of these side effects can be prevented or controlled with medication

Chemotherapy for cancer that has relapsed (come back)

Ovarian cancer can relapse after treatment. If this happens, another course of chemotherapy may be necessary. The same drugs can be given again or a different combination of chemotherapy drugs may be administered. This is called second-line treatment. The choice of drugs will take into account which drugs were used in previous treatments, and the side effects and benefits of the drugs.

c) Radiotherapy

Radiotherapy is usually not used to treat ovarian cancer except in exceptional circumstances.

Prognosis

5 year survival rates are as follows

Stage	5 year survival rate
1	91.5%
2A	83.5%
2B	66.5%
3A	45%
3B	36%
4	14%

2) Germ Cell tumours of the ovary

Ovarian Germ cell tumours are tumours that arise from the cells that will become eggs (ovum) in the ovary. The majority of ovarian germ cell tumours are benign and are called dermoid cysts or mature teratoma (see chapter 5). Malignant ovarian germ cell tumours are rare accounting for 1-2 % of all ovarian malignancies.

Classification

There are many types of malignant Germ cell tumours of the ovary. The most common are:

       a) Dysgerminoma

       b) Yolk-sac tumours

       c) Immature teratoma

       d) Mixed germ cell tumours

Causes of germ cell tumours

The cause of germ cell tumours is unknown. Germ cells are a normal part of the ovary, but sometimes changes in these cells make them divide and grow too quickly to become a tumour.

Signs and Symptoms

a) Abdominal distension with a palpable abdominal mass

b) Acute abdominal pain due to twisted, haemorrhage or ruptured ovarian cyst.

c) Abdominal distension

d) Fever

e) Abnormal vaginal bleeding

f) Increasing need to pass urine

Diagnosis

Several tests can be performed to make a diagnosis of this tumour

a) Blood tests

Elevation of AFP (alpha-fetoprotein) and serum beta HCG (human chorionic gonadotrophin) is suggestive of ovarian germ cell tumours in young women.

b) Ultrasound scan

Ultrasound scans can be done both abdominally and transvaginally to look at pelvic organs. Enlargement of the ovaries can be visualised on ultrasound.

c) CT (computerised tomography) scan

A CT scan may be performed to have a three-dimensional view of the abdomen and pelvis.

Staging

Staging of these tumours is similar to that of epithelial cancer stated earlier in this chapter.

Treatment

Most women with malignant germ cell tumour of the ovary can be cured. Treatment will depend on the site and type of germ cell tumour. Treatment is usually a combination of surgery and chemotherapy.

a) Surgery

In most women, the tumour only involves 1 ovary and so surgery is performed to remove just that ovary and the fallopian tube (unilateral salpingoophrectomy). If this is the surgery performed, then fertility is preserved. However, if both the ovaries are involved then both the ovaries and the uterus may need to be removed (total abdominal hysterectomy and bilateral salpingoopherectomy).

b) Chemotherapy

Malignant Germ cell tumours are very sensitive to chemotherapy. Except for stage 1 disease, chemotherapy is essential to destroy these tumours.

c) Radiotherapy

Occasionally, certain types of germ cell tumours may require radiotherapy.

Fertility

These tumours are often found in young women. If only one ovary is removed, then there is a chance of future pregnancy. If chemotherapy is given, sometimes the remaining ovary may fail to produce eggs but generally, ovulation will resume after completion of the chemotherapy.

If both the ovaries are removed, then the patent will be in menopause. In some women who still have one ovary but have undergone chemotherapy, menopause may occur. Patients who are in menopause will require hormone replacement therapy.

3) Ovarian Sex Cord-Stromal tumours

Ovarian sex cord-stromal tumours originate from the cells in the ovarian matrix (which comprises granulosa, theca, sertoli and leydig cells as well as fibroblasts of stroma origin). The ovarian matrix supports these germ cells. Many of these tumours are steroid producing tumours. Unlike epithelial ovarian cancer, these cancers usually present at stage 1 at diagnosis,

Classification

The most common types of ovarian sex cord-stromal tumours are as follows

a) Fibroma

b) Granulosa cell tumours

c) Sertoli-Leydig cell tumour

d) Thecoma

e) Sertoli cell tumour

f) Leydig cell tumour

g) Fibrosarcoma

h) Sclerosing stromal tumour

i) Mixed or unclassified cell type

Signs and symptoms

Signs and symptoms will depend on the type of tumours

a) Abdominal swelling and/or distension: Fibromas can present with fluid in the abdomen (ascitis) and/or lungs (hydrothorax) and this is called Meig's syndrome

b) Abdominal pain

c) Female hormone (oestrogen) producing tumours may cause: early puberty (precocious puberty), irregular and heavy menses as well as postmenopausal bleeding.

d) Male hormone producing tumours may cause virilization symptoms (eg hoarseness of voice, excessive body hair, acne)

Diagnosis

a) Examination

Physical examination may reveal a pelvic and abdominal mass. Fluid in the abdomen (ascites) may be detected

b) Ultrasound

Ultrasound will show a tumour in one or both ovaries. These tumours are usually solid with some cystic areas.

c) CT scan

CT scan can be done to confirm the ultrasound findings. CT scan may show enlarged lymph nodes.

Treatment

a) Surgery

Surgery is the mainstay of treatment for this type of tumours. Surgery will depend on the age of the patient and her desire for future pregnancy. The surgery of choice is usually removal of the affected ovary and tubes (salpingoophrectomy) with conservation of the uterus and the other tube.

b) Chemotherapy

When the possibility of cancer spread is high (eg large tumours, ruptured during surgery or lymph nodes positive) chemotherapy may be indicated.

c) Radiotherapy

Radiotherpay may be necessary in inoperable or recurrent cases.

d) Hormonal treatment

Tamoxifen (antioestrogen), gonadal releasing hormone agonist and high dose progesterone have been tried for advanced and recurrent tumours.

Prognosis

The five year survival rates for the most common malignant ovarian sex-cord tumour, the granulosa cell tumour is a follows:

Stage	5 year survival rate
1	100-90%
2	75-55%
3	50-22%

Summary

Cancer of the ovary can originate from the 3 layers of the ovary namely the epithelium, the stroma and the germ cells. Epithelial ovarian cancer is the most common type. As the ovary is an Intra-abdominal structure, many cases of cancer of the ovary are diagnosed late. Surgery is the mainstay of management for cancer of the ovary. The type of surgery will depend on the stage of the cancer. Very early cancer of the ovary may be managed by simply removing the involved ovary. In more advanced cancer, removal of the uterus and both ovaries with removal of the omentum and pelvic lymph nodes may be necessary. The patient will also need to under chemotherapy after surgery.

PART 2
Laparoscopic Surgery in Gynaecology

Chapter 15

Overview of laparoscopic surgery in gynaecology

Chapter 15: Overview of Laparoscopic Surgery in Gynaecology

Generally, there are two ways of performing gynaecological surgery: laparotomy and laparoscopy. Laparotomy is the conventional open surgery, where an incision of several inches long is required. Two of the most common incisions for laparotomy in gynaecology are the lower midline incision, a vertical incision below the umbilicus; and the Pfannenstiel incision, a transverse incision just above the pubis.

Figure 15.1. Low midline incision
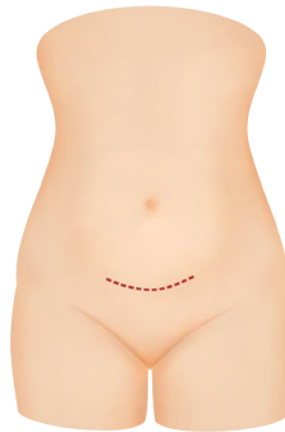
Figure 15.2. Transverse Incision (Pfannenstiel incision)
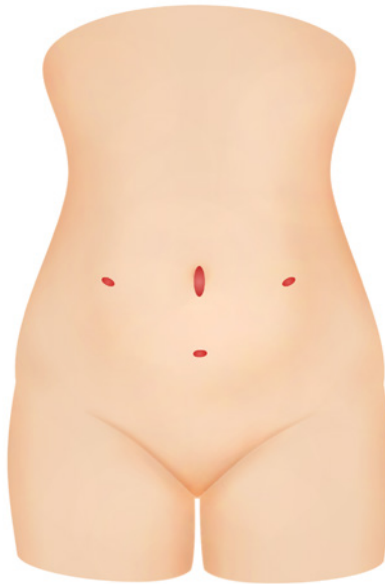
Figure 15.3. Incisions for
laparoscopic surgery

Laparoscopy, on the other hand, is performed through several small "keyhole" incisions in the abdomen, where instruments like a laparoscope (a thin telescope-like instrument),scissors and graspers are inserted to perform the surgery.

When is laparoscopy needed?

Laparoscopy is performed either for diagnostic or operative purposes. Diagnostic laparoscopy is a procedure that allows the doctor to directly view the pelvic organs to investigate pelvic pain, infertility, suspected ectopic pregnancy, endometriosis and other diseases. It is usually recommended when the cause or symptom of a disease cannot be confirmed via other diagnostic tests, such as ordinary enquiring about the symptoms, physical examination, ultrasound or radiological (X-ray) examinations. Operative laparoscopy allows a doctor to perform gynaecological surgeries in a minimally invasive manner.

How is Laparoscopic Surgery Performed?

Laparoscopic surgery is performed under general anaesthesia. Prior to the laparoscopy, a tube (catheter) may be inserted into the bladder to drain urine during the surgery. A 10 mm incision is made in the umbilicus and a Veress needle is inserted into the abdomen. The Veress needle is then connected to a carbon dioxide (CO_2)) insufflation tubing. Gas is passed into the abdominal cavity to distend the abdomen, so as to allow the doctor to see the pelvic organs and to perform the surgery easily. A 10 mm trocar (g) is placed in the umbilicus, followed by several 5 mm trocars, which are placed at the lower abdomen.

A laparoscope attached to a video camera, is passed through the 10 mm port. Video images captured by the video camera are immediately displayed on a video monitor. A powerful light source is channeled into the abdominal cavity for the purpose of illumination. Instruments like laparoscopic scissors and graspers are inserted through the other 5mm ports to perform the surgery. At the end of the surgery, all the instruments are removed and the CO_2 gas is released. The incisions are either sutured or taped. In some patients, a drainage tube is left in the pelvis to drain out any fluid that may accumulate after the surgery.

Figure 15.4 series of photos showing how laparoscopic surgery is performed. (a) A 10mm incision made in the umbilicus (b) Veress needle placed through this incision (c) Trocar inserted into this umbilical incision and laparoscope placed in the trocar (d) 3 other 5mm trocars are inserted (e) this is how the wounds look after the surgery

Scan Me

Watch Video 15.1

Laparoscopic Surgery in Gynaecology an overview
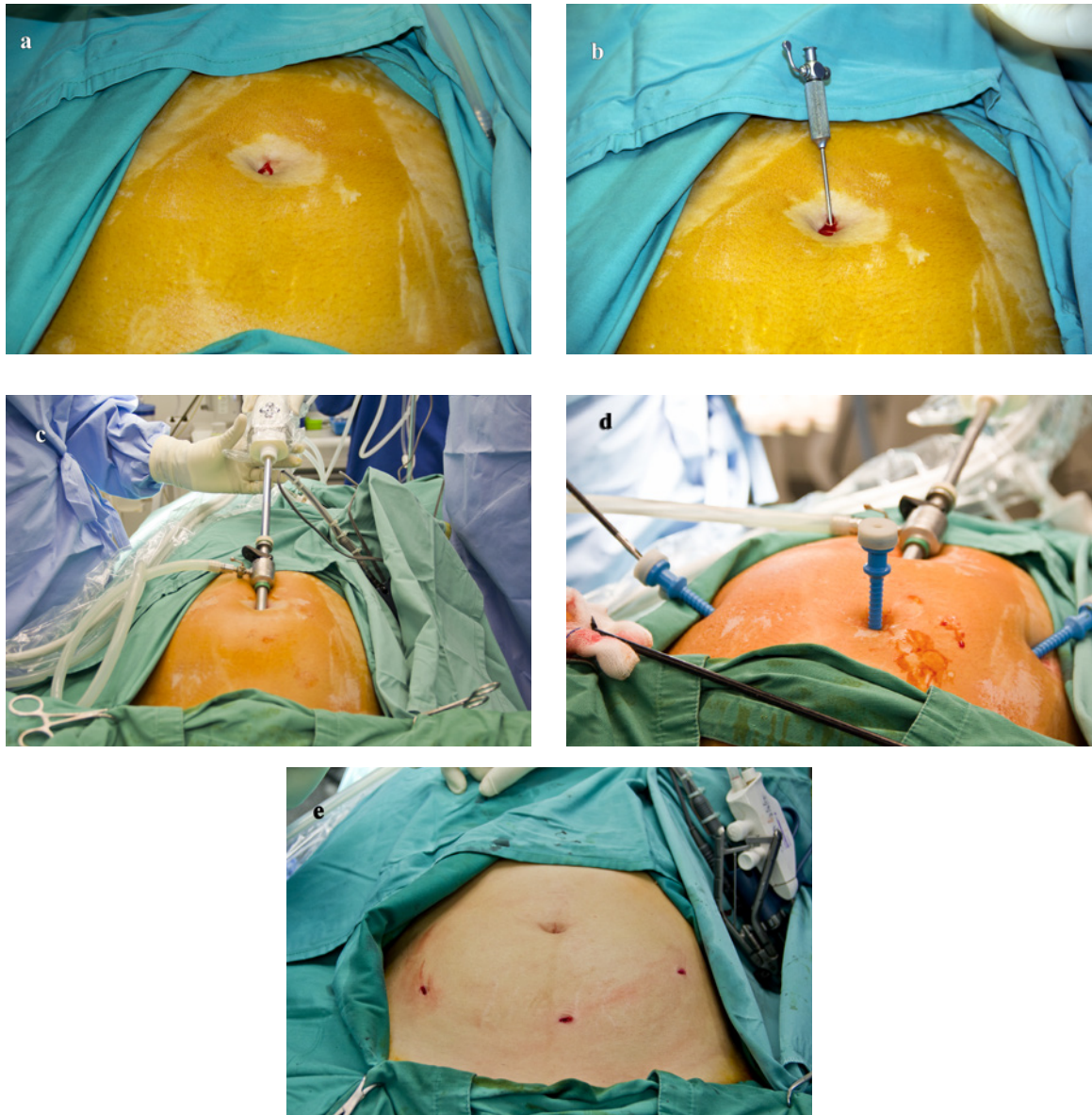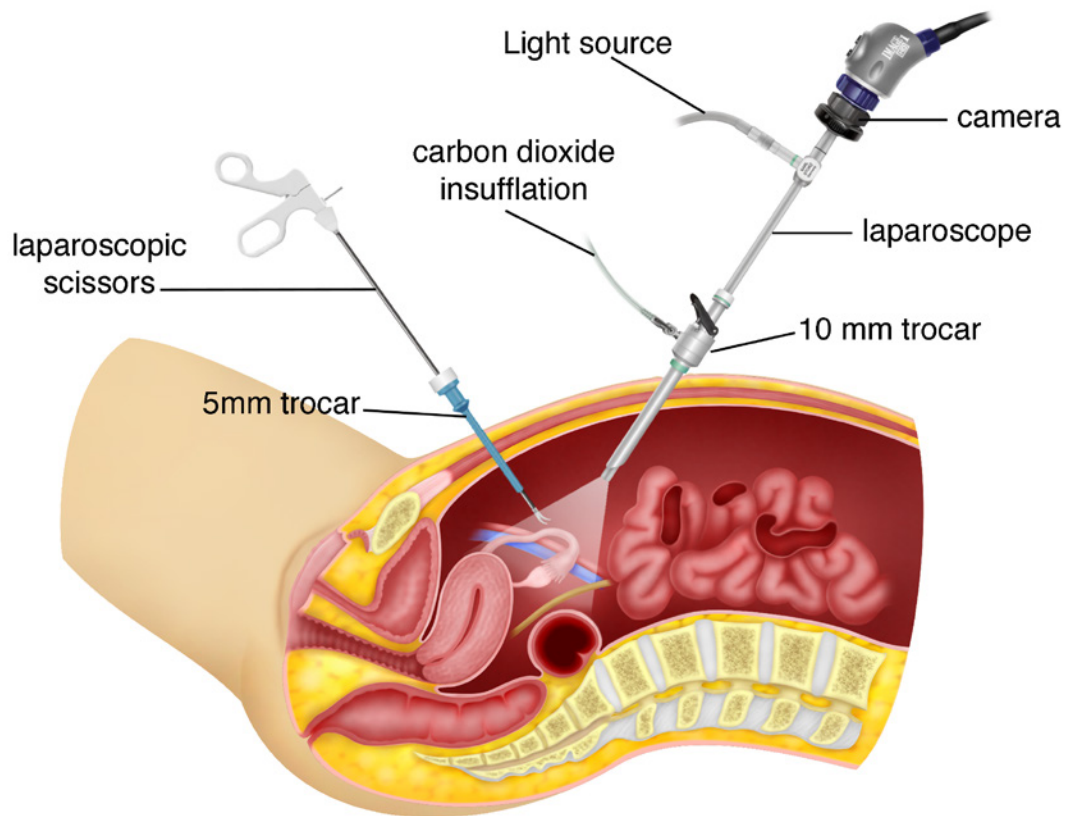
https://vimeo.com/149733613

Figure 15.4

Figure15.5 How is laparoscopic surgery performed

Advantages of Laparoscopic Surgery

1) Less postoperative pain. In laparotomy, a large incision is usually made and layers of the abdomen are separated in order to access the abdominal and pelvic organs. These layers are then sutured one by one on closure of the abdomen. In laparoscopic surgery, however, only small punctures (keyholes) are made. Thus, postoperative pain as a result of wound healing is far less in laparoscopy compared to laparotomy.

2) Quicker return of bowel function. Due to the fact that the bowel is manipulated less in laparoscopy, the return of bowel function is faster.

3) Quicker return to solid food.

4) Quicker return to daily activities.

5) Reduced chance of scar formation in the abdomen. In laparoscopy only fine instruments are used to perform the surgery whereas in laparotomy, the surgeon places his hands into the abdomen and pelvis to perform the surgery. Therefore, laparotomy has a higher likelihood of developing adhesions (scar tissue in the abdomen) than laparoscopy. This is especially important for patients who want to conceive because adhesions in the area of fallopian tubes and ovaries may lead to difficulty in conceiving.

6) Reduced infection rate because the small incisions do not expose the internal organs to air in the operating room.

7) Reduced bleeding during surgery.

9) Smaller scars on the skin.

10) Video magnification offers the surgeon a better view of the diseased organs and its surrounding vessels and nerves.

Possible Postoperative Effects of Laparoscopic Surgevry

1) Aching of muscles.

2) Discomfort and tiredness for up to five days.

3) Increased urge to urinate because the CO2 insufflated during the surgery can apply pressure on the bladder.

4) Nausea

5) Pain at the incision sites. Medication is usually prescribed to alleviate this.

6) Period-like pain and a few days of vaginal bleeding or discharge.

7) Shoulder pain for a few days because the CO2 insufflated can irritate the diaphragm, which shares the same nerves) as the shoulder(predominantly the phrenic nerve).

Gynaecological surgeries that can be performed by Laparoscopy

Tubal ligation

1) Tubal ligation

2) Ectopic pregnancy

3) Investigation of infertility

4) Removal of uterus (hysterectomy)

5) Removal of fibroids (myomectomy)

6) Endometriosis surgery

7) Prolapse of the uterus

8) Removal of the ovarian cysts

9) Cancer of the endometrium

10) Cancer of the cervix

Conditions that may be difficult to perform Laparoscopic Surgery

Patients with the following conditions may not be suitable to undergo laparoscopic surgery:

1) History of bleeding. Laparoscopic surgery may not be suitable for patients who suffer from bleeding disorders, as it may increase their risk of profuse bleeding during the surgery.

2) History of laparotomy. Patients who previously had a laparotomy may not be suitable for laparoscopic surgery because laparotomy can lead to scarring which may cause the pelvic and abdominal organs to adhere to the abdominal wall. Separation of these scar tissues may lead to complications. However, an experienced surgeon can still perform laparoscopic surgery on patients with such condition.

3) Pregnancy. Due to the enlarged uterus, inadvertent uterine injuries from trocar placement may occur. The other possible problem is that, due to CO2 insufflation, acid-base imbalance from CO2 absorption may lead to hypercarbia (excessive carbon dioxide in the bloodstream), which may compromise the foetus. However, with adequate precautions, laparoscopic surgery can still be performed on pregnant women especially during the early stages of pregnancy.

4) Large uterus Uterus may be enlarged because of fibroids or adenomyosis. When the uterus is large, there may be less space for the surgeon to perform a laparoscopic surgery. It may be difficult for a surgeon to visualise all the structures via a laparoscope.

All in all, a doctor's own skills and experience are crucial in determining whether he can perform the surgery laparoscopically. Doctors, who have only received basic laparoscopy training, could not perform more advanced and complicated laparoscopic surgeries.

Fact 15.1

Why many gynaecologist do not perform laparoscopic surgery?

Traditionally, all gynaecologist are taught to perform surgery by laparotomy. During a laparotomy, the surgeon looks directly at the area he is operating on and uses his hands to perform the surgery. It is easy for a gynaecologist to learn the art of performing surgery by laparotomy. However, laparoscopic surgery is performed by looking at a monitor. The images transmitted on the monitor are in 2 dimension (3D cameras are now available). Surgery is also performed using fine instruments passed through a trocar. As such, he has to learn to coordinate his hands to what he sees on the monitor (hand-eye coordination). It takes a longer time to learn laparoscopic surgery and the learning curve is steeper than in laparotomy. Due to time constrain, many gynaecologists are not willing to master the skills required to perform good laparoscopic surgery because it is time consuming.

Summary

1) In laparoscopic surgery, 1 to 4 small incisions are made to perform the surgery.

2) Many gynaecological surgeries can be performed by laparoscopy.

3) There are many advantages of laparoscopic surgery compared to surgery by laparotomy.

4) The type of surgery that can be performed by laparoscopy will depend on the skill of the surgeon

Chapter 16

Preparation for Laparoscopic Surgery

Chapter 16: Preparation for Laparoscopic Surgery

When is the best time to undergo laparoscopic surgery?

Laparoscopic surgery is best performed just after menstruation. The reasons are as follows:

1) The blood flow to the uterus, ovaries, fallopian tubes and pelvis is reduced at this time therefore, surgery can be performed easily, with less bleeding.

2) The inner lining of the uterus (endometrium) will be thin so a hysteroscopy can be done, at the same time, if required.

3) To check whether a fallopian tube is blocked a blue dye is injected into the tube via the cervix (tubal insufflation) (watch Video 1.1 Normal pelvic anatomy). This is the best time for the procedure to be done safely as the chances that the patient is already pregnant are minimal.

Scan Me

Watch Video 1.1

Normal female pelvic anatomy
https://vimeo.com/149588511

What should I eat before surgery?

You should have a well balanced diet before the surgery so that your recovery from the surgery will be smooth. Avoid taking anything that may cause bleeding during surgery (eg. traditional chinese medication). If you are on any medication, before the surgery please inform your surgeon. Patients may have to stop taking certain medication one week prior to the surgery. Taking a good dose of vitamins (Vit A, C, E) 2 weeks before surgery may assist in your postoperative recovery. Please discuss with your doctor well in advance before the surgery.

When should I see a doctor?

Except in emergencies, you should meet your doctor well in advance (more than 2 weeks in advance) to discuss your surgery. This will enable your doctor to ensure that you do not have risk factors for the surgery. If you have any medical problems such as hypertension or diabetes, you will need to see a physician to ensure that these diseases are well controlled before the surgery.

When will I be admitted?

In complex cases, you will usually be admitted the day before the surgery. If the surgery is a simple procedure, then you may be admitted on the actual day of surgery.

What will be done before admission?

Blood tests are usually performed before an admission. A Chest X-ray and an ECG (electrocardiogram) may be performed in some patients. In complex cases, cross matching of blood will be done so that blood is available during the surgery.

What is the preoperative preparation?

You will be given a fluid (eg. Fleet Phosphosoda® or ColoClean®) the day before to empty your bowel before the surgery. After drinking the fluid, you will have watery stools. There are several advantages of bowel preparation:

1) When the bowel is empty, it will collapse and will make surgery easier

2) It is also easier to repair the bowel intraoperatively when the bowel has been "cleaned"

How long should I fast before the surgery?

Generally, for at least 6 hours prior to surgery

How long will the surgery take?

The duration of the surgery will depend on its complexity. Generally, a simple case can be completed within an hour. However, more complex surgery may take 2-6 hours. The more experienced the surgeon, the faster he can perform the surgery.

What position will I be during the surgery?

Laparoscopic surgery in gynaecology is generally done with the patient lying on her back with legs spread apart, in order for the surgeon to have access to the vagina. The head is generally tilted downwards (Trendelenburg postion) so that the bowel will move upwards and away from the site of the pelvic surgery

How will the postoperative recovery be?

After the surgery, you will be kept in the operating room for about 2 -3 hours, for observation. You will be sent to your room after that. You may have a tube (catheter) from the urinary bladder and sometimes a tube from the abdomen, to drain any blood that may have accumulated after the surgery. You may be allowed to drink some clear fluid immediately after the surgery. Once you have passed flatus (wind) and are able to move or get out of bed, the tubes from your bladder and pelvis will be removed. You will be encouraged to get out of bed and walk as early as possible so that you may be able to pass flatus as quickly as possible. Once you have passed flatus, you will be allowed to drink other drinks and later have soft diet and then move on to solid food.

Will I have a catheter in the bladder?

In most cases, a catheter will not be necessary. However, in more complex cases where the surgeon foresees more postoperative pain and a longer time to ambulate, a catheter may be placed in the bladder. It will be taken out the moment you can walk.

Will I have a drain inserted?

In complex cases, a tube (drain) to remove the excess blood that may form in the pelvis, may be placed. Removing the excess blood is important to allow the quick return of bowel activity. Once you have passed flatus and the amount of blood that is draining is minimal, the drain will be removed.

When can I have sex after surgery?

This will depend on the type of surgery. If you have undergone a hysterectomy, there will be sutures in the vagina, which will take about 6 weeks to heal. Therefore, it is best to resume sexual activity 2 months after the surgery. In other cases, where there are no incisions in the vagina, sexual activity can resume when you feel better (usually 1 to 2 weeks after the surgery).

When can I get back to work?

A minor laparoscopic procedure, will allow you to get back to work 1 to 2 weeks after surgery. After a major surgery you should however rest for 1 to 2 months before getting back to work.

When can I drive after the operation?

In simple cases, you can resume driving after 1 week. In complex cases such as hysterectomy, you should refrain from driving for 1 month.

How can I make sure I can recover from the surgery fast?

Fast recovery will depend on your health status. You should eat a healthy and balanced diet before and after surgery. Consumption of vitamins will assist you in your recovery. Please discuss with your doctor about a good supply of vitamins that can be consumed pre and postoperatively so that your recovery will be smooth.

When can I bathe after surgery?

The small wounds of the surgery are usually covered with waterproof dressing so that you can bathe immediately after the surgery. However, there is a worry that the dressing may fall off while you are bathing. Therefore, it is advisable to if possible you should just wipe yourself especially around the wound areas to avoid infection.

Will I have vaginal discharge or bleeding after the surgery?

After a hysterectomy, there will be sutures at the top of the vagina. This wound may cause some bleeding, especially in women who are active. The bleeding may last for up to 6 weeks. You need not be alarmed unless the bleeding is excessive. If the bleeding is excessive, you should consult your doctor.

There is some manipulation of the uterus during surgery. This manipulation may cause bleeding from the uterus, postoperatively. Sometimes, your menses may even be earlier. As long as the bleeding is not heavy, it is normal.

Healing of the vaginal wound can lead to vaginal discharge. If the discharge is not foul smelling or excessive, it is normal.

In what situations should I immediately see a doctor after the surgery?

There are certain conditions that may require that you see a doctor immediately.

1) Excessive per vaginal bleeding

2) Foul smelling vaginal discharge

3) Excessive watery vaginal discharge

4) Foecal like material coming out of the vagina

5) Severe pelvic pain or loin pain

6) Inability to pass flatus or move your bowel

7) Feeling faint or dizziness

Fact 16.1

Is bowel preparation necessary before laparoscopic surgery?

There are studies, which show that bowel preparation is not necessary even for bowel surgery. In simple laparoscopic surgery a bowel preparation and even an enema is not necessary either. However in more difficult cases, where there may be a risk of bowel injury during the surgery, an enema is advocated. This will enable the laparoscopic repair of the bowel, without the need for a colostomy.

Summary

It is vital to discuss all preoperative preparation with your doctor before a laparoscopic surgery. A good understanding of all the do's and don'ts's before and after the surgery will help you understand what you will be going through and help you recover well after the surgery

Chapter 17

Complications in Laparoscopic Surgery

Chapter 17: Complications in Laparoscopic Surgery

" A specialist is one who has made all the possible mistakes that can be made in a very narrow field" - Niel Bohr

Complications occur in any form of surgery, may it be laparotomy or laparoscopy. The more experienced a surgeon is, the less likely that a complication may occur. It is important to know about all the possible complications that could occur before embarking on a surgery.

Complications can occur during the 2 different steps of laparoscopic surgery.

1) During the first step of passing carbon dioxide into the abdominal cavity (creating the pneumoperitoneum) and while inserting the trocars and the laparoscope.

2) During the surgical procedure itself.

1) During the first step of passing carbon dioxide into the abdominal cavity (creating the pneumoperitoneum) and insertion of the trocars and the laparoscope

a) Placement of the first trocar.

Complications can occur in the placement of the first trocar. There are many ways of placing the first trocar. The first technique is by using a Veress needle to introduce carbon dioxide into the abdomen (insufflation) and blindly placing the first trocar through the umbilicus. If there are adhesions of the intestines to the abdomen especially at umbilical site, injury to the intestines may occur. If this injury is noticed, the injured intestines can easily be repaired either laparoscopically or via a laparotomy.
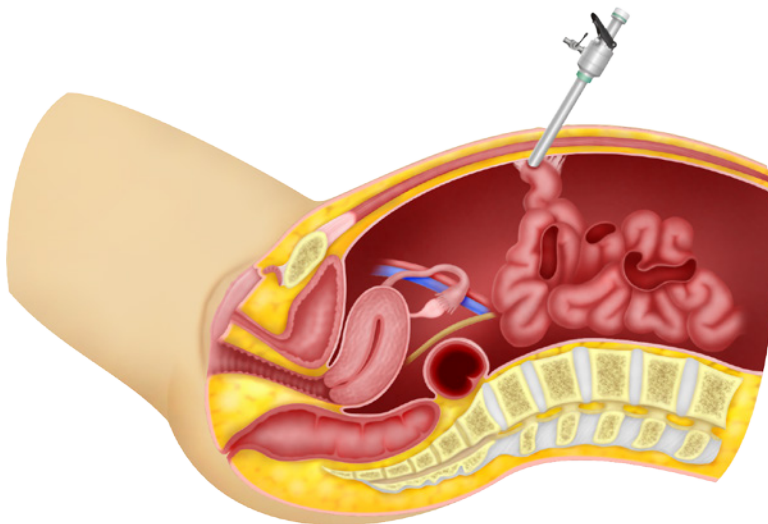

Figure 17.1 injury to the intestines that are adherent to the abdominal wall at the umbilicus

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There are several strategies to reduce the incidence of this complication.

i) Verres at the Palmar point

If adhesions are suspected, as in patients with previous midline laparotomy surgery, then a Veress needle can be placed at the Palmar point (a point just below the left costal margin at the midclavicular line). Carbon dioxide insufflation can then be done from this position. A 5 mm trocar can be placed at this site to visualise the abdomen and pelvis and to look for any adhesions before proceeding to place all the other trocars. The incidence of adhesions at the Palmar point is very low and so the risk of organ injury while starting laparoscopy from this site, is safe. However, the disadvantage is that the trocar placed at this site is an extra incision which is difficult to use during the surgery. The patient may end up with more than 4 wounds in the abdomen.
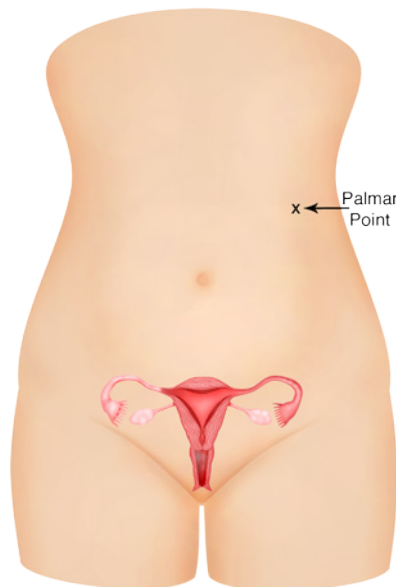

Figure 17.2 Palmar Point

ii) Open Laparoscopy

Open laparoscopy is a technique whereby an incision is made in the umbilicus so the rectus sheath (g) and peritoneum is opened under direct vision. Once the abdominal cavity is penetrated, a trocar is placed into the abdomen and insufflation is done. As this is not a blind procedure, any bowel adherent to the umbilicus will be seen through this incision, and if bowel injury does occur, repair can be done immediately. Studies show that this method does not reduce the incidence of bowel injury but if it does occur, it will be easily detected. The disadvantage is that the incision made in the umbilicus is usually larger and there may be leakage of gas from the large incision, making surgery sometimes difficult. In order to avoid the leakage of carbon dioxide, a sleeve called the "Hasson sleeve" can be added to the trocar to plug the leak. A purse string suture can also be placed around the trocar to tighten the tisssues around the trocar.

iii) Optical Trocar

Nowadays, trocars are hollow and their sleeves come with transparent tips. This type of trocar allows a laparoscope to be placed in it while it is inserted into the abdomen. With the laparoscope in its sleeve, the trocar is rotated and it can be seen penetrating the subcutaneous layer, rectus sheath and finally the peritoneum. This can be done before or after insufflation. This technique removes the worry of blind insertion of the trocar. This again will not prevent bowel injury but if injury does occur it will be detected and repaired immediately. The disadvantage of this method is that while optical trocars are disposable, they are quite expensive.

Figure 17.3 Optical trocar

iv) Ternamian trocar

A ternamian trocar is a special trocar which has an extra "screw thread" on it. After insufflating the abdomen with carbon dioxide, this trocar can be "screwed" into the abdomen with a laparoscope placed in it. Just like the optical trocar, this trocar can be seen penetrating the subcutaneous layer, rectus sheath and finally the peritoneum. Again, this will not prevent bowel injury, but if injury does occur it can be detected and repaired.

Figure 17.4 Ternamian trocar with a laparoscope in it

b) Placement of the secondary trocars

After placement of the first trocar (usually through the umbilicus), other trocars need to be placed. Two trocars are usually placed on either side of the abdomen. While placing these trocars, arteries (such as the inferior epigastric artery and superficial epigastric artery, may sometimes be injured, leading to bleeding. These can be sutured easily.

2) Complications Occurring during the Surgical Procedure

a) Injury to internal organs during surgery

There is always the possibility of injuring internal organs during the surgery. Organs that may be at risk of injury are the ureters, bladder, large intestines (rectum and sigmoid colon) and small intestines.

i) Ureter

The ureter is a tube that runs from the kidney to the bladder. It runs below the ovary and passes through a tunnel (ureteric tunnel) just before it reaches the bladder. Common sites of injury to the ureter are at the pelvic brim, below the ovary and at the ureteric tunnel. Certain diseases such as endometriosis sometimes causes adhesions of the ureter to the ovary and uterosacral ligament. Dissection of the ureter from the ovary/ uterosacral ligament is usually unnecessary except in difficult cases. This requires advanced laparoscopic skills. Laparoscopic surgery usually involves the use of coagulation (g) of tissues. When coagulating tissues, lateral dissipation of heat may cause accidental ureteric damage, which may not be recognised during surgery. The patient may present one week later with leakage of urine into the vagina or into the abdomen or with loin pain and fever due to stricture (narrowing) of the ureter. This complication is especially seen during laparoscopic hysterectomy, when the ascending branch of the uterine artery is coagulated and cut. Adhesions can bring the ureter closer to the uterine arteries causing accidental burns. Further surgery may be necessary to repair this injury. This may just involve placement of a plastic tube (stent) up the ureter via the bladder, so that urine will drain from the kidney to the bladder and allow healing of the injured ureter. It may sometimes be necessary to reattach the ureter into a new site in the bladder (reimplantation of the ureter). This is usually done with an open surgery.

ii) Large intestines (rectum and sigmoid)

In deep infiltrating endometriosis (DIE), the disease may invade the rectum and cause dense adhesions between the rectum and the vagina, cervix and/or uterus. Releasing the bowel can lead to rectal or sigmoid colon injury. Preoperative bowel preparation is essential when such conditions are suspected. If rectal injury occurs and preoperative bowel preparation has been performed, then the injury can be repaired laparoscopically (if the surgeon is competent) or by laparotomy. However, if there is no preoperative bowel preparation, then a temporary colostomy (opening of the bowel on the abdomen) has to be done to allow healing. This is rare but can be very troublesome to the patient. Rarely is a bowel injury not suspected during surgery but manifests as a bowel leak a few days later. The patient may experience severe pelvic pain or pass out feces through the vagina. This patient may require repeat surgery either by laparoscopy or laparotomy to repair the bowel and may also need a colostomy.
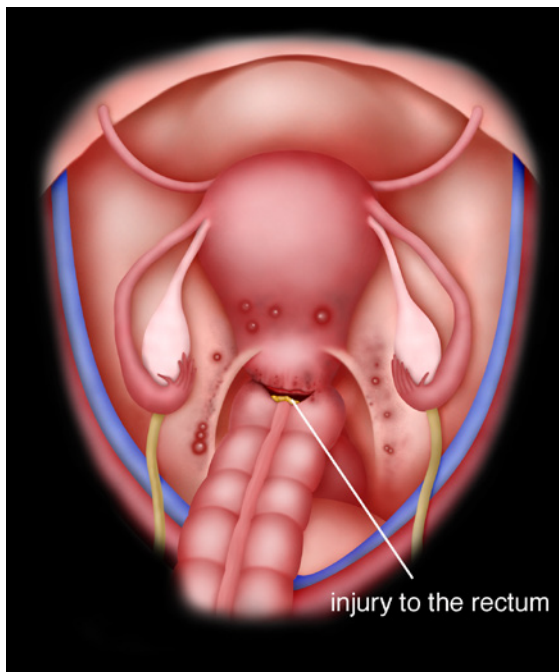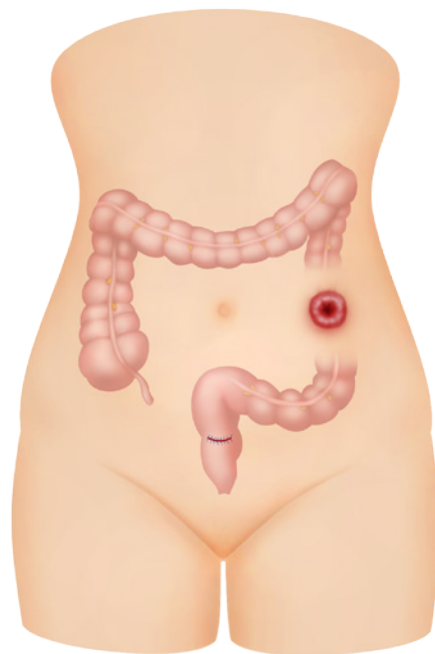

Figure 17.5 Injury to the rectum

Figure 17.6 Colostomy

Case 17.1 : Rectal injury

A 44 year old lady consulted me in May 2007 for severe dysmenorrhoea (g) and heavy per vaginal bleeding. She had previously had a laparoscopic cystectomy. Examination revealed an enlarged uterus of 14 gestational week size (g). Nodules were felt in the Pouch of Douglas. Ultrasound showed an adenomyotic uterus with a thickened posterior wall. There was a left ovarian cyst resembling an endometioma, measuring 3.08 x 5.55 cm. She underwent a total laparoscopic hysterectomy. Upon completion of the hysterectomy, a hole was noted in the rectum. This was sutured laparoscopically using 3-0 vicryl sutures. Postoperatively, she recovered well and was discharged well. She is still on my followup and she is well

Discussion

In patients with severe endometriosis and adenomyosis, rectal adhesion to the uterus and vagina is common. Therefore, it is necessary to do bowel preparation before the surgery, so that if bowel injury occurs, it can be repaired immediately without the need of a colostomy. It is also important in such cases to carefully release the rectum from the vagina before removing the uterus.

iii) Urinary Bladder

The urinary bladder is in front of or anterior to the uterus. It is attached loosely to the cervix. In patients who have had previous Caesarean sections, the bladder may be stuck to the cervix and uterus. In patients with large fibroids or adenomyosis, the bladder may be stretched and its position may be distorted. The bladder may also be infiltrated by endometriosis. When performing laparoscopic surgery in such situations, it may sometimes be difficult to identify the margins of the bladder so bladder injury may occur. When shaving off bladder endometriosis, a hole can be made in the bladder. If the injury is detected during surgery, the injury can easily be repaired either laparoscopically or by laparotomy. A urinary catheter has to be placed in the bladder for an extended period of time if repair of the bladder is performed. Occasionally, the injury is not detected during the surgery. The patient may present with pain and /or leakage of urine through the vagina (vesicovaginal fistula). If this occurs, than the fistula may have to be repaired either laparoscopically or by laparotomy.
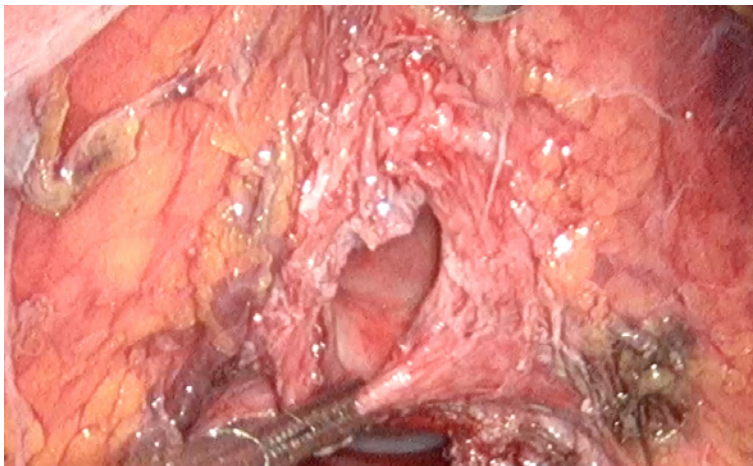

Figure 17.7 Injury to the bladder

Case 17.2 : Bladder injury

Madam TL, a 43 year old lady with 4 children, saw me with a complaint of pain while passing urine. Upon examination she had a 26 gestational week sized (g) uterus. Ultrasound showed a uterine fibroid measuring 9.03 x 12.09 cm. She underwent a total laparoscopic hysterectomy in August 2014. The surgery was completed without any incident. The uterus was removed by vaginal morcellation (cutting the uterus and fibroid into small pieces using a pair of scissors before removing through the vagina). The uterus and the fibroid weighed 1.32 kg. After removal of the uterus vaginally, a laparoscopy was performed and a bladder tear was seen. The bladder was repaired with vicryl 3-0 suture. Continuous suturing was performed. The vault was then sutured laparoscopically. She was discharged with a catheter on the second postoperative day. The catheter was removed on the 7th postoperative day, after a cystogram (X-ray of the bladder filled with contrast medium to make sure that the wound in the bladder has healed) showed that the bladder was intact. She is currently well.

Discussion

Injury to the bladder can occur at any stage of the surgery. In this case, it most probably occurred during vaginal morcellation of the uterus and fibroid. This is not common. My suspicion is that there was some urine in the bladder while the vaginal morcellation was performed and so the bladder was torn by the fibroid during the vaginal manipulation. It is necessary to make sure that the bladder is empty before embarking on vaginal morcellation.

iv) Small Intestines

The small intestines can be stuck to the uterus, ovaries and abdominal wall. This may be due to diseases such as endometriosis, pelvic inflammatory diseases or a result of previous operation/operations. Injury to the small intestines may occur while releasing the adhesions. Such injury, if detected during surgery can be repaired either laparoscopically or by laparotomy. As with the other organs, the injury may sometimes only be detected in the postoperative period. The patient may experience abdominal distention, pain and inability to pass flatus. A second surgery may be necessary to repair the injured intestines.
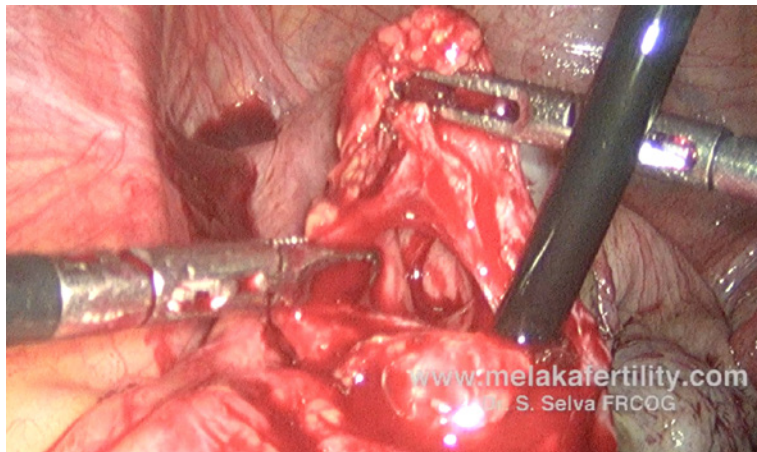
Figure 17.8 Injury to the small intestine

Case 17.3 : Small intestine injury

Miss DI a 23 year old single lady, presented in August 2014 with the problem of slight dysmenorrhea. She had undergone a laparoscopic appendicectomy 3 year prior to seeing me. Ultrasound showed a large left endometrioma measuring 7.60 x 13.54 cm. She underwent a laparoscopy. The small bowel was densely adherent to the ovarian cyst. While releasing the small intestine, a perforation was seen. This injury was sutured with vicryl 3-0 suture using interrupted sutures. Subsequently, cystectomy was performed. Postoperatively, she was well.

Discussion

Patients with previous abdominal or pelvic surgery may have adhesions of the bowel to the female reproductive organs such as the uterus or ovary. Releasing the bowel can lead to bowel injury. It is important to warn the patient of the possible risk before surgery. Bowel injury must be diagnosed during surgery so that the patient will not have to undergo a second surgery in order to repair it.

b) Bleeding during surgery

Any form of bleeding obscures vision during laparoscopic surgery. Therefore it is vital to have as little bleeding as possible during the surgery. Bleeding from blood vessels may require a conversion to laparotomy, and blood transfusion may be necessary. However, injury to vessels can occur at any point in surgery. An example is when the Verres needle is being placed into the abdomen. This needle can injure any one of the major blood vessels such as the aorta, vena cavae or the iliac ateries or veins. When blood vessels need to be dissected out during surgery, injury may occur. This injury can be coagulated or repaired either laparoscopically or by laparotomy. On rare occasions, bleeding occurs postoperatively when a coagulated vessel opens up or a sutured vessel slips. If this occurs another surgery either by laparoscopy or laparotomy may be necessary to control the bleeding.

Case 17.4 : Postoperative bleeding

Madam JL was a 50-year-old lady. She had an abnormal cervical smear. She underwent a colposcopy and a biopsy. The biopsy confirmed that she had grade 3 cervical intraepithelial hyperplasia. She underwent a total laparoscopic hysterectomy. The surgery was uneventful and the vaginal vault was closed with no bleeding seen at the end of the surgery. She developed severe pelvic pain the next day. Pelvic ultrasound showed fluid in the Pouch of Douglas. She underwent another laparoscopy. There were 1000 mls of blood and blood clots in the pelvis. The blood and blood clots were aspirated. The left uterine artery was bleeding. The uterine artery was isolated and a clip was applied. Postoperatively, she was well.

Discussion

Laparoscopic surgery is performed with an intrabdominal pressure of between 12 and 15 mm Hg. Such pressure can mask bleeding. It is necessary to look for any evidence of bleeding with low intra abdominal pressure at the end of the surgery. Even when this is done, sometimes bleeding can occur after the surgery.

Case 17.5 : Accidental injury to the right external iliac vein during laparoscopic radical hysterectomy

Madam OLL, a 50-year-old lady, consulted me in December 2008 with irregular per vaginal bleeding. Examination revealed a cervical cancer (stage 1B). She underwent a laparoscopic radical hysterectomy and pelvic lymphadenectomy. While performing the pelvic lymphadenectomy, a small hole was accidentally made in the right external iliac vein. Fortunately, the hole did not bleed when the vein was not touched. "Surgicel®" was placed on the hole to prevent any bleeding and the surgery was continued. At the end of the surgery, no bleeding was seen from the injury. Postoperatively, there was no bleeding and the patient was discharged well.

Discussion

Accidental injury to any abdominal and pelvic organ and vessel can occur during surgery. Injury to a major vein or artery can be dangerous. In difficult cases, blood must to be cross matched and reserved in case of very heavy bleeding. Although such bleeding may be controlled by laparoscopy, laparotomy may be required.

c) Gas Embolism

The gas that is distending the abdomen can sometimes get into the blood circulation. This is called gas embolism. This rarely happens but it is a very serious complication and can be fatal. This is the reason why laparoscopic surgery is performed with the assistance of a specialist anaesthetist.

d) Subcutaneous Emphysema

Sometimes the carbon dioxide that is used to distend the abdominal cavity may leak into the subcutaneous layer (fat layer). This is called subcutaneous emphysema. This usually occurs when the Verres needle is used to insufflate the abdomen. It can even occur after trocar placement when the trocar accidentally slips into the subcutaneous layer. This is usually detected early and is not very   serious. The gas is removed by reinserting the Veress needle of the trocar into the abdomen. Sometimes the emphysema is so extensive that it can go up to the neck and face. In such situations, conversion to a laparotomy may be necessary.
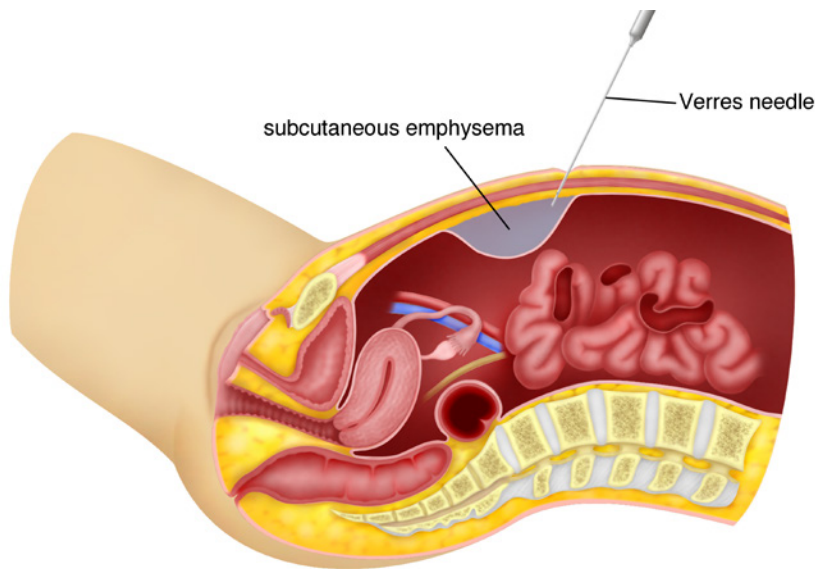
Figure 17.9 Verres needle causing subcutaneous emphysema

General Complications

1) Anaesthetic Complication
Laparoscopic surgery is performed under general anaesthesia. Difficulty in intubation, infection of the lungs and cardiac events during general anaesthesia may occur.

2) Deep Vein Thrombosis or Pulmonary Embolism
Blood clots may occur in the veins of the legs postoperatively. This blood clot can dislodge and move to the lungs causing pulmonary embolism. This can be life threatening. Prevention of this complication includes using stockings on the legs, using pumps and giving prophylactic heparin. The disadvantage of giving heparin prophylactically is that it may increase the incidence of intra operative and postoperative bleeding.
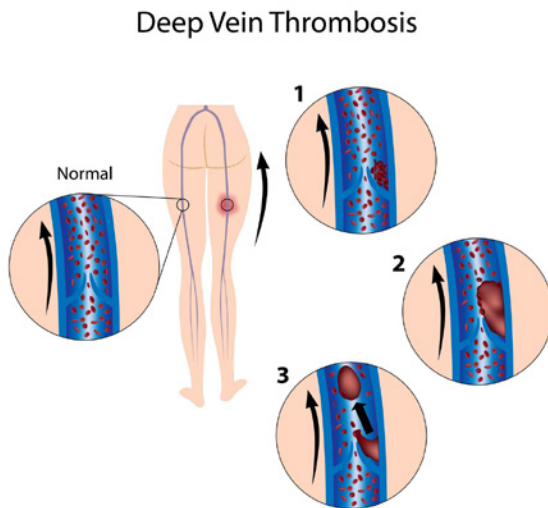
Figure 17.10 Deep Vein thrombosis
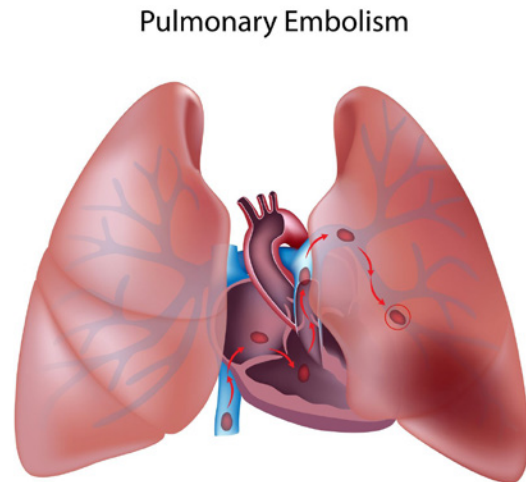
Figure 17.11 Pulmonary Embolism

3) Incisional Hernia

Even though the incisions performed during laparoscopic surgery are small, sometimes abdominal contents can pass through (herniate) though them leading to incisional hernia. This may require subsequent surgery.
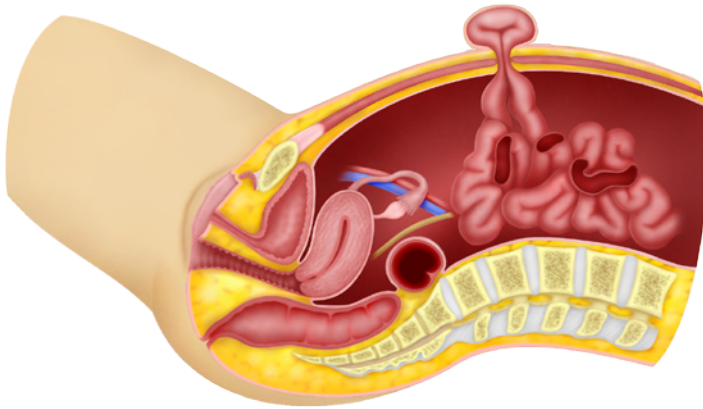
Figure 17.12 Incisional (umbilical) hernia

4) Infection

One of the advantages of laparoscopic surgery is that it is performed in a closed environment. The incidence of pelvic or abdominal infection is lower but may still occur. Laparoscopic surgery is usually performed through the umbilicus. The umbilicus is a common site for skin infection and so it is important for patients to clean the umbilicus thoroughly before coming in for surgery.

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Complications of laparoscopic surgery

http://vimeo.com/149741703

Summary

1) Complications occur in any form of surgery, may it be laparotomy or laparoscopy.

2) The more experienced a surgeon is, the less likely that a complication may occur.

3) Most complications are accidental.

4) It is important to discuss all possible complications with your doctor before embarking on a surgery.

Chapter 18

Laparoscopic tissue removal

Chapter 18: Laparoscopic Tissue Removal

One of the most common questions asked about laparoscopic surgery is "How do you remove tissues from the abdomen through such small incisions?".

There are many ways in which tissues are removed from the abdomen

1) In patients undergoing total laparoscopic hysterectomy, when the cervix is detached, an opening is made in the vagina. The uterus can then be removed from the vaginal opening. This is similar to the way a baby is delivered vaginally.
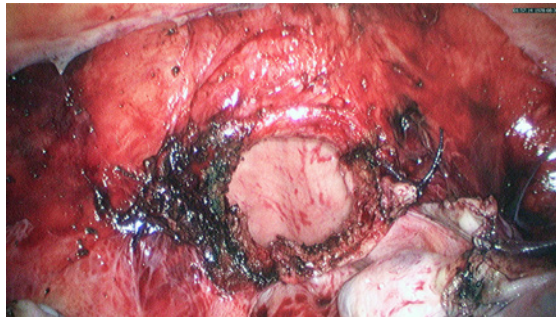
Figure 18.1 Vaginal vault opening after total laparoscopic hysterectomy
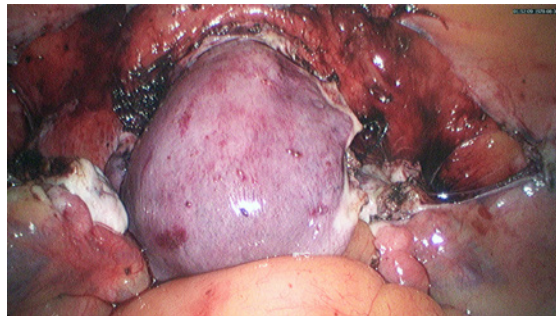
Figure 18.2 Uterus pushed through this vaginal vault opening
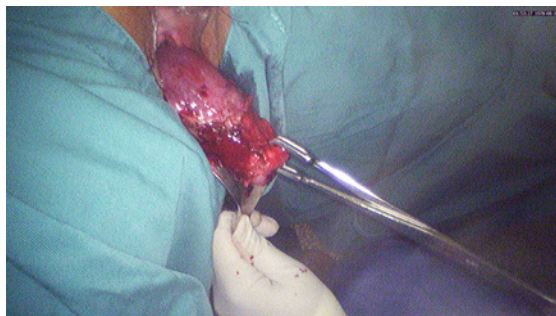
Figure 18.3 Uterus removed from the vagina

2) In patients not undergoing hysterectomy, an opening can be made in the vagina, behind the uterus in the Pouch of Douglas (known as culdotomy). Tissues can be removed through this opening. Large fibroids and ovarian cysts are usually removed in this manner.
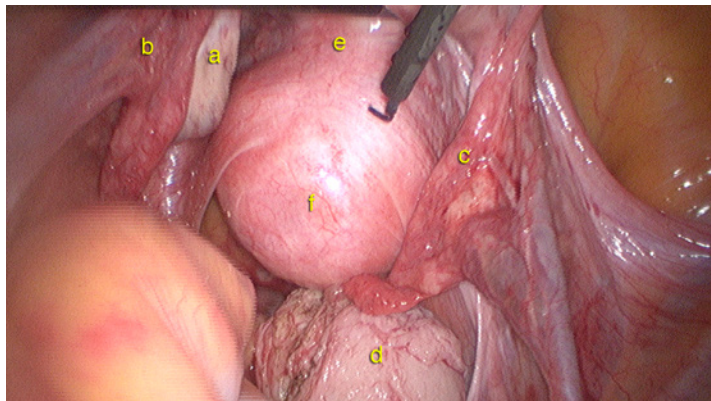
Figure 18.4 Probe used to push the vagina (a) left ovary, (b) left fallopian tube, (c) right fallopian tube, (d) fibroid, (e) cervix, (f) probe pushing the vagina)
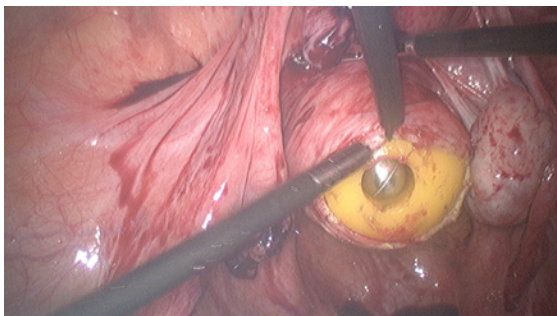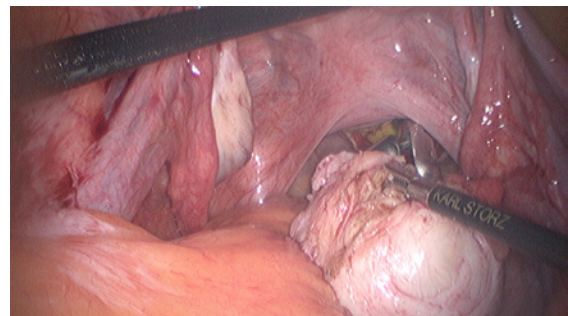

Figure 18.5 Incision made in the vagina

Figure 18.6 Fibroid held with a forceps

3) A plastic bag can be introduced into the abdomen via the 10mm trocar. Small tissues such as ovarian cyst walls and ectopic pregnancy can be placed in this plastic bag. The plastic bag is then brought out of the skin and the tissues are removed. The bag is then removed.
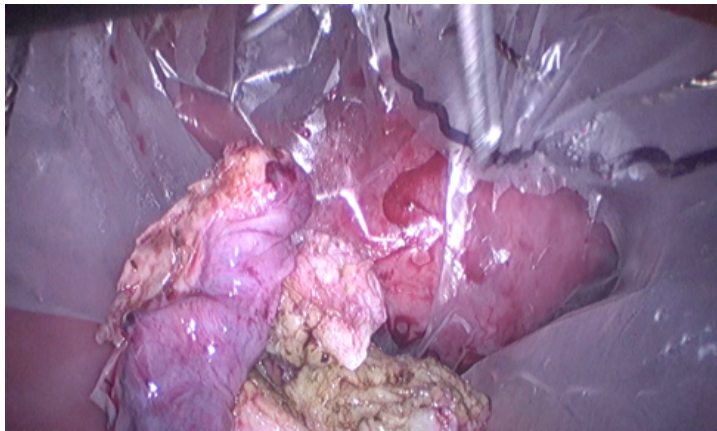

Figure 18.7 Fallopian tube placed in a bag

Figure 18.8 Bag brought out of the umbilical
wound and the fallopian tubes removed

4) An instrument called a morcellator can be used to cut the tissues into small pieces and these pieces can then be removed. A morcellator is an electrical device with cylindrical blades that rotates to cut tissues such as fibroids into small pieces of diameter ranging from 10mm to 20mm. Electric morcellation is done within a bag.
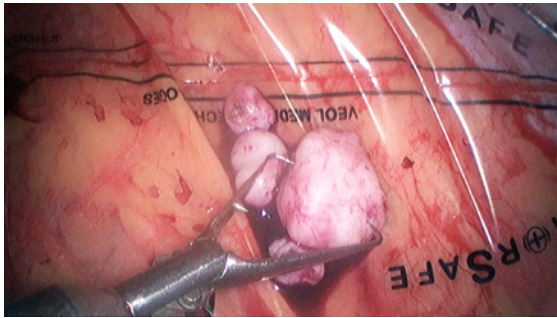

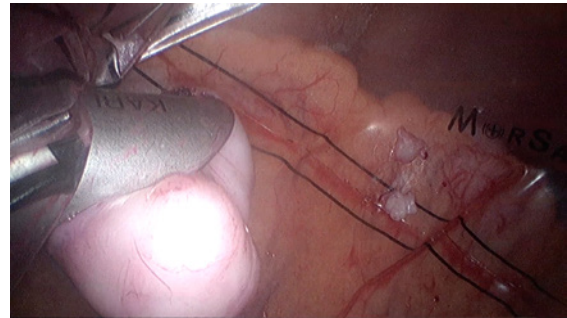
Figure 18.9 Fibroids placed in a bag

Figure 18.10 Morcellation of a fibroid within a bag

Figure 18.11 External view of morcellation of a fibroid within a bag

Figure 18.12 Morcellated fibroid tissues weighing 1.5 kg

5) Sometimes a knife can be passed via a trocar or even through the skin to cut a large tissue such as fibroids or even the uterus into small pieces. These small pieces can then be removed either through a culdotomy or placed in a plastic bag and removed through a slightly enlarged skin incision.
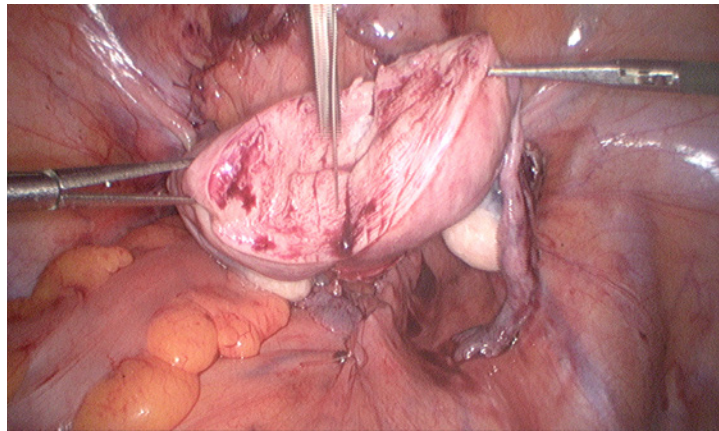

Figure 18.13 Uterus cut into small pieces with a knife

Figure 18.14 Small pieces of uterus placed in a
bag and removed from the skin incision

6) A minilaparotomy incision measuring 2 to 3 inches can be made transversely suprapubically and the tissue can be cut with a knife and removed from the abdomen.
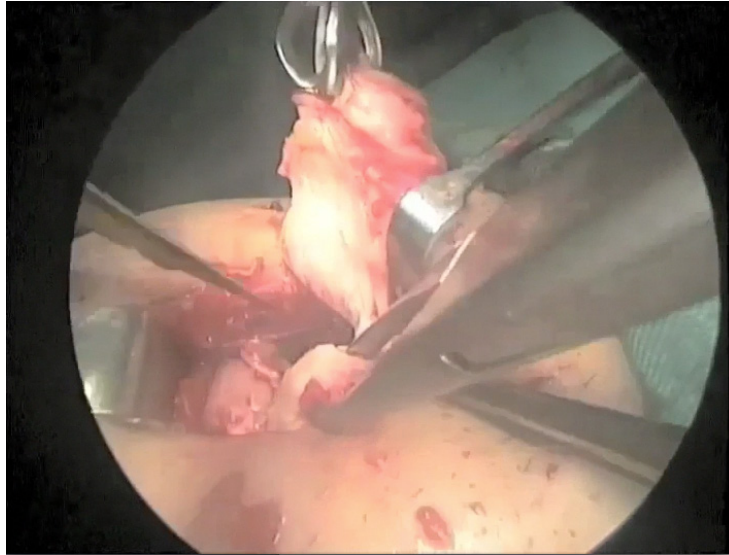

Figure 18.15 minilaparotomy and fibroid removed through the incision

Fact 18.1

Controversy on morcellation of fibroids

Fibroids (leiomyoma) are generally benign. However, there is a small risk of fibroids being malignant or cancerous (leiomyosarcoma). There are different reports of this risk ranging from 1 in 350 to 1 in 10,000. During the morcellation of fibroids using an electric morcellator, there is a risk of spreading fibroid tissues to other parts of the abdomen. As such, all electric morcellations are now done within an enclosed bag

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Laparoscopic tissue removal

http://vimeo.com/155090018

Summary

There are many methods of removal of specimen after laparoscopic surgery. Specimen can be removed through the vagina or cut into small pieces, placed in a bag and removed or morcellated into small pieces using a morcellator.

Chapter 19

Single Incision Laparoscopic Surgery

Chapter 19 : Single Incision Laparoscopic Surgery

What is Single incision Laparoscopic Surgery?

Traditional laparoscopy requires 3 to 4 incisions ranging from 5 to 10 mm, to perform the surgery. Single incision laparoscopic surgery is performed using a single incision of 20 to 25 mm, in the umbilicus, to perform the surgery.
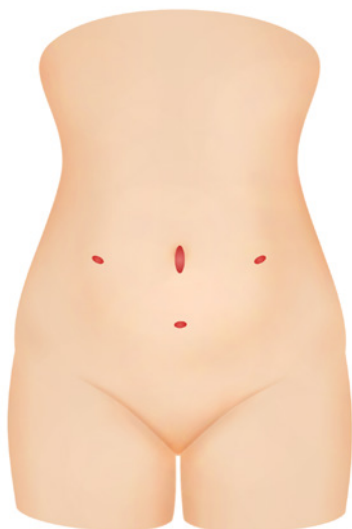
Figure 19.1 Incisions for traditional 4 port laparoscopy

Figure 19.2 Incision for single incision laparoscopic surgery

How is it performed?

There are several ways to perform single incision laparoscopic surgery. One method is to use commercially available devices such as the SILS Port and Gel Port. In this technique, a single incision measuring 2 to 2.5 cm, is made in the umbilicus. The incision is extended into the abdominal cavity by cutting the rectus sheath and the peritoneum and the device is then fixed in place. Carbon dioxide (CO_2) insufflation is done. Trocars measuring 5mm to 10mm are placed into the port to introduce a laparoscope and instruments to perform the surgery.

Figure 19.3 Commercially available single incision devices

The second method is performed without using any special device but with only trocars that are generally used during traditional laparoscopic surgery. After making the skin incision measuring 2.5 cm, the skin is detached from the rectus sheath and a space with a distance of about 1.5 cm is created all around the incision. This is to release the skin from the rectus sheath. After this, an instrument called a Veress needle is used to pass carbon dioxide into the abdominal cavity. This is to separate the abdominal wall from the abdominal organs. A trocar with a rubber band attached to it is inserted into the abdomen in the middle of the incision. A laparoscope attached to a camera is passed into the abdomen and video images captured by the video camera are displayed on a video monitor. A powerful light source is channeled into the abdominal cavity for the purpose of illumination. Another two, 5mm trocars are placed lateral to the first trocar on either side to allow the passage of instruments such as laparoscopic scissors and graspers to perform the surgery.

At the end of the surgery, all the instruments are removed and the CO2 gas is released. The umbilicus is then reconstructed.
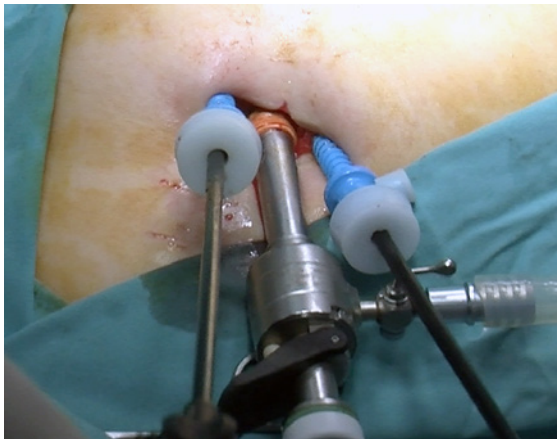

Figure 19.4 Port placement in single incision laparoscopic surgery (top view)

Figure 19.5 Port placement in single incision laparoscopic surgery (side view)

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Watch Video 19.1

How is single incision laparoscopic surgery performed

http://vimeo.com/149741718

**What are the advantages and disadvantages
of these 2 different techniques?**

The advantage of using commercially available devices is that these devices are designed to fit into the abdominal incision tightly so as to prevent the leakage of carbon dioxide. It is also easy to change trocars from 5mm to 10mm during surgery. However, these devices are expensive and are disposable. The distances between the trocars are also small, making surgery especially suturing difficult.

The advantage of using only the trocars is that this technique is cheaper because no other extra device is necessary. The trocars can also be placed quite far apart, so that there is more space, for easy dissection and suturing. The disadvantage of this technique is that, if the incisions made in the rectus sheath are large, leakage of carbon dioxide may cause surgery to be difficult. It is also more difficult to change trocars that have already been placed in the abdomen.

Advantages of Single Incision Laparoscopic Surgery?

Single incision laparoscopic surgery has as many advantages as traditional laparoscopic surgery. This includes:

Less postoperative pain

Quicker return of bowel function.

Quicker return to solid food.

Quicker return to daily activities.

Reduced chances of scar formation in the abdomen.

Reduced infection rate.

Reduced bleeding during surgery.

Shorter hospital stay.

Video magnification offers the surgeon a better view of diseased organs and its surrounding vessels

The added benefit of single incision laparoscopic surgery is that there will be only 1 scar (see Figures 19.4 and 19.5) and it is hidden in the umbilicus. Due to a single incision, the postoperative pain is also believed to be lesser than in traditional laparoscopic surgery.

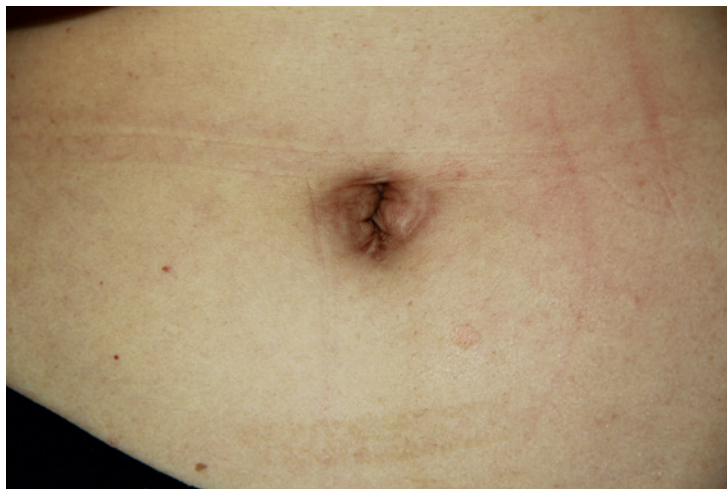Figure 19.6 umbilical wound at the end of the surgery

Figure 19.7 umbilical wound 3 months after
single incision laparoscopic surgery

What are the disadvantages?

It is technically more demanding for the surgeon to perform this surgery. There is crowding of instruments in the umbilicus and this will cause limitations to the movement of these instruments (triangulation).

Suitable candidates for single incision laparoscopic surgery		
1	Single incision bilateral tubal ligation with Filshie's clip	Scan Me Watch Video
2	Single incision laparoscopic salpingoophrectomy	Scan Me Watch Video
3	Single incision laparoscopic cystectomy for ovarian cysts	Scan Me Watch Video
4	Single incision laparoscopic salpingectomy for ectopic pregnancy	Scan Me Watch Video
5	Single incision Total Laparoscopic Hysterectomy	Scan Me Watch Video
6	Single incision laparoscopic myomectomy	Scan Me Watch Video

Summary

Single incision laparoscopic surgery is performed using a single incision of 20 to 25 mm in the umbilicus. There are several ways of performing this operation. It is a technically demanding surgery for the surgeon but it has several advantages for the patient.

Chapter 20

3D (Three Dimensional) Laparoscopy

Chapter 20: 3D (Three Dimensional) Laparoscopy

Conventional laparoscopy uses a two-dimensional view. This has the disadvantages of lack of depth perception and spatial orientation. An expert, after performing 2D laparoscopy for many years, adapts to perform excellent laparoscopic surgeries with the 2D laparoscope. The introduction of 3D (three-dimensional) laparoscopy has given surgeons the extra benefit of depth perception, spatial resolution and accuracy.

There are several 3D laparoscopes in the market. The following companies develop them:

1. Einstein Vision by Scholly Fiberoptics, Germany and marketed by B Braun Germany)

2. Storz - Germany

3. Olympus - Japan

4. Viking systems -USA

The technology of 3 D laparoscopy is still evolving. Most companies are only producing 3D laparoscopic systems in standard definition (SD). Einstein Vision is perhaps the first company that has a 3D laparoscope in high definition (HD). They have been supplying 3D laparoscopes for Da Vinci Robots for many years.

The biggest advantage of 3D laparoscopy is that vision is in 3D so surgeons can operate with vision in three dimension. When vision is in three dimension, depth perception is available so the operation becomes easier and safer. Surgeons are also less fatigued during the long hours of surgery.

One disadvantage of 3D laparoscopy is that the equipment is currently very expensive (although very much less than the Da Vinci Robot). The operating team also must wear glasses to view the screen in 3 D and only a 10mm telescope is available in 3D.

Scan Me

Watch Video 20.1

3D laparoscopy
https://vimeo.com/159012750

Figure 20.1 Performing laparoscopic surgery using 3D laparoscopic system

Summary

3D laparoscopy is a new technology. It provides the surgeon and his team with a 3 dimensional view of the surgical field. This technique makes the surgery safer for the patient and less tiring for the surgeon hence reducing the room for error.

Chapter 21

Laparoscopic Surgery for Infertility

Chapter 21 : Laparoscopic Surgery for Infertility

Laparoscopy is a very useful tool in the investigation of infertility. Investigations for an infertile couple will include blood tests, ultrasound, checking the quality and quantity of sperms (seminal analysis) and hysterosalpingography (HSG). These are known as non-invasive tests. If abnormalities are detected during these tests, a diagnostic laparoscopy may be suggested for the completion of an infertility workup. I do not believe that routine laparoscopy is necessary for all women who cannot conceive, but it is useful in selected patients.

In many patients where no abnormalities are detected during non-invasive tests, some abnormalities such as pelvic adhesions and endometriosis may be seen during laparoscopy. During laparoscopy, a dyed fluid can also be injected into the uterus via the cervix to see whether the tubes are patent. This is called tubal chromotubation.

Scan Me

Watch Video 1.1
Normal female pelvic anatomy
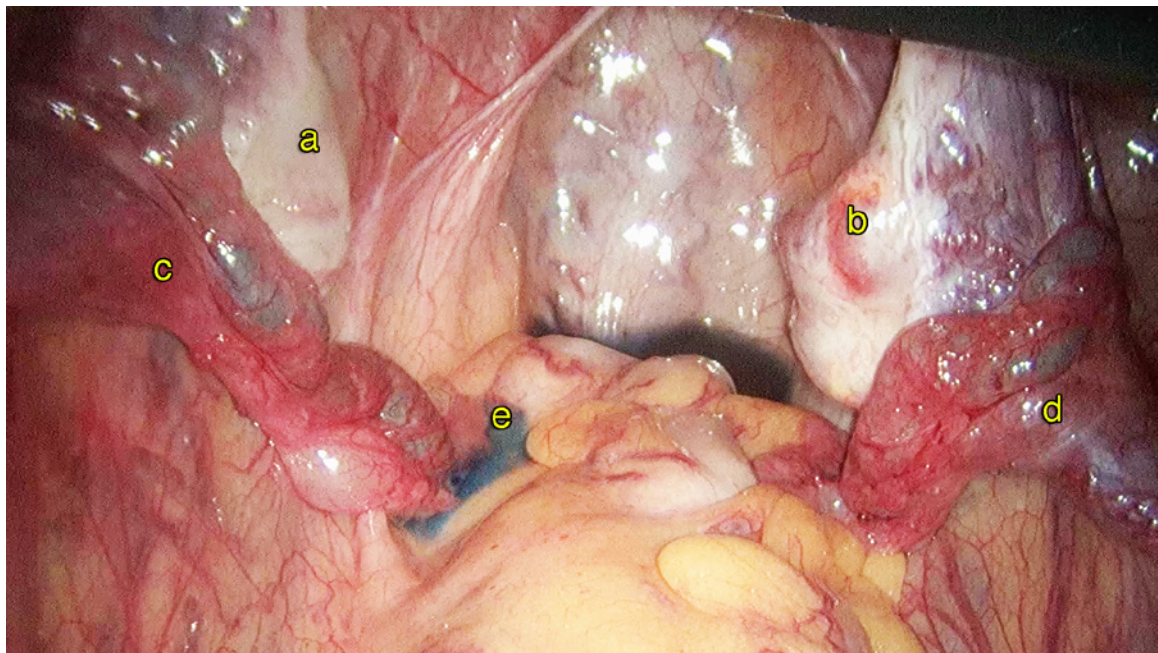https://vimeo.com/149588511

Figure 21.1 Patent fallopian tubes (a: left ovary, b: right ovary, c: left fallopian tube, d: right fallopian tube with dye in it, e: blue dye coming out of the left fallopian tube)

When is laparoscopy indicated?

1) Fallopian tubes are found to be blocked or a hydrosalpinx (g) is found during a HSG (see Figures 8.1 and 8.2). Laparoscopy can be performed to correct these conditions. This is discussed in detail in chapter 29.

2) There is a suspicion of endometriosis either by taking a history or endometriotic cysts are seen on ultrasonography. A laparoscopy will assist in confirming the disease as well as treating it (see chapter 25).

3) Fibroids are seen and thought to be the cause of the infertility. A laparoscopic myomectomy can be performed (see chapter 24).

4) Ovarian cysts are seen on ultrasound and these cysts are thought to be the cause of infertility. A laparoscopy can be performed to remove these cysts (Laparoscopic cystectomy, see chapter 27).

5) Pelvic adhesions are seen as an incidental finding during a routine laparoscopic investigation for endometriosis. Such adhesions can be excised laparoscopically.

6) Adenomyosis is a complex disease that usually coexists with endometriosis is suspected. Patients with adenomyosis are also usually subfertile. Laparoscopy can assist is confirming the diagnosis of adenomyosis and surgical excision of part of the adenomyosis can be performed. (This is discussed in chapter 31).

7) Polycystic ovarian disease is suspected, laparoscopic ovarian drilling can be performed. (see chapter 23).

Fact 21.1

Should all women with infertility undergo a routine laparoscopy?

Laparoscopy has a big benefit as an investigative tool in infertility. When a laparoscopy is performed, the pelvis and abdomen can be visualised directly for evidence of any disease. Diseases such as mild endometriosis and pelvic adhesions can never be diagnosed without a laparoscopy. The patency of fallopian tubes can also be checked during laparoscopy. However, in my practice I do not advocate routine laparoscopy for all infertility patients. It is only when pathology is suspected by investigations such as ultrasound examination or hysterosalpingogram, do I advocate that a laparoscopy be performed. Routine laparoscopy for all infertile women is too invasive and the benefit from it is minimal.

Summary

Laparoscopy is a very useful tool in the management of patients with infertility. It can be used as a tool for the investigation and treatment of the many diseases that causes infertility.

Chapter 22

Laparoscopic Tubal Sterilisation

Chapter 22 : Laparoscopic Tubal Sterilisation

Tubal sterilisation can be performed either just after a normal delivery (postpartum sterilisation), during a Caesarean section or when a woman is not pregnant (interval sterilisation). Most interval sterilisations are performed laparoscopically. Traditionally, this surgery is performed by making 2 or 3 incisions in the abdomen, one umbilical incision for insertion of the camera, and the other incisions with ports to place instruments to perform the surgery. The various techniques are as follows:

1) Laparoscopic Clip Application

There are 2 types of clips available in the market namely the Hulka-Clemens clip and the Filshie clip. This technique is usually performed using 2 incisions. The first incision is in the umbilicus to place a 5 mm telescope. The second is a 8 mm incision placed laterally to introduce the trocar for the clip applicator. Clips are placed on the isthmus part of both tubes. The clips apply pressure on the tube, resulting in complete tubal occlusion (closure) and eventual necrosis (g) at the clip site.

The advantages of this technique are;

1. there is no transection of tubes or its surrounding tissues so bleeding risk is reduced.

2. minimal time is required for its application.

3. only 4 mm of the tube is damaged by the clip so future tubal reversal (if requested) will be successful.

The disadvantage of this technique is that the clips are quite expensive. This technique is currently performed via a single incision though the umbilicus (see Chapter 19).
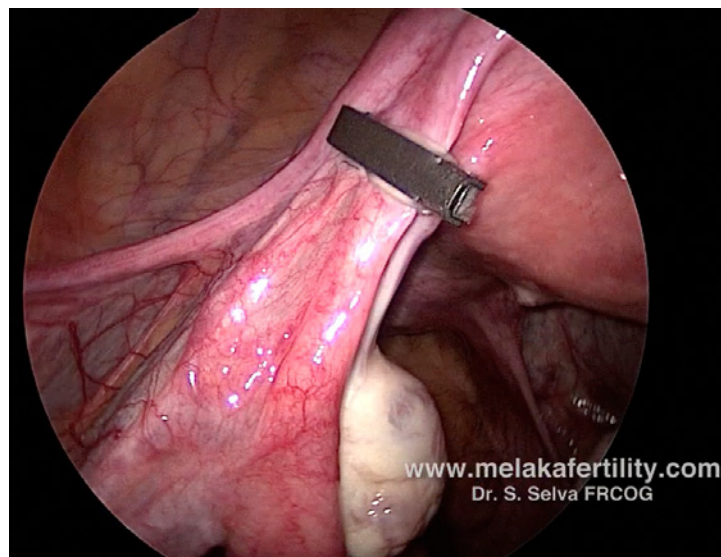

Figure 22.1 Flischie's clip application

2) Laparoscopic Fallope or Yoon rings insertion

In this technique a 2 -3 cm segment of the fallopian tube is drawn inside a narrow cone shaped applicator. The silastic ring (that has been stretched over the outside of the applicator) is then released into the tubal loop. As the ring contracts due to its elasticity, it constricts the base of the loop and blocks the fallopian tube. Deprived of its blood supply, the constricted loop is replaced with scar tissue, and the remaining healthy tubal segment separates, similar to the old Pomeroy tubal ligation method used by open technique. This surgery can be performed with 1 incision in the umbilicus. An operative laparoscope can be placed to visualise the pelvis and the applicator can be passed through the operative channel. The surgery can also be performed with 2 incisions, 1 in the umbilicus for the placement of the laparoscope while the other incision placed suprapubically or laterally to place the applicator. The disadvantage of this method is that there is a possibility of injury to the mesosalpinx causing haemorrhage. Rigid tubes or large tubes can also be divided by the applicator causing bleeding. This however can be controlled by bipolar coagulation. The amount of tissue damage is small allowing for tubal reversal.
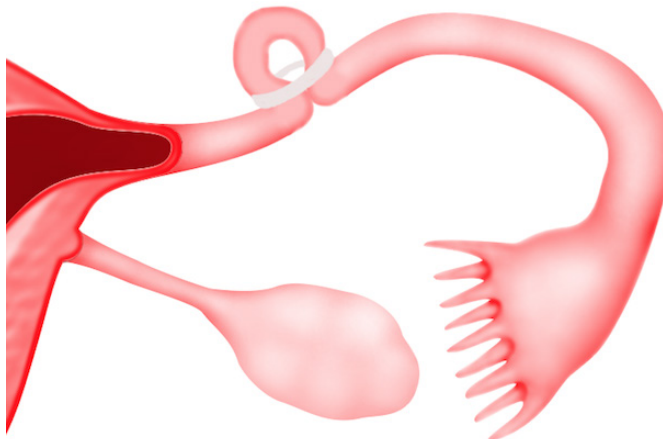
Figure 22.2 Fallope's ring

3) Laparoscopic Bipolar Electrocoagulation

This technique is usually performed with 2 or 3 incisions or a single incision technique. A 5 mm incision is placed in the umbilicus for the placement of a 5 mm trocar. Two other 5 mm trocars are placed in the abdomen, usually on either side. The tubes are then coagulated. This is usually done at the isthmus. About 3 cm of the tube must be coagulated. The coagulated tube then may or may not be transected and excised.
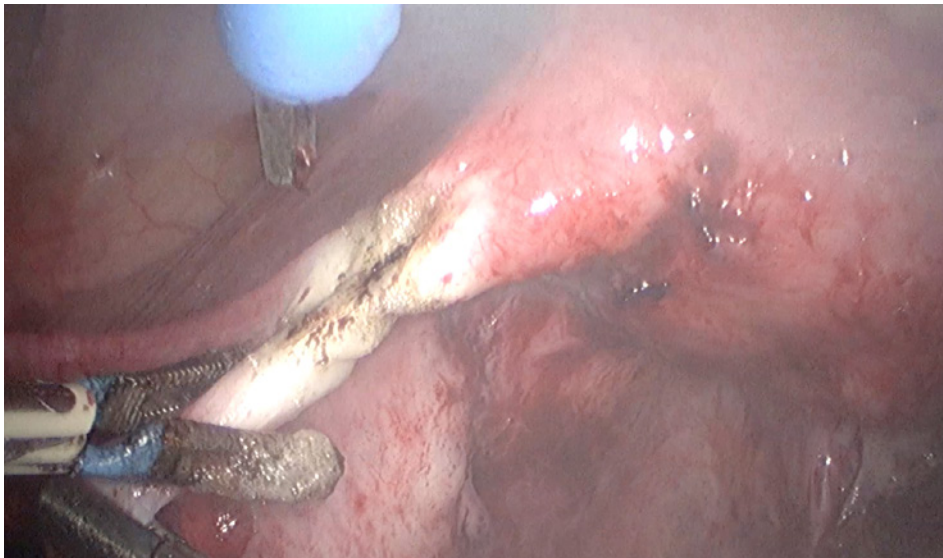

Figure 22.3 bipolar coagulation of left fallopian tube

4) Laparoscopic Unipolar Electrocoagulation

Just like the bipolar electrocoagulation, this surgery can be performed with 2 or 3 incisions (3 incisions if the tubes need to be transected and excised). After careful evaluation of the pelvis and the bowel pushed away, the tubes are held with a grasper attached to a monopolar electrocoagulation device and about 3 cm of the tube is coagulated. Due to lateral spread (the electrical current spreading outward from the coagulating forceps), more tube tend to be damaged in this technique. The coagulated tubes may or may not be transected or excised

Scan Me

Watch Video 22.1
Laparoscopic sterilization

https://vimeo.com/149484799

Single Incision Laparoscopic Tubal Ligation

Laparoscopic tubal ligation can also be performed via a single incision technique. In this method, instead of making 2 more incisions to perform the surgery, a single incision is made in the umbilicus and 2 or 3 trocars are placed through this incision to perform the surgery.

Scan Me

Watch Video 19.2
Single incision bilateral tubal ligation with Filshie's clip)

http://vimeo.com/149741716

Summary

Interval sterilisation is sterilisation done when the patient is not pregnant. This is usually done via the laparoscopic route. There are several techniques and this includes laparoscopic clip application, laparoscopic Fallope or Yoon rings insertion, laparoscopic bipolar electrocoagulation and laparoscopic unipolar electrocoagulation. These surgeries can also be performed via the single incision laparoscopic technique.

Chapter 23

Laparoscopic Surgery for Polycystic Ovarian Syndrome

Chapter 23 : Laparoscopic Surgery for Polycystic Ovarian Syndrome

Laparoscopic Ovarian Drilling

This surgery has been advocated for polycystic ovarian disease. It is performed in women who despite weight reduction and fertility drugs, still do not ovulate. The aim of this surgery is to destroy the ovarian capsule. This will reduce androgen (g) (male hormone) production and lead to regular ovulation and pregnancy.

How is it performed?

This surgery is usually performed with 3 incisions,. The first incision is in the umbilicus for the placement of the laparoscope. The second is to pass a grasper to hold the ovary and the third is to pass a "fine pin" needle diathermy instrument. This instrument is used to "drill" holes into the ovaries using electrical current. The number of holes made differ, ranging from 4 to 12. The duration of each drilling is a few seconds. This surgery can also be performed using lasers.
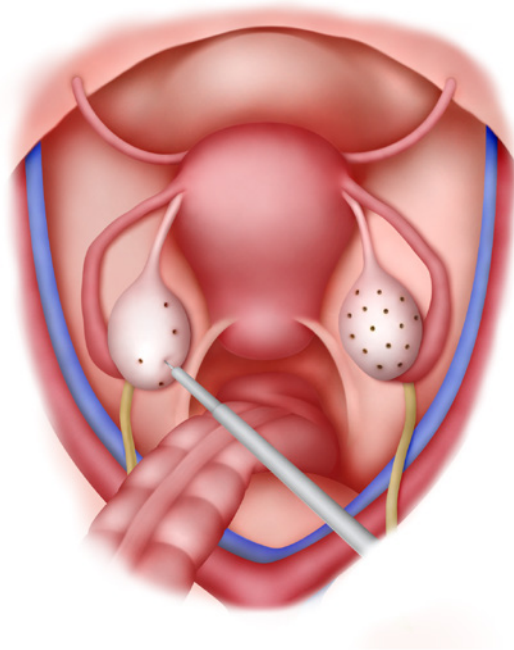

Figure 23.1 Drawing showing how
Laparoscopic Ovarian Drilling is done

Advantage

The advantage of this technique is that it is easy to perform and the reported ovulation rate post operation is 80% and pregnancy rate 50%.

Disadvantage

There is a risk of ovarian scarring, formation of adhesions and damage to the ovary and its blood supply leading to premature ovarian failure.
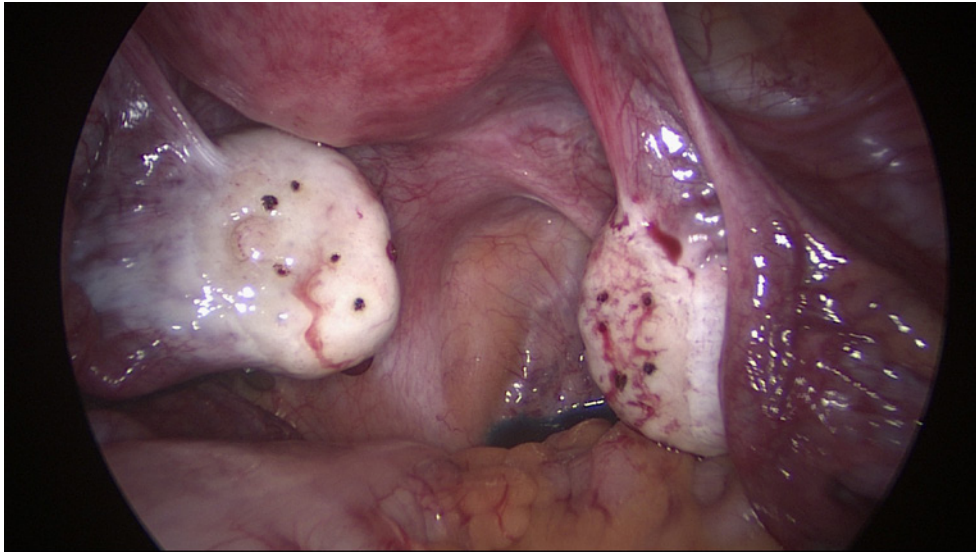
Figure 23.2 Photograph showing Laparoscopic Ovarian Drilling

Scan Me

Watch Video 23.1
Laparoscopic surgery for
polycystic ovarian syndrome

http://vimeo.com/159013473

Summary

Laparoscopic Ovarian Drilling is one
of the options often considered for the
treatment of polycystic ovarian disease.
It is an easy operation to perform but
has a risk of premature ovarian failure

Chapter 24

Laparoscopic Surgery for Fibroids

Chapter 24: Laparoscopic Surgery for Fibroids

There are several types of laparoscopic surgeries available for the treatment of fibroids namely

1. Laparoscopic myomectomy
2. Single Incision laparoscopic myomectomy
3. Total laparoscopic hysterectomy
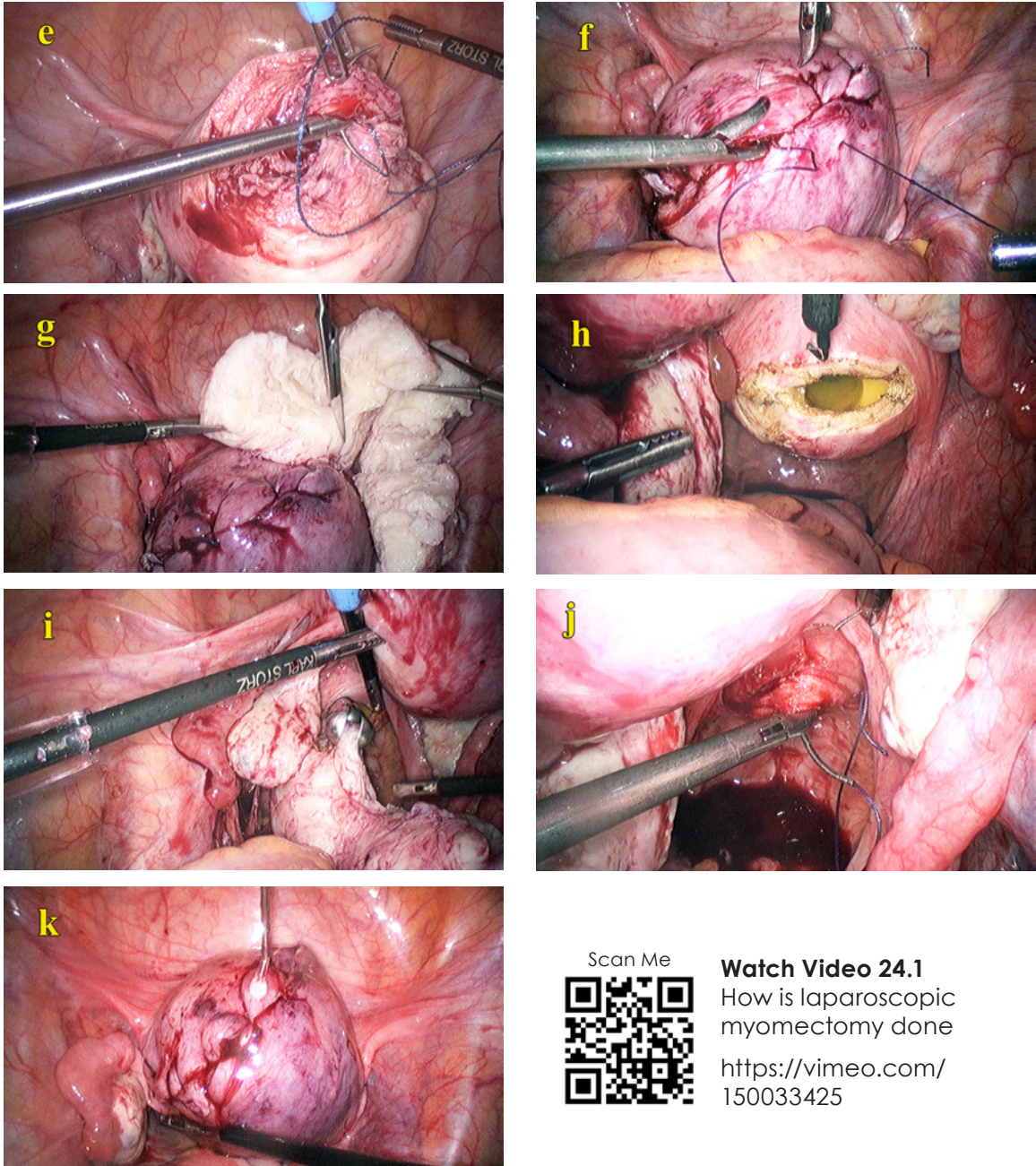
1) Laparoscopic myomectomy

How is laparoscopic myomectomy performed?

Laparoscopic removal of fibroids is a technically demanding surgery. It will require advance laparoscopic surgical skills. There are several steps in performing this surgery.

> Step 1: To reduce bleeding during the surgery (devascularization). This may involve injection of vasopressin and /or ligation of the uterine arteries.

> Step 2: To make an incision on the uterus and removal (enucleation) of the fibroids. This may require one or more incisions on the uterus.

> Step 3: To suture all the incisions made on the uterus. Advance suturing skills is required because meticulous repair is necessary.

> Step 4: To remove the fibroids from the abdomen.

At the end of the surgery anti adhesion barriers are usually placed to reduce the chances of intestines and omentum to be adherent (g) to the incision sites. A drainage tube may be placed in the pelvis to drain out any blood that may collect after the surgery. This tube is removed after a few days.
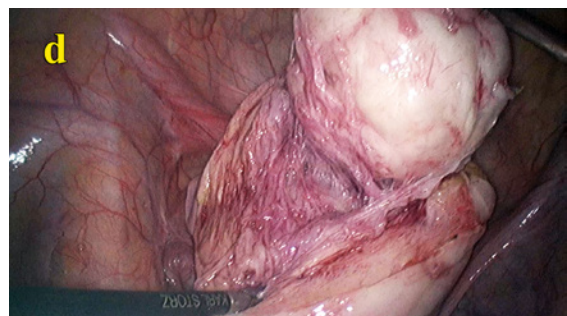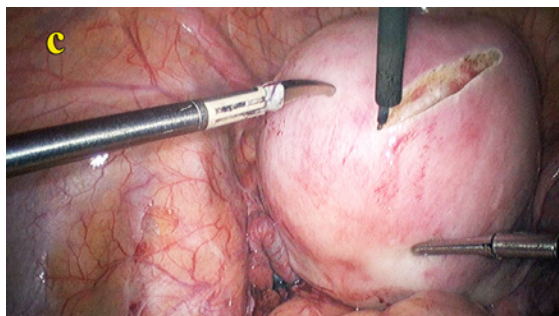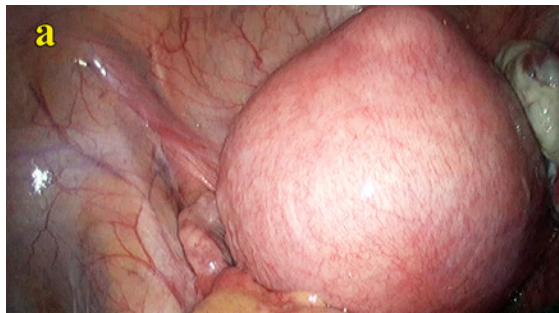
Scan Me

Watch Video 24.1
How is laparoscopic myomectomy done

https://vimeo.com/ 150033425

Figures 24.1 (a – k) – series of photos showing how laparoscopic myomectomy is performed (a) fibroid uterus (b) vasopressin injected (c) incision made on the fibroid (d) fibroid enucleated (e) Inner defect sutured with barbed sutures (f) serosa sutured (g) fibroid cut into small pieces (h) colpotomy done (i) fibroid removed through the colpotomy (J) colpotomy defect sutures (k) defect covered with antiadhesion gel

What steps are taken to reduce bleeding during surgery?

There are several strategies to reduce bleeding during laparoscopic myomectomy.

1. Vasopressin (a drug that shrinks (vasoconstricts) blood vessels) can be injected into the junction between the fibroid and the uterus so as to reduce bleeding during the surgery. Vasopressin usually works for about 1 hour and so enucleation of the fibroid and suturing of the defect must be done quickly before bleeding resumes.
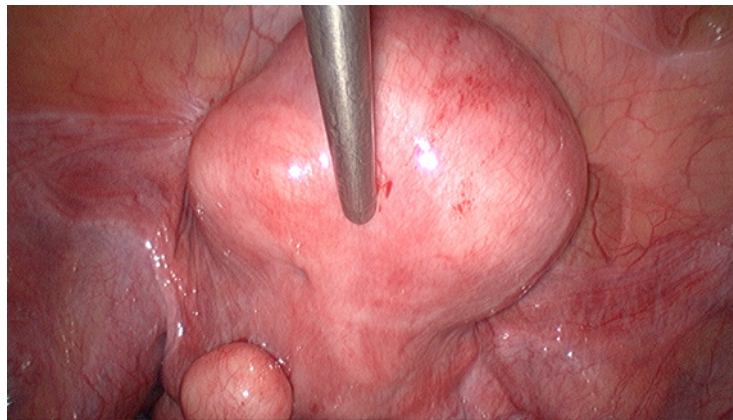

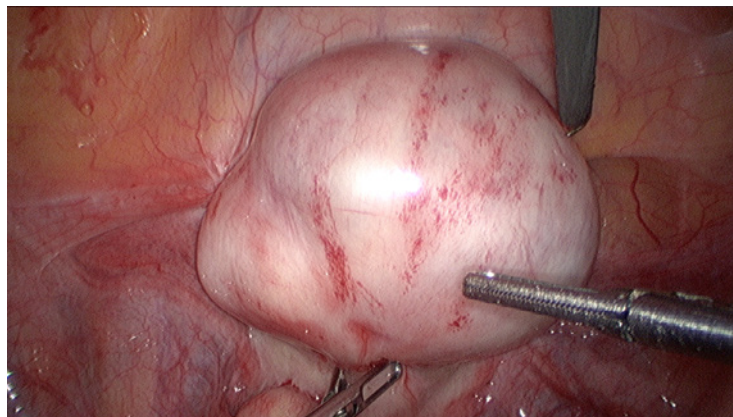Figure 24.2 Fibroid before injection of vasopressin

Figure 24.3 Fibroid has turned white after injection of vasopressin

2. The blood supply to the fibroids is believed to come directly from the uterine arteries. So ligation of the uterine arteries can be done temporarily with clips or permanently with clips or sutures. This can be done at 2 sites namely the ascending branch of the uterine artery or at the origin of the uterine arteries from the internal iliac artery. The ascending branch of the uterine arteries is usually sutured. The uterine arteries can be clipped or ligated at its origin from the internal iliac arteries. Since the blood supply of all fibroids is believed to come directly from the uterine arteries, ligation of the uterine arteries permanently, will cause shrinkage of any small fibroids that were not removed during the surgery. Ligation of the uterine arteries may even reduce the incidence of recurrence of fibroids. However there is a fear that permanent ligation of the uterine arteries may reduce the blood supply (vascularization) of the uterus and thus reduce the chances of future pregnancy. So, temporary ligation with clips is another option to prevent bleeding and the clips can be removed on completion of the myomectomy.
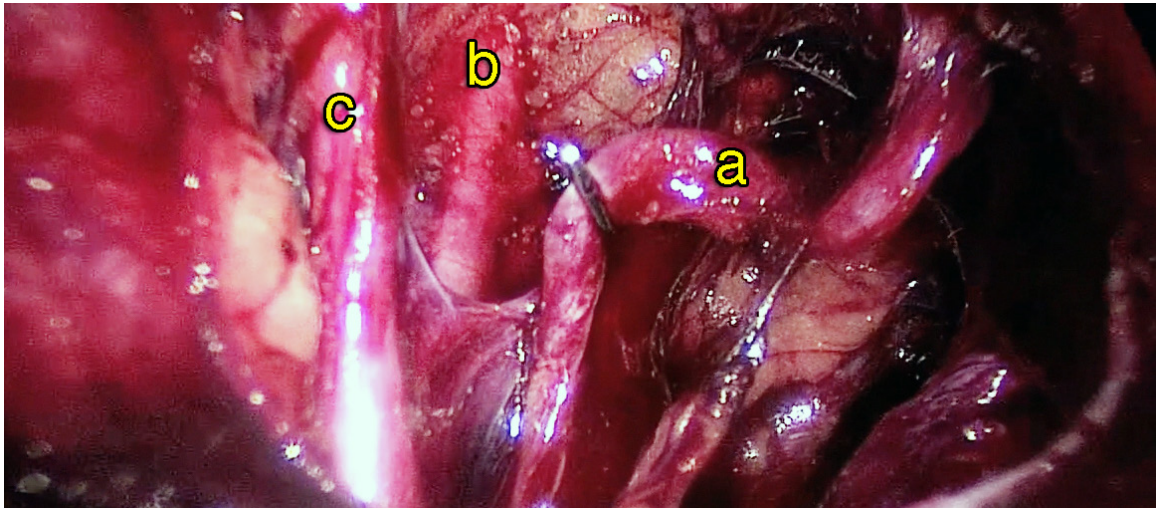

Figure 24.4 Clipping the left uterine artery at its origin (a) uterine artery, (b) ureter, (c) obliterated umbilical artery
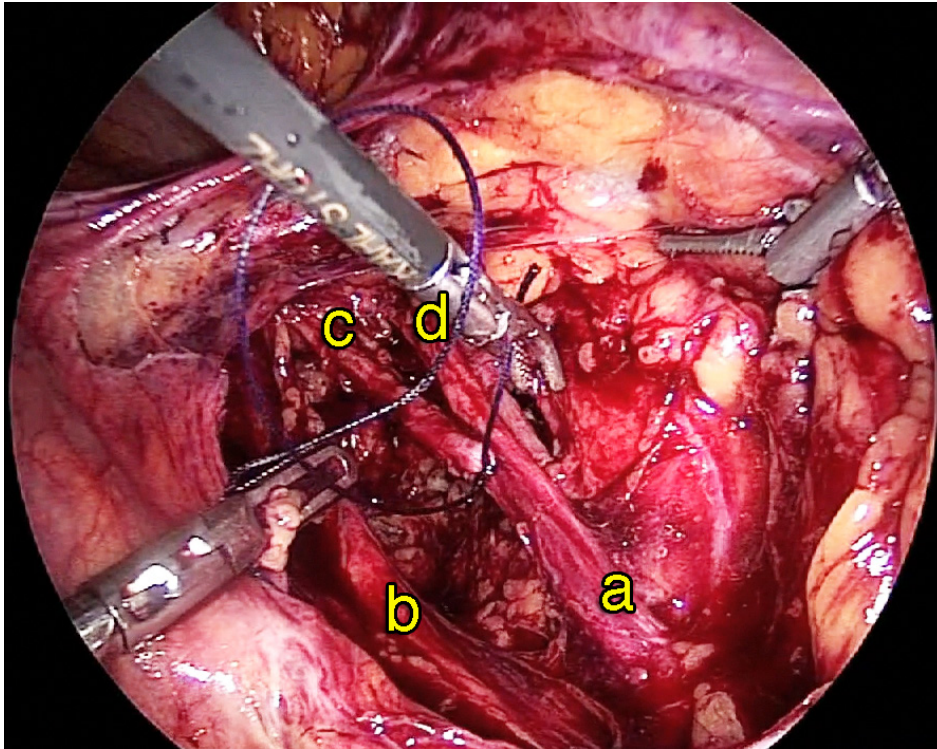
Figure 24.5 Tying the right uterine artery at its origin (a) internal iliac
artery, (b) ureter, (c) uterine artery, (d) obliterated umbilical artery

Case 24.1 Spontaneous pregnancy after Laparoscopic Myomectomy

DSCA is a 28 year old lady who consulted me in March 2013. She had a miscarriage in December 2012 at 15 weeks of pregnancy. Examination revealed a 16 gestational week size (g) uterus. Ultrasound done showed a large uterine fibroid measuring 9.5 x 11.65 cm. There was a cystic lesion within the fibroid indicating degeneration of the fibroid. She underwent a laparoscopic myomectomy. Postoperatively, she was well. She was advised not to conceive for 1 year. She conceived spontaneously in June 2014 after trying for a few months. She delivered a healthy baby boy by Caesarean section in February 2015.

How are the fibroids removed from the abdomen?

Removal of fibroids from the abdomen and pelvis can be tedious and time consuming. Fibroids are usually removed using an electric morcellator or through an incision on the upper part of the vagina behind the cervix (culdotomy). This is described in detail in chapter 18.

What are the advantages of laparoscopic myomectomy?

All the advantages of laparoscopic surgery described in chapter 15 applies to laparoscopic myomectomy. However many of the patients with fibroids are also sub fertile. Laparoscopic surgery, will reduce the incidence of postoperative pelvic adhesions, thus the chances of spontaneous pregnancy is perhaps higher in laparoscopic myomectomy compared to conventional myomectomy performed by laparotomy.

What are the disadvantages of laparoscopic myomectomy compared to myomectomy by laparotomy?

1. Technically demanding
   Laparoscopic myomectomy is a difficult operation compared to myomectomy by laparotomy. It requires advance laparoscopic skills and the learning curve is very steep.

2. Takes longer time to perform
   Laparoscopic myomectomy can take from 2 to 3 times longer than open myomectomy because of all the different steps that are necessary.

3. May miss small fibroids
   When myomectomy is performed by laparotomy, the uterus can be felt with the hands and small fibroids can be felt by tactile stimulation (felt by touch). So small fibroids can be detected and removed. However during laparoscopic myomectomy, only fibroids that are seen can be removed. Sometimes an ultrasound is performed during the operation to determine the location of fibroids that are located deep in the myometrium so that an incision can be made at the appropriate part of the uterus to remove these fibroids.

4. When using an electric morcellator (g) to remove the fibroids, fragments of fibroids may be accidentally left behind in the abdomen and pelvis. These fragments may attach to abdominal and/or pelvic structures and may grow. Such fibroids are called parasitic fibroids. To avoid this occurrence, fibroids are morcellated within a bag (see chapter 18 and Figures 18.8 and 18.9).

What are the risks of laparoscopic myomectomy and open myomectomy?

When performing myomectomy by laparoscopy or laparotomy, considerable blood loss may occur which may require blood transfusion. There is also a small risk that if bleeding is excessive, a hysterectomy may be necessary.

Which patients are not suitable for laparoscopic myomectomy?

Laparoscopic myomectomy can be difficult in some patients.

1) Large fibroids

When the fibroid is large, surgery can be difficult. This is because there will not be much space in the abdomen to manipulate the fibroid. Sometimes these large fibroids can be "shrunk" with the use of GnRH agonist injections for several months before performing the myomectomy laparoscopically. However, the disadvantage of giving GnRH agonist is that fibroids can become soft and adherent to the uterus and removal (enucleation) may be difficult. The injection can also cause small fibroids to shrink and "disappear" and these fibroids may reappear after that surgery.

Figure 24.6 A patient with a large uterine fibroid. This was after the patient had received GnRH analogue to shrink the fibroid
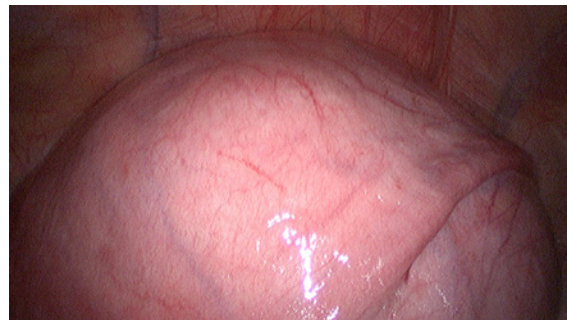

Figure 24.7 Laparoscopic view of the large uterine fibroid of the patient shown in Figure 24.6. Laparoscopic myomectomy was performed. See Figure 18.10 for the morcellated fibroid tissues.

Scan Me

Watch Video 24,2
Laparoscopic myomectomy
for a large uterine fibroid

http://vimeo.com/150296714

Case 24.2 Laparoscopic Myomectomy for large uterine fibroids

Another colleague referred KR to me. She was noted to have an abdominal mass of 30 gestational weeks size (g). She was single and virgo intacta. She was asymptomatic. Her menses were regular with normal flow. Examination and ultrasound done showed a large subserous fundal fibroid measuring 18.2 x 12.5cm and another posterior fibroid measuring 8.3 x 10.4 cm. She was keen on a laparoscopic myomectomy. Due to the large size of the fibroid I advised her to receive GnRH (Gonadotrophin releasing hormone) agonist injection for 6 months to shrink the fibroid before embarking on the surgery. She received a depot injection which lasted for 3 months and was seen again 3 months later. The fibroids had reduced in size. They were 15.5 x 10.2 and 7.7 x 9.2 cm respectively. She was advised to take a second dose of the depot injection but due to side effects she refused. She underwent laparoscopic myomectomy. It was a slightly difficult surgery but was successful. The total weight of all the fibroids removed was 1.5kg (Figure 18.11). Postoperatively, she has been well.

Discussion

Laparoscopic myomectomy can be performed on women who are virgo intacta, without the assistance of a uterine manipulator. Performing laparoscopic myomectomy to remove large uterine fibroids is challenging. Giving GnRH agonist to shrink the fibroid have 2 benefits namely (1) the uterus and fibroids will be smaller and so there will be more space to perform the surgery (2) the injection will make the fibroid less vascular and so there will be less bleeding during the surgery. The disadvantage is that due to the shrinkage of the fibroid, enucleation (g) of the fibroid will be slightly more difficult.

2) Multiple fibroids:

In patients with many uterine fibroids, it may be difficult to remove all the fibroids laparoscopically. As described earlier, during laparoscopy, the surgeon does not have the advantage of using his hands to feel the uterus for all the fibroids and as such, may miss some of the fibroids
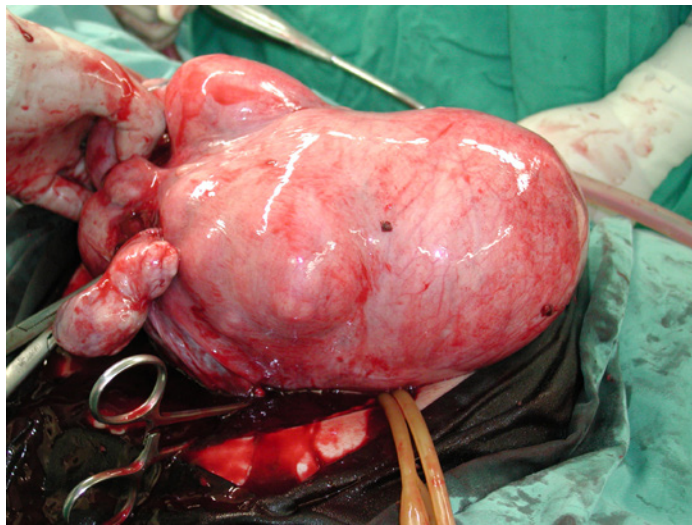

Figure 24.8 multiple large uterine fibroids seen at a laparotomy

3) Multiple previous surgeries:

Patients who have had multiple previous surgeries especially laparotomies may have adhesions of the bowel to the abdomen and the pelvic organs. This may be a relative contraindication for laparoscopic myomectomy. An experienced surgeon however will still be able to and can still perform laparoscopic surgery in such patients.

Case 24.3 Laparoscopic myomectomy for a large submucous fibroid

Madam MM a 32 year old lady, with 3 children, came to see me in 2009 for a gynecological examination and Pap smear. Examination and ultrasound did not reveal any abnormalities. She saw me again in 2015 at 38 years of age with a 1 year history of heavy menses. She was also suffering from bleeding in between her menses. She did not complain of dysmenorrhea. Examination and ultrasound showed a 14 gestational week size (g) uterus. There was a large submucous fibroid measuring 4.82 x 5.09 cm. The different options for surgery namely transcervical resection of the fibroid or laparoscopic myomectomy were discussed. She was keen on a tubal ligation and so she preferred a laparoscopic myomectomy and a tubal ligation. She underwent the surgery (watch video 24.3). Post operatively, she has been well.

Discussion

Transcervical resection of the fibroid would have been the optimal surgery for this patient. As the fibroid was large and type 1 (see Figure 41.2), she would have been asked to take gonadotrophin releasing hormone agonist for several months to shrink the fibroid before undergoing surgery. As she had already decided to undergo a laparoscopic tubal ligation, she opted for a laparoscopic myomectomy. The only disadvantage of undergoing a laparoscopic myomectomy is that since she would have a scar in the uterus, which would extend into the uterine cavity, if she conceives again, she would have to undergo an elective Caesarean section.

Scan Me

Watch Video 24,3
Laparoscopic myomectomy for a large submucous fibroid

http://vimeo.com/150158638

2) Single incision Laparoscopic Myomectomy

Laparoscopic myomectomy can be performed through a single incision. Single incision laparoscopic surgery has been described in chapter 18. Single incision laparoscopic myomectomy is usually performed in patients with few small fibroids. It is technically more demanding than traditional 3 or 4 port laparoscopic myomectomy.

Scan Me

Watch Video 19.7
Single incision laparoscopic myomectomy

https://vimeo.com/149741721

3) Total Laparoscopic Hysterectomy

In patients who have completed their family (g) and are over 40 years old, hysterectomy is an option. If the uterus is not too large, this procedure can be performed laparoscopically. This surgery can be performed either by traditional 4 port laparoscopic surgery or by single incision laparoscopic surgery. For details on how laparoscopic hysterectomy is performed please read chapter 33 and for single incision laparoscopic hysterectomy see chapter 19.

Summary

Several types of laparoscopic surgeries can be performed for uterine fibroids. This includes laparoscopic myomectomy (removal of fibroids), single incision laparoscopic myomectomy, total laparoscopic hysterectomy and single incision laparoscopic hysterectomy. Laparoscopic myomectomy has many advantages over myomectomy by laparotomy. However, it is a technically demanding surgery.

Fact 24.1

Can laparoscopic myomectomy be performed in women who have never had sexual intercourse before (virgo intacta) ?

There is a misconception that it is difficult to perform laparoscopic myomectomy in a virgo intacta woman. Laparoscopic surgery is usually performed with the assistance of a uterine manipulator. A uterine manipulator is an instrument placed into the uterine cavity via the vagina so that the uterus can be moved vaginally during surgery. However this is not absolutely necessary during a laparoscopic surgery. The uterus can be manipulated with instruments placed through the trocars abdominally, with no manipulation of the vagina and so no injury to the hymen.

Chapter 25

Laparoscopy for Endometriosis

Chapter 25: Laparoscopy for Endometriosis

Laparoscopy is considered the "gold standard" in diagnosing as well as treating endometriosis. Often, diagnosis and treatment are performed during the same operation. The surgical complexity can vary from as minor as destroying the endometriotic implants superficially with intense heat, to as major as removing and repairing the pelvic organs. As the disease usually affects these vital structures such as the bowel, ureters, bladder, blood vessels, etc., it is important to find a well-trained laparoscopic surgeon to treat the disease so that the risks can be kept minimal.

Types of Operations

The type of operation depends on the severity of the endometriosis. The more severe the condition, the more complex the operation, and the higher the risk it will pose. It is necessary for the patient to discuss thoroughly with her gynaecologist in order to understand the extent of the operation to be performed (prior to the surgery).

The following are the many types of operations available today:

1) Coagulation
This procedure makes use of electric current or laser to "dry up" the endometriotic spots or nodules. It is relatively quick and easy, but it is difficult to ensure that the entire lesion has been thoroughly destroyed and will not regrow. In cases where vital structures are involved, the procedure must be done with extra care so that underlying normal tissues will not be damaged.
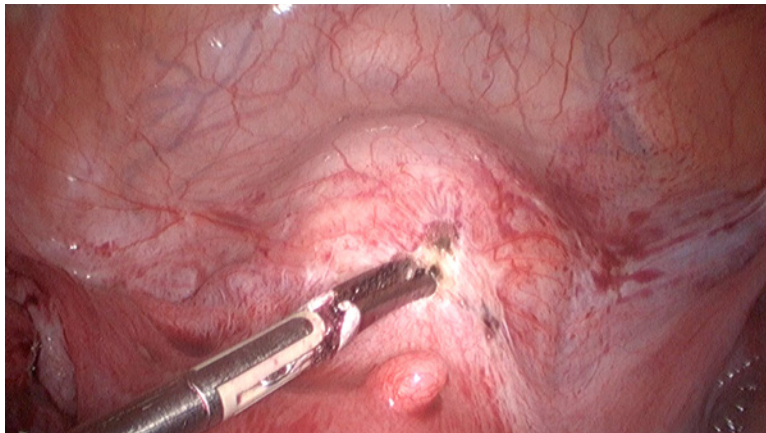
Figure 25.1 Coagulation of endometriosis over the bladder

2) Excision of endometriotic implants

Excision is a better technique compared to coagulation but it requires special skills and experience. The surgeon must be familiar with the normal pelvic anatomy so that he will be able to excise all abnormal endometriotic implants. In cases where the vital organs are infiltrated by the lesion, the surgeon must be able to excise the lesion while keeping the organs as normal as possible. If a vital organ has to be partially excised, the surgeon must be able to repair it so that its function will not be compromised.
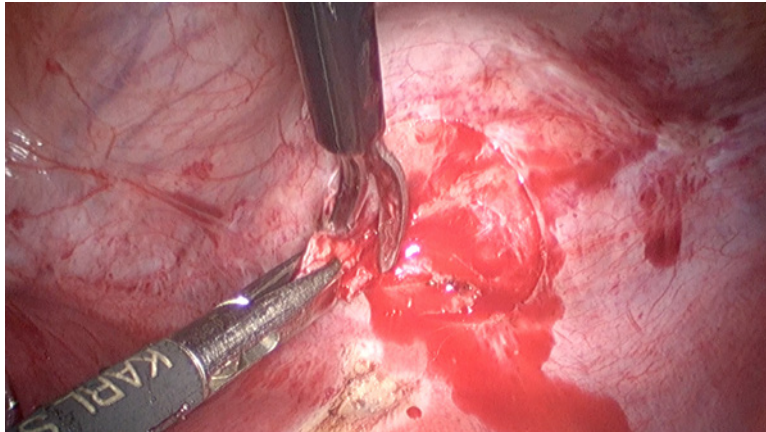
Figure 25.2 Excision of endometriosis over the bladder

3) Excision of endometriotic cyst wall (ovarian cystectomy)

This procedure is necessary for treating ovarian endometrioma or chocolate cyst. It is crucial for the surgeon to completely remove the entire cyst wall without damaging the normal ovarian structure.
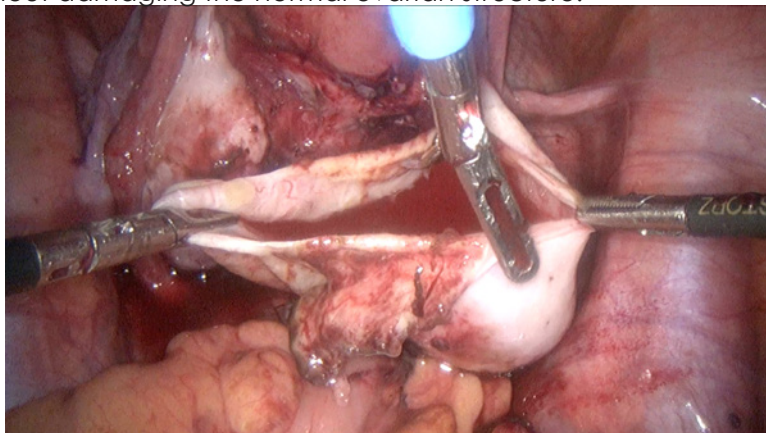

Figure 25.3 Ovarian cystectomy for a right endometriotic cyst

4) Excision of adhesions

5) Excision of deep infiltrating endometriosis (DIE)

Deep infiltrating endometriosis (DIE) is a specific type of endometriosis in which the endometriotric implants have invaded the wall of the organs. Excision of the implants is very challenging because only partial excision is necessary. Meticulous skills are required to repair the partially excised organs so that their functionality will not be compromised. Therefore, surgery will not be advised unless the patient is suffering from its symptoms. Specific sites like recto-vaginal septum pose an even higher challenge and risk to the surgery and a multidisciplinary approach involving a bowel surgeon and a urologist is a must.
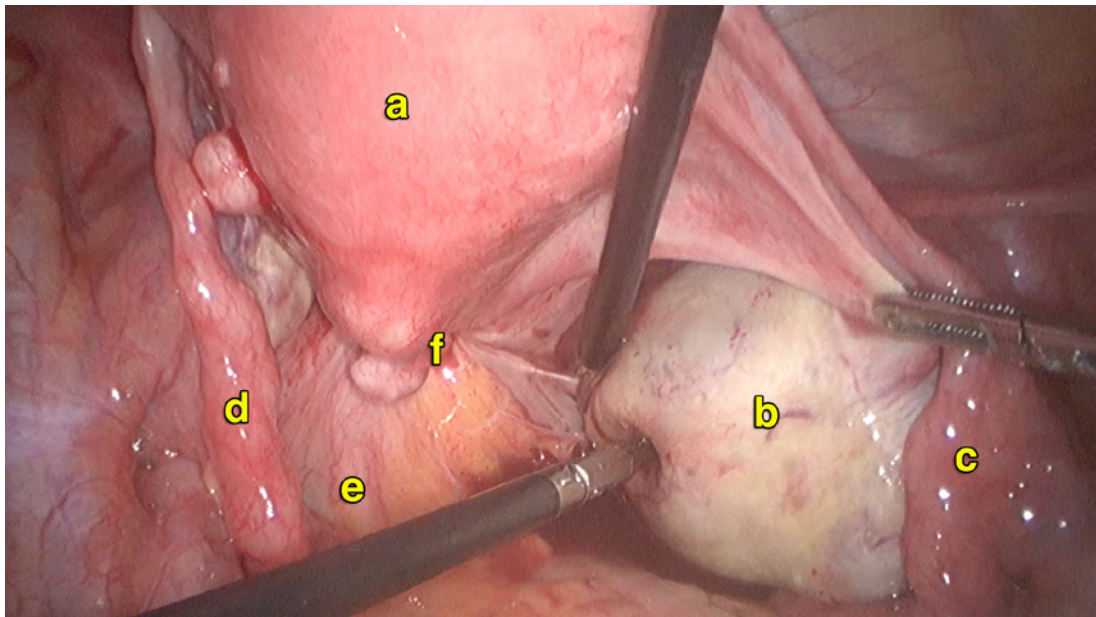
Figure 25.4
Deep infiltrating endometriosis involving the rectum, vagina and left uterosacral ligament
(a) uterus, (b) right endometrioma, (c) right fallopian tube, (d) left fallopian tube, (e) left ureter,
(f) deep infiltrating endometriosis involving the vagina, rectum and left uterosacral ligament

6) Excision of rectosigmoid and bowel endometriosis

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Watch Video 25.3
Laparoscopic surgery for
rectovaginal endometriosis

https://vimeo.com/159015020

7) Removal of one or both ovaries (oophorectomy)
When the ovary is severely damaged by the ovarian cyst or
when the ovarian cyst is too large to be removed via cystectomy,
it may be necessary to remove the entire ovary. This is usually
considered as a last resort because once both ovaries are
removed, hormone production immediately ceases. This will
lead to symptoms similar to natural menopause, but in a more
intense manner due to the sudden changes in hormone levels.

8) Removal of the uterus (hysterectomy)
This procedure may be necessary in cases of severe endometriosis
especially when there is also adenomyosis. It may or may not
involve oophorectomy but is typically performed together with
excision of endometriotric implants. It is usually considered in
women who have completed their family (see Chapter 33).

9) Removal of endometriosis of the bladder

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Watch Video 25.4
Laparoscopic management
of bladder endometriosis

https://vimeo.com/163190083

10) Laparoscopic uterosacral nerve ablation (LUNA)
This procedure aims to alleviate chronic pelvic pain by
resecting the nerves that link the uterus to the brain.

Recurrence After Surgery

The recurrence rate for endometriosis varies from approximately
10% to 50%. The more severe the endometriosis, the more
likely it will recur. Recurrence occurs particularly because of
incomplete or inadequate excision of endometriotic implants.
Although it is almost impossible to remove all the endometriotric
implants (especially when the disease involves vital structures),
it is still important to choose a well-skilled gynaecologist who
is able to remove as much of the endometriotic implants
as possible during surgery, to lower the recurrence risk.

Preventing Recurrence

In view of the fact that endometriosis is an oestrogen-dependent disease, suppressing oestrogen, may delay or even prevent a recurrence of the disease. One method to do so is to take oral contraceptive pills continuously 3 months at a time (i.e. 4 menstrual cycles per year) in a long-term manner.

Chances of Getting Pregnant

Chances of getting pregnant rely on the severity of the disease. As long as the reproductive function is not interfered with, pregnancy is possible. However, in many cases, endometriosis damages and distorts the anatomy of the reproductive organs, such as causing scarring and blockage in Fallopian tubes as well as, distorting or enlarging the uterus (particularly with adenomyosis). The presence of ovarian endometriomas (chocolate cysts) also damages the ovaries. The damage may become permanent when the cysts grow too large or become twisted. It is therefore important not to delay treatment because the progression of endometriosis may irreversibly narrow the chances of pregnancy.

Choosing A Gynaecologist

Endometriosis surgery is perhaps the most difficult and complex gynaecological operation to perform. It is best performed laparoscopically because of the direct superior visualization of the pelvic cavity. Not only should the surgery be performed in a centre, dedicated to laparoscopy, but also, be performed by a well-trained and experienced laparoscopic surgeon. As endometriosis may involve the bowel, bladder and ureters, the gynaecologist must be able to work with a bowel surgeon as well as a urologist.

Case 25.1

Pregnancy via IVF in a patient who underwent bilateral cystectomy for endometrioma

NHMT came to see me in 2012. She was 27 years of age and had undergone a previous laparotomy and cystectomy for endometrioma at a different hospital in 2010. She was given gonadotrophin releasing hormone agonist for 6 months followed by danazol. She had been married for 2 years and could not conceive. She had also previously done a hysterosalpingogram, which showed a blocked left fallopian tube and a patent right fallopian tube. She complained of slight dysmenorrhea. She had attempted an intrauterine insemination (IUI) in the other hospital, but she was not successful.

Examination and transvaginal ultrasound showed bilateral ovarian cysts measuring 2.14 x 2.51cm (left ovary) and 2.00 x 2.40cm (right ovary). AntiMullerian hormone (a hormone to test the ability of the ovaries to produce oocytes (eggs)) done was in the normal range, indicating that she could still produce oocytes. She was discouraged to undergo another laparoscopic cystectomy and was advised to undergo IVF. She agreed and underwent the procedure in 2012. It was a successful attempt. Only 4 eggs were retrieved and there were only 2 embryos. She conceived and delivered a baby boy in 2013. She is currently on 3 monthly Depoprovera® injections to prevent a recurrence of the endometriosis.

Discussion

This lady underwent a cystectomy for endometrioma. She had a recurrence of the endometriomas but was advised to not undergo a second surgery because of the worry of reducing her ovarian reserve (ability to produce oocytes). She was advised to undergo IVF to increase her chances of pregnancy. The pregnancy itself would cause a reduction in the chances of recurrence and after the delivery she was advised to stop ovulation to reduce the chances of recurrence.

Case 25.2

Spontaneous pregnancy in a young lady who underwent 2 previous laparoscopic cystectomies for large endometriomas

SSMS first me saw at the age of 19 in 2001. She complained of left iliac fossa pain for 3 months. Her menses had been regular but she had been having dysmenorrhea of increasing severity. Examination and abdominal ultrasound showed a large endometrioma of size 4.65 x 4.98 and 4.11 and 3.21cm in diameter. She underwent a laparoscopic cystectomy. She had 2 large endometrioma in her left ovary. The right ovary was normal and both her fallopian tubes were normal. Postoperatively, she was given gonadotrophin realeasing hormone (GnRH) agonist monthly for 6 months. She was well after that. However she returned in 2002 again complaining of increasing dysmenorrhea. Examination and ultrasound done showed bilateral endometrioma of size 3.42 x 3.52cm and 1.75 and 2.25 cm. She underwent a second laparoscopy and was found to have a large right endometrioma and a small left endometrioma. Laparoscopic cystectomy was performed. Postoperatively she received dimetriose for 6 months. She was still single and was advised to take oral contraceptive pills but she refused. She was on regular follow up. She had small ovarian cysts, which were not symptomatic. She got married in 2004 (age 22) and had difficulty in conceiving. Hysterosalpingogram (HSG) done showed a blocked left tube. She was given clomiphene citrate. In 2005 she had another endometrioma in the right ovary measuring 3.06 x 5.04 cm. Surgery was not advised and she was advised to conceive. She conceived spontaneously in 2006 (age 24) and delivered a baby girl by Caesarean section for fetal distress in 2007. She was on oral contraceptives after the delivery till 2010. Again she had difficulty in conceiving. There were no more ovarian cysts seen on ultrasound. She was again prescribed clomiphene citrate. She conceived spontaneously in 2012 (age 30) and delivered a baby boy in 2013. She is currently well and is on oral contraceptive pills.

Discussion

This young lady developed endometrioma and underwent 2 laparoscopies. Fortunately she got married early and because of her young age managed to conceive spontaneously twice. Preventing recurrence of endometriosis in unmarried women is important. The cheapest way of doing this is by taking oral contraceptives. She refused to take the OCPs when she was single and only took the pills after her first delivery. It is important to note that multiple surgeries on the ovaries can lead to a reduction in the ovarian reserve.

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Watch Video 25.1
Laparoscopic surgery for Endometriosis

https://vimeo.com/149998622

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Watch Video 25.2
Laparoscopic cystectomy for
endometrioma and ovarian cysts

https://vimeo.com/149998620

Summary

Laparoscopy is the gold standard for the diagnosis and treatment of endometriosis. The types of operations that can be performed include coagulation, excision of the endometriotic implants, excision of the endometriotic cyst wall (ovarian cystectomy), excision of adhesions, excision of deep infiltrating endometriosis (DIE), excision of rectosigmoid and bowel endometriosis, removal of one or both ovaries (oophorectomy), removal of the uterus (hysterectomy), removal of endometriosis of the bladder and laparoscopic uterosacral nerve ablation (LUNA). Endometriosis surgery can be complex and should be performed by an experienced laparoscopic gynecological surgeon, assisted by a bowel surgeon and an urologist.

Chapter 26

Laparoscopic Surgery for Ectopic Pregnancy

Chapter 26 : Laparoscopic Surgery for Ectopic pregnancy

There are several techniques in performing
surgery for ectopic pregnancy

1) Laparoscopic Salpingectomy

This technique involves the excision of the tube containing the ectopic pregnancy. It can be performed using the 3 or 4 port technique or a single incision technique. In the 3 or 4 port technique, the tube is held with a grasper and the mesosalpinx (the tissue that holds the tube to the uterus) is coagulated using bipolar current, and then cut. The tube containing the ectopic pregnancy is then detached from the uterus and the ovaries.

Ectopic tubal pregnancy

Left tube containing the ectopic pregnancy is removed
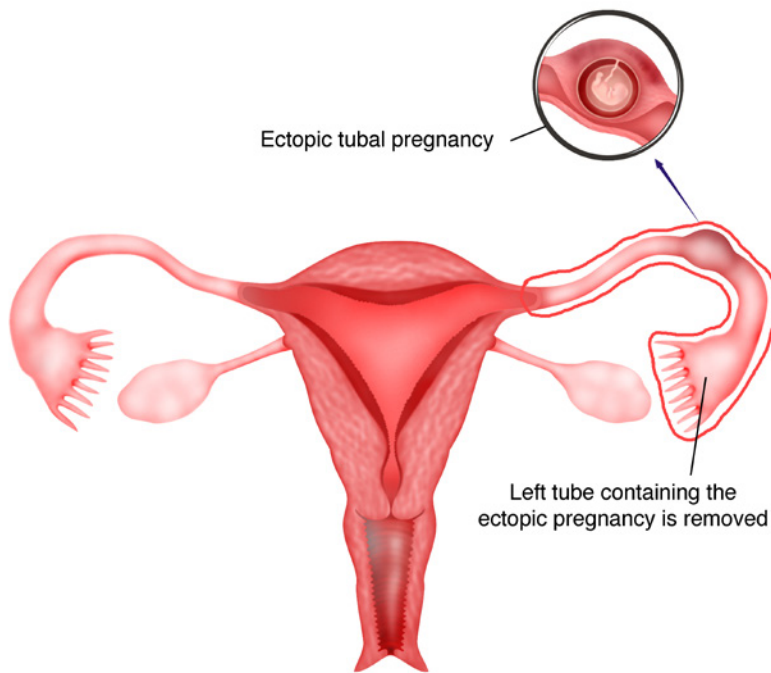
Figure 26.1 Salpingectomy for a left tubal pregnancy

Care must be taken to be as close to the tube as possible because sometimes, excessive coagulation can cause the blood supply to the ovaries being compromised.

In ruptured ectopic pregnancy, there may be active bleeding and this bleeding has to be coagulated first before attempting to excise the tube. Blood and blood clots present in the abdominal and pelvic cavity have to be aspirated and this can sometimes be a tedious problem.

The ectopic tissue is then placed in a bag and removed from the pelvis. Copious irrigation of the pelvis and abdomen is done to remove all the blood accumulated in the pelvis.

The advantage of laparoscopic salpingectomy is that the tube with the ectopic pregnancy is removed and so there will be no worry of some ectopic pregnancy tissue left in the pelvis.

The disadvantage is that the removal of the tube reduces the chances of spontaneous pregnancy. If the other tube is patent, the patient still has a chance of spontaneous pregnancy. However, if this tube is blocked or damaged, she will only be able to conceive via invitrofertilization (IVF).

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Watch Video 26.1
Laparoscopic salpingectomy for ectopic pregnancy

http://vimeo.com/149858701

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Watch Video 19.5
Single incision laparoscopic salpingectomy for ectopic pregnancy

https://vimeo.com/149741723

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Watch Video 26.5
Laparoscopic salpingoophrectomy for a large ectopic pregnancy with a concomitant intrauterine pregnancy (heterotrophic pregnancy

https://vimeo.com/149858699

2) Laparoscopic Salpingotomy

In this technique, an incision is made on the antimesenteic border (g) (the part of the tube that is opposite to the mesosalpinx (g)) of the fallopian tube, and the ectopic tissue is extracted from the tube. The incision on the tube may or may not be sutured. If the incision is sutured, the surgery is called laparoscopic salpingotomy. If the incision is not sutured than the surgery is called laparoscopic salpingostomy. This technique is usually performed on unruptured and early tubal pregnancy.

An incision is made on the tube and the ectopic pregnancy is removed
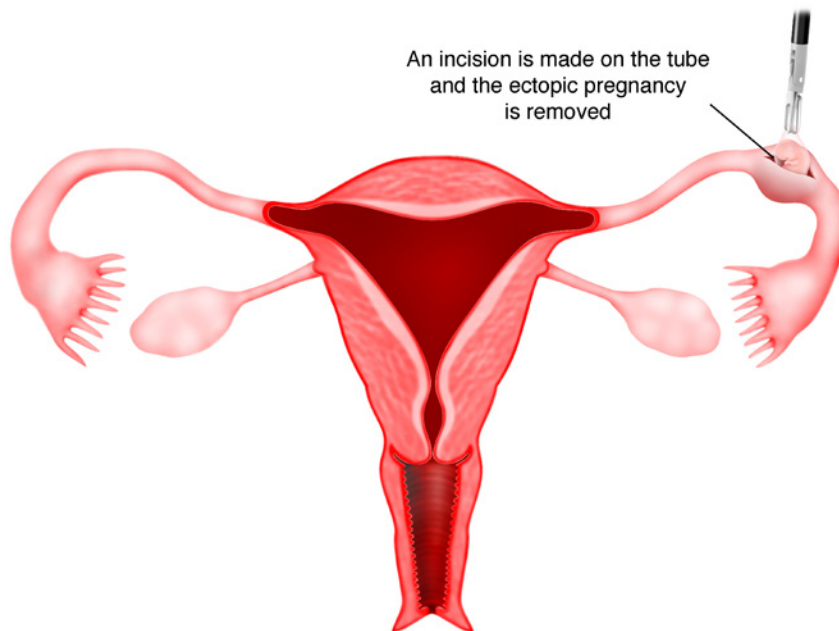
Figure 26.2 Laparoscopic salpingotomy
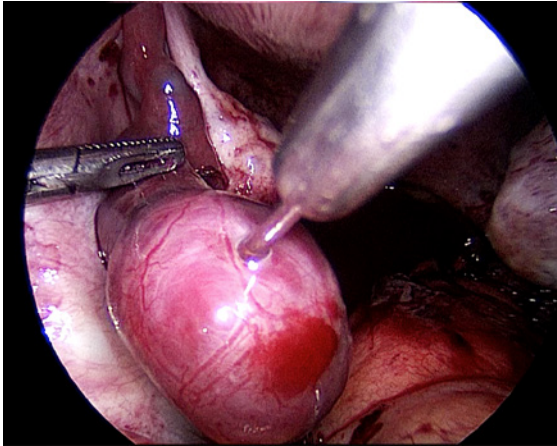
Figure 26.3 Vasopressin injected into
the antimesenteric border of left
tubal ectopic pregnancy
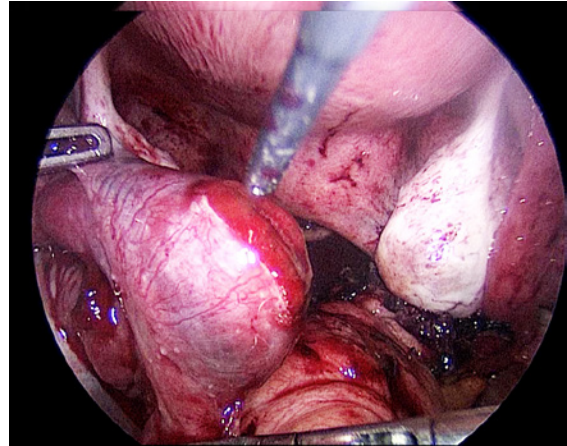
Figure 26.4 Incision made on the
antimesenteric border
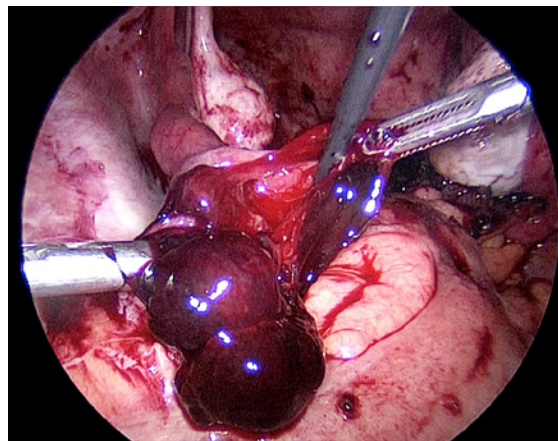
Figure 26.5 ectopic pregnancy
removed from the tube

The advantage of this technique is that the tube is still intact and so the patient can conceive with the assistance of this tube in the future.

The disadvantage is that, because the tube is scarred as a result of the surgery, another ectopic pregnancy may occur at the same site. There is also a small risk that after the surgery, some ectopic pregnancy may still be present in the tube and this may grow.

As such, if this technique is performed it is essential to repeat the blood test (serum beta HCG) to ensure that the level is declining, thus indicating that there is no further growth of the ectopic pregnancy. A hysterosalpingography will be required after 3 months to ascertain whether the tube is still patent. This technique is usually recommended if the patient only has 1 patent tube because removal of the tube will necessitate IVF for the patient to conceive.

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Watch Video 26.2
Laparoscopic salpingotomy
for ectopic pregnancy

http://vimeo.com/149858702

Case 26.1

Spontaneous pregnancy after Laparoscopic Salpingotomy for an Ectopic Tubal Pregnancy

NMA, a 33-year-old lady first consulted me in 2013. She was eight weeks pregnant. Ultrasound showed 2 well-formed gestational sacs with fetuses but with no fetal activity. She underwent a suction curettage. Postoperatively, she was well with regular menstrual periods. Six months later she presented with pelvic pain. She had missed her menses and a pregnancy test was positive. Ultrasound showed a normal sized uterus with no intrauterine gestational sac and a left adnexal mass with fluid in the Pouch of Douglas. A diagnosis of ectopic pregnancy was made. She underwent a laparoscopic salpingotomy (watch video 26.2). Postoperatively she was well. She underwent a hysterosalpingogram (HSG) six months later, which showed a patent right tube. The left tube could be seen but there was no spillage of dye. She underwent one cycle of intrauterine insemination but it was without success. She conceived spontaneously four months later and delivered a healthy baby girl in 2015.

Discussion

The 2 types of surgery that can be done for tubal ectopic pregnancy are (1) laparoscopic salpingostomy and (2) laparoscopic salpingectomy. Laparoscopic salpingostomy can only be done if the fallopian tube is not ruptured. The advantage is that, the patient will still have the tube although it is diseased. She may be able to conceive spontaneously with the operated tube. This method is usually considered when a patient only has 1 normal tube and has developed an ectopic pregnancy in that tube. NMA was keen to retain the tube and so a salpingotomy was done. She would have run a risk of developing a second ectopic pregnancy in the operated tube but fortunately, she conceived with an intrauterine pregnancy and delivered the child.

3) Laparoscopic excision of cornual pregnancy

When the ectopic pregnancy is at the cornual region of the uterus (Figure 7.4), then pregnancy is usually diagnosed much later. Cornual pregnancy is much more difficult to excise laparoscopically because it is larger and can bleed extensively. The technique involves injection of vasopressin around the cornual ectopic pregnancy and placing a purse string suture around it. An incision is then made to enucleate the ectopic pregnancy. The defect is then sutured. In large cornual pregnancy, a part of the uterus may have to be removed together with the tube. In difficult cases, laparotomy may be necessary.

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Watch Video 26.3
Laparoscopic excision of cornual pregnancy

http://vimeo.com/150044031
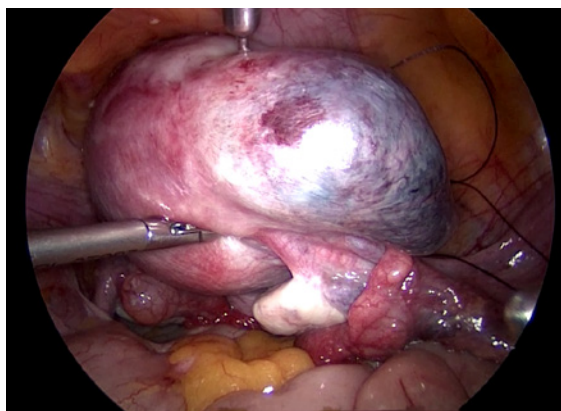
Figure 26.7 Vasopressin injected into the cornual pregnancy
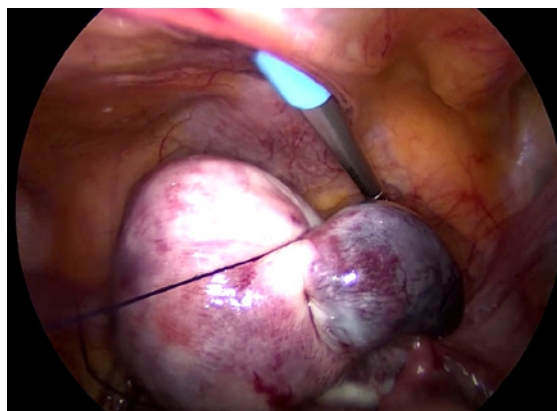
Figure 26.8 Purse string suture around the cornual pregnancy
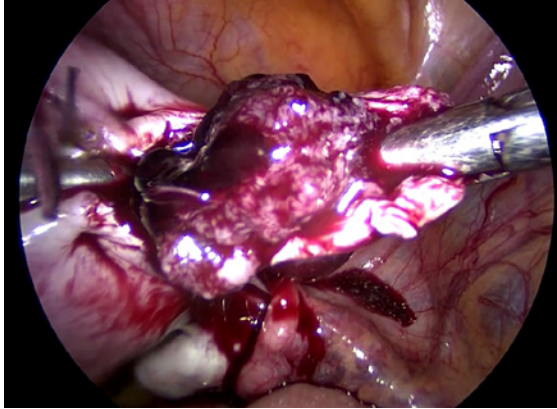
Figure 26.9 excision of the cornual pregnancy
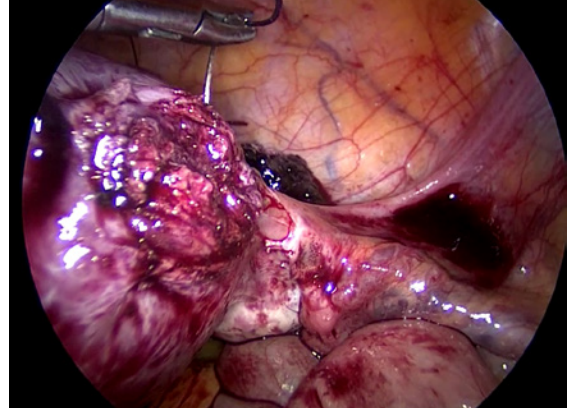
Figure 26.10 Suturing of the defect
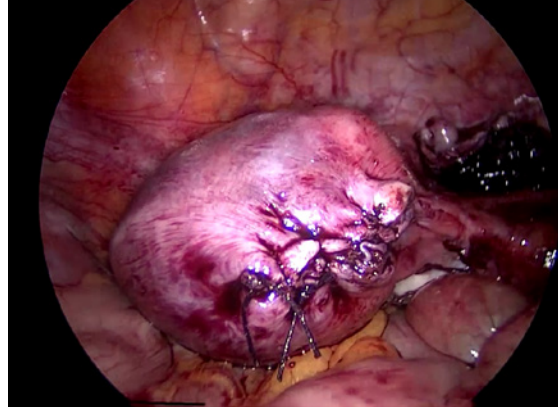
Figure 26.11 At the completion of the surgery

Case 26.2

Laparoscopic Resection of a Cornual Ectopic Pregnancy

Madam UDS who had been married for 3 years came to see me in 2009 because she was unable to conceive. Hysterosalpingogram done in another hospital showed that both her tubes were blocked. She underwent a laparoscopy, which showed a normal sized uterus. Both her tubes were normal and were patent after tubal insufflation was performed under pressure. She conceived spontaneously 2 months after the laparoscopy but unfortunately, it ended as a missed abortion. She had to undergo an evacuation of the product of conceptus. Postoperatively, she was well but could not conceive. She was given several cycles of clomiphene citrate with no success. In 2011, she underwent an intrauterine insemination cycle after being given follicular stimulating hormone (FSH) injections. She conceived after the procedure. Unfortunately it resulted in a cornual ectopic pregnancy. She underwent a laparoscopic right cornual resection of the ectopic pregnancy in 2011 (Figures 26.7 -26.11) (watch video 26.3). Post operatively in 2013 she underwent a hysterosalpingography, which showed that the left tube was not patent. She conceived after undergoing IVF.

Discussion

Cornual ectopic pregnancy is not common. It is usually diagnosed late because patients with this condition do not have many symptoms. Rupture of a cornual ectopic pregnancy can lead to profuse bleeding. In this patient, the diagnosis was done early because she underwent an IUI and was on regular follow-up. The excision was done successfully laparoscopically.

4) Laparoscopic Excision of Ovarian Ectopic Pregnancy

Ovarian ectopic pregnancy is rare. When the ectopic pregnancy is in the ovary, the ectopic pregnancy and a small part of the ovary, has to be excised. This has to be done carefully to ensure that all the ectopic pregnancy is removed and not too much ovarian tissue is removed with it.
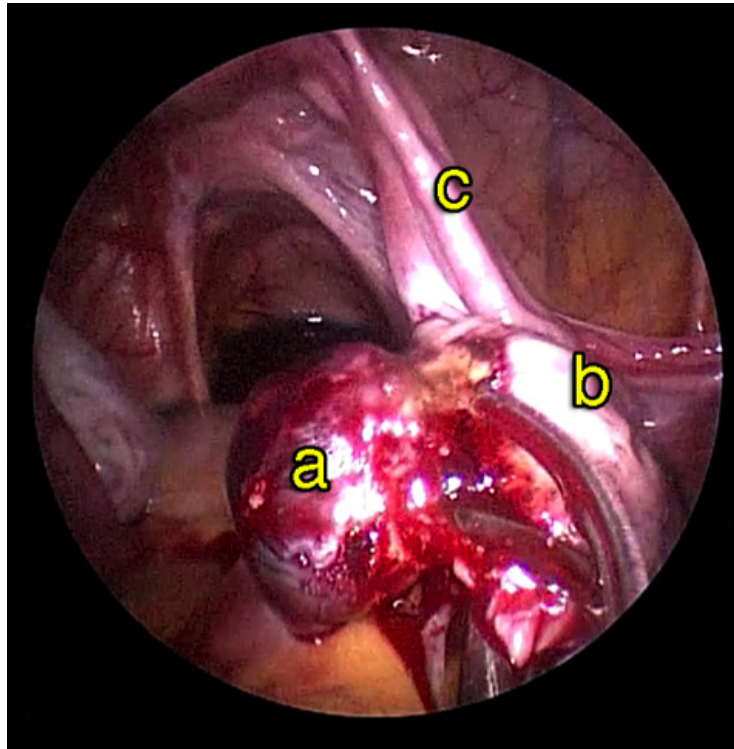

Figure 26.12 Excision of ovarian ectopic pregnancy (a) ovarian ectopic pregnancy (b) right ovary (c) right fallopian tube)

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Watch Video 26 .4
Laparoscopic excision of ovarian ectopic pregnancy

http://vimeo.com/149858698

5) Single Incision Laparoscopic Surgery for Ectopic Pregnancy

A number of the above mentioned surgeries can be performed by using the single incision laparoscopic technique. Although the surgery performed is the same, the technique involves only one incision through the umbilicus. This is technically more demanding for the surgeon. Laparoscopic salpingectomy for tubal ectopic pregnancy and even the excision of ovarian ectopic pregnancy is currently performed using single incision laparoscopic surgery.

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Watch Video 19.5
Single incision laparoscopic salpingectomy for Ectopic Pregnancy

http://vimeo.com/149741723

Summary

Laparoscopic surgery for ectopic pregnancy includes laparoscopic salpingectomy, laparoscopic salpingotomy, laparoscopic excision of cornual pregnancy and laparoscopic excision of the ovarian ectopic pregnancy. All these procedures can also be performed using the single incision laparoscopic method.

Chapter 27

Laparoscopic Surgery for Ovarian Cyst

Chapter 27 : Laparoscopic Surgery for Ovarian Cyst

Laparoscopic surgery for ovarian cysts will depend on the type of cyst. Generally, non-pathological cysts (follicular and corpus luteal cysts – see Chapter 5) do not require surgery except when there is a complication (torsion, bleeding etc).

Endometriotic cysts have been discussed in Chapter 25 and polycystic ovarian disease in Chapter 23. Laparoscopic surgery for the most common benign pathological cysts namely the dermoid cyst and benign cystadenomas is discussed in detail below:

Laparoscopic surgery for benign pathological cysts

1) Laparoscopic Cystectomy (removal of the cyst)

This the commonest surgery performed for a benign cyst like a dermoid cyst. The surgery involves removal of only the cyst and leaving normal ovarian tissue behind. The skill of the surgery is to separate the cyst from the ovary without spillage.

How is Laparoscopic Cystectomy performed?

This surgery is performed by first placing the cyst in a bag which is placed in the pelvic cavity. The bag will help collect any spillage, which may occur if the cyst is accidentally opened during the cystectomy.

An incision is made on the cyst to separate the cyst from the ovary. By gentle dissection, it is possible to completely separate the cyst intact from the ovary. However, as cyst walls can be very thin or densely adherent to the ovary, sometimes a hole can be made in the cyst. If this occurs, the contents of the cyst can be aspirated and a cystectomy is performed, with the ovary still being within the bag.

The bag (with the cyst and its contents) is then closed and removed through a slightly enlarged incision in the umbilicus. The pelvis and abdomen are then thoroughly washed. If the defect in the ovary is large, the ovary may be repaired with sutures.

In patients who wish to conceive, the patency of the fallopian tubes will be tested. If there are other incidental findings such as adhesions or endometriosis, these will be treated as well.
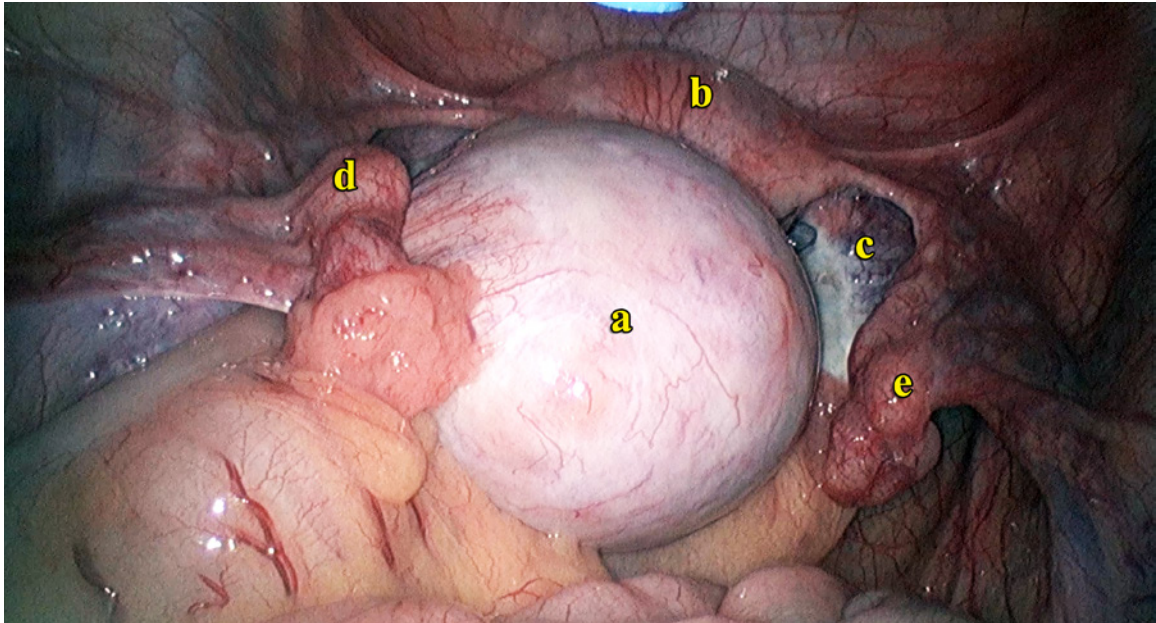
Figure 27.1 (a) left dermoid cyst, (b) uterus, (c) right ovary, (d) left fallopian tube, (e) right fallopian tube

Scan Me

Watch Video 27.1
Laparoscopic cystectomy
for a large dermoid cyst

http://vimeo.com/150455054

Scan Me

Watch Video 27.2
Laparoscopic cystectomy for
a mucinous cystadenoma

http://vimeo.com/159017867
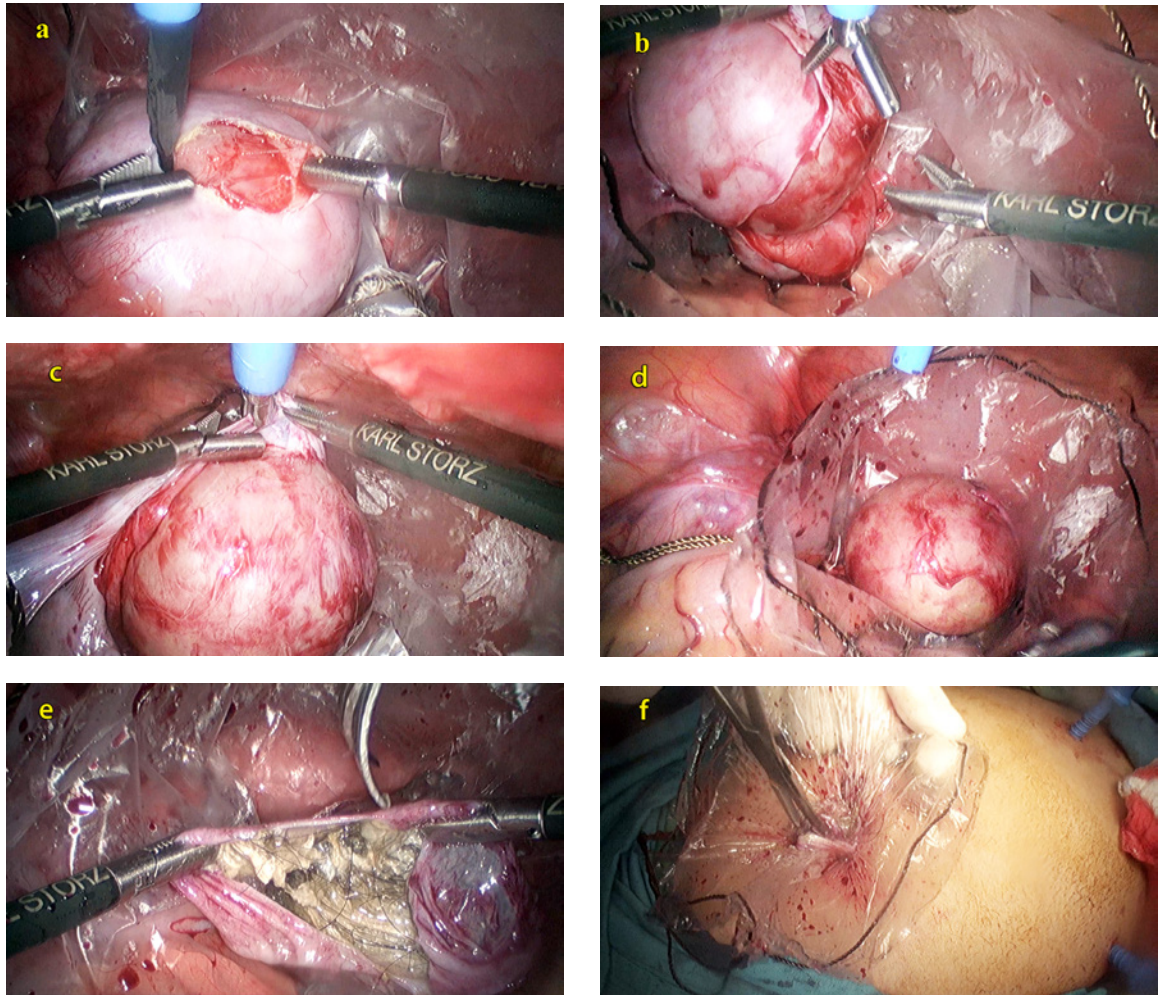
Figures 27.2 (a) incision made on the cyst, (b) cyst wall separated from the cyst, (c) ovary almost completely separated from the cyst, (d) cystectomy completed and cyst placed in the bag, (e) cyst opened and contents aspirated. Note the hair of the dermoid cyst, (f) bag brought out of the small incision on the skin and the cyst wall and its contents are removed

What are the advantages of a Laparoscopic Cystectomy?

All the advantages of laparoscopic surgery described in chapter 15 also apply to laparoscopic cystectomy. However, many women with dermoid cysts are young and will desire pregnancy in the future. Laparoscopic cystectomy will reduce the incidence of postoperative pelvic adhesions, thus the chances of spontaneous pregnancy is perhaps higher after laparoscopic cystectomy compared to conventional cystectomy performed by laparotomy.

What are the disadvantages of Laparoscopic Cystectomy?

The contents of a dermoid cyst are varied (hair, teeth, thick paste like (sebaceous) material, watery fluid). Spillage of these cyst contents into the pelvis and abdomen can cause postoperative pain, adhesion and may also cause difficulty in conceiving. Performing laparoscopic cystectomy for dermoid cyst without spillage of its contents in the pelvis and abdomen is a skillful surgery. When the surgery is performed within a bag, the chance of spillage of its contents into the pelvis and abdomen, is reduced. Technically, the bigger the cyst, the more difficult the surgery.

2) Laparoscopic Salpingoophrectomy (Removal of the ovary and tube)

In older women who have completed their families, a second option is to remove the whole ovary. This can be done especially if the ovary is very large. In a large dermoid cyst, cystectomy may be difficult to perform and the amount of remaining normal ovarian tissue will be small. Laparoscopic salpingo-ophrectomy is a much easier operation to perform compared to laparoscopic cystectomy. The surgery is performed by first detaching the ovary from its blood supply by isolating, coagulating and cutting the infundibulopelvic ligament (the ligament that contains the blood supply to the ovary). The ovary is then detached from the uterus by coagulating and cutting the ovarian ligament (the ligament that is attached to the uterus). The ovary that has been detached is placed in a bag. The fluid in the cyst is aspirated, and the bag is closed and removed usually through an enlarged incision made in the umbilicus. The pelvis and abdominal cavity are then thoroughly washed.

Scan Me

Watch Video 27.3
Laparoscopic salpingoophrectomy and omentectomy for an ovarian cancer

https://vimeo.com/159018922
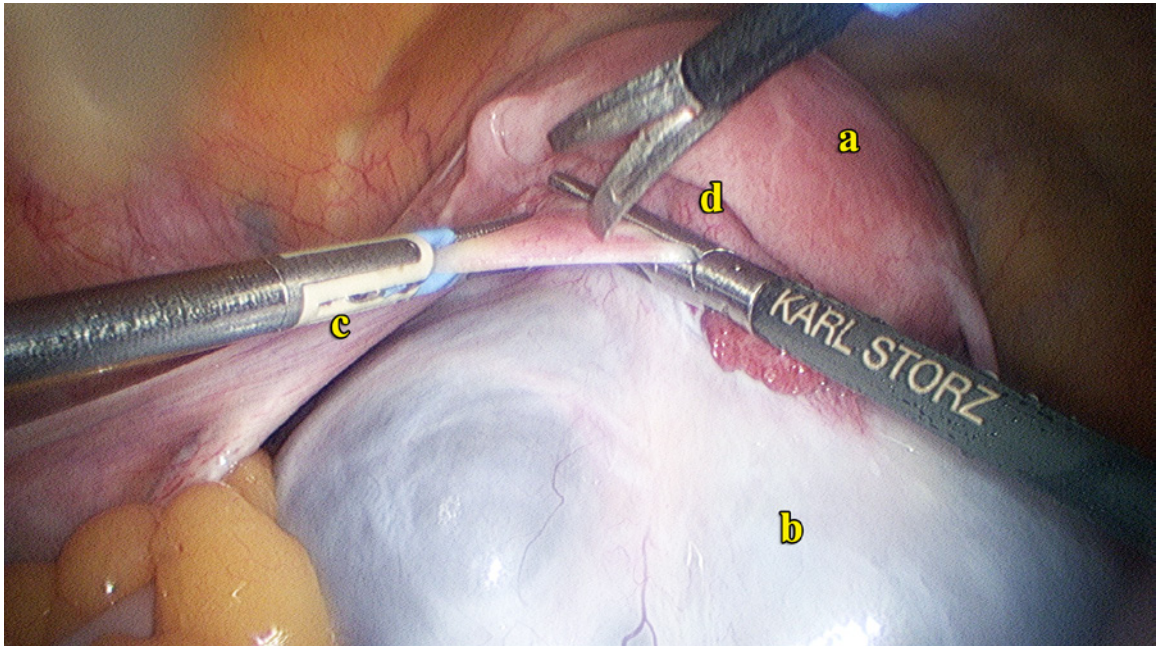
Figure 27.3 Large left ovarian cyst – left salpingoopherectomy done (a) uterus, (b) left ovarian cyst, (c) left infundibulopelvic ligament, (d) left fallopian tube
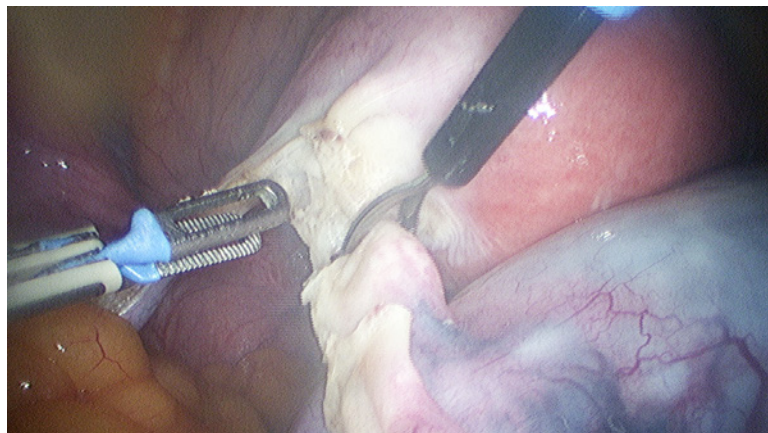
Figure 27.4 Left ovarian cyst detached from the uterus

Case 27.1
Laparoscopic Salpingoophrectomy and Omentectomy for Ovarian Cancer

TS, a 43 year old lady, has been married for 21 years with no children. She had 3 unsuccessful IVF cycles. She was diagnosed with an ovarian cyst in another hospital. She had undergone a lumpectomy and axillary node clearance for a left breast cancer 2 years earlier. She also received radiotherapy and chemotherapy for the breast cancer. Examination and ultrasound showed a mixed echogenic cyst (containing both solid and cystic structures) measuring 4.65 x 3.44 cm. There were small cysts in the right ovary as well measuring 1.08 x 1.23 and 1.15 x 1.72cm. There was minimal fluid in the Pouch of Douglas. A PET scan done was normal. Both she and her husband were counseled regarding the possibility of the mass being a metastatic breast cancer. She wanted a conservative surgery and still wanted to conceive. She underwent a laparoscopy. The right ovarian tumour (Figure 14.1) appeared malignant whereas the right ovarian cysts appeared benign. The right ovary was removed and sent for frozen section. Biopsies of the left ovary and partial omentectomy were also done. The histopathology was an adenocarcinoma probably metastatic from the breast cancer. Postoperatively she recovered well. Further histopathological assessment of the ovarian mass and comparing it with that of the breast cancer concluded that the ovarian tumour was not a metastatic cancer of the breast but a primary ovarian cancer. She is currently contemplating removal of all the reproductive organs.

Discussion

Laparoscopic surgery for ovarian cancer is a controversial topic. Most of the ovarian cancer cases are performed by laparotomy. In this case, since she was not mentally prepared to remove of both her ovaries and the uterus, laparoscopy was performed to make a diagnosis of the pelvic tumour and then contemplate further surgery. Laparoscopy aided in avoiding multiple laparotomies.

3) Laparoscopic Hysterectomy

On rare occasions, a dermoid cyst can be cancerous. This will not be known until a pathologist examines the cyst. Older women with a dermoid cyst have a higher chance of it being malignant. Thus, in women who are above 45 years of age, a hysterectomy and removal of the ovary with the cyst or both ovaries is another option. Laparoscopic hysterectomy is discussed in Chapter 33.

Scan Me

Watch Video 33.1
Total laparoscopic hysterectomy

http://vimeo.com/150079694

4) Single incision Laparoscopic surgery

All the above-mentioned surgeries can also be performed with a single incision. Single incision laparoscopic salpingo-ophrectomy (removal of the ovary) and hysterectomy (removal of the uterus) are fairly easy to perform. However, single incision laparoscopic cystectomy can be more challenging especially in patients with large cysts. (see chapter 19)

Scan Me

Watch Video 19.3
Single incision laparoscopic salpingoophrectomy for ovarian cyst

http://vimeo.com/149741720

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Watch Video 19.4
Single incision laparoscopic cystectomy

http://vimeo.com/149741715

Scan Me

Watch Video 19.6
Single incision total laparoscopic hysterectomy

http://vimeo.com/149741719

Summary

Laparoscopic surgery for an ovarian cyst will depend on the type of cyst. The surgeries that can be performed are laparoscopic cystectomy, laparoscopic salpingoophrectomy and laparoscopic hysterectomy. All these surgeries can also be performed by single incision laparoscopy.

Chapter 28

Laparoscopic Tubal Ligation Reversal

Chapter 28: Laparoscopic Tubal Ligation Reversal

Tubal ligation (also known as having one's "tubes tied") is a surgical procedure for sterilization, in which a woman's fallopian tubes are permanently closed. Tubal ligation is considered a permanent method of birth control. It is usually performed via the laparoscopic route (see chapter 22). Some patients find themselves wanting to conceive again later in life. Reasons include divorce and a new marriage, loss of a child, or simply the realization that they would like a larger family. Such women who have previously undergone tubal ligation and want to have another baby, may request for a reversal of the tubal ligation.

There are 2 ways in which a woman who had previously undergone a tubal ligation could conceive again. The first is by a surgery to reverse the tubal ligation and the second is by Invitro-Fertilization (IVF). It is important to understand the advantages and disadvantages of each technique before deciding, which technique will be suitable for the couple.

Comparison of the advantages and disadvantages of laparoscopic tubal reversal and IVF

Comparison	Tubal ligation Reversal	IVF
Advantages	One procedure	Can work with low sperm count
	More Natural	Faster and non surgical
	Able to treat other gynaecological diseases at the same time	
Disadvantages	Surgery	Ultrasound guided
	General anaesthesia	Sedation anaesthesia
	Risk of ectopic pregnancy	Risk of multiple pregnancies
	Surgical discomfort	Ovarian Hyperstimulation
	5% tubes cannot be repaired	5% -10% of cycles cancelled
	If unsuccessful, then IVF	If unsuccessful, then try again
	Need for future contraception	Tubes still "tied"

The advantages of tubal ligation reversal are that after a successful surgery to "open up" the tubes, the couple can attempt to conceive every month. If she successfully conceives, then she can have as many pregnancies as she desires. The disadvantage is that, if only 1 pregnancy is desired, she will need to have future contraception. There is also a 5% incidence of ectopic tubal pregnancy after the tubal ligation reversal.

Traditionally, tubal reversal is performed using a large incision (laparotomy) and microscopes or other image-enhancing devices. The recovery time could be several weeks. However, now this surgery can be performed laparoscopically.

The most important factor that determines the success of tubal reversal surgery is the technique of tubal ligation that had been performed. During tubal ligation, a part of the tube is destroyed (see chapter 22). The lesser the damage the better the chances of pregnancy after tubal reversal. Generally, a patient who has undergone tubal ligation using clips (figure 22.1) will have the best success rate because the amount of tubal destruction will only be 4 mm. If the fimbrial ends of the tubes have been removed (fimbriectomy), the success of tubal reversal will be the lowest. Tubal ligation by coagulation or by suturing, and cutting of the tubes will depend on the length of the normal tubes left behind for reconstruction. The shorter the amount of tube that is left behind after the tubal ligation, the poorer the success of pregnancy after the reconstruction.

Preoperative assessment

A review of the operative notes on the technique used for the tubal ligation performed previously could be useful. If the technique of tubal ligation performed involved the loss of most of the tubes, then IVF may be a better option to achieve a pregnancy. Often, information on the previous tubal ligation may not be available. In such an instance, it may be necessary for the patient to undergo a diagnostic laparoscopy first, to see whether the tubes are amenable for reconstruction. If they are not suitable for repair, than the tubal reversal is abandoned and the patient can proceed with IVF. However if the tubes look sufficiently good for repair, tubal reversal surgery can proceed as planned.

The surgery

Laparoscopy is performed in the usual manner (see Chapter 15). After placing the laparoscope to visualize the uterus, tubes and ovaries, 3 secondary trocars are placed for the introduction of the microsurgical instruments. These are finer instruments compared to the instruments used in normal laparoscopy. The tubal block is removed and the two segments of the tubes are prepared to be connected. The part of the tube that remains attached to the uterus is called the proximal end; and the other part with the fimbrial end is called the distal part of the tube. A blue dye is injected via the cervix to see if the proximal part is patent. In order to determine whether the distal part of the tube is patent, a probe is placed at the fimbrial end and a blue dyed fluid is injected. If the dye comes out of the other end, then the distal end of the tube is patent. Another method is to pass a fine tube through the cervix and into the fallopian tube from the proximal end into the distal end and out of the fimbrae. This will also assist in the alignment of both parts of the tubes for connection. The 2 ends of the tubes are then sutured together using fine sutures. Suturing of the 2 parts together requires advanced surgical techniques. The process is repeated on the other tube. Once the connection of both tubes is completed, a blue dye is injected through the cervix and if the dye is seen flowing out of both the fimbrial ends, the surgery is considered a success.
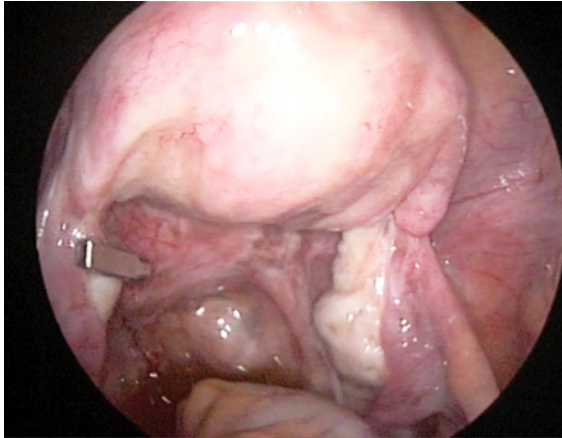
Figure 28.1 Bilateral tubal ligation done. Filshie's clip still seen on the left tube but not seen on the right tube. The right Filshie's clip was found in the Pouch of Douglas
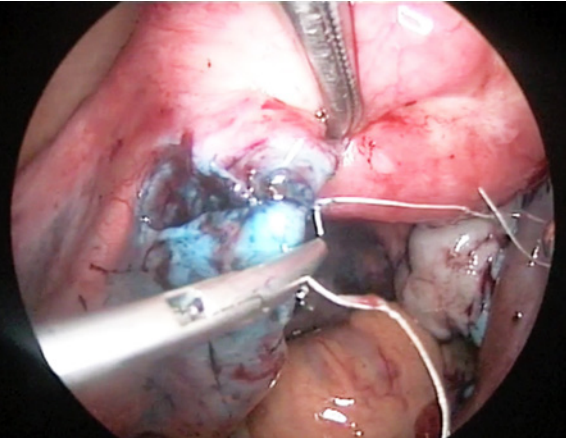
Figure 28.2 left fallopian tube anastomosis
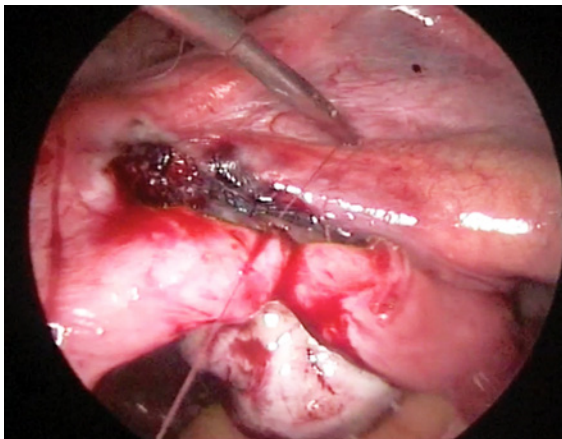
Figure 28.3 Right fallopian tube anastomosis
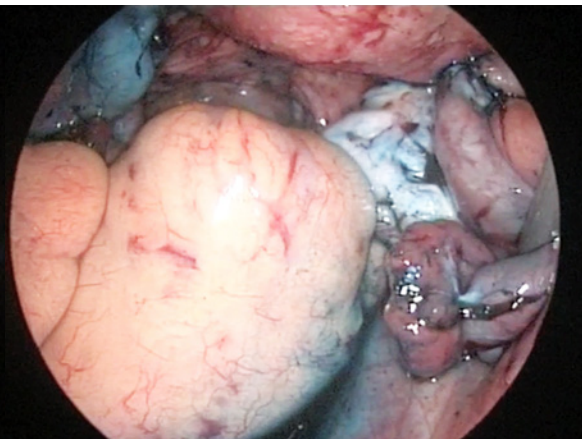
Figure 28.4 Both fallopian tubes are patent after the surgery. Blue dye seen coming out of both the tubes

Scan Me

Watch Video 28.1
Video 28.1 Reversal of tubal ligation

https://vimeo.com/150044038

Case 28.1
Spontaneous pregnancy after reversal of tubal ligation

Madam CYL was a 32-year-old lady who consulted me in June 2009. She had had 2 children and a tubal ligation using Filshie's clips in 2005. She remarried and wanted a reversal of the tubal ligation. She underwent a tubal reversal in July 2009 (watch video 27.1). She subsequently conceived spontaneously and delivered a healthy baby girl in December 2010.

Learning point

This lady underwent a tubal ligation at 28 years of age. This may be considered too early an age to undergo a tubal ligation. In this patient the reversal of tubal ligation was successful for several reasons. The first reason is that she was young and so did not have any problems with ovulation. Secondly, because Filshie's clip was used, the amount of tissue damaged during the tubal ligation was small and so the surgery to reverse the tubal ligation was successful.

Pregnancy

Patients should wait for three months prior to attempting pregnancy in order to give the tubes a chance to heal completely. Trying to conceive before that could result in an increased risk of ectopic tubal pregnancy

Summary

Reversal of tubal ligation can be performed laparoscopically. The success of this surgery will depend on the technique of the tubal reversal. The longer the length of tubes left behind after the tubal ligation, the better is the success of tubal ligation reversal. The best chance of success occurs when the tubal ligation was done using clips.

Chapter 29

Laparoscopic Surgery for Tubal Block and Hydrosalpinx

Chapter 29 : Laparoscopic Surgery for Tubal Block and Hydrosalpinx

There are several surgeries that can be performed for tubal block and hydrosalpinx.

Hydrosalpinx

A hydrosalpinx is usually associated with adhesions around the tube. The tube may be adherent to the ovary, an ovarian cyst, uterus or pelvic side walls. These adhesions are usually released and the tubes detached before proceeding with the surgery. The 2 surgeries that can be offered for hydrosalpinx are as follows:

1. Removal of the fallopian tube (salpingectomy).

Generally this is a simple operation that can be performed laparoscopically. The difficulty is to release the tube from its adhesion to the pelvic and abdominal organs. Once it is released the tube can be excised easily with the use of diathermy and scissors. Usually the whole tube is removed up to the cornual end.

Scan Me

Watch Video 29.1
Laparoscopic bilateral salpingectomy for bilateral hydrosalpinx

http://vimeo.com/150044052

Case 29.1 : Bilateral hydrosalpinx laparoscopic bilateral salpingectomy done followed by 2 successful IVF cycles

RN consulted me in May 2008 with a history of subfertility for 7 years. Hysterosalpingogram done in another country, showed bilateral hydrosalpinx. After discussing the advantages and disadvantages of salpingectomy she underwent a laparoscopic bilateral salpingectomy. She underwent an IVF cycle in August 2008. It was a successful cycle and she delivered a baby boy in 2009. She underwent a second IVF cycle in 2014 and is currently pregnant.

Discussion

When there is gross hydrosalpinx, performing laparoscopic salpingectomy before IVF/ICSI increases the chances of pregnancy.

2. Fimbrioplasty (opening and creating the fimbrial end of the tube)

Adhesiolysis is done to release the tube. To ensure that there is no block at the cornual end, methylene blue dye is injected and the hydrosalpinx should be filled with the dye. A cruciate incision is made at the most distal end of the tube.

Scan Me

Watch Video 29.2
Laparoscopic bilateral fimbrioplasty for bilateral hydrosalpinx

http://vimeo.com/150044057
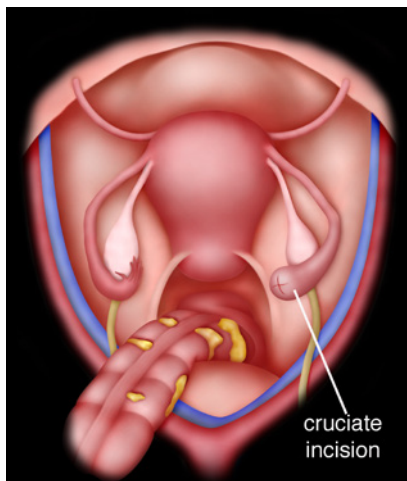
Figure 29.1
Cruciate incision made on the right hydrosalpinx
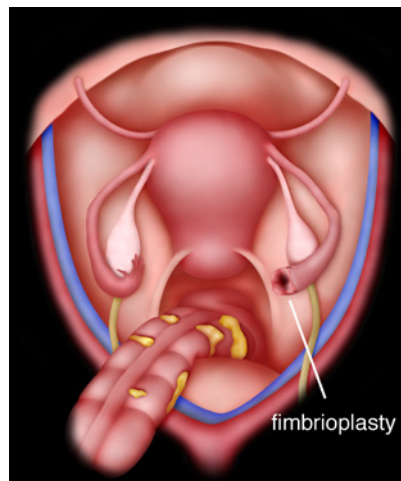
Figure 29.2 Fimbrioplasty done

The fluid in the tube is then removed. The ends of the tube are sutured using fine sutures to evert it (turned it out) and attach it to the outside of the tube, so as to keep it open and prevent it from closing back after the surgery. Suturing using fine sutures also requires advanced laparoscopic skills. Once the tube is repaired, it is tested to see whether it is patent.
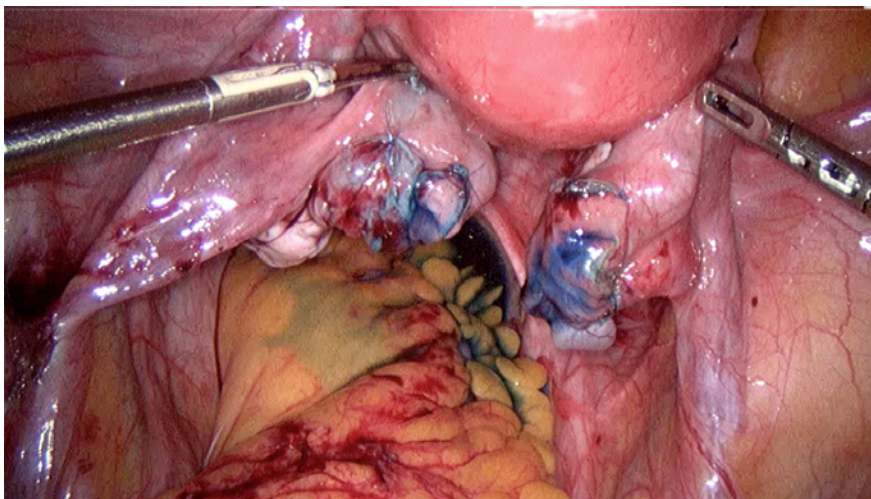
Figure 29.3 Completed Bilateral Fimbrioplasty

Controversy In Surgery for Hydrosalpinx

Hydrosalpinx is the presence of fluid in a fallopian tube its cavity and blockage of the tube at the fimbrial end. Chronic presence of fluid in the tube can lead to damage of the cilia in the tube. Damaged cilia will decrease the function of the fallopian tube in moving eggs and sperm. The larger the hydrosalpinx, the more the damage done to the inner lining and cilia of the fallopian tube.

Another problem with a hydrosalpinx is that, fluid collected in the tube can flow into the endometrial cavity. This fluid can also prevent embryo implantation during natural conception when the other tube is patent and normal. In IVF, when an embryo is placed in the uterine cavity, this fluid can wash away the embryos preventing implantation.

The surgical management of hydrosalpinx is controversial. If the hydrosalpinx is large especially if it can be seen on ultrasound, then removal of the tube is the best surgery. If it is bilateral, both the tubes have to be removed and the patient will then require IVF to conceive.

If the hydosalpinx is small and only detected during hysterosalpingography (HSG), then there is difficulty in deciding which is the best surgery for the patient. If the hydrosalpinx is in only one tube, the tube can be removed and the patient can conceive naturally with the other normal tube, without the worry that the fluid in the tube with hydrosalpinx will interfere with her chances of pregnancy.

If the hydrosalpinx is bilateral then a decision has to be made whether to repair the tube by fimbrioplasty or remove both the tubes. This decision can be an emotional one. On the other hand, the advantage of removal of the tube is that the patient's chances of pregnancy after IVF will probably improve but the disadvantage is that, she will never be able to conceive naturally. The advantage of fimbrioplasty is that by repairing the tube, the patient still has a chance of conceiving naturally, but the disadvantage is that if she does not conceive and if the hydosalpinx recurs she may need another surgery to remove the tube before undergoing IVF.

Tubal block

When the tube is blocked either at the cornual end or midway within the tube, such block may be due to spasm or adhesions within the tube. Tubal insufflation is usually done by placing a cannula in the cavity and closing off the cervix and then pushing fluid with dye into the cavity, to open up and flush the tube. When no dye is seen coming out of the fimbrial end, several things can be done.

1) A small tube can be placed directly at the tubal ostium (g) and dye can be injected to "open up the tube".

2) A solid wire can be passed via the catheter placed at the tubal ostium and the wire can then be pushed to assist in releasing any adhesions within the tube to open it up (see chapter 40 and Figures 40.5, 40.6 and 40.7).

3) Reimplantation of the tube into the cornual end of the uterus. Occasionally, the block is in the cornual end of the tube. In such situation, the blocked area in the cornual end can be excised and the tube detached from the uterus and then reimplanted into the patient's cornual end. This surgery was popular before the advent of IVF, However, it is now rarely done because it is a difficult surgery to perform and the pregnancy rates are not very high. In such situations IVF is advised.

All these strategies can assist in opening up the tube in some patients but there is no guarantee that the "opened tube" will be functional or the patient be able to conceive spontaneously after the surgery. Tubes that are "opened" during laparoscopic surgery may close back after the surgery. If the patient could not conceive spontaneously, then a repeat HSG should be performed. If the tubes are blocked again, then she may require IVF. (watch Video 29.3 Hysteroscopic cannulation for proximal tubal block)

Scan Me

Watch Video 29.3
Hysteroscopic Cannulation
for Proximal Tubal Block

https://vimeo.com/150044067

Summary

Tubal block and hydrosalpinx are not uncommon among women who have difficulty in conceiving. These conditions are usually diagnosed by a hysterosalpingogram (HSG). Tubal block may be "opened up" by performing a laparoscopy and a hysteroscopy at the same time. Hydrosalpinx can be either repaired (fimbrioplasty) or removed (salpingectomy). In many patients with these conditions, IVF may have to be done to achieve a successful pregnancy.

Chapter 30

Laparoscopic Surgery
for Pelvic Inflammatory Disease

Chapter 30 : Laparoscopic Surgery for Pelvic Inflammatory Disease

The main modality of treatment for Pelvic Inflammatory Disease (PID) is antibiotics. Laparoscopic surgery is rarely necessary when pelvic inflammatory disease is clinically diagnosed. However, laparoscopic surgery may be done in the following circumstances:

1) Persistent Infection

Laparoscopy may be necessary when symptoms of PID are not resolving after a course of antibiotics and collection of fluid resembling an abscess is seen in the pelvis on ultrasonography. Recurrence of symptoms of PID at the same site may be another reason for laparoscopy. The aim of the surgery is to first make the diagnosis, by taking some of the fluid for culture and sensitivity and to drain the puss. Occasionally, especially when there is recurrence, removal of the fallopian tube (salpingectomy) or even an ovary (oopherectomy) may be necessary to control the flaring up of the disease.
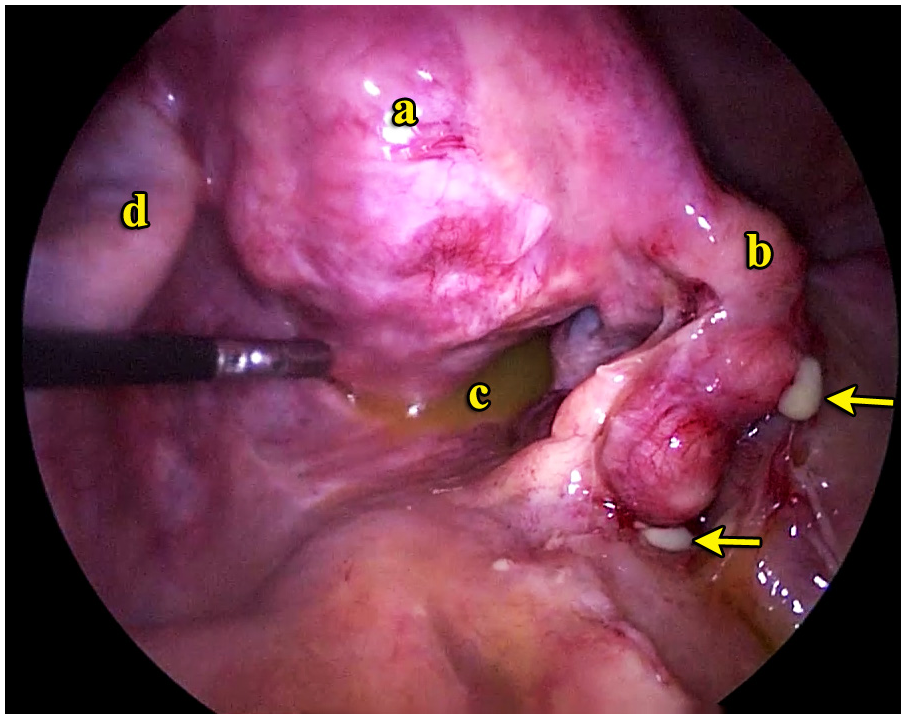
Figure 30.1 Pelvic inflammatory disease (a) uterus, (b) right fallopian tube with pus in it (arrows showing pus), (c) pus in the Pouch of Douglas, (d) left ovary
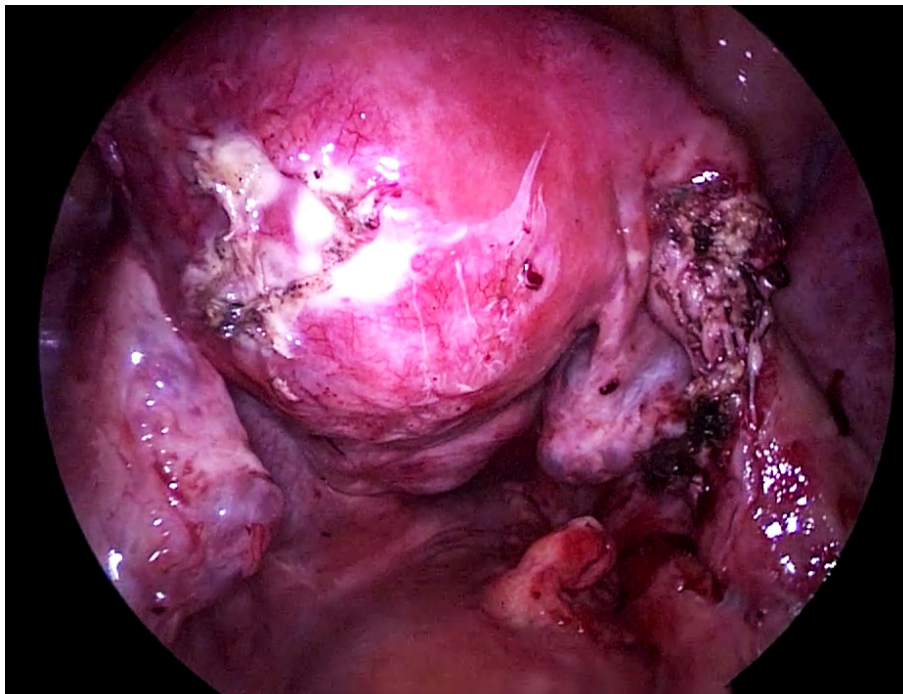
Figure 30.2 right salpingectomy done

2) Differential diagnosis

Sometimes the diagnosis of a PID may not be confirmatory on clinical examination and pelvic ultrasonography. There may be a worry of appendicitis, twisted ovarian cyst or a haemorrhagic cyst. In these situations, a laparoscopy may be necessary to confirm the diagnosis. If the diagnosis of PID is confirmed, fluid can be taken for culture and any collection of pus aspirated.

3) Investigation of infertility or chronic pelvic pain

Laparoscopy may be performed as part of the investigation of infertility or chronic pelvic pain. Pelvic adhesions causing the tubes and ovaries to be adherent to the uterus, pelvic sidewalls and intestines may be the cause of the infertility and/or chronic pelvic pain. Hydrosalpinx may be present a well. These adhesions can be released and removed. The hydrosalpinx can be repaired (see chapter 29).

Figure 30.3 Severe perihepatic adhesions seen in a woman
who presented with infertility with no other symptom.
This is usually caused by chlamydia infection
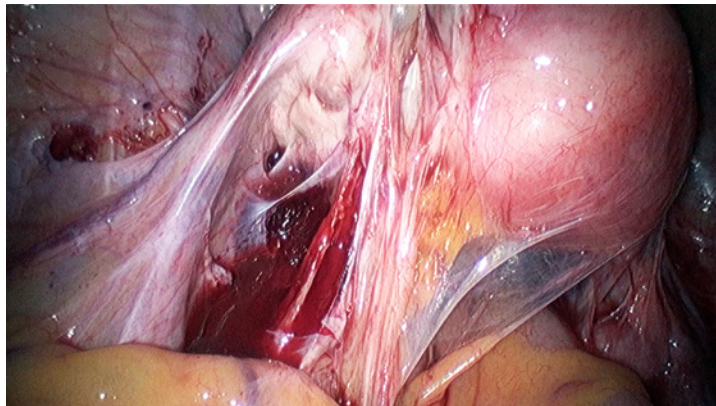
Figure 30.4 uterus, left tube and ovary buried in adhesions
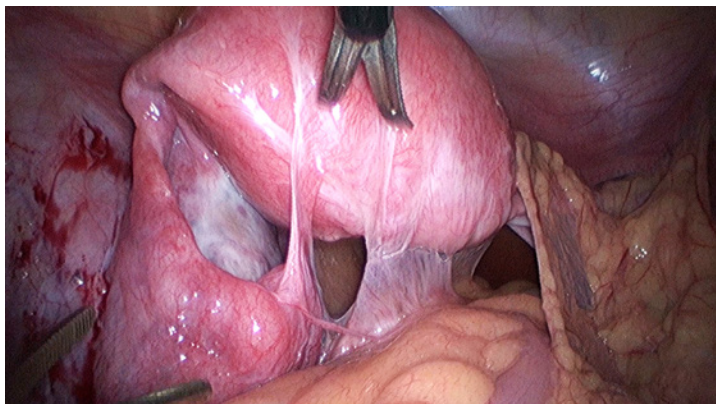
Figure 30.5 adhesions between the uterus tubes and the intestines

Case 30.1 : Recurrent Pelvic Inflammatory Disease (PID): laparoscopic salpingectomy

Madam HKL currently 43 years of age, first consulted me in May 1998 at the age of 26. She already had 4 children at that time and presented with severe right iliac fossa pain. The general surgeon diagnosed her as acute appendicitis and she underwent a laparoscopy. At laparoscopy, the appendix was found to be normal. There were blood clots in the pelvis and a ruptured and bleeding right ovarian cyst was seen. These blood clots were evacuated and the bleeding ovarian cyst was cauterized. The appendix was also removed. Post operatively she was well.

She conceived her 5th child and delivered normally in 2003 (age 31). She underwent a minilaparotomy and tubal ligation immediately after the delivery.

She was seen in March 2005 (age 33) with a complaint of mild left sided pelvic pain. There was some pain elicited on moving the uterus on vaginal examination. She did not have any vaginal discharge. She was diagnosed as a case of mild Pelvic inflammatory Disease (PID) and was given antibiotics. She recovered.

She was seen again in June 2007 (age 35) with left sided pelvic pain Transvaginal ultrasound done did not reveal any abnormalities. She had mild pain on vaginal examination. She was again diagnosed with PID. She was not keen on admission and was given oral antibiotics.

She was admitted the next day with severe lower abdominal pain. A laparoscopy was performed. There was some pus in the Pouch of Douglas (g) and the left tube was infected. She underwent a left salpingectomy (g). No organisms were grown from the pus taken from the fallopian tube for culture and sensitivity (g). Postoperatively she was well. She was discharged with antibiotics.

She was well until September 2012 (age 40) when she presented to the emergency unit with right iliac fossa pain. Examination and ultrasound revealed an enlarged right fallopian tube and pain on vaginal examination. She was not keen on admission and was treated as PID with oral antibiotics. She was admitted 1 month later with severe pelvic pain. CT scan done showed a right pelvic mass. She underwent a laparoscopy. The right fallopian tube was infected with pus (Figure 30.1). A right salpingectomy (g) was performed (Figure 30.2) (see Video 30.1). Pus taken for culture and sensitivity did not reveal any abnormalities. Postoperatively she has been well.

Scan Me

Watch Video 30.1
Laparoscopic salpingectomy in
a patient with recurrent pelvic
inflammatory disease

https://vimeo.com/159027900

Discussion

This case illustrates the difficulty in the diagnosis and treatment of
recurrent PID. Since no organisms were cultured from the pus obtained
from the pelvis, the exact cause of the PID is not known. Her husband
denied any symptoms. All the episodes of PID were treated with broad-
spectrum antibiotics (g) in order to cover the common organisms
causing PID such as chlamydia, gonorrhoea, and Gram negative
bacteria (g). When the symptoms did not improve, laparoscopy
was performed and the infected fallopian tubes were removed.

Case 30.2 Laparoscopic adhesiolysis and fimbrioplasty done followed by a successful IVF cycle

UL, a 28 year old lady who had been married for 3 years consulted me with a problem of being unable to conceive. She had undergone a hysterosalpingography (HSG) earlier, which showed a patent right tube and a hydrosalphinx (dilatation with fluid) of the left tube. She had attempted an intrauterine insemination (IUI) earlier but it was not successful. She had also taken many courses of clomiphene citrate (ovulation induction medication). Examination and transvaginal ultrasound showed that the uterus was of normal size and both the ovaries were normal. However there was an elongated cystic structure on the left side measuring 1.33 x 2.95 cm resembling a hydrosalpinx. She underwent a laparoscopy. Laparoscopy showed extensive adhesions with perihepatic adhesions (Figure 30.3 – 30.4). She underwent a laparoscopic adhesiolysis and a left salpingectomy (removal of the fallopian tube). A right fimbrioplasty (repair of the fallopian tube – see chapter 29) was also performed. Postoperatively she was well. She underwent an invitrofertilization (IVF) programme 2 months after the surgery and she conceived (watch video 30.2 Laparoscopic adhesiolysis and fimbrioplasty done followed by a successful IVF cycle)

Discussion

Fallopian tubes with gross hydrosalpinx are usually non functional. The fluid in the tube destroys its inner lining and even if the tube is repaired, it will not be able to function by picking up an egg and moving it down the fallopian tube. More over, in time it may become blocked again. The fluid that collects in the tube can spill into the uterine cavity and flush away any embryo that is placed there during an IVF programme. As such, tubes with hydrosalpinx have to be removed before an IVF programme.

Scan Me

Watch Video 30.2
Laparoscopic adhesiolysis and
fimbrioplasty done followed
by a successful IVF cycle

https://vimeo.com/159031234

Summary

The main modality of treatment for
pelvic inflammatory disease is antibiotics.
Laparoscopy is performed when there
is persistent infection requiring drainage
of pus and even removal of the fallopian
tube and or ovary, to make a diagnosis of
PID and in treating women with chronic
PID causing adhesions and infertility.

Chapter 31

Laparoscopic Surgery for Adenomyosis

Chapter 31 : Laparoscopic Surgery for Adenomyosis

Surgery for adenomyosis is challenging. The two types of surgery that can be performed for adenomyosis are:

> 1) Partial Resection of Adenomyoma
>
> 2) Hysterectomy.

1. Partial Resection of an Adenomyoma

When adenomyosis is localized, it is called an adenomyoma (see chapter 4). There are several reasons why this surgery may be contemplated.

1) The patient wishes to keep her uterus.

2) Medical treatment has failed.

3) She is suffering from severe pain during menses (dysmenorrhoea).

4) She may be suffering from heavy menses.

5) She cannot conceive or she has suffered repeated miscarriage.

In such situations a decision may be made to excise the adenomyoma.

Adenomyomas are usually located on the posterior wall of the uterus. Unlike fibroids, the margin of an adenomyoma is not well defined. Partial excision of the adenomyoma can be performed but it will be difficult to completely excise it. It is important to remember that since complete excision of an adenomyoma is impossible, complete relief of symptoms cannot be guaranteed by this surgery.

Laparoscopic excision of an adenomyoma has several challenges. The first is to decide how much to excise. Second the excision must be done in such a way, so as to allow the surgeon to close the defect left behind after the excision. Suturing of the defect can also be difficult because the tissues surrounding an adenomyoma are usually friable (g) and will not hold a suture easily (watch video 31.1 Laparoscopic excision of adenomyoma).

Scan Me

Watch Video 31.1
Laparoscopic excision of adenomyosis

http://vimeo.com/159031690

Case 31.1 Spontaneous pregnancy after adenomyomectomy

Madam TLC consulted me in 2009 with a problem of severe dysmenorrhea and inability to conceive. She had had 2 children 5 years prior to seeing me. Examination showed an enlarged bulky uterus with nodules in the Pouch of Douglas. Ultrasound showed a bulky uterus with a posterior adenomyotic nodule measuring 2.30 x 3.61 cm. She also had a small right endometrioma measuring 1.47 x 1.61 cm. She underwent a laparoscopic cystectomy and adenomyomectomy. Postoperatively she was well. She spontaneously conceived and delivered a baby by Caesarean section in 2014.

Discussion

In this patient the adenomyoma was small and localized and could be excised almost completely. As a result the patient did not have any more dysmenorrhea and conceived after the surgery. Patients who had undergone adenomyomectomy and conceive later are usually advised to undergo an elective Caesarean section
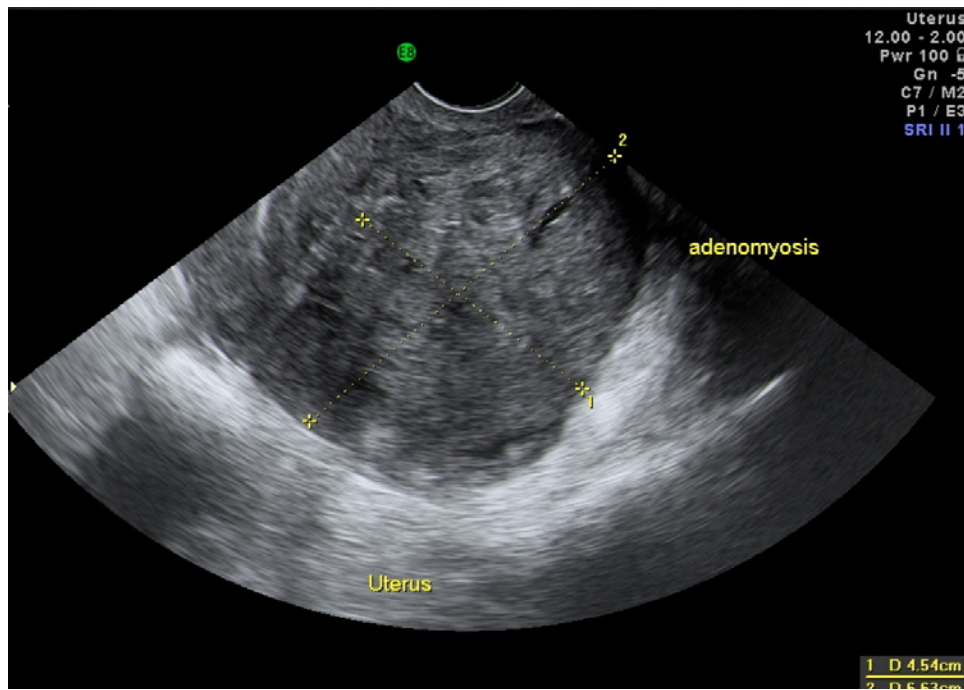
Figure 31.1 Ultrasound showing a posterior adenomyoma
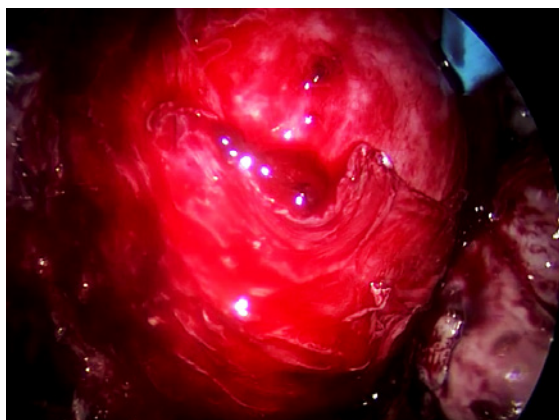
Figure 31.2 Laparoscopic view of the posterior uterine adenomyoma
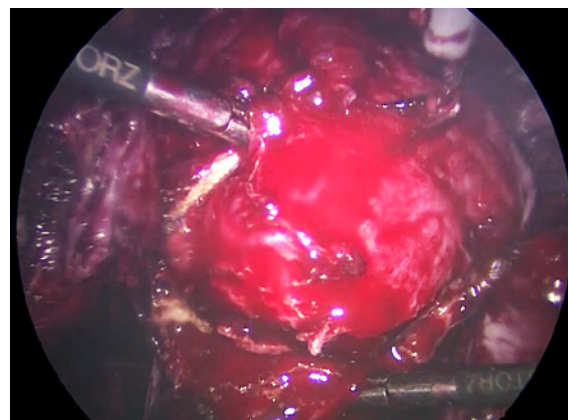
Figure 31.3 Excision of the uterine adenomyoma

2) Hysterectomy

Laparoscopic hysterectomy will relieve most of the symptoms of a uterus with adenomyoma. Adenomyoma is frequently found with endometriosis. The uterus can be very large and adherent to the bowel (rectum and sigmoid) making the hysterectomy difficult. The uterus can also be very vascular, causing bleeding during the surgery. Sometimes, the patient may need to be given GnRH analogues (g) for several months to reduce the size of the adenomyosis and reduce the vascularity of the endometriosis before a laparoscopic hysterectomy can be performed successfully (see chapter 33).

Case 31.2 Hysterectomy done for severe adenomyosis

Madam LH consulted me in 2011. She had been married since 2001 with no children. She had previously undergone a laparotomy and cystectomy for an endometrioma in another country. She had been suffering from severe dysmenorrhoea. Examination revealed a 14 gestational week sized uterus, which was tender on examination. Ultrasound showed an enlarged uterus with a thickened posterior wall resembling adenomyosis. There was a small right endometrioma and a left elongated cystic lesion measuring 6.40 x 3.56 cm resembling hydrosalpinx. She underwent a laparoscopy. She had a large adenomyotic uterus with severe pelvic adhesions. She also had a left hematosalpinx and a small right endometrioma. Laparoscopic right cystectomy, left salpingectomy and partial resection of the adenomyosis was performed. She was seen 6 months after the surgery. She was still suffering from dysmenorrhea but it was milder. She was advised to undergo IVF. She did not return for any follow-up after that. In 2013 she again suffered severe dysmenorrhea and had to undergo a laparotomy and total abdominal hysterectomy in her country.

Discussion

Adenomyomectomy is usually not complete because it is difficult to have a clear demarcation of the extent of the adenomyoma. After a adenomyomectomy, the patient may experience less pain during menses. Since this patient is infertile, she was advised to conceive, preferably by IVF. However she did not do so and the remaining adenomyosis continued to grow causing pain and ultimately a hysterectomy had to be performed.

Summary

Two types of surgery can be performed in cases of adenomyosis, namely Partial Resection of Adenomyoma and Hysterectomy. Complete resection of all adenomyosis is usually not possible. Only partial resection of part of the adenomyotic tissue can be done. If this is performed, the patient may still suffer from pain during menses and may even have heavy menses. A hysterectomy will usually cure all the symptoms caused by adenomyosis

Chapter 32

Laparoscopic Surgery
for Uterovaginal Prolapse

Chapter 32 : Laparoscopic Surgery for Uterovaginal Prolapse

Treatment for uterovaginal prolapse laparoscopically is a relatively new treatment modality. It has the benefits of an abdominal approach to the management of uterovaginal prolapse as well as a minimally invasive surgical technique. Laparoscopic surgery for uterovaginal prolapse can be performed with either a mesh or non-absorbable sutures. It may be done with or without the removal of the uterus.

1) Sacrocolpopexy

This is a surgery whereby a mesh is used to attach the vaginal vault, cervix or uterus to the sacral promontory (g). A mesh is a synthetic permanent material with many holes in it. It provides additional support by allowing the body's own tissue to grow into it. When pelvic support structures are weak, the weakened tissues can be reinforced with a mesh. There are several ways of performing this surgery.
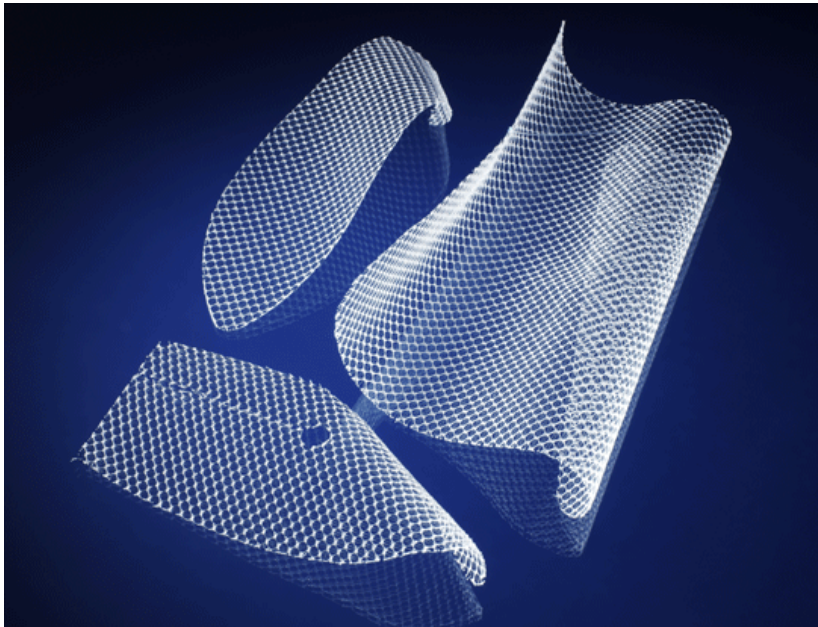
Figure 32.1 Mesh

a) Subtotal hysterectomy and sacrocolpopexy.

This is believed to be the ideal surgery for uterovaginal prolapse. The technique involves the removal of the body of the uterus but the cervix is retained. The cervix is then attached to a mesh and the other end of the mesh is attached to the sacral promontory.

Scan Me

Video 32.1
Laparoscopic subtotal hysterectomy and sacrocolpopexy for uterovaginal prolapse

http://vimeo.com/150044077

The technique

The peritoneum (g) overlying the sacral promontory is opened and the anterior longitudinal ligament is exposed. Care must be taken of the important structures that lay in this position, namely the right common iliac vessels, the medial sacral vessels and the right ureter. The peritoneum is then opened downwards on the right side of the sigmoid and extended up to the posterior part of the uterus. It is then extended to the left side over the rectum. The rectum is released from the vagina. A subtotal hysterectomy is then performed in the usual manner (see Chapter 33). A mesh is then attached to the cervix posteriorly. A second mesh is attached to the anterior part of the cervix or the upper part of the vagina if there is a cystocoele. The two meshes are then sutured together on either side taking the uterosacral ligaments with the suture. Excess anterior mesh is excised. The posterior mesh is then loosely sutured to the anterior longitudinal ligament of the sacral promontory. The peritoneum overlying the mesh is also then sutured together using absorbable sutures so as to completely cover the mesh.
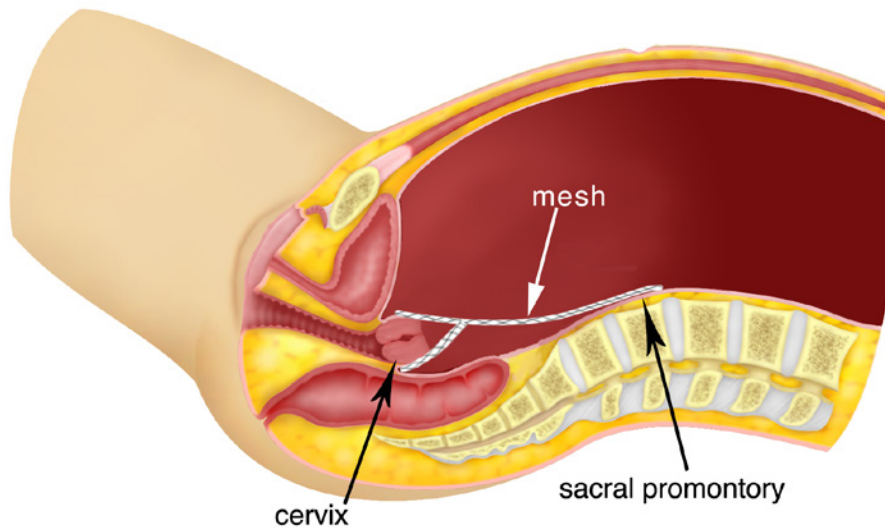
Figure 32.2 subtotal hysterectomy and sacrocolpopexy

The advantages of this surgery are:

1) The cervix is a stronger structure to attach the mesh to as opposed to the vaginal vault, if a total laparoscopic hysterectomy was performed. There will be lesser incidence of mesh erosion into the vagina.

2) The chances of mesh infection would be lower as the vagina is not opened.

3) It is easier to suture two meshes (one in front of the cervix and one behind the cervix) when the body of the uterus is removed than when the uterus is retained.

Disadvantage

It is important for the patient to undergo regular pap smears to ensure that cervical lesions such as cervical dysplasia and cervical cancer do not occur, since the cervix is retained.

Complications

1) Mesh infection: Even when aseptic (g) techniques are used, there is always a possibility of mesh infection. This can be very troublesome. It may resolve with antibiotics but in severe cases, another surgery may be necessary for the removal of the mesh.

2) Infection of the sacral promontory and the cervical disc can also occur. This may resolve with antibiotics. Again in severe cases the mesh may have to be removed.

3) Mesh erosion into the vagina or rectum. The mesh may occasionally erode into the vagina causing pain during sexual intercourse. The patient may also suffer from spotting of blood vaginally because of the mesh erosion into the vagina. The protruding mesh can be excised vaginally and the vagina repaired or healed with oestrogen cream.

4) Recurrence of prolapse. In a small percentage of patients the surgery might fail and prolapse of the bladder (cystocoele), prolapse of the rectum (rectocoele) or even the cervix may occur.

b) Total Laparoscopic Hysterectomy and Sacrocolpopexy

In this technique, all the procedures performed are as in the Subtotal Hysterectomy and Sacrocolpopexy except that the uterus and cervix are removed. The vagina is opened to remove the uterus vaginally and the vaginal vault is closed. After that, a Y shaped mesh is used to suture the front and back part of the vault and then attached to the sacral promontory.

This technique can be performed when there is a worry of diseases of the cervix such as cervical dysplasia or cervical cancer. The disadvantage of this technique is that the chance of mesh infection is higher because the vagina has been opened. The risk of mesh erosion into the vagina is also higher.
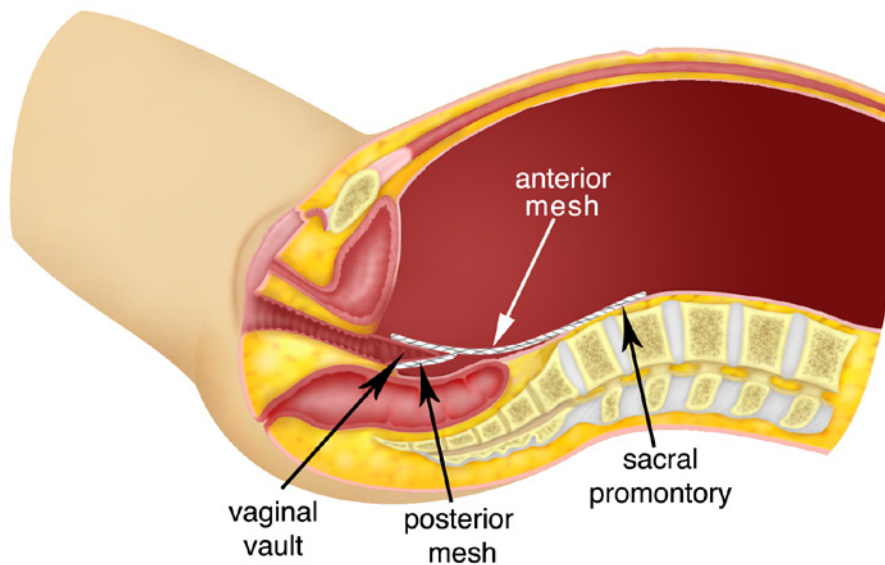
Figure 32.3 Total laparoscopic hysterectomy and sacrocolpopexy

c) Sacrocolpopexy without Hysterectomy

In patients who wish to retain their uterus, Sacrocolpopexy can be performed. This technique is slightly more complex because of the difficulty in placing two meshes, one at the front or anterior surface of the uterus and the second behind or posterior to the uterus. The posterior mesh is then attached to the sacral promontory. This surgery can be performed on women who do not have any diseases of the uterus eg fibroids, adenomyosis, endometrial hyperplasia, cervical dysplasia and heavy menses (menorrhagia).
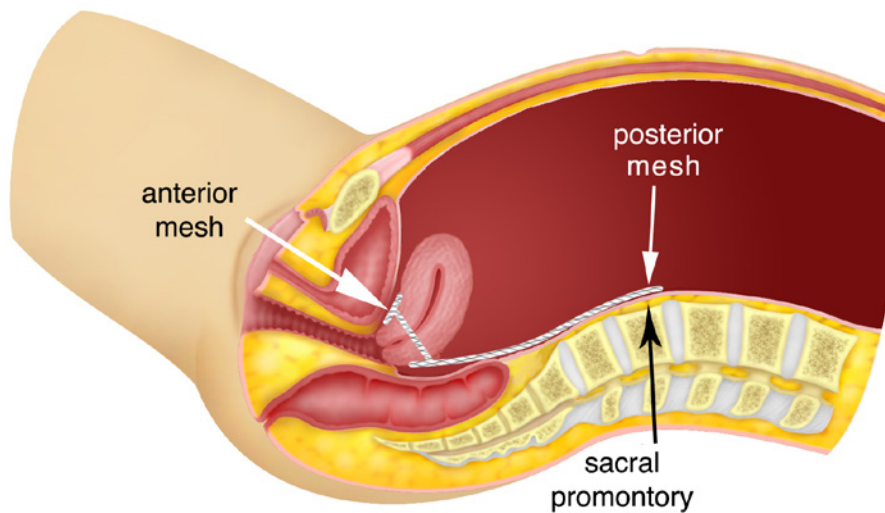
Figure 32.4 Sacrocolpopexy without hysterectomy

d) Post Hysterectomy Vaginal Vault Prolapse and Sacrocolpopexy

In patients who have vaginal vault prolapse (prolapse of the vaginal vault after a previous abdominal, vaginal or laparoscopic hysterectomy), Sacrocolpopexy can be performed. The technique is similar to the technique of Total Laparoscopic Hysterectomy and Sacrocolpopexy. The bladder and rectum is dissected away from the vaginal vault. Two meshes are used. The first is to suture the back (posterior) part of the vault to the muscles around the rectum (puborectalis muscle). The second mesh is sutured to the front (anterior) part of the vault. The two meshes are then sutured together to the vault. The other end is then sutured to the sacral promontory.
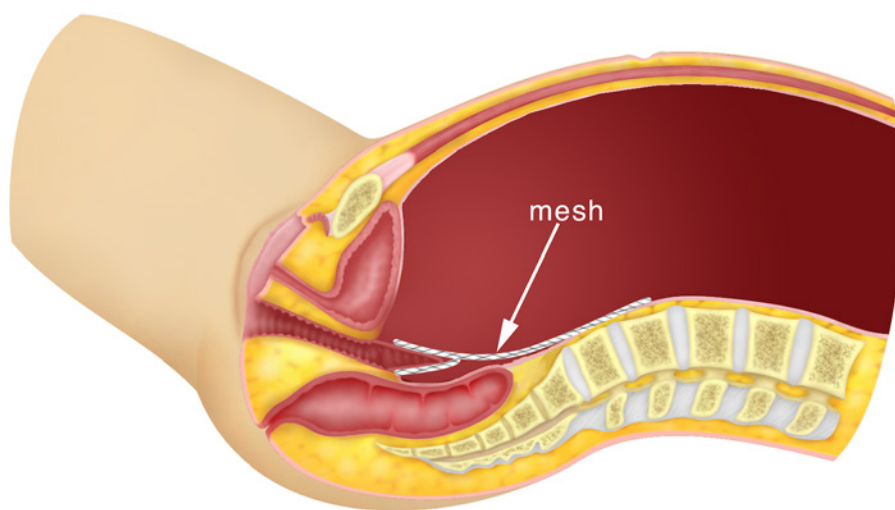
Figure 32.5 Sacrocolpopexy for Vaginal Vault Prolapse

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Video 32.2
Laparoscopic Sacrocolpopexy
for Vaginal Vault Prolapse

http://vimeo.com/150044082

Case: 32.1 : Laparoscopic sacrocolpoplexy for vaginal vault prolapse

HAH was a 48 year old lady with three children who underwent a total abdominal hysterectomy at another hospital eight prior to consulting me in November 2014 . She came with severe vaginal vault prolapse. She did not have any stress incontinence. Examination and ultrasound showed that her ovaries were normal. After discussing various options for surgery she chose to undergo a laparoscopic sacrocolpoplexy. She underwent the surgery in December 2014. Postoperatively she has been well. (see Video 32.2)

Discussion

There are several ways of treating a vaginal vault prolapse. Laparoscopic Sacrocolpopexy is a good method especially in healthy young patients. It is a technically demanding surgery and requires advanced laparoscopic skills

2) Using non absorbable sutures

Dr. C Y Liu popularized this technique. This technique can be performed with or without the removal of the uterus. The principle of this technique is that, instead of using a mesh, non-absorbable sutures are used to support the uterus or vaginal vault. With a hand in the vagina against the right sacrospinous ligament, the sacrospinous ligament is identified laparoscopically. The peritoneum on the ligament is opened and the ligament is exposed. A suture is placed into the right sacrospinous ligament and the suture is attached to the vaginal vault. This is repeated on the left side. Another suture is placed through the uterosacral ligaments and attached to the vaginal vault.

Summary

Laparoscopic surgery for uterovaginal prolapse is a relatively new procedure. It may involve the use of meshes to suture the cervical stump or vaginal vault to the anterior ligament of the sacral promontory or the use of sutures to suture the sacrospinous ligament to the vaginal vault. Postoperative recurrence of prolapse is believed to be lesser than the traditional vaginal hysterectomy and pelvic floor repair.

Chapter 33

Laparoscopic Hysterectomy (removal of the uterus)

Chapter 33 : Laparoscopic Hysterectomy (removal of the uterus)

What is Laparoscopic Hysterectomy?

Hysterectomy is the surgical removal of all or part of the uterus. There are many reasons for removal of the uterus. These include cancer (of the uterus, cervix, ovaries), fibroids, endometriosis, heavy and prolonged menses and prolapse of the uterus. Traditionally, hysterectomy is performed either via an open surgery (laparotomy) or via the vagina (Vaginal Hysterectomy). In Laparoscopic Hysterectomy, the surgery is performed with the assistance of a laparoscope and with two or three other small incisions. The technique of how Laparoscopy is performed is described in Chapter 4.

What are types of Laparoscopic Hysterectomy?

There are several types of laparoscopic hysterectomy that can be performed. They are:

1) Total laparoscopic hysterectomy

In this technique, the whole procedure is performed laparoscopically.
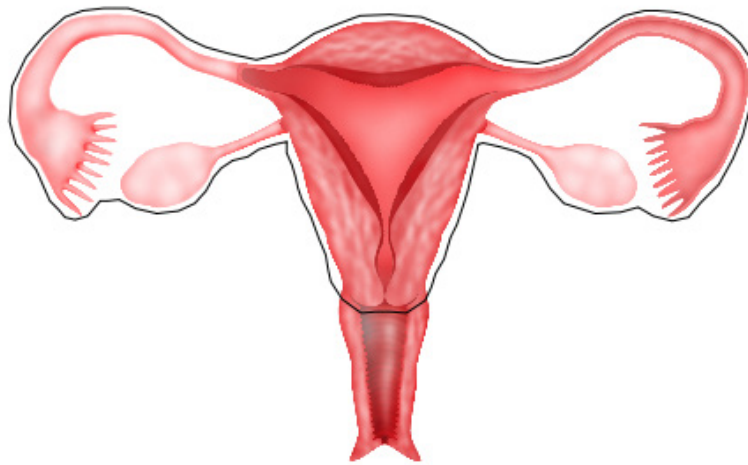
Figure 33.1 Total hysterectomy and bilateral salpingoophrectomy where the uterus, cervix and both ovaries are removed

2) Laparoscopic Assisted Vaginal Hysterectomy

In this technique, parts of the surgery are performed laparoscopically while others are performed vaginally, like in a Vaginal Hysterectomy. This is a much easier surgery to perform especially by surgeons who, may have not yet acquired advanced surgical skills such as laparoscopic suturing.

3) Laparoscopic Subtotal Hysterectomy

In this technique, the body of the uterus is removed, but the cervix is retained. Some surgeons believe that retaining the cervix will retain the pelvic support thus reducing the incidence of future prolapse. Retaining the cervix is also believed to retain normal sexual function. However, the disadvantage of leaving the cervix behind is the worry that diseases of the cervix such as cancer of the cervix may occur in the future. Diseases such as endometriosis and fibroid may grow from the cervix as well.
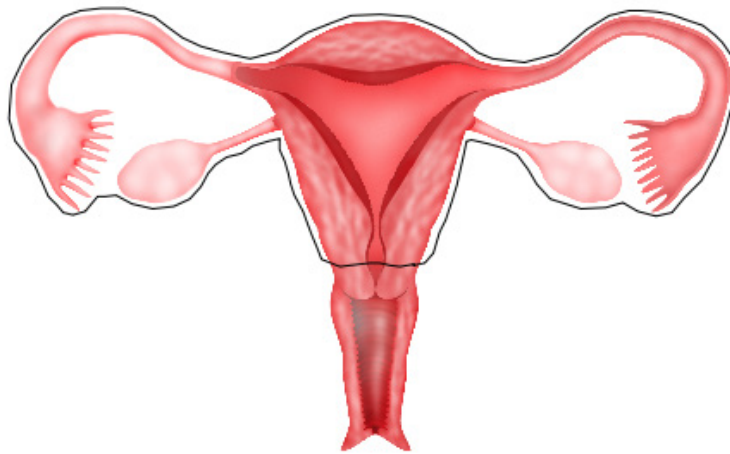
Figure 33.2 Subtotal Hysterectomy and Bilateral Salpingoophrectomy : the body of the uterus and both ovaries are removed. The cervix is retained

4) Single Incision Laparoscopic Hysterectomy

In this technique, the surgery is performed via just one incision of about 2.5 cm in the umbilicus. All the procedures in performing the hysterectomy (as described below) are done through this incision. It is a more skillful surgery and is described in detail in Chapter 19.

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Video 19.6
Single Incision Total
Laparoscopic Hysterectomy

http://vimeo.com/149741719

How is Laparoscopic Hysterectomy performed?

The technique of how laparoscopic surgery is performed is described in chapter 15. In hysterectomy, the round ligaments are first coagulated (using an electric current to stop any bleeding of tissue) and then cut. The peritoneum overlying the cervix is then cut and the bladder is pushed downwards away from the cervix. If the ovaries are to be removed, the ligament containing the blood supply to the ovaries (infundibulopelvic ligaments) are coagulated and cut. If the ovaries are to be preserved, then the ligament connecting the ovary to the uterus (ovarian ligament) is coagulated and cut. The fallopian tubes are also coagulated and cut and the ovaries are detached from the uterus. The broad ligament (the membranous structure attaching the ovaries to the pelvis) is released. The ascending branches of the uterine arteries are sutured, coagulated and cut. An incision is then made on the vagina and this incision is then extended around the vagina to detach the vagina from the cervix. The uterus is then detached and removed from the pelvis via the vagina. The vaginal vault is then sutured with absorbable sutures.

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Video 33.1
Total Laparoscopic Hysterectomy

http://vimeo.com/150079694
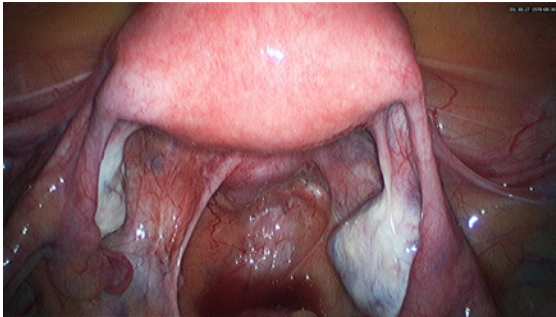
Figure 33.3 Uterus, fallopian tubes and ovaries
before a total laparoscopic hysterectomy
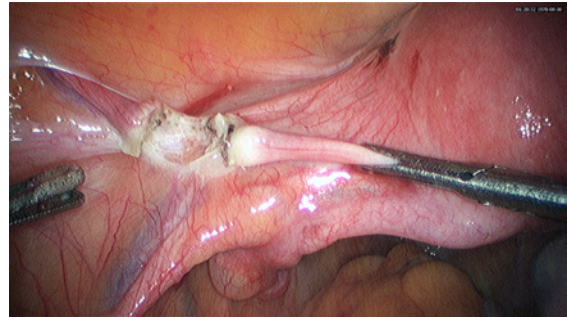
Figure 33.4 The right round ligament
is coagulated and cut
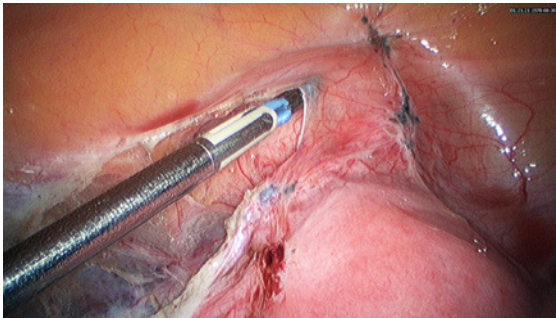
Figure 33.5 The peritoneum overlying the
bladder is opened and cut (note the darkish
areas are spots of endometriosis)
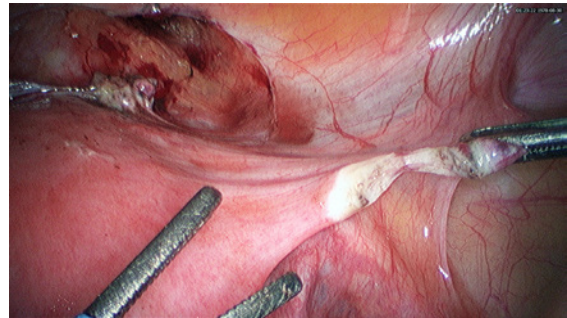
Figure 33.6 The left round ligament
is coagulated and cut
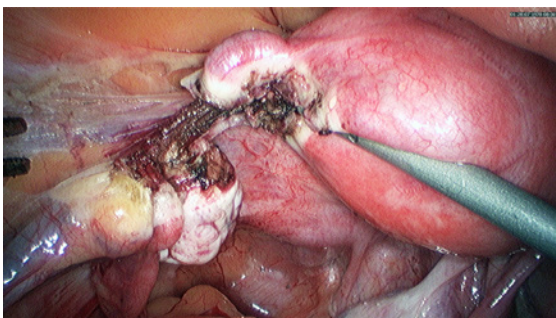
Figure 33.7 the left ovarian ligament and
fallopian tube is coagulated and cut
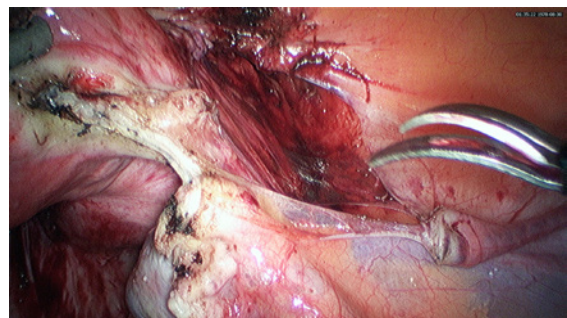
Figure 33.8 The right ovarian ligament and
fallopian tube is coagulated and cut
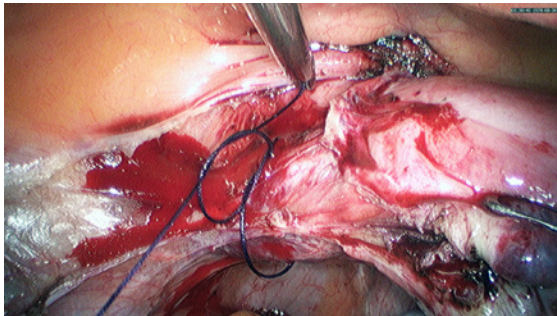
Figure 33.9 Then left ascending branch
of the uterine artery is sutured
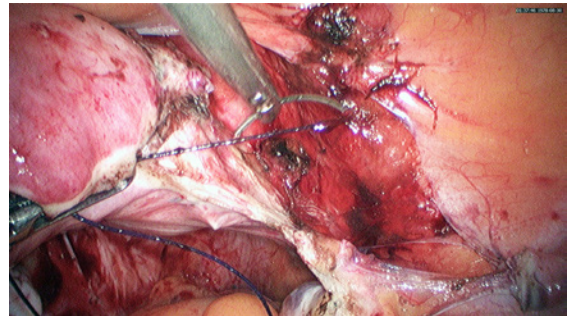
Figure 33.10 The right ascending branch
of the uterine artery is sutured
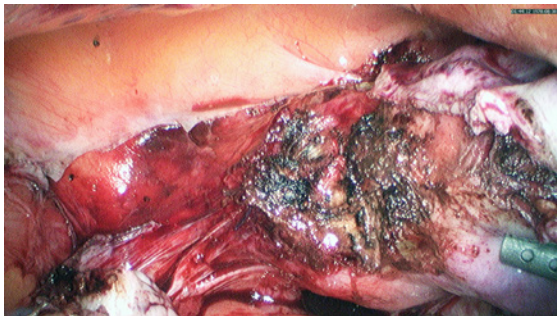
Figure 33.11 The left ascending branch of
the uterine artery is coagulated and cut
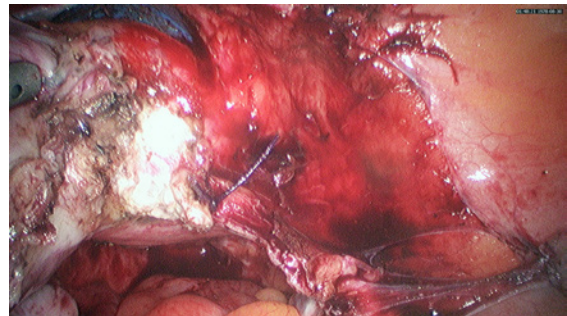
Figure 33.12 The ascending branch of the
right uterine artery is coagulated and cut
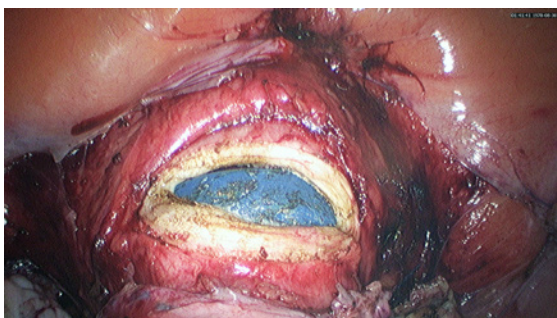
Figure 33.13 The vagina is opened
anteriorly on a Koh cup
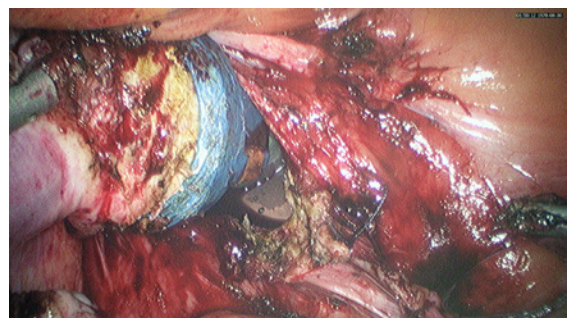
Figure 33.14 The uterus is detached from the vagina
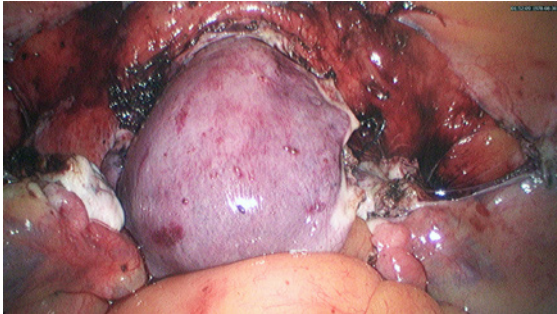
Figure 33.15 the uterus is pushed into the vagina
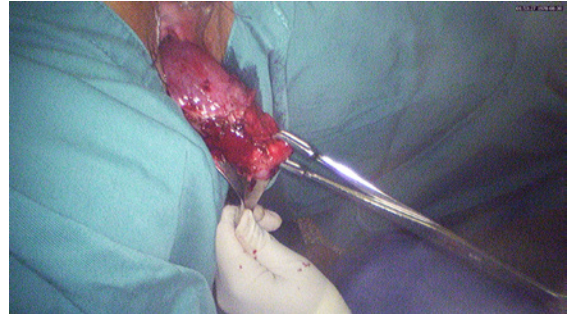
Figure 33.16 The uterus is removed from the vagina
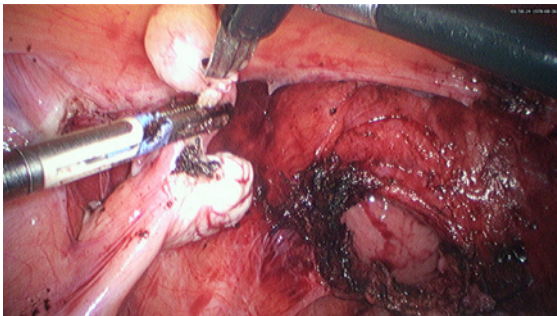
Figure 33.17 The fallopian tubes are removed
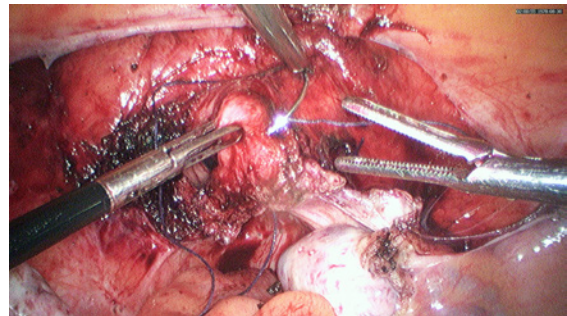
Figure 33.18 the vaginal vault is sutured
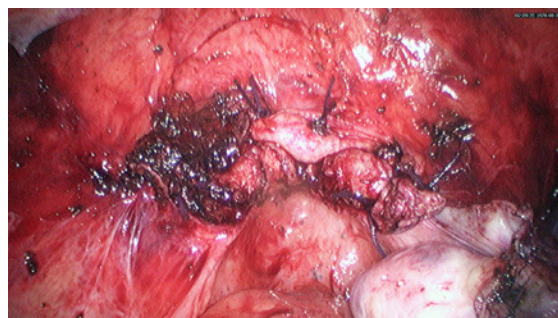
Figure 33.19 This is at the end of the surgery
when the vaginal vault is closed

What are the advantages of Laparoscopic Hysterectomy?

The advantages of laparoscopic surgery are the same as the advantages described in chapter 15.

What are the dangers of Laparoscopic Hysterectomy?

Laparoscopic Hysterectomy involves the detachment of the uterus from the pelvis. There are certain important structures that are nearby or attached to the uterus that may be accidentally injured during the surgery. These structures include the ureters, bladder and the bowel. If injury is recognized during the surgery, repair can be done. The injury is sometimes only noted after the surgery and a second surgery may be necessary to repair the injured structure such as a ureter.

The Bladder is located in front of (anterior to) the uterus and cervix. Due to diseases such as endometriosis or a previous Caesarean section, the bladder sometimes may be adherent to the uterus. In such situations, injury to the bladder may occur. Repair of the bladder may be necessary either laparoscopically or by a laparotomy.

In diseases such as endometriosis, the bowel may be densely adherent (g) to the uterus, posteriorly. The bowel (rectum and sigmoid) may have to be released from the uterus and cervix before the hysterectomy can be performed. Accidental injury to the bowel may occur and the bowel will have to be repaired. If detected during surgery, the repair may be performed at the same time. However, if the injury is detected postoperatively then a second surgery may be necessary.

Again, the more experienced and skillful the surgeon is, the lesser the chances of developing complications.

**Who are the candidates not suitable for
Laparoscopic Hysterectomy?**

Not all women can benefit from a hysterectomy performed laparoscopically. The ability to perform a laparoscopic hysterectomy will depend on the skill of the surgeon. The more skillful the surgeon, the better his performance in complex laparoscopic cases, laparoscopically. It may be difficult to perform a surgery laparoscopically, in the following situations:

1) Large uterus

A uterus may be enlarged because of fibroids or adenomyosis. When the uterus is large, there may be less space for the surgeon to perform a Laparoscopic Hysterectomy. It may be difficult for a surgeon to visualize all the structures via a laparoscope. Sometimes, a GnRH (g) analogue injection may be given to shrink the fibroid before performing Laparoscopic Hysterectomy.

2) Multiple previous surgeries

Women who have undergone previous multiple open surgeries may have scar tissue (g) (adhesions) formed in the abdomen. These adhesions may cause the bowel to be adherent to each other and the uterus and the abdominal wall. It may be difficult to release these adhesions laparoscopically. Previous open surgeries are not an absolute contraindication for laparoscopic surgery. A skillful surgeon can place a laparoscope in the abdomen to see whether there are adhesions before deciding whether to proceed with the surgery laparoscopically or to convert to a laparotomy. Not all patients who have undergone previous surgeries may have scar tissue in the abdomen.

3) Severe adhesions as a result of endometriosis

Some patients with severe endometriosis may have severe adhesions of the uterus, ovaries and fallopian tubes to the pelvis. In such situations, the surgeon must be very skillful in dissecting away the adherent structures (ureters, bowel or bladder) from the uterus and pelvis before proceeding with the hysterectomy. Injury to these structures may require repair, which is easier to be performed by open surgery then by laparoscopy.

Fact 33.1

Should the ovaries be removed during hysterectomy?

Removal of both ovaries will lead to immediate menopause. Removal of one ovary and retaining the other will not lead to menopause. Women with diseases of the ovaries such as ovarian cyst, ovarian cancer, endometriosis and so on may need one or both ovaries to be removed. In women who do not have any disease of the ovaries, removal of the ovaries is not recommended. In women who are postmenopausal, removal of both the ovaries is controversial. There have been studies suggesting that ovaries produce some useful hormones even in postmenopausal women. . The disadvantage of not removing both the ovaries from a postmenopausal woman is the risk of developing cysts or even ovarian cancer. This risk is very small. That is why it is essential for women who retain one or both ovaries after a hysterectomy to undergo regular transvaginal ultrasound to ensure that there are no cysts in the ovaries.

Fact 33.2

What is the difference between subtotal hysterectomy and total hysterectomy?

In subtotal hysterectomy, only the body of the uterus is removed and the cervix is retained. In total laparoscopic hysterectomy, the body of the uterus and the cervix are removed. Some believe that by retaining the cervix, the pelvic floor structure is intact and so there is a lesser chance of prolapse. There is also a suggestion that if the cervix is retained, sexual function will be better compared to if the cervix is removed. It is important to note that if the cervix is not removed, regular pap smears are a must. Some women may have monthly menstrual spotting from the cervix. There is a small risk of developing diseases such as fibroid and adenomyosis from the cervix.

Summary

Removal of the uterus (hysterectomy) can be performed via the laparoscopic route. The different types of laparoscopic hysterectomy are total laparoscopic hysterectomy, subtotal hysterectomy, laparoscopic assisted vaginal hysterectomy and single incision laparoscopic hysterectomy. Difficult laparoscopic hysterectomies involve women with large uterus, multiple previous surgeries and severe adhesions as a result of endometriosis.

Chapter 34

Laparoscopic Surgery for Endometrial Cancer

Chapter 34 : Laparoscopic Surgery for Endometrial Cancer

Surgery for endometrial cancer has been traditionally performed by laparotomy. Nowdays, Hysterectomy and Pelvic Lymphadenectomy can be performed laparoscopically.

Advantages of Laparoscopic surgery for endometrial cancer

All the advantages of laparoscopic surgery discussed in chapter 15 also apply to this type of surgery. Some of the special advantages are:

1) Magnification makes the surgery easier and more precise to perform.

2) It can be used as a tool to explore the pelvis and abdomen to stage the disease. Biopsies can also be taken from any part of the pelvis or abdomen.

3) In patients who are found to have more advanced cancer, laparoscopy provides the advantage of a quicker postoperative recovery and thus allowing an early start of radiotherapy and/or chemotherapy.

Risks of laparoscopic surgery

1) There is always a slight worry that laparoscopic surgery itself may cause spread of the disease because of the use of carbon dioxide to distend the abdomen. However this fear has been allayed by numerous studies that have been performed on laparoscopic surgery in cancer treatment which state that laparoscopy is safe for cancer surgery.

2) In some cases when the disease has spread or is adherent to vital structures such as bowel or blood vessels, it may not be possible to perform the surgery laparoscopically and so a laparotomy may have to be performed.

Suitable candidates for laparoscopic surgery

Patients with early Cancer of the Endometrium are best suited for laparoscopic surgery. These patients can benefit from all the advantages of laparoscopic surgery because cancer of the endometrium is often diagnosed early.

The technique

There are three basic aspects of laparoscopic surgery for cancer of the endometrium. They are:

> 1) Laparoscopic hysterectomy
>
> 2) Pelvic Lymphadenectomy or pelvic lymph node sampling
>
> 3) Para-aortic lymph node sampling

1) Laparoscopic hysterectomy

Laparoscopic hysterectomy is described in detail in Chapter 33. There is a slight difference when performing laparoscopic hysterectomy for Cancer of the Endometrium. In order to reduce haemotogenous (spread through the bloodstream) dissemination of the cancer, both the fallopian tubes and the infundibulopelvic ligaments are coagulated at the beginning of the surgery. Isolation and ligation of the uterine arteries at its origin from the internal iliac arteries follow. The spaces in the lateral pelvic wall are then opened to see if there are any enlarged lymph nodes. If enlarged lymph nodes are seen, these are removed and sent for frozen section (g). The pelvic lymphadenectomy can be performed before or after the hysterectomy. The hysterectomy is then performed as described in Chapter 33.

2) Pelvic Lymphadenectomy or Pelvic Lymph Node Sampling

Pelvic Lymphadenectomy is performed by first opening up of the space around the vessels of the pelvis, namely the common iliac vessels, the external iliac vessels, the internal iliac vessels and the obturator vessels, the lymph nodes surrounding these vessels are removed.
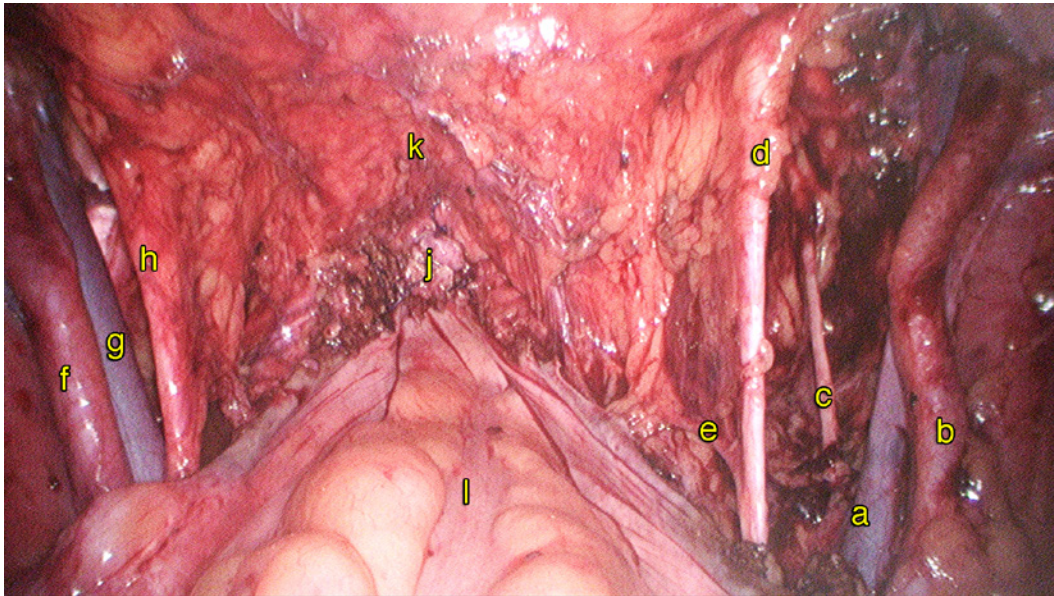
Figure 34.1
Laparoscopic view after completion of total laparoscopic hysterectomy and pelvic lymphadenectomy
(a) right external iliac vein, (b) right external iliac artery, (c) right obturator nerve,
(d) right obliterated umbilical artery, (e) right uterine artery, (f) left external iliac artery,
(g) right external iliac vein, (h) left obliterated umbilical artery, (j) vaginal vault, (k) bladder, (l) rectum

Scan Me

Video 34.1
Total laparoscopic hysterectomy and pelvic lymphadenectomy for endometrial cancer

http://vimeo.com/159032432

Case 34.1 Cancer of the endometrium: Total Laparoscopic Hysterectomy and Bilateral Salpingoophrectomy and Pelvic Lymphadenectomy

Madam LLH, a 55-year-old had postmenopausal bleeding. She underwent a hysteroscopy and a Dilatation and Curettage in a different country. The histopathology confirmed a well differentiated endometriod adenocarcinoma. Examination and ultrasound done showed a normal sized uterus. She underwent a Total Laparoscopic Hysterectomy and Bilateral Salpingoophrectomy and Pelvic Lymphadenectomy. The surgery took 2 hours (watch video 34.1). Postoperatively she was well. The histopathology confirms moderately differentiated adenocarcinoma with no pelvic lymph nodes involvement. She did not require any additional chemotherapy or radiotherapy. She is currently on followup.

3) Para-aortic lymph node sampling

Laparoscopic para-aortic lymph node dissection is a technique whereby lymph nodes are removed from around the aorta and vena cava. The removal of para-aortic lymph nodes is a controversial complex surgery which is not routinely performed. It requires a surgeon with advanced laparoscopic skills.

Summary

- Laparoscopic surgery can be performed for endometrial cancer.

- Total laparoscopic hysterectomy and pelvic lymphadenectomy are usually performed together.

- Performing this type of surgery laparoscopically requires advanced laparoscopic skills

Chapter 35

Laparoscopic Surgery for Early Cervical Cancer

Chapter 35 : Laparoscopic Surgery for Early Cervical Cancer

There are 2 types of laparoscopic surgery that can
be performed for Cancer of the Cervix.

1) Total laparoscopic hysterectomy

This is performed for very early stage 1A1 Cancer of the
Cervix. The technique is described in Chapter 32.

2) Laparoscopic Radical hysterectomy and pelvic lymphadenectomy

In this technique, the uterus, the upper third of the
vagina, the tissues around the uterus (parametrium),
tissues around the cervix (paracolpus) and the pelvic
lymph nodes are removed. This complex surgery requires
advanced laparoscopic surgical techniques.

The principles of this technique are as follows:

1) The peritoneum medial to the uterosacral ligament is opened and extended to the inferior part of the cervix detaching the rectum from the vagina.

2) The peritoneum overlying the ureters is opened and the obturator fossas are opened. The para-vesical and the para-rectal fossas are opened on both sides.

3) The uterine arteries are ligated and cut bilaterally and the parametrium is then detached close to the pelvic wall.

4) The uterosacral ligaments are excised.

5) The round ligaments are cut bilaterally and the peritoneum overlying the bladder is opened and the bladder is pushed down.

6) The ureteric tunnel are opened and the ureters are isolated and pushed laterally.

7) The para-colpus is coagulated and cut bilaterally.

8) The vagina is opened about 2-3 cm inferior to the cervix and a circumferential incision is made and the vagina detached. The whole specimen is then removed.

9) Pelvic lymphadenectomy is performed after this.

10) The vaginal vault is closed.

11) The pelvis is washed and haemostasis is attained.

12) A drain is inserted into the pelvis.
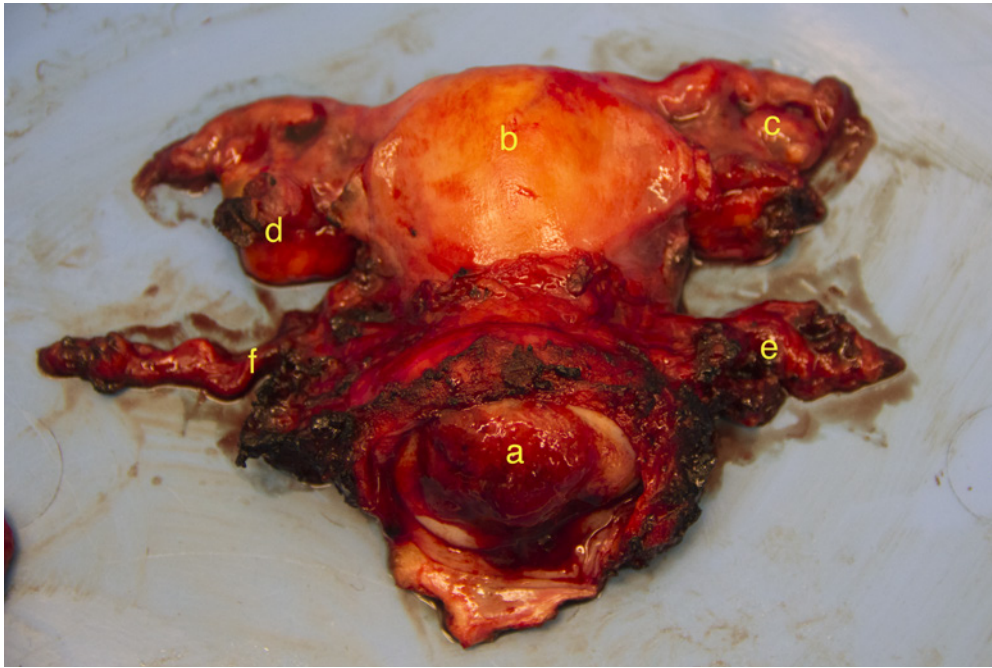
Figure 35.1 Post Laparoscopic Radical Hysterectomy specimen (a: cancer of the anterior lip of the cervix, b: uterus, c: left ovary, d: right ovary, e: left parametrium, f: right parametrium)

Case 35.1

Cancer of the cervix stage 1B: Laparoscopic radical hysterectomy and pelvic lymphadenectomy

Madam FN a 46-year-old lady consulted me in September 2015 with a problem of bleeding after sexual intercourse (post coital bleeding). Examination revealed cancer of the cervix involving the anterior lip, measuring 2 cm in diameter. Biopsy of the lesion confirmed an adenocarcinoma. A CT scan done did not show any extension of the cancer. She was diagnosed with cancer of the cervix stage 1B. She was counseled to undergo an Examination Under Anaesthesia (EUA) and a cystoscopy and if staged as cancer stage 1B to proceed to a Laparoscopic Radical Hysterectomy and Pelvic Lymphadenectomy. The EUA and cystoscopy confirmed cancer of the cerivix stage 1B and a Laparoscopic Radical Hysterectomy and Pelvic Lymphadenectomy was performed (watch video 35.1). The surgery took 3 hours 30 minutes. Postoperatively she was well. The histopathology confirmed cancer of the cervix stage 1B (Figure 35.1) with no involvement of the lymph nodes. Postoperatively, she did not receive any chemotherapy or radiotherapy. She is on followup.

Scan Me

Video 35.1
Laparoscopic Radical Hysterectomy
for early Cervical Cancer

https://vimeo.com/150127506

Summary

Laparoscopic surgery for early cancer of the cervix requires advanced surgical techniques. Very early stage 1A1 cancers will require just a Total Laparoscopic hysterectomy. However in all other early stage cancers of the cervix, the surgery will involve removal of the uterus, the upper third of the vagina, the parametrium, the para-colpus and the pelvic lymph nodes.

PART 3
Hysteroscopy

Chapter 36

Overview of hysteroscopy

Chapter 36 : Overview of hysteroscopy

What is Hysteroscopy?

Hysteroscopy is a procedure whereby a narrow telescope (called a hysteroscope) attached to a camera is passed via the cervix into the uterus to visualize the inside of the uterus (endometrial cavity).
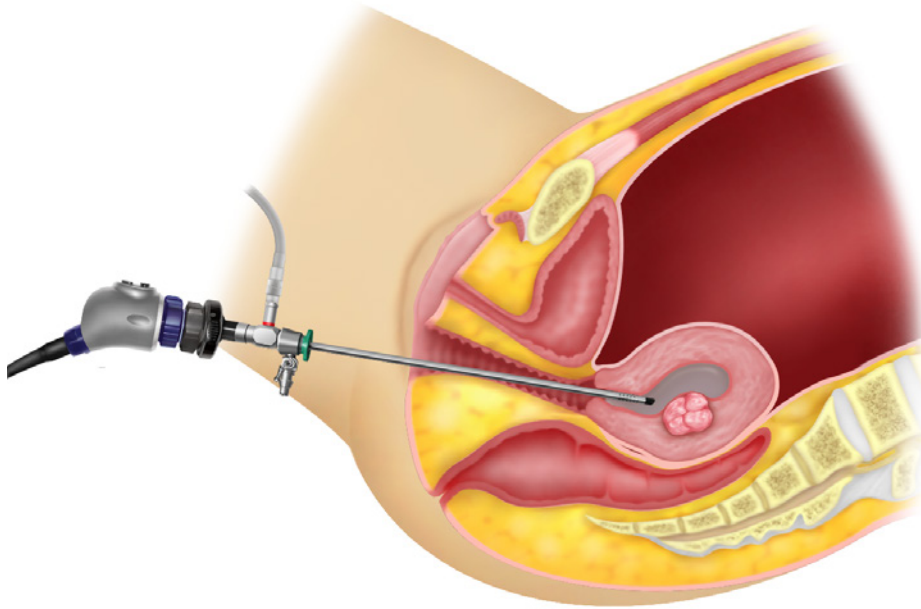
Figure 36.1 Diagnostic Hysteroscopy

Types of hysteroscopy

There are two reasons why hysteroscopy is performed.

1) **Diagnostic hysteroscopy** - to make a diagnosis of a symptom.

2) **Operative hysteroscopy** - to perform a surgery.

Indications for performing hysteroscopy

The reason for performing hysteroscopy will depend on whether it is for diagnosis or surgery. This is discussed in chapter 37 (diagnostic hysteroscopy) and chapter 38 (operative hysteroscopy).

The best time to perform a hysteroscopy

1) Just after menses (before ovulation) – the endometrium is thinnest just after menses and so the cavity can be seen well. This also removes the worry of performing a hysteroscopy during a pregnancy.

2) In post menopausal women, hysteroscopy can be performed at anytime

3) In patients who have irregular or prolonged bleeding, hormones should be given to stop the bleeding before hysteroscopy is performed. However, if bleeding persists, hysteroscopy should be performed despite the bleeding.

When is hysteroscopy not advisable?

1) During menses or per vaginal bleeding - It will be difficult to visualise the endometrial cavity during menses.

2) Pregnancy - If pregnancy is suspected hysteroscopy must be avoided because the procedure may injure the foetus.

3) Pelvic Inflammatory Disease (PID) - In patients who have PID or are suspected to have PID, hysteroscopy must be avoided to prevent the infection from flaring up.

4) Cancer of the cervix - In patients suspected of having cancer of the cervix hysteroscopy should not be done.

5) Acute herpes infection

6) Heavy vaginal discharge - this may be caused by sexually transmitted disease (eg trichomonas, gonorrhoea, chlamydia). A swab must be taken for culture and treatment must be given before the hysteroscopy.

Complications

Complications can occur during both diagnostic and operative hysteroscopy. Complications can be divided into :

1) intraoperative (occurring during the procedure)

2) postoperative (occurring after the procedure)

1) Intra-operative Complications

a) Pain

Diagnostic hysteroscopy is usually performed without anaesthesia. The internal Os (g) may be narrow and some pain or discomfort may be felt when the surgeon passes the hysteroscope through the internal Os (see Chapter 1). Some factors that may increase the chances of pain during office hysteroscopy include, nulliparity (patient has never delivered a baby), menopause, history of pelvic inflammatory disease and anxiety.
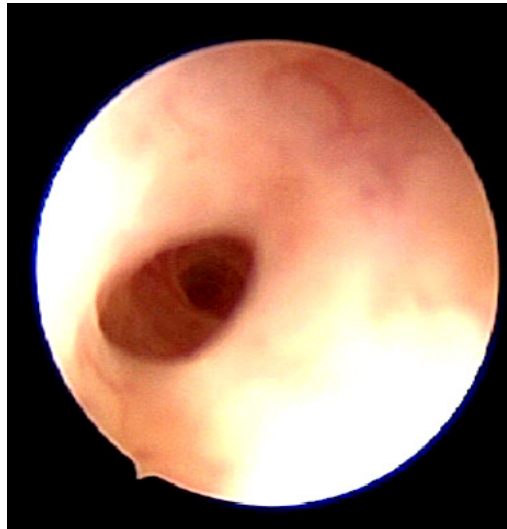
Figure 36.2 Narrow internal Os seen at diagnostic hysteroscopy

b) Vasovagal crisis

This is a sudden feeling of lightheadedness, nausea and fainting and this is related to pain that may occur when the hysteroscope is passed into the uterine cavity.

c) Perforation of the uterus

Perforation of the uterus may occur while performing hysteroscopy. This usually occurs when the cervical Os (see Chapter 1) is very tight and manipulation can cause perforation. Sometimes it may be due to the abnormal position of the uterus. When the uterus is acutely bent backwards (retroverted and retroflexed (Figure. 36.3)) or acutely bent forward (anteverted and anteflexed) (Figure. 36.4), a perforation may occur. When perforation occurs during a diagnostic hysteroscopy (Figure 36.5, 36.6 and 36.7), the procedure must be stopped and no further action is necessary. The patient will be asked to rest and be observed for a few hours to ensure that there is no internal bleeding. A perforation may also occur during an operative procedure (eg transcervical resection of a fibroid (see chapter 41) or excision of a uterine septum (see chapter 40) If this occurs, a laparoscopy may be necessary to ensure that the perforation has not injured any internal organ (eg bowel or blood vessels) and there is no internal bleeding. The perforation can be sutured laparoscopically.
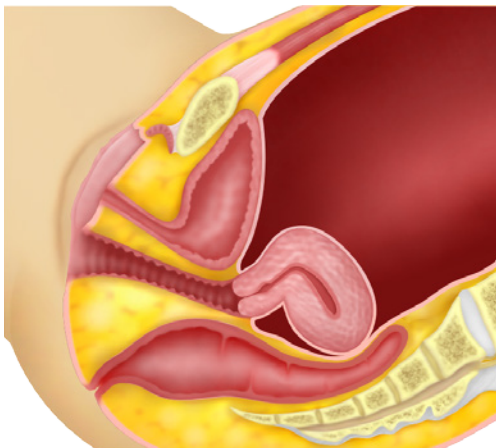
Figure 36.3 Acutely retroverted and retroflexed uterus
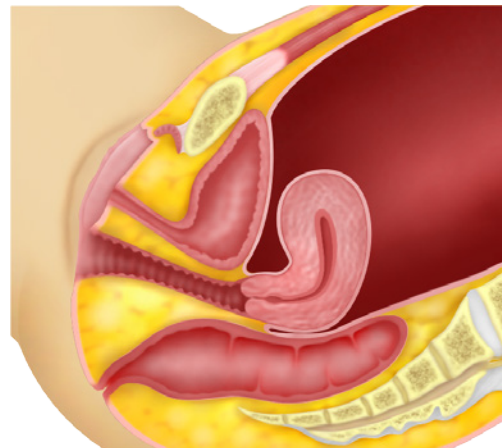
Figure 36.4 Acutely anteverted and anteflexed uterus
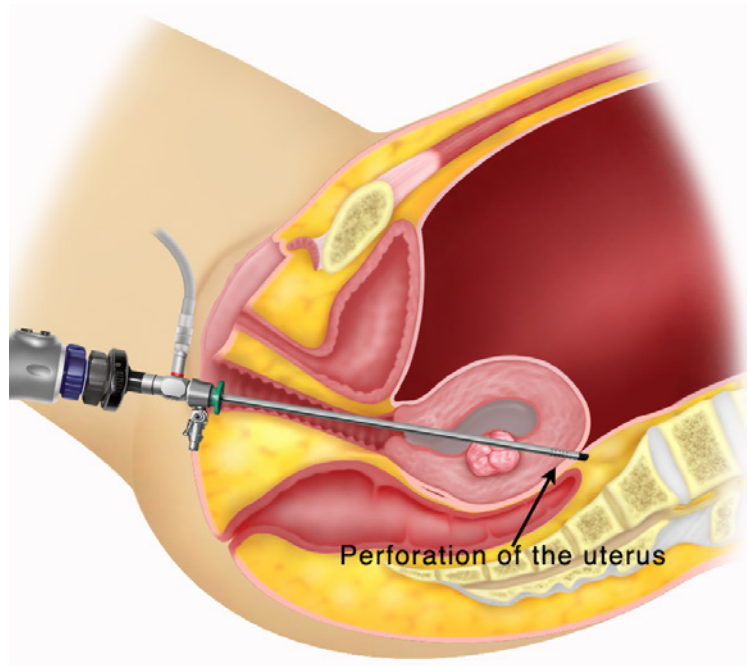
Figure 36.5 Hysteroscopy- perforation of the uterus
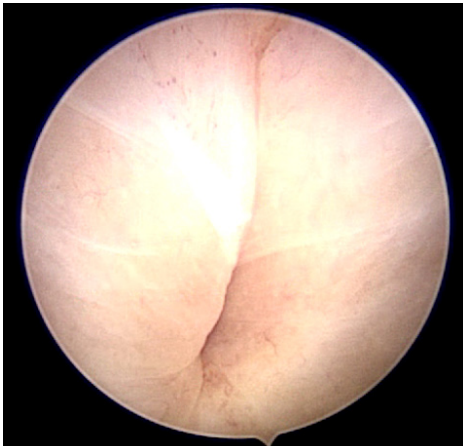
Figure 36.6 Hysteroscopic view of
a perforated uterine cavity
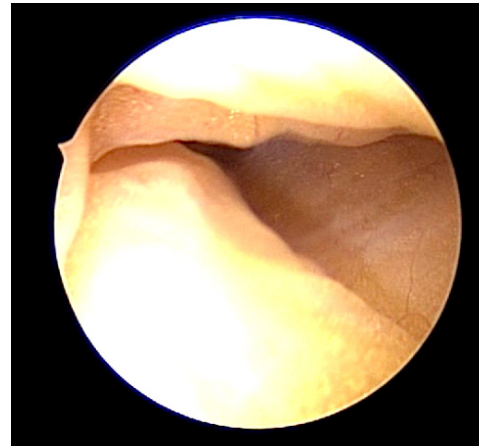
Figure 36.7 Bowel seen after
perforation of the uterus

d) Trauma to the cervix

A large hysteroscope is used during an operative hysteroscopy. Dilatation of the external and internal Os is necessary to pass the operative hysteroscope. The cervix is usually held with an instrument (eg tenaculum) when the internal Os is dilated. The cervix may be torn at this time. Such tears are usually sutured vaginally.
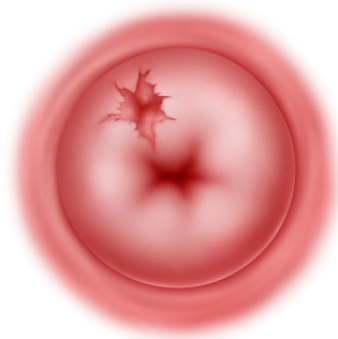
Figure 36.8 Cervical tear that may occur during hysteroscopy

e) Haemorrhage

During operative hysteroscopy (eg transcervical resection of a fibroid) bleeding may occur. This bleeding can sometimes be heavy. Such bleeding can be stopped by placing a catheter into the uterine cavity and distending it with saline so as to apply pressure to the endometrial cavity. The catheter is usually placed from 6 hours to 24 hours. Bleeding will usually stop and the catheter can be removed. However if bleeding persists, a hysterectomy may be necessary.
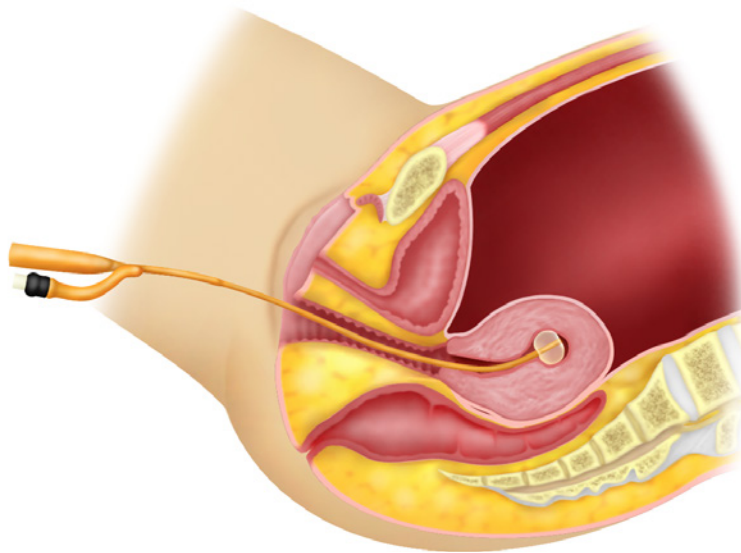
Figure 36.9 Catheter placed in the uterine cavity to control bleeding

f) Fluid overload

During operative hysteroscopy, glycine or saline is used to distend the uterus. This fluid can be absorbed by blood vessels that may be opened during the surgery. Too much absorption of this fluid, leads to fluid overload and the patient can become ill. She may become confused and puffy. This condition may require admission to the intensive care unit for observation. This is a very dangerous complication. When this complication is suspected, the surgery is stopped immediately and measures are taken to remove the extra fluid that has entered the body of the patient.

g) Gas embolism

This is a rare and very dangerous complication. Air may accidentally be drawn into the veins and this can go into the heart and lungs. This can be fatal.
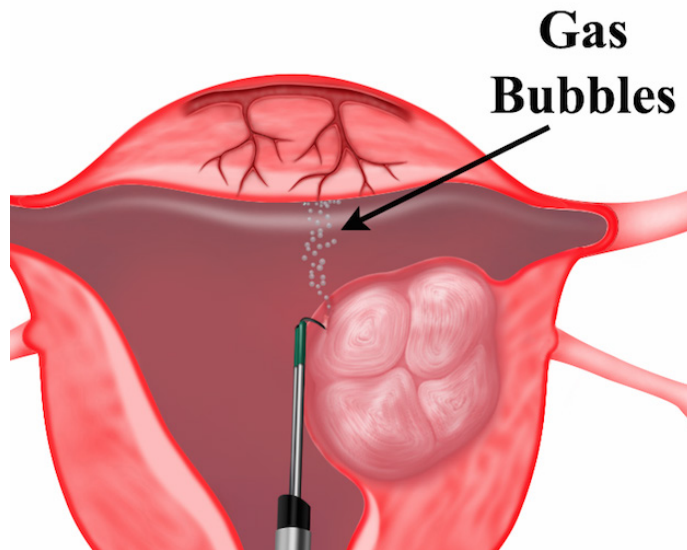
Figure 36.10 Gas bubbles can form during operative surgery

Case 36.1 Uterine perforation during office hysteroscopy

Madam ZF underwent a Diagnostic Hysteroscopy for the diagnostic evaluation of her infertility. The cervical Os was very tight and during manipulation to enter the cavity of the uterus a perforation of the uterine cavity was noted (Figure. 36.6 and Figure. 36.7). The hysteroscope was immediately removed. A transvaginal ultrasound was performed and fluid was seen in the Pouch of Douglas (g). The patient did not have much abdominal pain. She was rested for 2 hours and then re-evaluated. She did not have any abdominal pain and her vital signs were normal. She was allowed to go home and requested to return if she had any symptoms. She was seen again in a week and was well.

Discussion

In difficult cases especially when the uterus is acutely anteverted or retroverted, Diagnostic Hysteroscopy can be performed with the assistance of an abdominal ultrasound. If it is still difficult to enter the uterine cavity then the operation should be performed under general anaesthesia, while simultaneously a laparoscopy should be performed.

2) Post operative Complications

a) Haemorrhage
Patients who have been discharged can develop bleeding at home. This will require immediate admission and treatment.

b) Thermal damage to the bowel
During operative hysteroscopy using electric current (eg transcervical resection of a fibroid) an unknown thermal injury to the bowel may occur and this may not be noticed during the surgery. After several days, the patient may suffer from abdominal pain and fever. This may require another surgery (laparoscopy or laparotomy).
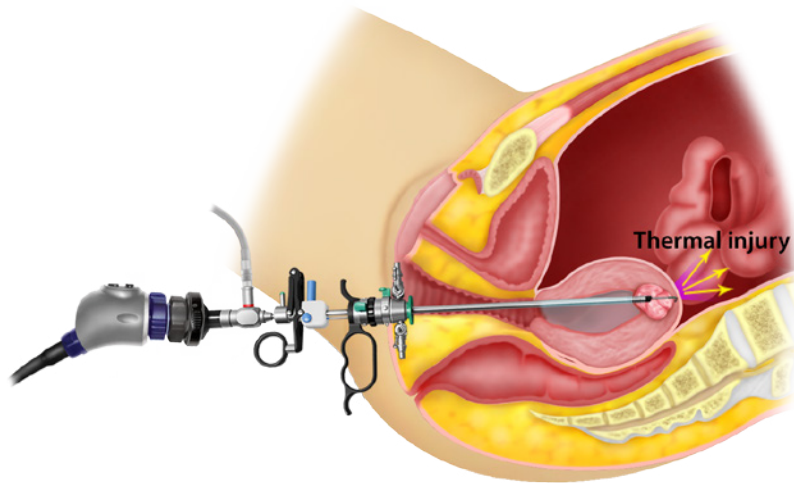
Figure 36.11 Accidental thermal injury during operative hysteroscopy

c) Infection
Infection of the endometrial cavity rarely occurs after the surgery. This can present as fever and pelvic pain, and can usually be resolved with antibiotics.

d) Intrauterine adhesions
After operative hysteroscopy, intrauterine adhesions can occur. This may lead to decrease in uterine bleeding and some times amenorrhoea (cessation of menses).
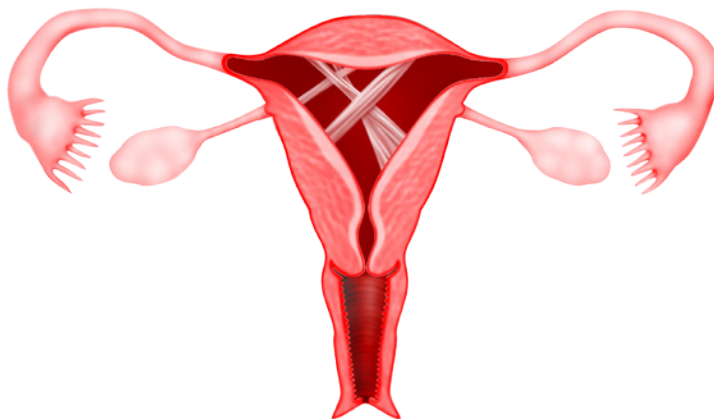
Figure 36.12 Intrauterine adhesions

Post operative advise

1. Some women may experience cramping similar to period pain after the procedure. There may be shoulder pain, which is caused by the fluid, or gas that is used to inflate the uterus. This pain will subside in a few days.

2. There may be some bleeding after the hysteroscopy especially when hysteroscopic surgery is performed. Bleeding usually subsides in a few days.

3. Sexual intercourse must be avoided till bleeding and vaginal discharge stop.

4. In patients who have a higher risk of pelvic infection (eg tubal block or hydrosalpinx) antibiotics may be given before and after the procedure.

5. Tampons should be avoided for at least a month after the hysteroscopy, to help reduce the risk of infection.

6. Severe lower abdominal pain, pain during urination, fever, vaginal discharge that is smelly or unpleasant and heavy bleeding are symptoms that will require the immediate attention of a doctor.

Scan Me

Video 36.1
Overview of Hysteroscopy

http://vimeo.com/150239548

Summary

Hysteroscopy is a technique whereby a fine telescope attached to a camera is inserted into the uterine cavity through the cervix to visualize the inner lining of the uterus. Hysteroscopy done for the purpose of investigation is called Diagnostic Hysteroscopy whereas that which is done for the purpose of surgery is called Operative Hysteroscopy. Hysteroscopy is usually performed just after menstruation. Just like any surgical procedure several complications can occur during and/or after the surgery.

Chapter 37

Diagnostic Hysteroscopy

Chapter 37 : Diagnostic hysteroscopy

Diagnostic hysteroscopy is performed to make a diagnosis of a symptom (see Figure. 36.1)

Indications for Diagnostic Hysteroscopy

Diagnostic hysteroscopy is performed for the following reasons

1) Evaluation of abnormal vaginal bleeding

2) Evaluation of unusual vaginal discharge

3) Evaluation of infertility

4) Location of a foreign body (eg intrauterine contraceptive device)

5) Evaluation of repeated miscarriage

6) Evaluation of abnormal transvaginal ultrasound

7) Evaluation of an abnormal hysterosalpingogram (HSG)

8) Preoperative evaluation

9) Postoperative evaluation

10) Diagnosis and classification of a submucous fibroid

11) Diagnosis and staging of endometrial cancer

How is it performed?

A Diagnostic Hysteroscopy is usually done without any anaesthesia and as an outpatient procedure. This procedure is sometimes called Office Hysteroscopy. A simple oral painkiller may be given before the surgery. A fine telescope attached to a camera is inserted into the uterine cavity via the cervix. Saline or carbon dioxide is used to distend the endometrial cavity so that there is space for the cavity to be visualised. This endometrial cavity can then be seen on a video monitor. The patient can see the procedure while it is being done. Some patients may experience discomfort while the surgeon negotiates through the internal Os (the junction between the cervix and the uterine body) into the uterine cavity. Fine surgical instruments may be then passed into the uterus to perform minor surgery such as taking a small sample of tissue (biopsy) of the endometrium, releasing adhesions or removal of polyps. The procedure usually takes between 5 to 10 mins.

Advantages of Diagnostic Hysteroscopy

1. Outpatient or office procedure - A diagnostic hysteroscopy can be performed without anaesthesia as an outpatient or office procedure.

2. The endometrial cavity can be visualised directly and a diagnosis can be made immediately.

3. Some minor surgery can also be performed at the same time.

Preoperative preparation

The best time to perform a diagnostic hysteroscopy is just after menses. At this time the endometrial lining is very thin and not vascular. No preparation is usually required. An oral painkiller (analgesic) may be given 30 minutes before the procedure. When a tight cervical Os is anticipated (eg postmenopausal women) a tablet (misoprostol - cytotac) may be given orally or placed in the vagina 30 minutes before the procedure. A local anesthetic may sometimes be injected into the cervix before the procedure.

**Minor surgeries that can be performed
during diagnostic hysteroscopy**

1. Biopsy (a small sample of tissue is taken) of the endometrium

2. Removal of small endometrial polyps (see Chapter 6)

3. Removal of a missing IUCD (Figure. 37.1).

4. Release of endometrial adhesions
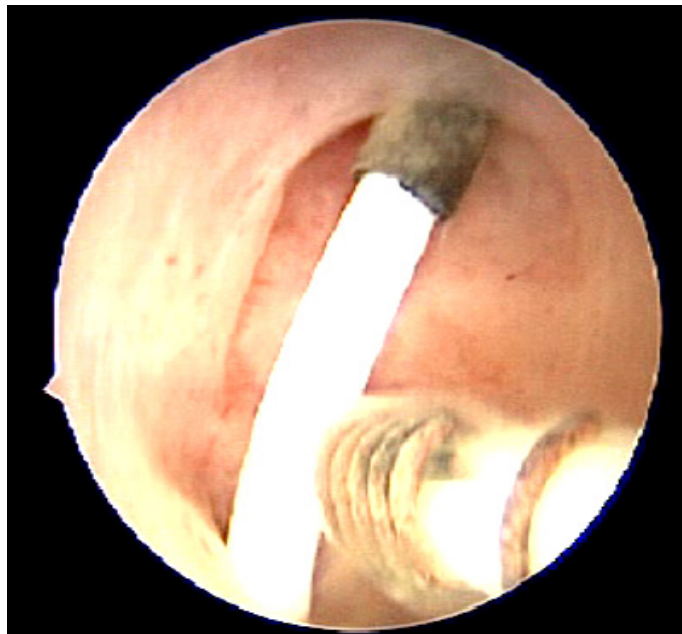
Figure 37.1 Missing IUCD

Scan Me

Video 37.1
Diagnostic Hysteroscopy

https://vimeo.com/150317709

Summary

Diagnostic hysteroscopy is a very useful tool in the evaluation of the endometrial cavity when endometrial pathology is suspected. It can be done without anaesthesia in an office setting

Chapter 38

Operative Hysteroscopy

Chapter 38 : Operative Hysteroscopy

When a surgery is performed using a hysteroscope,
it is called Operative Hysteroscopy.

Indications for operative hysteroscopy

1. **Fibroids**
   Submucous fibroids can be resected (removed)
   with an operative hysteroscope (Chapter 40).

2. **Polyps**
   Small growths that develop on the lining of the uterus that
   can cause irregular and heavy menses (Chapter 6)

3. **Intrauterine Adhesions**
   Scar tissues in the uterine cavity that may cause
   absent periods or infertility (Chapter 40).

4. **Missing Intrauterine Contraceptive Device (IUCD)**
   IUCD may be lost and this can be retrieved
   with a hysteroscope (Figure 37.1).

5. **Fallopian tube obstruction**
   When a fallopian tube is seen to be blocked via a
   hysterosalpingogram (HSG), a hysteroscopy can be
   performed and the fallopian tube can be cannulated (g)
   to open up the blocked tube. This may be performed with
   the assistance of laparoscopy (Figure 40.5,40.6 and 40.7)

6. **Uterine septum**
   Uterine septum may cause repeated miscarriage.
   A hysteroscopy can be performed to cut this
   uterine septum (Figure 40.3 and Figure 40.4))

Preoperative preparation

In some patients a preoperative injection of GnRH (gonadotrophin releasing hormone) analogue may be given for 1 - 3 months before the surgery. In patients whose cervical Os is believed to be narrow (tight) misoprostol tablets may be placed in the vagina a few hours before the surgery to soften the cervical Os so that it can be dilated easily.

How is Operative Hysteroscopy performed?

Operative hysteroscopy can be performed under spinal or general anaesthesia. The advantage of performing the procedure under spinal anaesthesia is that the patient is awake and complications such as fluid overload (eg cough) can be detected early. During the procedure, patient will be placed in a lithotomy position (legs up and apart) so that the surgeon can have access to the vagina. The perineum and vagina is cleaned with antiseptic solution and a drape is used to cover the legs and the abdomen, only exposing the perineum. The cervix is held with an instrument and the cervical Os will be dilated to permit the passage of an operative hysteroscope (the diameter of an operative hysteroscope is larger than that of a diagnostic hysteroscope). The surgeon than performs the surgery while looking at a video monitor. When the surgery is performed under spinal anaesthesia, the anaesthetist or a nurse will be constantly talking to the patient. At the end of the surgery, the legs will be brought down and the patient will be returned to the ward. If the surgery is performed under spinal anaethesia, she will experience a lack of sensation in the lower limbs for about 6 hours, after which that she may return home.

Advantages of Operative Hysteroscopy

There are only several conditions where surgery can be performed using a hysteroscope but if a surgery is performed in this manner, the patient has several benefits:

1. **There are no abdominal incisions**
   Both laparoscopic myomectomy and myomectomy by laparotomy will result in scar formation in the abdomen. No scars will be formed in the hysteroscopic resection of a fibroid.

2. **There are no incisions or scars in the uterus**
   In laparoscopic myomectomy and myomectomy by laparotomy, one or more incisions are made in the uterus to remove the fibroids. Such incisions will leave scars on the uterus. The presence of such scars may be a contraindication for normal vaginal delivery and the patient may have to undergo a caesarean delivery. When hysteroscopic resection of a fibroid is performed, there are no scars in the uterus and so when the patient conceives, she can undergo a normal vaginal delivery.

3. **Day surgery**
   This procedure can be performed as a day procedure. The patient will feel normal after the surgery. She can usually get back to work the next day.

Summary

Operative Hysteroscopy is performed under spinal/epidural or general anaesthesia.
It has many advantages over surgery performed by laparotomy or laparoscopy.

Chapter 39

Hysteroscopy for Abnormal Uterine Bleeding

Chapter 39 : Hysteroscopy for abnormal uterine bleeding

Abnormal uterine bleeding is a common gynaecological problem. The causes of abnormal uterine bleeding are numerous and a comprehensive discussion is beyond the scope of this chapter.

The common causes of uterine bleeding that can be diagnosed and treated by hysteroscopy are:

1) Endometrial polyps

2) Submucous fibroids

3) Endometrial hyperplasia

4) Endometrial cancer

5) Retained products of conceptus

6) Sacculation of a caesarean scar

1) Endometrial polyps

Endometrial polyps are common and may cause abnormal uterine bleeding. Diagnosis of these polyps can be done by transvaginal ultrasound, saline infusion sonography or hysteroscopy (see chapter 6). Polypectomy can be done either during Diagnostic Office Hysteroscopy or hysteroscopy under general anaesthesia (see chapter 37).

2) Submucous fibroids

Fibroids that protrude into the endometrial cavity are called submucous fibroids Submucous fibroids can be resected hysteroscopically (see chapter 41).
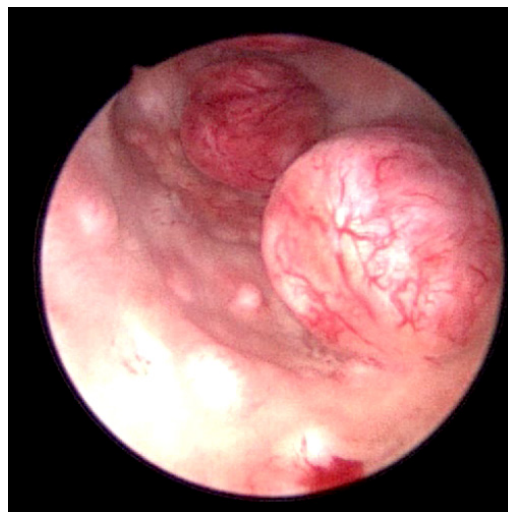
Figure 39.1 Multiple Submucous Fibroids

3) Endometrial Hyperplasia

There are many types of endometrial hyperplasia. Some endometrial hyperplasia can progress to endometrial cancer. When the endometrium is thick, especially in post menopausal women, this condition may be suspected. Sometimes, hyperplasia coexists with endometrial cancer. Making a diagnosis of endometrial hyperplasia by hysteroscopy can be difficult. This is because when distension fluid is used during hysteroscopy, the endometrium is compressed, making the hyperplastic tissues more difficult to visualize. Hyperplasia can be focal or global. Endometrial hyperplasia can be suspected when;

1. Focal or papillary mucosal projections with or without gland cysts are seen
2. Abnormal vascular network with atypical vessels are seen
3. Crowded or abnormally spaced gland openings are seen

Taking a biopsy of the abnormal areas and doing a curettage of the endometrium will confirm the diagnosis of endometrial hyperplasia.
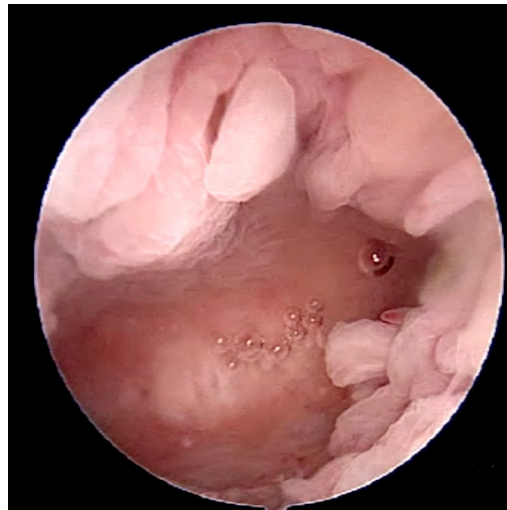
Figure 39.2 endometrial hyperplasia

4) Endometrial cancer

The diagnosis of endometrial cancer requires histology. During hysteroscopy, endometrial cancer can be suspected when:

1. Papillary, polypoidal, nodular or mixed endometrial growth is seen with friable tissue

2. There is a focal necrosis of tissues

3. Atypical vessels can be seen

Biopsies need to be taken with an office hysteroscope, the amount of tissue obtained using a fine 5 French biopsy grasper is small. Traditionally, curettage is done to obtain sufficient amount of tissue so as to be more accurate and to obtain a bigger and deeper amount of endometrial tissue.
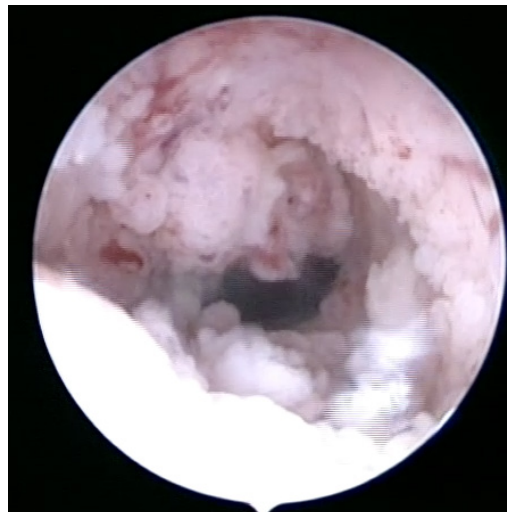
Figure 39.3 Cancer of the Endometrium

4) Retained Products of Conceptus

Retained products of conceptus must always be considered when irregular bleeding is seen in a woman of reproductive age. This usually occurs close to a time of a recent pregnancy but may occur months and even years later. Retained pieces of fetal bone may be seen on ultrasound as an intensely bright line within the endometrium. A hysteroscopy sometimes aided by a wire loop can dislodge these bony fragments.
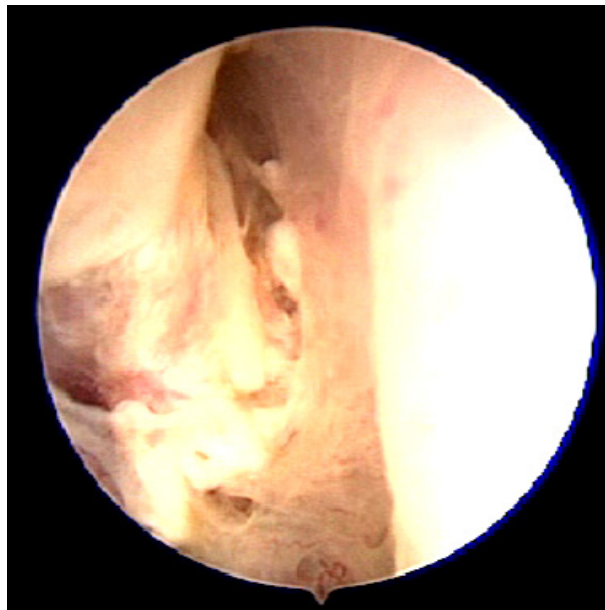
Figure 39.4 retained products of conceptus

5) Sacculations of a Caesarean section scar

Some women have irregular menses with vaginal spotting or discharge after menstruation. These women sometimes experience fluid collection at the area of the caesarean section scar. This sacculation (g) can be viewed on an ultrasonogram. Hysteroscopy can be performed to look at the caesarean section scar to see whether there is any defect or endometrial tissue adherent to the scar. This is usually a benign condition that may not require any treatment but if persistent, repair of the sacculation can be done by laparoscopy or laparotomy.

Figure 39.6 Hysteroscopy view showing sacculation

Figure 39.5 Ultrasound picture showing sacculation at the previous Caesarean section site

Summary

Abnormal uterine bleeding is a common gynaecological problem. Hysteroscopy assists in evaluating the uterine cavity for pathology. In some patients this pathology can be treated by hysteroscopy.

Chapter 40

Hysteroscopy for Infertility

Chapter 40 : Hysteroscopy for infertility

Hysteroscopy is a useful tool in the evaluation of the endometrial cavity in an infertile patient. Hysteroscopy may be performed as a routine for all infertility patients or when an abnormality is found during an ultrasound examination, hysterosalpingography (HSG) or saline infusion sonohysterogram,

The most common surgical procedures that are performed in infertile patients are:

1) Polypectomy

2) Myomectomy

3) Lysis of Adhesions

4) Septoplasty

5) Tubal disease

1) Polypectomy

The removal of an endometrial polyp (see Figures 6.1 and 6.2) is called polypectomy. Small polyps can be removed during an Office Hysteroscopy procedure without anaesthesia whereas larger polyps are removed during an Operative Hysteroscopy procedure under anaesthesia. (see Chapter 36 and 38). The base of the polyp can either be cut using a pair of scissors, diathermy needle or resectoscope. Pregnancy rates are generally believed to improve after the removal of these polyps. (see Chapter 6)

2) Myomectomy

This is discussed in chapter 41

3) Lysis of adhesions

Intrauterine adhesions may be a cause of infertility. Intrauterine adhesions (IUA) are also known as Asherman's syndrome. Intrauterine adhesions occur:

1) after dilatation and curettage for elective pregnancy termination, missed or incomplete abortions

2) after dilatation curettage is performed to remove a retained placenta, postpartum

3) when dilation and curettage is done in a non pregnant uterus

4) after hysteroscopic, open or laparoscopic myomectomy for submucosal fibroids

5) when there is endometrial infection due to tuberculosis or septic abortion

Diagnosis

Clinical :
Patients with intrauterine adhesions may
present with decreased menstrual flow.

Transvaginal ultrasound :
Ultrasound may show a thin endometrium or loculations
(cavities) of blood in the endometrial cavity (hematometra)

Hysterosalpingography (HSG) :
HSG may show a small endometrial cavity with filling
defects, which are irregular and splotchy.
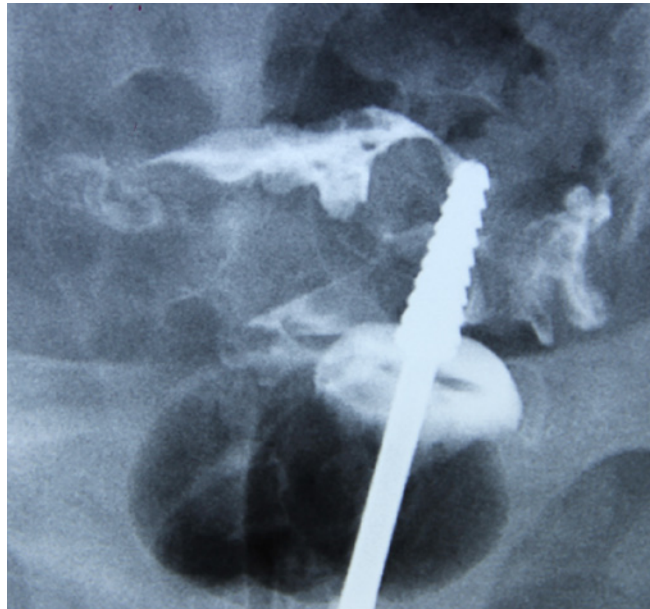
Figure 40.1 HSG showing intrauterine adhesions

Hysteroscopy :
A diagnostic hysteroscopy will be able to confirm
the diagnosis of Intrauterine Adhesion
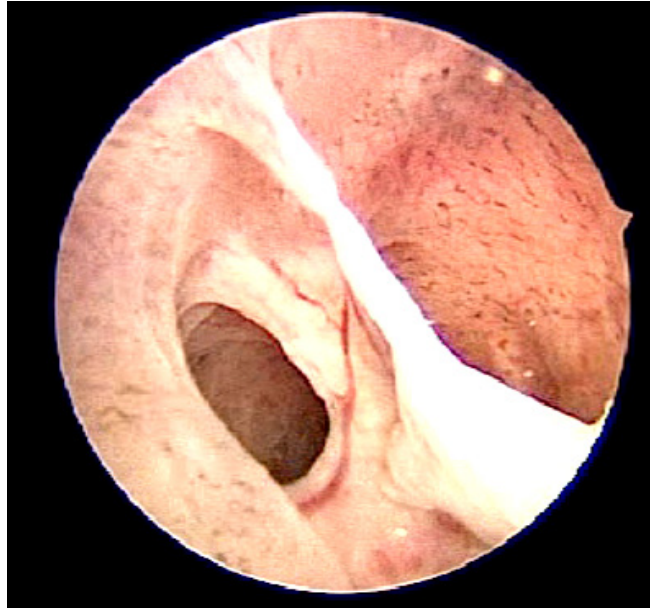
Figure 40.2 Intrauterine adhesions

Classification

Intrauterine adhesions can be classified into endometrial,
myometrial and connective –fiber synechae.

Treatment

Operative Hysteroscopy is the treatment of choice for Intrauterine
Adhesions. Mild adhesions can even be lysed during a Office
Hysteroscopy procedure. Severe adhesions can be the most
difficult and dangerous hysteroscopic procedure because of the
loss of anatomical landmarks, resulting in a high risk of uterine
perforation (see chapter 36). It is usually best done with the guide
of the laparoscope or transabdominal ultrasound to help maintain
orientation and limit perforation. Treatment can be done using
a pair of scissor, mono or bipolar electrodes or a resectoscope.
After recreation of the endometrial cavity, an intrauterine
contraceptive device (IUCD) or a balloon catheter can be placed
in the endometrial cavity to prevent a recurrence of adhesions.
Patients may be given oestrogen therapy for 2-3 months to assist
in the regeneration of the endometrial cavity. After the treatment,
the IUCD or Folley's urinary catheter is removed and a repeat
hysteroscopy is done to ensure that there are no more adhesions.

Case 40.2
Hysteroscopic lysis of intrauterine adhesions
leading to spontaneous pregnancy

MY a 35 year old lady with regular menses since menarche, miscarried her first pregnancy in June 2010 and underwent a curettage. She did not have any menses after the curettage. She saw a doctor who gave her hormones to induce her menses but she did not get any withdrawal bleeding. She consulted me in October 2010. Examination and ultrasound did not reveal any abnormality. She underwent a hysteroscopy. There was a thick intrauterine adhesions at the fundus of the uterus (Figure 40.2). Adhesiolysis was performed. An intrauterine contraceptive device (IUCD) was placed in the uterine cavity. She was given cyclical hormone replacement therapy for 3 months. She had regular normal menses while on the cyclical hormones. After 3 months of regular menses, the IUD was removed and she was encouraged to conceive. She continued to have regular menses. A few months later she conceived spontaneously and delivered a healthy baby boy.

Discussion

Adhesions in the uterine cavity after curettage for miscarriage is not uncommon and it is called Asherman's syndrome. It usually presents with the absence of menses after the procedure. The IUCD is placed in the uterine cavity so that the adhesions do not recur. Cyclical hormone replacement therapy medication is given to develop the endometrium so that the patient gets normal regular menses.

4) Septoplasty

Hysteroscopic resection has replaced the older metroplasty done by either laparotomy or laparoscopy. It may be performed under laparoscopic guidance or with transabdominal ultrasound guidance. The septum can be incised using a pair of scissors, diathermy needle, wire loop electrode or laser. The septum is incised from the apex while simultaneously working from side to side continuing cranially until the cavity is flushed across the fundus. If the septum extends to the cervix, this can also be cut although there is a small worry of cervical incompetence.
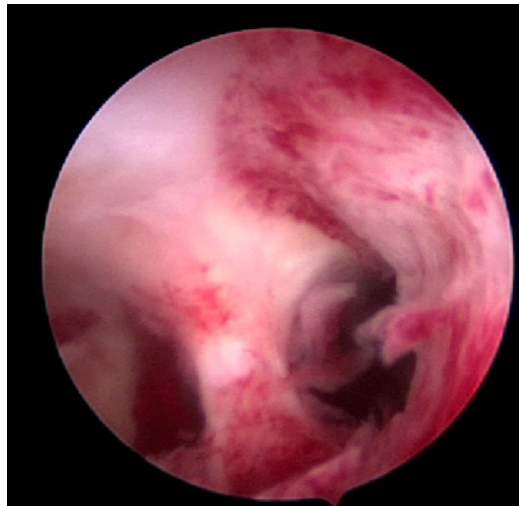
Figure 40.3 Uterine septum

Figure 40.4 Uterine cavity after excision of septum

Case 40.1
Hysteroscopic resection of uterine septum which resulted in a
spontaneous pregnancy in a woman with 2 previous miscarriages

Madam LHS, a 30 year old lady who had 2 previous miscarriages at about 12 weeks of pregnancy consulted me in January 2014. Ultrasound showed a septate uterus (see Figure 40.3). She underwent a laparoscopy and hysteroscopy. Incision of the septum was performed hysteroscopically (see Figure 40.4). Both the fallopian tubes were patent. Postoperatively she was well. She conceived spontaneously and delivered a healthy baby girl.

Discussion

Incision of a uterine septum is controversial. Some women with uterine septum can conceive and deliver a full term baby while others may experience miscarriages. Incision of the septum is advisable for women with large uterine septums whereas surgery is only contemplated for women with small septums if they have suffered previous miscarriages.

Scan Me

Video 40.1
Hysteroscopic resection
of uterine septum

http://vimeo.com/159033073

5) Tubal Block

Proximal Tubal Occlusion (PTO) is a condition whereby the tubes appear blocked at the beginning of the fallopian tube on hysterosalpingography (HSG) (Figure 8.2). Bilateral PTO may be due to a congenital abnormality. However unilateral PTO may be due to transient tubal spasm or plugging by mucus, debris or air bubbles.

Hysteroscopic tubal cannulation is successful in relieving PTO. During this procedure, a fine catheter is inserted via a hysteroscope to the tubal ostium and dye is injected to open up the tube. If this fails another smaller catheter called a guide wire is passed through the first catheter and advanced into the fallopian tube to open it up. This is usually done while simultaneously performing laparoscopy
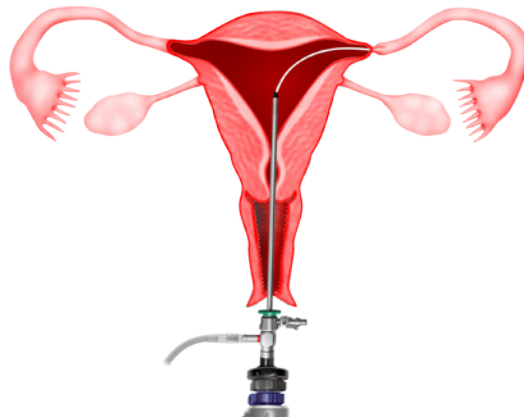
Figure 40.5 Hysteroscopic cannulation of the blocked fallopian tube
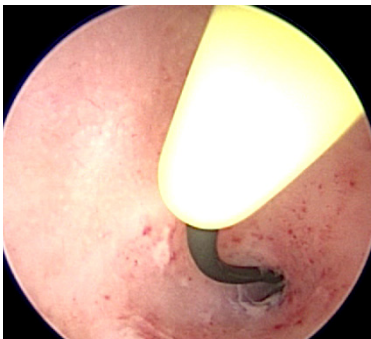
Figure 40.6 Hysteroscopic cannulation of the tubal ostium

Figure 40.7 Laparoscopic view showing cannulation of the fallopian tube

Scan Me

Video 29.3
Hysteroscopic Cannulation
for Proximal Tubal Block

https://vimeo.com/150044067

Summary

Hysteroscopy is a very useful tool in the evaluation of the endometrial cavity in an infertile patient. Hysteroscopy aids in the diagnosis and treatment of endometrial pathology or diseases

Chapter 41

Hysteroscopic Removal of Fibroid (Transcervical Resection of Fibroid (TCRF)

Chapter 41 : Hysteroscopic Removal of Fibroid (Transcervical Resection of Fibroid (TCRF))

Submucous fibroids are fibroids that protrude into the uterine cavity.

These fibroids are basically divided into 3 types :

Type 0   :   The fibroid is completely found in the uterine
               cavity with no extension into the myometrium

Type 1   :   Submucous fibroid with less than 50%
               found within the myometrium

Type 2   :   Submucous fibroid with more than 50%
               found within the myometrium

Figure. 41.1 Type 0

Figure. 41.2 Type 1

Figure. 41.3 Type 2

Symptoms

Even a small submucous fibroid can cause symptoms such as

1) heavy menses
2) prolonged menses and spotting
3) vaginal discharge
4) cramping during menses
5) bleeding after menstruation

Diagnosis

The diagnosis of a submucous fibroid can be made by:

1) Transvaginal ultrasound (Figure 41.4).

2) Saline Infusion Sonology (SIS) - Fluid is injected into the uterine cavity and an ultrasound is performed. The fluid in the uterine cavity will move around the fibroid and the attachment of the fibroid to the uterus will be easily seen (Figure 41.6).

3) Magnetic Resonance Imaging (MRI) - MRI can show a submucous fibroid well but this is an expensive diagnostic test

4) Office Hysteroscopy - An Office Hysteroscopy can be done to confirm the diagnosis of a submucous fibroid before surgery is contemplated (Figure 41.5).
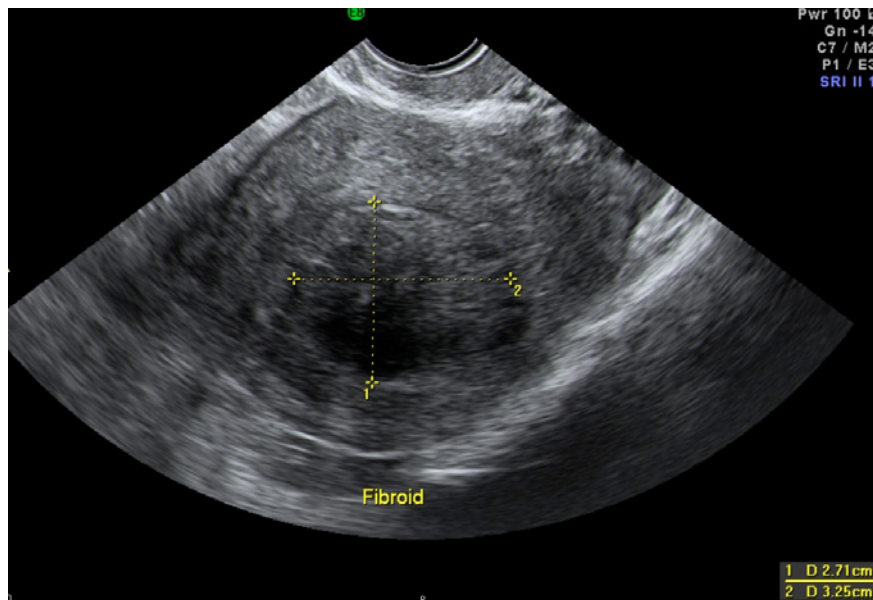
Figure 41.4. Transvaginal ultrasound showing submucous fibroid
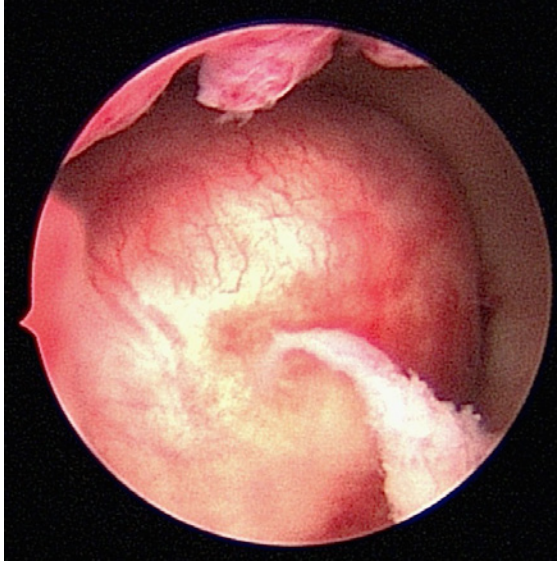
Figure 41.5. Hysteroscopy showing submucous fibroid
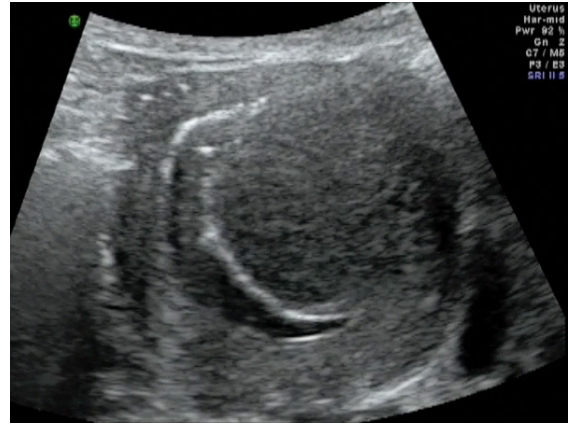
Figure 41.6 saline infusion sonography

Case 41.1
Spontaneous pregnancy after Transcervical
Resection of Fibroid for submucous fibroid

Madam CSB a 37 year old lady with 2 children was referred to me in August 2013 for a problem of inability to conceive for 2 years. Her last child was 5 years of age. She had had 1 episode of heavy menses and dysmenorrhea. Transvaginal ultrasound showed a submucous fibroid measuring 2.71 x 3.25 cm. An Office Hysteroscopy was performed and a large type 2 posterior submucous fibroid was seen (Figure 41.5). Her haemoglobin was only 5.8g%. She was admitted for blood transfusion and was given monthly gonadotrophin releasing hormone analogue (GnRH analogue). She received 3 doses on GnRH analogue. The fibroid reduced in size to 2.19 x 3.04 cm. She underwent a transcervical resection of the fibroid in October 2013. Postoperatively she was well. She spontaneously conceived in June 2014. At the time of writing she was 36 weeks pregnant. (see Video 41.1)

Preoperative Considerations

1) The size of the submucous fibroid is important in deciding the type of surgery. Patients with large submucous fibroids (> 3cm) may need to receive GnRH (g) analogue (gonadotrophin releasing hormone analogue) injections to shrink it.
   GnRH analogue may be given for 2 - 3 months. It is easier to perform hysteroscopic surgery on a smaller submucous fibroid.

2) The type of fibroid is also important. Generally, type 0 fibroids can be removed easily via hysteroscopy. Type 2 fibroids are more difficult and may require 2 surgeries to completely remove them.

Preoperative preparation

1) The surgery is usually done just after menses. Patients who have received GnRH analogue may not have their menses.

2) The patient will usually be admitted on the same day of the operation. A tablet called misoprostol may need to be either taken orally or placed in the vagina. This tablet is given to soften the cervix so that it will be easy to dilate the cervix during the surgery.

How is the surgery performed?

1) The surgery is usually done under spinal or epidural anaesthesia.

2) The perineum and vagina will be cleaned with antiseptic. Sterile drapes are placed and only the perineum is exposed.

3) The cervix will be dilated to allow passage of a larger diameter hysteroscope (resectoscope).

4) A camera is attached to a hysteroscope so the surgery can be visualised on the monitor.

5) Fluid is used to distend the uterine cavity so that the cavity can be visualised during the surgery.

6) A loop is used and electricity is used to cut the fibroid into small pieces until the base of the fibroid is reached. The small chips of fibroid are then removed through the vagina.

7) Any bleeding seen will be coagulated.

Scan Me

Video 41.1
Transcervical Resection of Fibroid

http://vimeo.com/

(a)

(b)

(c)

(d)
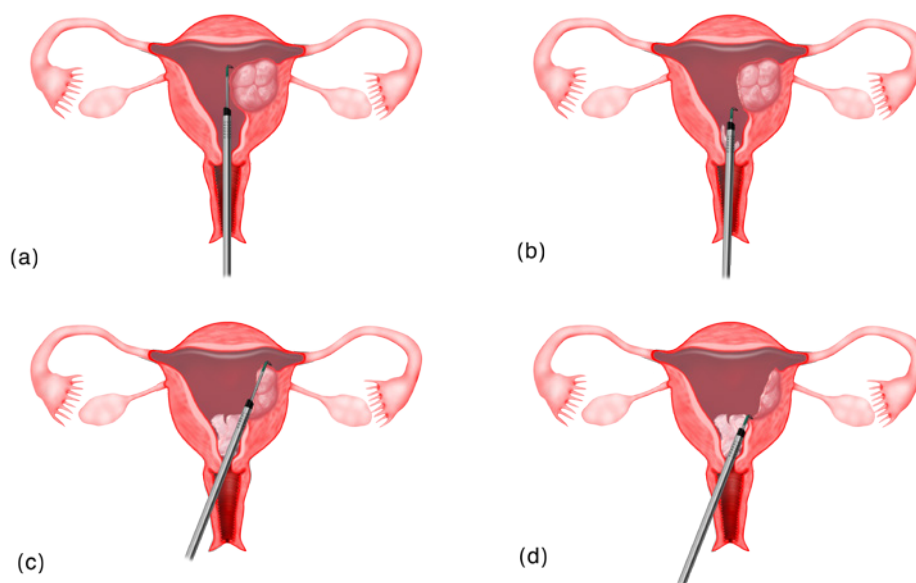
Figure 41.7. Series of drawings showing how Transcervical
Resection of Submucous Fibroids is performed

The advantages of performing Transcervical Resection of fibroid

1) There is no incision on the abdomen compared to myomectomy by laparoscopy or laparotomy.

2) The patient can conceive immediately after a TCRF as there is no incision in the uterus. After a myomectomy, there will be an incision in the uterus and pregnancy must be deferred for 6- 9 months.

3) Women who are pregnant after TCRF, can have normal vaginal delivery. Women who undergo myomectomy may need to deliver by Caesarean section.

4) Recovery is immediate after TCRF. Myomectomy recovery may take from 1 week (laparoscopic myomectomy) to 1 month (myomectomy by laparotomy)

Disadvantage of Transcervical Resection of Fibroid

1) Only submucous fibroids can be removed by the TCRF. In myomectomy by laparoscopy or laparotomy, all other fibroids such as intramural or subserous can be removed at the same time.

2) Sometimes, larger submucous fibroids can only be removed with more than one surgery.

Postoperative advice

1) The patient is usually returned to the ward after surgery.

2) If spinal or epidural anaesthesia is given, the patient will experience numbness and weakness of the lower limbs for about 6 hours

3) Some patients may be kept overnight while others may return home the same day.

4) Some women may experience cramping, similar to period pain, after the procedure. There may be shoulder pain, which is caused by the fluid that is used to inflate the uterus. This pain will subside in a few days.

5) There may be some bleeding after the procedure. Bleeding usually subsides in a few days, too.

6) Sexual intercourse must be avoided till bleeding and vaginal discharge stop.

7) Antibiotics may be given before and after the procedure.

8) Tampons should be avoided for at least a month after the hysteroscopy, to help reduce the risk of infection.

9) Severe lower abdominal pain, pain during urination, fever, vaginal discharge that is smelly or unpleasant and heavy bleeding are symptoms that will require the immediate attention of a doctor.

Summary

Transcervical Resection of Fibroid is a good operation for patients with submucous fibroids. There are many advantages of performing TCRF for women with submucous fibroids compared to myomectomy by laparoscopy or laparotomy. TCRF must be performed by a skilled/experienced gynaecologist.

Glossary

Term	Explanation
Abscess	A collection of pus that has built up within the tissue of the body
Acute	An acute disease is a disease with a rapid onset and/or a short course
Adhesion	Adhesion are scar tissues that form between tissues and organs, causing them to stick together
Adnexa	The organs attached to the uterus, namely the ovaries, the Fallopian tubes, and the ligaments that hold the uterus in place.
Alpha Feto Protein	A protein found in the blood that is produced by the yolk sac and the liver during foetal development. It is used as a marker for some types of ovarian cancer
Amenorrhoea	The absence of a menstrual period in a woman of reproductive age
Anaemia	A condition with a decrease in the amount of red blood cells or hemoglobin in the blood.
Anastomosis	An anastomosis is a surgical connection between two structures. Usually these structures are tubular such as blood vessels, tubes or intestines.
Androgen	A group of hormones that controls the male characteristics
Anterior	In front of
Anteverted	Anteverted uterus is a uterus that is inclined or tilted forward towards the urinary bladder
Anti Mullerian Hormone	Women are born with their lifetime supply of eggs, and these gradually decrease in both quality and quantity with age. Anti-Mullerian Hormone (AMH) is a hormone secreted by cells in developing egg sacs (follicles). The level of AMH in a woman's blood is generally a good indicator of her ovarian reserve.
Antimesenteric Border	The fallopian tube is attached to the uterus by a membrane called the broad ligament,That part of the tube that is opposite to the attachment of the broad ligament is called the anti mesenteric border.

Glossary

Term	Explanation
Arcuate	The cavity of a uterus is said to be arcuate when the fundus of the uterus is curved like a bow inwards.
Ascites	The build up of fluid in the space between the lining of the abdomen and the abdominal organs
Aseptic	A state of being free from disease-causing contaminants
Asymptomatic	There are no symptoms
Barbed Suture	A barbed suture is a type of surgical suture that has barbs on its surface. While suturing tissue, these barbs penetrate inside the tissue and lock them into place, eliminating the need for knots to tie the suture.
Bilateral	Both sides
Biopsy	A sample of tissue taken from the body in order to examine it more closely
Broad Ligament	The broad ligament of the uterus is the wide fold of peritoneum that connects the sides of the uterus to the walls and floor of the pelvis.
CA125	Cancer antigen 125 is a test that may be used to look for early signs of ovarian cancer
Cannulated	To insert a canulla (a small tube) into tubular organ, duct or vessel, as for the drainage of fluid or the administration of medication
Catheterization	In urinary catheterization a tube known as a urinary catheter is inserted into a patient's bladder via the urethra. Catheterization allows the patient's urine to drain freely from the bladder for collection.
Chemotherapy	Chemotherapy is a type of cancer treatment that uses drugs to destroy cancer cells
Chronic Obstructive Pulmonary Disease	This is a lung disease that makes it hard to breathe. It is caused by damage to the lungs over many years, usually from smoking
Clomiphene Citrate	It is a medication used to bring out the eggs (induce ovulation)

Glossary

Term	Explanation
Coagulation	The use of heat produced by electric current to bring about localised destruction of tissues so that bleeding can be stopped
Colposcopy	Is a procedure whereby a doctor uses a microscope to examine the cervix to look for abnormalities
Colpotomy	Any surgical incision into the wall of the vagina.
Completed The Family	Do not have any desire to have any more children
Cone Biopsy	This is an extensive form of cervical biopsy. A cone shaped wedge of tissue is removed from the cervix and examined under a microscope.
Contrast	A medical contrast medium is a substance that is used to look at structures or fluids within the body during an Xray, CT scan or MRI. It is commonly used to enhance the visibility of blood vessels and the intestinal tract
CT Scan	Computerized tomography scan uses X-rays and a computer to create detailed images of the inside of the body
Culture	The cultivation of bacteria in an artificial medium containing nutrients
Curettage	Is a procedure where a curette is used to remove tissue by scraping or scooping
Cyst	A sac or cavity which is not normal containing fluid.
Cystectomy	An operation to remove a cyst usually in the ovary
Cystoscopy	It is a procedure used to see the inside of the urinary bladder and urethra
Depoprovera	Depot medroxyprogesterone acetate (DMPA) is a long-acting reversible hormonal contraceptive birth control drug that is injected every three months.
Devascularization	The interruption of blood supply to a part of the body by the blocking or destroying blood vessels
Diaphragm	The sheet of muscles that separates the thoracic cavity from the abdominal cavity

Glossary

Term	Explanation
Dilatation And Curettage (D&C)	This is a procedure to remove tissue from the lining of the uterus (endometrium)
Dysmenorrhoea	The medical name for painful periods
Dyspareunia	The medical term for pain during sex/intercourse
Dyspepsia	Deranged or impaired digestion also called indigestion
Enema	A procedure in which liquid is injected into the rectum to expel its contents
Endometriotic Implants	Fragments of endometriotic mucosa implanted on pelvic structures
Endometrium	It is the inner lining of the uterus
Enucleation	Surgical removal of a mass without cutting into or dissecting it
Follicles	These are spherical structures in the ovaries that contain an egg
Friable	Easily tear, fragment or bleed
Frozen Section	A specimen of tissue that has been quick-frozen, cut and stained immediately for rapid diagnosis of possible malignant lesions. This is performed at the time of surgery for immediate diagnosis
Fundus	This is the top part of the uterus
Gangrene/Gangrenous	Gangrene is s term used to describe the decay or death of an organ or tissue caused by a lack of blood supply
Gestational Weeks Size	Pelvic organs are usually measured according to the size of pregnancy. A uterus is 12 gestational weeks size if it measures like a 3 months pregnancy uterus. Similarly, a 20 gestational weeks size uterus is about 5 months of pregnancy and a 28 gestational weeks size uterus is about 7 months pregnancy.
Gonadotrophin Releasing Hormone Agonist/Analogue	A gonadotropin-releasing hormone agonist (GnRH agonist, GnRH–A) is a synthetic protein modeled after the hypothalamic neurohormone GnRH.

Glossary

Term	Explanation
Gynaecological Cancers	Gynaecological cancers are cancers of the female reproductive system. This includes cancer of the uterus, ovaries, fallopian tubes cervix, vagina and vulva.
Haemotosalpinx	A fallopian tube which is dilated with blood
Histopathology	It is the microscopic examination of tissue in order to study a disease
Histopathology	The study of diseases involving the tissue cells
Hormone Replacement Therapy (HRT)	It is the treatment used to relieve the symptoms of menopause. It replaces female hormones that are at a lower level when a woman approaches menopause
Human Chorionic Gonadotrophin	Human chorionic gonadotropin (better known as HCG) is produced by the placenta during pregnancy.
Hydrosalpinx	Hydrosalpinx is a fallopian tube dilated with fluid
Hyperplasia	Increased cell production. This may be a sign of abnormal or precancerous changes
Hysterectomy	An operation to remove the uterus
Hysterectomy And Bilateral Salpingoophrectomy	An operation to remove the uterus, both fallopian tubes and both ovaries
Hysterosalpingogram	Hysterosalpingography (HSG) is a X-ray procedure to investigate the shape of the uterine cavity and the shape and patency of the fallopian tubes
Hysteroscopy	It is procedure whereby a doctor looks at the inside of the uterus
Inflammation	It is part of the complex biological response of body tissues to harmful stimuli, such as pathogens, damaged cells or irritants
Infundibulopelvic Ligamant	This is a fold of peritoneum that extends out from the ovary to the wall of the pelvis and it contains the ovarian vessels and ovarian plexus of nerves.

Glossary

Term	Explanation
Intracytoplasmic Sperm Injection	Intracytoplasmic sperm injection (ICSI), is an in vitro fertilization procedure in which a single sperm is injected directly into an egg.
Intrauterine Insemination	Intrauterine insemination (IUI) is a fertility treatment that involves placing sperm inside a woman's uterus to facilitate fertilisation. The goal of IUI is to increase the number of sperm that reach the fallopian tubes and subsequently increase the chance of fertilisation.
Invitrofertilization	In vitro fertilization (IVF) is a process by which an egg is fertilised by sperm outside the body
Lateral	The outer side of a body part
Leiomyosarcoma	A malignant (cancerous) smooth muscle tumor.
Lesions	A region in an organ or tissue that has suffered damage through injury or disease
Lobulated	Lumpy
Lumen	The inside space of a tubular structure, such as fallopian tube.
Magnetic Resonance Imaging	This is a medical test that uses a powerful magnetic field, radio frequency pulses and a computer to produce detailed pictures of organs, soft tissues, bone and virtually all other internal body structures.
Medial	The inner side of a body part
Meig's Syndrome	This is a condition in a woman with a benign ovarian tumor associated with ascites (fluid in the abdominal cavity) and pleural effusion (fluid in the lungs) that resolves after removal of the tumor.
Menarche	This is the first menstrual bleeding in a girl
Menopause	A natural decline in reproductive hormones when a woman reaches her 40s or 50s.
Mesosalpinx	The mesosalpinx is the portion of the broad ligament that stretches from the ovary to the level of the uterine tube

Glossary

Term	Explanation
Metastasis	Metastasis of a cancer is when the cancer has spread from its original position to another part not related to it
Metroplasty	Metroplasty is plastic surgery or reconstructive surgery on the uterus.
Morcellator	An instrument that is used to cut hard tissues like fibroids into cylindrical shapes and removed through the trocar
MRI Scan	MRI scanning uses magnetism, radio waves, and a computer to produce images of body structures
Mutation	A mutation occurs when the DNA of a gene is damaged or changed in such a way as to alter the genetic message carried by that gene.
Myomectomy	An operation to remove fibroids
Necrosis	Death of body tissues
Nulliparous/ Nulliparity	Never having borne a child.
Omentectomy	Surgery to remove part or all of the omentum, The omentum is a large apron of fatty tissue containing veins, arteries, lymphatics and attaches to and nourishes the stomach and the entire colon
Oocytes	An oocyte is an immature egg cell in the ovary.
Oopherectomy	An operation to remove one or both of ovaries.
Ovarian Reserve	Ovarian reserve is a term that is used to determine the capacity of the ovary to provide egg cells that are capable of fertilization resulting in a healthy and successful pregnancy
Parametrium	These are fibrous tissues that extends from the cervix to the pelvic bone
Parous	Having given birth one or more times.
Patent	A tubular organ is patent when it is not blocked

Glossary

Term	Explanation
Perimenopause	Perimenopause means "around menopause" and refers to the time period during which a woman's body makes its natural transition toward permanent infertility (menopause). Perimenopause is also called the menopausal transition.
Peritoneal Washout	This is a procedure done to wash the peritoneal cavity and the fluid is taken to look for cancer cells
Peritoneum	The thin membrane lining the walls of the abdominal and pelvic cavities and the organs of the abdomen and pelvis
PET Scan	A positron emission tomography (PET) scan is a type of imaging test. It uses a radioactive substance called a tracer to look for disease in the body. A PET scan shows how organs and tissues are working.
Polycystic Ovarian Syndrome (PCOS)	This is a condition found in women in the reproductive age group with irregular or infrequent menstruation, obesity, pimples (acne) and excessive hair growth
Port	The small incision with a trocar placed in the abdomen for the purpose of passing instruments into the abdomen when performing laparoscopic surgery
Posterior	To the back of
Pouch Of Douglas	This space between the rectum and the posterior wall of the uterus.
Premature Ovarian Failure	Premature ovarian failure is when a woman's ovaries stop working before she is 40year of age
Proctosigmoidoscopy	This is an internal examination of the lower large bowel (colon), using an instrument called a sigmoidoscope.
Product Of Conceptus	Placental and/or foetal parts that remain in the uterus
Progestin	Progestins are synthetic or man made progesterone
Pyosalpinx	A fallopian tube which is dilated with pus
Radiotherapy	This is the treatment for cancer using high energy radiation, usually X-rays

Glossary

Term	Explanation
Rectovaginal Septum	The membranous partition between the rectum and vagina
Rectus Sheath	A strong fibrous sleeve that is found below the skin of the abdomen
Resolving	A disease is resolving when it is improving or getting better
Retroverted	A retroverted uterus means the uterus is tipped backwards so that it aims towards the rectum
Sacculation	The formation of a sac or pouch
Sacral Promontory	The most prominent anterior projection of the base of the sacrum
Sacrocolpopexy	Sacrocolpopexy (sacral colpopexy) is a surgical technique for repairing pelvic organ prolapse
Salpingectomy	An operation to remove the fallopian tube
Salpingoophrerectomy	An operation to remove the fallopian tube and the ovary
Salpingostomy	An operation in which an incision is made in the fallopian tube. The incision is not sutured and left open.
Salpingotomy	An operation in which an incision is made in the fallopian tube. The incision is then sutured
Seminal Analysis	A semen analysis measures the amount of semen a man produces and determines the number and quality of sperm in the semen sample.
Septum	A uterine septum is a piece of tissue that divides the uterine cavity
Serosa	Serosa or serous membrane is a thin membrane that cover the walls of the internal organs and the thorax, abdomen and pelvic cavities.
Spasm	A spasm is a sudden, involuntary contraction of a muscle, a group of muscles, or a hollow organ
Stroma	These are tissues that provide support for an organ in the body

Glossary

Term	Explanation
Total Laparoscopic Hysterectomy	Removal of the uterus with the assistance of a laparoscope
Transabdominal Ultrasound	This is an ultrasound performed with gel placed on the abdomen and pelvis and a transducer placed to view the internal organs.
Transvaginal Ultrasound	This is an ultrasound performed with a transducer placed in the vagina to visualise the pelvic organs
Trocar	A trocar is a medical device that is placed through the abdomen during laparoscopic surgery. The trocar functions as a portal for the subsequent placement of other instruments, such as graspers, scissors, staplers, etc.
Tubal Chromotubation	This is a technique performed during laparoscopy whereby some dye (usually blue in colour) is injected into the uterus via the cervix to see the patency of the fallopian tubes. If the tubes are patent, the dye will be seen flowing out of the fimbrial end.
Tubal Ostium	This is the tubal opening seen in the uterine cavity during hysteroscopy
Tumour Marker	Tumor markers (also known as biomarkers) are substances found at higher than normal levels in the blood, urine, or body tissue of some people with cancer
Ultrasound	
Ultrasonography	Ultrasound is a type of imaging. It uses high-frequency sound waves to look at organs and structures inside the body.
Umbilicus	Navel or belly button
Urethra	The passageway between the bladder and the external part of the body, which allows urine to be excreted from the body
Uterine Artery Embolization	Uterine artery embolization (UAE) is a procedure where an interventional radiologist uses a catheter to deliver small particles that block the blood supply to the uterine body.

Glossary

Term	Explanation
Uterosacral Ligamants	The ligaments that travel from the uterus to the anterior aspect of the sacrum
Virgo Intacta	A woman who has never had sexual intercourse and her hymen remains unbroken
Withdrawal Bleeding	Pervaginal bleeding that occurs after taking a course of progestogens or oral contraceptive pills

Abbrevations

Abbrevations	What it stands for
AFP	Alpha feto protein
AMH	Anti mullerian hormone
CA125	Cancer antigen 125
CBD	Continuous bladder drainage
CT scan	Computerized tomography scan
FSH	Follicular stimulating hormone
GnRH	Gonadotrophin releasing hormone
HCG	Human chorionic gonadotrophin
ICSI	Intracytoplasmic sperm injection
IUI	Intrauterine insemination
IVF	Invitro fertilization
LH	Luteinizing hormone
MRI	Magnetic resonance imaging
PET scan	Positron emission tomography
PID	Pelvic inflammatory disease
POD	Pouch of Douglas
POF	Premature ovarian failure
UAE	Uterine artery embolization

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