87 Gynaecology

ABNORMAL UTERINE BLEEDING IN THE NON-PREGNANT STAT

ABNORMAL UTERINE BLEEDING IN THE NON-PREGNANT STATE

Bleeding in the non-pregnant state may occur at the time of an expected menstrual period, between periods (intermen strual bleeding; IMB), after intercourse (postcoital bleeding; PCB) or following the menopause (postmenopausal bleeding; PMB). Menopause is diagnosed in women who have not had a menstrual period after 12 months without the use of hormonal contraception. Vaginal bleeding ma y also occur after surgical instrumentation of the uterus and/or cervix, including insertion of an IUCD. The principal causes of uterine and vaginal bleeding in the non-pregnant state can be divided into structural and non-structural causes (Table 87.5) and their relationship to menses or coitus (Table 87.6). The mainstay of management is to identify and treat the associated pathology . Investigations include a pregnancy test and ultrasound assessment of the pelvic anatomy (two dimensional/three-dimensional ultrasound scan or saline the uterine sonogram) as well as an endometrial biopsy of cavity , performed either under direct vision at hysteroscopy or ® biopsy . Hysteroscopy combined with blindly with a Pipelle endometrial biopsy improves the sensitivity and specificity for detection of endometrial pathology compared with either performed alone (Figure 87.18). The indications for undertaking an endometrial biopsy are shown in Summary box 87.2 . A colonoscopy may also be indicated to exclude colorectal pathology as a potential cause for the bleeding. - Women taking tamoxifen, a selective oestrogen receptor modulator used in the treatment of breast cancer, represent a special group as the drug can induce uterine abnormalities in endometrial 10–40% of women, such as the development of polyps, hyperplasia, cancer and, rarely , uterine sarcomas, which are much more aggressive. Tamoxifen treatment results in a doubling of the risk of endometrial cancer after 1–2 years and has a quadrupling e ff ect after 5 years. The relationship is time dependent but dose independent. The risk does not decrease on cessation of treatment. There is no consensus regarding the need for screening and which method to use; the alternative, more common approach is to investigate only those women who develop abnormal uterine bleeding with tamoxi - - fen use. Aromatase inhibitors such as anastrozole, letrozole and exemestane are also used in the treatment of breast cancer, but their e ff ects are not mediated via the oestrogen receptor ted with less endometrial pathology so they have been associa than tamoxifen. They may also reverse abnormalities induced by tamoxifen use.

Figure 87.16 Ultrasound features of adenomyosis. Anechogenic myometrial tissue with acoustic shadowing posterior to it (arrow). Figure 87.17 Ultrasound features of adenomyosis. Fan-shaped

shadowing (arrow).

/uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Summary box 87.2 Indications for an endometrial biopsy /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Erik Adolf von Willebrand , 1870–1949, physician, Helsinki, Finland. Henry T Lynch , 1928–2019, Professor of Preventative Medicine, Creighton University , Omaha, NE, USA, discovered familial susceptibility to certain kinds of cancer. Women known to have Lynch syndrome (hereditary non - polyposis colorectal cancer) and those considered at risk of inheriting a mismatch repair gene abnormality are another special group, as their lifetime risk of developing endometrial cancer is as high as 60%. Unlike sporadic cases of endometrial cancer, which are usually diagnosed during the sixth and se venth decades, the mean age at diagnosis in Lynch syndrome is the fifth decade. However, it appears that the 5-year survival rate in patients with Lynch syndrome-associated endometrial cancer is similar to that in women with sporadic disease. International guidelines suggest that these women should be screened annually from the age of 35 years with transvaginal ultrasound to measure the endometrial thickness and an endometrial biopsy . Abnormal bleeding can also be caused by invasive carci - noma of the cervix, the incidence of which has been reduced by screening programmes that aim to detect the precancerous state, cervical intraepithelial neoplasia (CIN), using cervical cytology . The sample is checked for high-risk serotypes of human papilloma virus (HPV) (16, 18, 31 and 33) tha t can cause changes to the cervical cells. If these types of HPV are not identified on the sample, then no further action is required. If, however, these high-risk HPV serotypes are identified, the sample is checked for cervical cell changes, with the aim of treating these before they get a chance to turn into cervical cancer. In the UK, this is carried out every 3 years in women aged 25–49 years, and every 5 years in women aged 50–64 years. In women aged 65 years or older, a cervical screen will be conducted if one of the last three tests was abnormal or no test had been performed since the age of 50 years. Abnormalities in cervical cytology are followed up by microscopic examina - tion of the cervix (colposcopy). CIN may be treated with local ablation (cryocautery , cold coagulation, electrocoagulation or laser) or excision (large loop e x cision of the transformation zone [LLETZ]).

uterine and vaginal bleeding. Structural Endometrial or endocervical polyp Fibroids (leiomyoma) Endometrial hyperplasia Malignancy of the

genital tract Non

Endometriosis structural Adenomyosis Coagulopathy, e.g. thrombocytopenia, von Willebrand’s disease Ovulatory dysfunction, e.g. polycystic ovary syndrome Endometrial, e.g. endometritis Iatrogenic, e.g. exogenous sex steroid administration, IUCD, hormonal contraceptive use Other, e.g. arteriovenous malformations, chronic renal/hepatic disease IUCD, intrauterine contraceptive device. TABLE 87.6 Uterine and vaginal bleeding in the non- pregnant state in relation to menstrual bleeding. a Menstrual Endometrial polyp/malignancy Fibroids a Intermenstrual Vaginal trauma/malignancy Cervical polyp/malignancy a Endometrial polyp/malignancy a Postcoital Vaginal malignancy Cervical ectropion/polyp/malignancy a These cancers occur principally in postmenopausal women. Endometrial biopsy should be considered in the following cases: Women with suspected endometrial pathology All women >45 years old in whom medical treatment has been unsuccessful Women with persistent intermenstrual bleeding Endometrial thickness >4 /uni00A0 mm in postmenopausal women or persistently thickened or abnormal appearance of the endometrium in premenopausal women and endometrial thickness >7 /uni00A0 mm in women with known polycystic ovarian syndrome Irregular or unscheduled bleeding while on hormone replacement therapy after the initial 3 months Younger women with major risk factors for endometrial hyperplasia/cancer: Polycystic ovarian syndrome Obesity Treatment with tamoxifen Irregular bleeding while on unopposed oestrogen Irregular bleeding in high-risk populations, such as family history of endometrial/colon cancer, especially hereditary non- polyposis colorectal cancer Figure 87.18 Hysteroscopic biopsy of endometrial cancer (cystic endometrium is visible at hysteroscopy).

/uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Cervical cancer is one of the leading causes of mortality in the world. To improve the uptake of the cervical screening programme, testing for HPV in the comfort of a woman’s own home is being investigated. Current vaccination programmes against HPV serotypes are aimed at reducing the incidence of cervical carcinoma. In the UK, the vaccination is currently o ff ered to girls and boys aged 12–13 years with a repeat dose o ff er ed 6–24 months later, prior to becoming sexually active. The vaccine helps protect against mouth, throat, anal and genital cancers as well cervical cancer. Menstrual bleeding may be excessively heavy , irregular or frequent in the absence of pathology; this is known as dys - functional uterine bleeding. NICE guidance in the UK has suggested a three-step hierarchal tr eatment approach to the management of heavy menstrual bleeding (Table 87.7).

Investigations TVUS has high sensitivity and speci /f_i city; MRI may be indicated if the women declines Radiological imaging a TVUS or the /f_i ndings are unclear. Identi /f_i cation of potential pathology such as polyps, /f_i broids Hysteroscopy and histology Direct visualisation of pathology with guided samples taken for histopathology Management Medical management Tranexamic acid, NSAIDs (off-label use) Oestrogen suppression with hormonal treatments (i.e. levonorgestrel IUS [after 1 year of use, there is a 71–95% reduction in menstrual blood loss with approximately 50% of women becoming amenorrhoeic], combined oral contraceptive pill [off-label use], progestogens, i.e. desogestrel [off-label use], GnRH agonists with or without add-back hormone replacement therapy) GnRH agonists aim to shrink /f_i broids by inducing a hypo-oestrogenic state. This class of

drug, however, is limited by its association with a loss in bone mineral density; in addition, /f_i broids tend to regrow to their original size when treatment is discontinued Ulipristal acetate (Esmya in whom surgical procedures (including uterine /f_i broid embolisation) are not appropriate or have not worked. This drug should be used with caution as it has been associated with severe liver injury and liver function should be monitored during its use Radiological interventions/minimally invasive HIFU or MRgFUS: adverse effects include abdominal pain, skin burns and leg pain treatment options secondary to thermal injury of the sciatic nerve, intestinal perforation and temporary acute renal failure UAE involves blocking the blood supply to the /f_i broids using a technique in which particles are embolised into each uterine artery via an angiographic catheter (87.19). This technique has shown more value in the presence of a single large /f_i broid than in a multi /f_i broid uterus. Postembolisation syndrome is reported, which consists of pelvic pain as a result of uterine ischaemia, nausea, fever secondary to necrosis and haematoma formation at the femoral artery puncture site. In addition, complications such as those associated with radiation exposure, haemorrhage, unplanned surgery, infection, thrombosis and an age-related impairment of ovarian reserve have also been reported Surgical management (uterus preserving) Hysteroscopic polypectomy (risks include uterine perforation; damage to surrounding organs) Transcervical resection of /f_i broids (complications include hyponatraemic /f_l uid overload and thermal injury to surrounding structures) Myomectomy (open or laparoscopic [bleeding and damage to surrounding structures, with the risk of conversion to a hysterectomy <1% secondary to excessive bleeding. Morcellation is described in further detail in Uterine /f_i broids (leiomyoma) Surgical management (non-uterine Endometrial ablation/resection (risks include thermal injury to surrounding organs and preserving) /f_l uid overload; not recommended in women wishing to retain their fertility). The aim of ablative methods is to reduce the menstrual bleeding by ablating the endometrium down to the basalis layer using electrical, thermal or laser energy. More than 90% of women report a reduction in menstrual blood loss without the need for further treatment at 2 years of follow-up, with 25–35% experiencing amenorrhoea. The criteria for endometrial ablation are described in Hysterectomy: a total hysterectomy is preferred over a subtotal procedure as persistence of symptoms is reported within the cervical stump (risks include damage to surrounding organs and /f_i stula formation) GnRH, gonadotropin-releasing hormone; HIFU, high-intensity focused ultrasound; IUS, intrauterine system; MRgFUS, magnetic resonance- guided focused ultrasound; MRI, magnetic resonance imaging; NSAID, non-steroidal anti-in /f_l ammatory drug; SPRM, selective progesterone receptor modulator; TVUS, transvaginal ultrasound scan; UAE, uterine artery embolisation. ®), an SPRM, is only licensed for use in premenopausal women Figure Figure 87.20]). Surgical complications include Table 87.8

/uni25CF /uni25CF /uni25CF /uni25CF /uni25CF The management plans are individualised for the patient, taking into account concomitant symptoms and fertility requirements. A hysterectomy can be carried out by three di ff erent routes: vaginally , abdominally or laparoscopically . The route of entry is dependent on a number of factors, including: uterine size; presence of other patholog y; mobility and descent of the uterus; history of previous surgery; and skill of the operating surgeon. No di ff erence in prolapse symptoms, sexual satisfac tion or pelvic pain has been reported between a total or sub total (conservation of the cervix) hysterectomy . Furthermore, it is now recommended that the fallopian tubes are removed in conjunction with the uterine body , whether the ovaries are conserved or not. The fallopian tubes have no contin ued func tionality following a hysterectomy but can be a potential source of malignancy if retained. Conservation or removal of the s age, presence of coexist ovaries is dependent on the woman’ ing pathology and/or risk

factors for malignancy .

Figure 87.19 Pre-embolisation angiogram showing catheterisation of the left uterine artery and blood supply to a large fundal /f_i broid (courtesy of Dr Mark Bratby, Consultant Vascular and Interventional Radiologist, John Radcliffe Hospital, Oxford, UK). TABLE 87.8 Criteria for endometrial ablation. Uterus <10 /uni00A0 cm in length Absence of major intrauterine pathology that would distort the uterine cavity No history of previous endometrial ablation procedures No evidence of endometritis Family is complete Figure 87.20 Laparoscopic view of a uterine fundal /f_i broid. Pedunculated Intramural submucosal Fallopian tube Uterine cavity Pedunculated Subserosal subserosal Uterus Submucosal Cervix Vagina Figure 87.21 Uterine /f_i broids.

ACUTE ABDOMEN

ACUTE ABDOMEN

Abdominal pain is one of the most challenging presenting complaints in the emergency department. Common causes include: /uni25CF adnexal torsion; /uni25CF ovarian cyst accident, e.g. rupture; /uni25CF PID; /uni25CF endometriosis; /uni25CF appendicitis; /uni25CF bowel obstruction.

ANATOMY

ANATOMY

The reproductive structures of the dividing embryo di ff eren tiate after the seventh week of development. The gonads and internal and external genitalia constitute the sex organs. In the female, the Müllerian ducts develop into the uterus, fallopian tubes, cervix and upper third of the vagina. The urogenital sin us in turn forms the lower two-thirds of the vagina. The female external genitalia are described as the vulva, which is bordered by the mons pubis anteriorly and the labio crural folds posterolaterally . The opposing skin that covers the introitus is known as the labia majora. The labia minora are folds of skin that fuse anterior ly around the clitoris, which con tains erectile tissue similar to the penis in the male. The pos terior part of the introitus is referred to as the fourchette and this stretches considerably during childbirth to allow delivery of the baby . The vagina is an elastic, distensible tube, approximately 6–7 /uni00A0 cm long, passing upwards and backwards from the introi tus. The cervix protrudes into the v ault of the vagina, divid ing it into the anterior, posterior and lateral fornices. Pelvic structures can be felt in the posterior and lateral fornices on bimanual examination, as the v aginal vault sits just below the pouch of Douglas (the area at the bottom of the pelvic cavity bordered by the uterus anteriorly and rectum posteriorly). The urethra and bladder neck sit above the anterior wall of the vagina; the perineal body and rectum behind the posterior wall (Figure 87.1). The uterus consists of a body and a cervix (neck of the uterus) and is an upside-down pear-shaped structure that is flattened anteroposteriorly , giving its cavity a flat, triangular shape. The uterus is supported partly by ligaments attached to Johannes Peter Müller , 1801–1858, Professor of Anatomy and Physiology , Berlin, Germany , described the paramesonephric duct in 1825. James Douglas , 1675–1742, anatomist, midwife and physician to Queen Caroline, London, UK, helped expose the fraudulent claims of Mary Toft, who, in 1726, famously tricked a number of doctors into believing that she had given birth to rabbits. Gabriele Falloppio (Fallopius) , 1523–1563, Professor of Anatomy , Surgery and Botany , Padua, Italy . He carried out what may have been the first clinical trial in over 1000 men of the use of condoms to prevent transmission of syphilis. - - - - - - the cervix (transverse cervical, pubocervical and uterosacral) that consist of condensed connective tissue. The cervix is a canal, approximately 2–3 /uni00A0 cm long in the non-pregnant woman, connecting the external os, which can be seen on speculum examination, to the internal os, where the cervix enters the uterine cavity . The uterine cavity to cervical length ratio varies through hormonal influences and developmental phases, with the uterine body increasing in size as puberty progresses. The cervical canal is located within the centre of the bony cavity of the pelvis, with the uterus pivoted around this point. It is more commonly angled forwards (anteverted) relative to the vagina. It is usually freely mobile, with filling of the bladder

Causes of abnormal uterine bleeding in the non-pregnant • state Surgical management of endometriosis, adenomyosis, • uterine /f_i broids, uterovaginal prolapse and ovarian tumours Pouch of Ovary Cervix Douglas Rectum Uterus Bladder Urethra Introitus Anus Figure 87.1 Female anatomy.

or changes in position rotating it backwards. In others, it can be retroverted, a variation of normal, or secondary to weak ligaments or because it becomes adherent as the result of a disease process such as endometriosis. The uterus may also be angled forwards (anteflexed) relative to the cervix or backwards (retroflexed), which can be determined through bimanual examination. The uterine walls are 1–2 /uni00A0 cm thick and composed of smooth muscular tissue (myometrium). The uterine cavity is lined with endometrium, a tissue that undergoes cyclical changes in response to ovarian hormones. T he endometrium has both a basal and functional layer. The basal layer lies adja cent to the myometrium and from it develops the functional layer. The basal layer is not shed during menstruation, unlike the functional layer. The functional layer is influenced by oes trogen and progesterone, which thicken it, preparing the lining for implantation. This layer is completely shed during men struation should conception not occur. In the lean pa tient, the uterine size can be estimated on palpation. This is usually a subjective assessment outside of imaging modalities. The most common cause of an enlarged uterus, apart from pregnancy , is fibroids (benign tumours of the myometrium) growing inside or outside of the uterus. In the presence of fibroids or other conditions causing enlarge ment of the uterus, the uterine size is often described in terms of the number of weeks' gestation it approximates to, were the woman pregnant. At the uterine fundus, on either side, are the corn ua, which connect the uterus to the fallopian tubes. These are thin, muscular tubes, approximately 10 /uni00A0 cm long. They are divided into four parts: intram ural, isthmus, ampulla and the fimbriated opening, which picks up the oocyte following its release at the time of ovulation. The tubes are v ery narrow in the isthmic and intramural parts but widen at the ampullary region. Each tube is contained within the upper part of the broad ligament, a fold of peritoneum on either side of the uterus, which also contains blood vessels as well as the round and ovarian ligaments. The fimbriated opening and part of the ampulla, however, are free and closely associated with the ovary on either side. The ovaries are flattened, ovoid structures, approximately 3–4 /uni00A0 cm - in dimension, suspended from the back of the broad ligament on either side of the pelvic side wall by the ovarian ligament, which originates from the uterine body . The ovarian blood - vessels are contained within the infundibulopelvic ligaments, which are continuations of the broad ligament to the pelvic - brim on either side. A sound understanding of pelvic anatomy is key to surgical excellence and safety (Figure 87.2). The sacral promontory is considered a crucial landmark and the summit of the pelvis. While pelvic pathology may reac h into the abdominal cavity , the origin is alwa ys below the sacral promontory . The sacrum is a bony prominence that is - used as a point of reference in surgery and in surgical anatomy . The sacral promontory is the level at which the common iliac vessels bifurcate into the external and internal iliac vessels, and the level at which the ureter transverses from the lateral to medial side. Another key structure at this level is the superior hypogastric nerve plexus (autonomic nerve plexus), which is

Space of Retzius Median Bladder paravesical space Vesicovaginal space Uterine artery Vagina pararectal Rectovaginal septum/space Medial pararectal space/ Bladder Okabayashi space Retrorectal space Sacrum Figure 87.2 Surgical anatomy of the pelvis, including the key surgical spaces, vessels and nerves in relation to the pelvic organs (illustrative representation of anatomical spaces by PR Supramaniam). External iliac vein External iliac artery Lateral paravesical space Iliolumbar Obturator trunk nerve Psoas muscle Lateral space/ Obturator Latzko fossa space Ureter Genitofemoral nerve

nerves. The aorta bifurcates at the level of the L4 vertebral body , where it forms the right and left common iliac vessels. The common iliac vessel then further bifurcates as described above at the

level of the sacral promontor y . The external iliac artery mainly supplies the lower limbs and has one anterior branch known as the inferior epigastric artery . Note should be made of the position of this artery when determining placement of lateral ports during laparoscopy , to avoid vascular injury . The internal iliac artery divides further into the anterior and posterior divisions. The anterior division is the main blood supply to the vital organs of the pelvis. The posterior division mainly supplies the gluteal region. The anterior division travels parallel to the ureter and gives o ff its first branch, the uterine artery , followed by the superior vesical artery , and continues as the obliterated umbilical artery . There is often a 5- to 6-cm distance from the origin of the anterior division prior to the first branch. This is often the level at which surgeons perform internal iliac artery ligation to manage cases of massive haemorrhage during obstetric surgery and prophylactically in pelvic exenteration surgery . The pelvic structures are supplied by the autonomic ner vous system. The inferior hypogastric nerve (T10–L2) provides sympathetic fibres and the pelvic splanchnic nerve provides parasympathetic fibres. These fibres merge to supply both the ureter and urinary bladder and can often be injured in com ple x pelvic surgery , leading to complications of residual blad der dysfunction and sexual dysfunction. Pelvic spaces have recently featured in surgical anatomy as a key learning point to aid surgeons in performing safe surgery . The retroperitoneal spaces are divided into those that are pres ent bilaterally (pararectal and paravesical spaces) and those that are present in the midline (space of Retzius, rectovaginal space and the retrorectal space). The pararectal space is bound medially by the r ectum and laterally by the internal iliac artery . The posterior leaf of the broad ligament forms the roof and the levator ani muscle forms the floor. Cranially , the space is bordered by the uterine artery . The pararectal space is further divided into medial and lateral spaces by the ureter, with the medial pararectal space also known as the Okabayashi space and the lateral pararectal space called the Latzko space. The paravesical space is a retroperitoneal space that is lat eral to the urinary bladder. Medially it is bound by the uri nary bladder, laterally by the pelvic walls and inferiorly by the uterine artery . The paravesical space is further divided into medial and lateral spaces by the obliterated hypog astric artery . The floor of the medial paravesical space is formed by the levator ani muscle. The obturator and pelvic lymph nodes are contained in the lateral paravesical space, important during a radical hysterectomy , and the limit of dissection is bounded by the posterior limit of the obturator nerve. The space of Retzius is the midline retroperitoneal space between the bladder and the anterior abdominal wall. It is Anders Retzius , 1796–1860, Swedish anatomist. Hidekazu Okabayashi , 1884–1953, Japanese gynaecologist, demonstrated the first nerve-sparing radical hysterectomy in Kyoto Imperial University Hospital, Kyoto, Japan, 1921. Wilhelm Latzko , 1863–1945, Austrian gynaecologist, described a technique for vaginal closure of vesicovaginal fistula following a hysterectomy , 1914. Heinrich Wilhelm Gottfried Waldeyer-Hartz , 1836–1921, Professor of Pathological Anatomy , Berlin, Germany . the obliterated hypogastric artery . This space is often used in urogynaecological procedures as the b ladder neck is exposed, aiding surgery performed f or incontinence. It is also used in deep endometriosis surgery during management of bladder nodules to aid in tension-free closure of the cystotomy . The rectovaginal space refers to the posterior retroperito - neal space that is formed by the uterus anteriorly and the rec - tum posteriorly . The lateral borders of this space are provided by the uterosacral ligament. This space is often explored to aid in radical hysterectomy and deep endometriosis surgery . The retrorectal space is a r etroperitoneal space that is bound by the rectum anteriorly . It is often explored in com - plex pelvic surgery and deep endometriosis surger y associated with excision of the rectum. The presacral vein that lies poste - rior to Waldeyer’s fascia is often an area of concern because, if not carefully dissected, it can lead to severe uncontrollable haemorrhage.

Adenomyosis

Adenomyosis

Adenomyosis is a benign uterine disorder characterised by the presence of ectopic endometrium or endometrium-like struc - tures within the myometrium accompanied by smooth muscle hypertrophy or hyperplasia. The ectopic endometrium can be present either di ff usely or focally within the myometrium. The complexity of the condition is contrib uted to by its variable presentation and di ffi culty in making an accurate diagnosis, and, subsequently , its management. The true prevalence of the condition is unknown because of variable diagnostic criteria, and ranges from 1% to 70%. Table 87.4 outlines the presenting characteristics, recommended investigations and management options. /uni25CF Joseph (Gustav) Asherman , 1889–1968, Czech–Israeli gynaecologist. This syndrome was first described by Heinrich Fritsch in 1894, Asherman further characterised it in 1948.

Presenting characteristics Non-speci /f_i c Symptoms Dysmenorrhoea Abnormal uterine bleeding Chronic pelvic pain Subfertility Presentation in the fourth and /f_i fth decades of life Asymptomatic Dyspareunia Uterine enlargement Signs Uterine tenderness Abnormalities identi /f_i ed at hysteroscopy (irregular endometrium with endometrial defects, cystic haemorrhagic lesions, altered vascularisation) Increased/longer oestrogen exposure (early menarche [≤ 10 years of age], short menstrual cycles [≤ 24 days in Risk factors length], elevated body mass index, oral contraceptive use, increasing age, tamoxifen use) Spontaneous miscarriage and multiple pregnancies Increasing parity Uterine instrumentation/incision (caesarean sections, surgical termination of pregnancy, SMM, endometrial curettage) Endometrial hyperplasia Leiomyomas that breach the endometrial–myometrial interface Endometriosis Smoking Diagnosis The Morphological Uterus Sonographic Assessment (MUSA) group recommends commenting on eight Ultrasound morphological features in its classi /f_i cation of adenomyosis (presence, location, differentiation, cystic or non- cystic, myometrial layer, the extent of disease, size of the lesion and vascularity). Typical features include an enlarged globular uterus with asymmetrical thickening of the myometrium, myometrial cysts, echogenic subendometrial lesions, hyperechogenic islands, fan-shaped shadowing, an irregular junctional zone and vascularity on colour Doppler (Figures Three or more sonographic criteria are usually required to make a diagnosis of adenomyosis Can help differentiate an adenomyoma from /f_i broids Magnetic resonance imaging Historically obtained at the time of hysterectomy; considered the gold standard Histology Limited in those wishing to preserve their fertility Management Analgesia (i.e. NSAIDs) Medical management Hormonal preparations (i.e. levonorgestrel IUS [off-label use]; combined oral contraceptive pill; progestogens, i.e. dienogest; GnRH agonists and antagonists; danazol; aromatase inhibitors, i.e. letrozole; selective progesterone receptor modulators) HIFU or MRgFUS: adverse effects include abdominal pain, skin burns and leg pain secondary to thermal injury Radiological of the sciatic nerve,

intestinal perforation and temporary acute renal failure interventions/ UAE: postembolisation syndrome is reported, which consists of pelvic pain, nausea, fever secondary to minimally invasive necrosis and haematoma formation at the femoral artery puncture site. In addition, complications such as those treatment options associated with radiation exposure, haemorrhage, unplanned surgery, infections and an age-related impairment of ovarian reserve have also been reported Different techniques: Surgical management Non-excisional surgical techniques (thermal coagulation of diseased myometrium) (uterus preserving) Partial reduction surgeries (i.e. for diffuse adenomyosis including wedge resections, wedge-shaped uterine wall (adenomyomectomy) removal, modi /f_i ed reductive surgery and transverse H incisions) Complete adenomyotic excision (i.e. for focal adenomyosis including the double- or triple- /f_l ap method and asymmetric dissection method) Hysterectomy: a total hysterectomy is preferred over a subtotal procedure as recurrence of the disease has Surgical management been reported within the cervical stump and rectovaginal septum (non-uterine Endometrial ablation/resection preserving) Uterine rupture (6% [>1% following an adenomyomectomy versus 0.26% following a myomectomy]), silent Postoperative uterine rupture complications Higher incidence of placenta accreta, increta and percreta compared with caesarean sections and myomectomies Asherman’s syndrome Disease recurrence GnRH, gonadotropin-releasing hormone; HIFU, high-intensity focused ultrasound; IUS, intrauterine system; MRgFUS, magnetic resonance- guided focused ultrasound; NSAID, non-steroidal anti-in /f_l ammatory drug; SMM, surgical management of miscarriage; UAE, uterine artery embolisation. 87.14–87.17)

Figure 87.14 Ultrasound features of adenomyosis. Asymmetry between the anterior and posterior uterine wall and hyperechoic islands (arrow). Figure 87.15 Ultrasound features of adenomyosis. Myometrial cysts (arrows).

Adnexal torsion

Adnexal torsion

An adnexal torsion is commonly the result of an ovary , and occasionally a fallopian tube, twisting along its pedicle and interrupting its arterial supply , leading to ischaemia. Rapid identification and intervention are necessary to preserve ovarian function. Table 87.3 lists the presenting character - istics, recommended investigations and management options of an ovarian torsion. /uni25CF /uni25CF /uni25CF /uni25CF - /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF - /uni25CF e best /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF

TABLE 87.3 Presenting characteristics, recommended investigations and management options of an ovarian torsion. Characteristics Symptoms and Abdominal pain (sudden onset) signs Nausea/vomiting Diarrhoea Abdominal/pelvic tenderness Palpable adnexal mass Signs of peritonism Non-speci /f_i c and,

therefore, a high clinical suspicion is necessary Risk factors Enlarged ovary, e.g. cyst Para-ovarian cyst Hydrosalpinx Previous torsion Investigations Ultrasound Unilateral ovarian enlargement and ovarian tissue oedema, with less de /f_i ned borders. Comparison with the contralateral ovary will show a distinct difference Peripheral displacement of follicles; follicular ring sign Central placement of the ovarian/adnexal mass in the suprapubic region The affected ovary may appear as a solid mass

with hypo- and hyperechoic areas, in keeping with haemorrhage and necrosis The pedicle that is twisted may be seen as a ‘whirlpool’ that is visible both in grey

scale and on colour Doppler Abnormal Doppler signals, e.g. coiling of the ovarian vessels (early/subacute), complete absence of perfusion (late) Free /f_l uid in the pelvis Bloods Raised in /f_l ammatory markers (can also be normal) Management Laparoscopy Detorsion (Figure 87.10) Ovarian cystectomy to be performed at the same time or at a later date once the ovary is reperfused and the degree of oedema has diminished to reduce the likelihood of an oophorectomy

Figure 87.10 Laparoscopic image of ovarian torsion.

CHRONIC ABDOMINAL PAIN Endometriosis

CHRONIC ABDOMINAL PAIN Endometriosis

Endometriosis is a common inflammatory condition and is diagnosed by the presence of endometrium-like tissue in extrauterine sites. The most commonly a ff ected sites are the pelvic organs and peritoneum, although distant sites such as the lungs are occasionally a ff ected (resulting in symptoms such as recurrent haemoptysis at the time of menstruation or recurrent pneumothoraces) (Figure 87.11). The exact pathognomonic mechanism remains elusive, but it is widely believed that most endometriotic lesions develop from retrograde menstruation. It is estimated to a ff ect 5–10% of women, mainly of reproductive age, with the incidence reported to be higher in certain subgroups, e.g. women with a history of infertility . Endometriosis may be associated with a number of symptoms, but the predictive value of any one symptom or set of symptoms remains uncertain as each can have other causes (e.g. irritable bowel syndrome or interstitial cystitis), with a significant proportion of a ff ected women remaining asymptomatic. The most common symptom is pain. Other symptoms include: cyclical and non-cyclical pain; dysmenorrhoea (pain related to menstruation); deep dyspareunia (pain during intercourse); dyschezia (pain on opening the bowels); and dysuria. Many women also su ff er from fatigue, haematuria, chronic pelvic pain, infertility and rectal bleeding (haematochezia). The extent of the disease varies from a few small peritoneal lesions on otherwise normal pelvic organs to deep endometri - osis and large ovarian endometriotic cysts (endometriomas). tion of endometriomas has been synonymous The identifica with deep disease. There can be extensive fibrosis in structures), and adhesion such as the uterosacral ligaments (Figure 87.12 formation causing marked distortion of the pelvic anatomy (Figure 87.13). Disease severity can be assessed by describing the operative findings, or quantitatively using various classifica - tion systems, but there is little correlation between such systems and the type or severity of symptoms experienced. Endometriosis typically appears as superficial ‘powder burn’ or ‘gunshot’ lesions on the ovaries, serosal surfaces and luish puckered lesions, peritoneum – black, dark brown or b nodules or small cysts containing old haemorrhage surrounded b y a variable extent of fibrosis. Atypical or ‘subtle’ lesions are also common, including red implants (petechial, vesicular, polypoid, haemorrhagic, red flame-like) and serous or clear vesicles. Other appearances include white plaques or scarring and yellow-brown discoloration of the peritoneum. Ovarian

Figure 87.11 Endometriosis seen on the peritoneal surface of the diaphragm. Figure 87.12 Endometriosis seen on the uterosacral ligament. Figure 87.13 Bilateral ovarian endometriosis with pelvic adhesions.

been reported in 17–44% of women with endometriosis. They are distinguishable from simple haemorrhagic ovarian cysts because typically they are densely adherent to the peritoneum of the

ovarian fossa, fallopian tube and posterolateral aspect of the uterus. The surrounding fibrosis may also involve the bowel. Deep endometriosis represents another disease type. This is defined by the presence of endometrium-like tissue 5 /uni00A0 mm beneath the peritoneum, with growth seen in the utero sacral ligaments, vagina, bowel, bladder or ureters; when such lesions grow into the vagina they may be visible on speculum e xamination as ‘blue-domed’ cystic lesions in the posterior for nix. Lesions infiltrating the bowel may mimic cancer in their presentation. The gold standard for making a diagnosis of endometriosis is through laparoscopy with histological confirmation; non-invasive diagnostic tools, such as ultrasound scanning (transvaginal and transrectal), can r eliably detect only severe forms of the disease, i.e. endometriomas or deep endometriosis of the pelvis. MRI can detect haemosiderin deposits in abdominal organs to suggest deep endometriosis. A sigmoidoscopy may also provide additional information on the level of disease involvement in cases of deep endometriosis involving the bowel. The distance between the inferior border of a bowel lesion and anal verge can impact on the proposed surgical intervention and degree of associated risks. Excision of low rectal lesions (5–8 /uni00A0 cm from the anal verge) has been associated with a higher risk of anastomotic leaks and transient neurogenic bladder dysfunction. Finding pelvic tenderness, a fixed retroverted uterus, ten der uterosacral ligaments or enlarged ovaries on examination is suggestive of endometriosis. The diagnosis is more certain if deeply infiltrating nodules are found on the uterosacral lig aments or in the pouch of Doug las and/or visible lesions are seen in the vagina or on the cervix. A digital rectal examination should also be conducted to assess for disease involving the rectosigmoid ar ea, as well as lateral and dorsal extension of the disease suggesting involvement of the hypogastric vessels and/ or nerves. The findings may , however, be normal. The treatment options are limited because the cause is uncertain. These include: conservative management; medical management (simple analgesia or hormonal drugs to suppress ovarian function [progestogens, the levonorgestr intrauterine system, gonadotropin-releasing hormone agonists in conjunction with add-back hormone replacement therapy]); and surgical management (ablation or excision of endometriotic lesions). Women may require multiple admissions for surgery and/or prolonged treatment with costly drugs that can have problematic side e ff ects. Surgical planning needs to be aware of the proximity of the disease to the ureter and the risk of ureteric stricture leading to hydronephrosis and renal dysfunction. The surgical risks include those for any laparoscopic procedure, including damage to the bowel, bladder and ureters (2 in 1000 women); the risks are increased if deep endometriosis is present secondary to anatomical displacement of structures such as the ureter, as well as in repeat surgical cases where repeated Thomas Hodgkin , 1798–1866, curator of the museum and demonstrator of morbid anatomy , Guy’s Hospital, London, UK. repeated bowel shavings can reduce the integrity of the bowel wall increasing the risk of fistula formation. Bow el resection or injury increases the risk of faecal peritonitis. Bowel integrity can be assessed by stretching the bowel over a rectal manipulator to identify thinned areas, filling the pelvis with fluid and then pushing air into the rectal lumen whilst looking for bubbles or injecting methylene blue in the rectum and looking for leaks. - Consideration should be given to ureteral stent insertion in cases of bladder endometriosis close to the trigonum which can usually be removed after approximately 6 /uni00A0 weeks. A catheter - will be needed for 8–10 days postoperatively , followed by a cystogram checking for suture integrity prior to removal. Rarely , infection in an endometrioma will result in the formation of a tubo-ovarian abscess. For a woman who has completed her family , hysterec - tomy plus bilateral salpingo-oophorectomy with total excision of endometriotic disease o ff ers a good chance of cure. Sur - gical treatment, however, in a woman who wishes to retain her fertility needs to be as conserva tive as possible, ensuring that ovarian function is preserved. The aim is to remove the

endometriotic tissue while restoring the pelvic anatom y . The preferential method to retain ovarian function is ovarian drain - age with directed spot ablation (electrocoagulation, thermal coagulation, laser or plasma energy) over cystectomy . Coun - selling needs to include the increased risk of recurrence with cyst drainage versus a cystectomy , as w ell as consideration for preoperative oocyte cryopreservation, especially in the pres - ence of bilateral ovarian disease. Furthermore, bowel shaving - versus bowel resection is associated with the risk of incomplete disease resection. Several classification and staging systems hav e been pro - - posed for the diagnosis, management and prognosis of endo - metriosis. Currently , there is a need for an internationally accepted system. The endometriosis fertility index has demon - strated good predictive value in the determination of fecundity after endometriosis surgery . Endometriosis is also associated with an increased risk of o varian cancer (endometrioid and clear-cell types) and non-Hodgkin’s lymphoma, adding to the burden of the disease. el

EARL Y PREGNANCY COMPLICATIONS

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Ectopic pregnancy

Ectopic pregnancy

An ectopic pregnancy refers to a pregnancy that grows outside of the uterine cavity , most commonly within the fallopian tube. - To facilitate management of an ectopic pregnancy it is import - - ant to be able to describe the location of the pregnancy as accurately as possible. The newly agreed terminology broadly divides ectopic pregnancies into uterine (defined by evidence of trophoblast invasion be yond the endometrial–myometrial - junction, but not outside the uterine visceral/broad ligament peritoneum) and extrauterine ectopic pregnancies (Table 87.1). They are further described as being complete (solely confined to the myometrium) or partial (involving both the myometrium and the uterine cavity). Additional variations include rudimentary horn pregnan - cies. These are rare, with a reported incidence of 1 in 75 /uni00A0 000– 150 /uni00A0 000 pregnancies. They are able to develop into the second trimester if not diagnosed early through the identification of a single interstitial portion of the fallopian tube attached to the main unicornuate uterine body , with products of concep - - tion completely surrounded by myometrium, presenting with - severe pain and uterine rupture. A residual ectopic pregnancy refers to an ectopic preg - nancy that remains visible on ultrasound scan 3 months after a negative urinar y pregnancy test and serum beta-human chori - onic gonadotropin (β HCG) level of <20 /uni00A0 IU/L. As the ectopic pregnancy grows , the placental tissue can infiltrate the blood vessels surrounding the fallopian tube, leading to bleeding within the tube and into the peritoneal cavity . Further growth of the ectopic pregnancy can rupture the fallopian tube, causing significant intraperitoneal blood /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF loss. This constitutes a gynaecological emergency . An ectopic pregnancy occurs in 11 per 1000 pregnancies, and there is a maternal mortality rate of 0.2 per 1000 estimated ectopic pregnancies. The major risk factors for an ectopic pregnancy are shown in Summary box 87.1 . Summary box 87.1 Risk factors for an ectopic pregnancy /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF An ectopic pregnancy may be suspected on clinical grounds, but making the diagnosis can be di ffi cult (Table 87.2). /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Christian Johann Doppler , 1803–1853, Professor of Experimental Physics, Vienna, Austria, enunciated the ‘Doppler principle’ in 1842.

pregnancies. Uterine ectopic pregnancies Extrauterine ectopic pregnancies Cervical (the

gestational Tubal (Figure 87.4) (further sac is present below the divided into interstitial level of the internal os with [Figure 87.5], isthmic and absence of the ‘sliding sign’ ampullary) and evidence of blood /f_l ow Ovarian (colour Doppler around the gestational sac can help identify an area using colour Doppler) of increased vascularity within the ovary that Caesarean scar (the is representative of gestational sac is located peritrophoblastic blood /f_l ow low in the uterus, close separate from that of the to the

internal os with corpus luteum) (Figure 87.6 trophoblast invading into the anterior myometrium) Abdominal (commonly the (Figure 87.3) broad ligament, pouch of Douglas, uterovesical pouch Intramural (located above and surfaces of the tubes the level of the internal os) and uterus) Previous pelvic in /f_l ammatory disease (PID) Smoking History of infertility Use of an intrauterine contraceptive device (IUCD) Previous ectopic pregnancy Previous abdominal/pelvic surgery, e.g. myomectomy, hysteroscopic

resection Previous tubal surgery, e.g. sterilisation, salpingostomy, tuboplasty Endometriosis TABLE 87.2 Symptoms and signs of an ectopic pregnancy. Symptoms Signs Abdominal or pelvic pain Pelvic, abdominal and/ Amenorrhoea or missed or adnexal tenderness or fullness period Signs of peritonism Vaginal bleeding Pallor Breast tenderness Gastrointestinal symptoms Abdominal distension Dizziness, fainting, syncope Cervical motion tenderness Shoulder tip pain (pain on moving the cervix) Rectal

pressure or pain on Enlarged uterus defecation Tachycardia, hypotension Asymptomatic Shock, collapse Orthostatic hypotension) Figure 87.3 Ultrasound image of a caesarean scar ectopic pregnancy. Figure 87.4 Ultrasound image of a tubal ectopic pregnancy. (a) (b) Figure 87.5 (a, b) Ultrasound images of an interstitial ectopic preg

nancy.

The presentation of an ectopic pregnancy is variable and the di ff erential diagnoses include: /uni25CF miscarriage; /uni25CF urinary tract infection; /uni25CF ovarian cyst accident; /uni25CF appendicitis. A transvaginal ultrasound scan should be performed if the diagnosis is suspected (see Table 87.1 for the defining ultra sound characteristics of uterine and extrauterine ectopic preg nancies). The complete absence of an intrauterine gestational sac with a positive pregnancy test increases the probability of an ectopic pregnancy unless the pregnancy is not su ffi ciently advanced for the sac to be seen on ultrasound scan. An ectopic pregnancy is mor e likely if free fluid is seen in the pouch of Douglas or an adnexal mass is identified on ultrasound scan. In equivocal cases, serial measurements of serum levels, 48 hours apart, can help to establish the diagnosis. A rise in the β HCG level by at least 63% is mor e indicative of a viable intrauterine pregnancy and an ultrasound scan should be o ff ered between 7 and 14 days. Levels that halve when taken 48 hours apart are more suggestive of a failing pregnancy and a urinary pregnancy

test should be repeated after 14 /uni00A0 days. Levels that remain static or show a suboptimal increase or decrease over a 48-hour period are more likely to be repre sentative of an ectopic pregnancy . Furthermore, a single level above approximately 1500 /uni00A0 IU/L, in association with an empty uterus on ultrasound scan, in the absence of a heavy bleed, is suggestive of an ectopic pregnancy . Laparoscopy can also be used as a diagnostic tool (Figure 87.7); occasionally , however, a false-negative diagnosis is obtained when the pregnancy is not su ffi ciently advanced and is, therefore, too small to be seen within the fallopian tube. Management of an ectopic pregnancy can be divided into expectant, medical (methotrexate) or surgical treatment. The choice of treatment is dependent on: the haemodynamic stabil ity of the patient; ultrasound features of the ectopic pregnancy (presence of free fluid, presence or absence of fetal cardiac activity); serum β HCG level; and the patient's understanding of the diagnosis, commitment to follow-up and choice. Expectant management and medical management in the form of methotrexate can be o ff ered to women who are clin ically stable and pain fr ee, who have a serum β HCG level <1500 /uni00A0 IU/L for expectant management and between 1500 and <5000 /uni00A0 IU/L for medical management, who are committed to the follow-up protocol and where the ectopic pregnancy is not alive and measures <35 /uni00A0 mm. In these circumstances, repeat - serum β HCG levels are recommended on days 4 and 7. A - fall of ≥ 15% is considered reassuring and should be repeated weekly thereafter until <20 /uni00A0 IU/L. If the levels deviate from this, then the patient should be reviewed further to plan ongoing management. Women should be advised of the risk of rupture and the need for additional/alternative treatment if the situation should change. Methotrexate is a folic acid antagonist that interferes with β HCG DNA synthesis. Significant side e ff ects include hepatotoxicity . Further pregnancies should be avoided for a minimum of 3 /uni00A0 months following treatment with methotrexate. Careful patient selection is vital. Furthermore, some patients fail to respond to this medication and will require surgical management. Surgical management should be o ff ered to women who prefer to have surgery or those who are unable to commit to - follow-up as well as those with significant pain, those who have a rising serum β HCG lev el of ≥ 5000 /uni00A0 IU/L and/or those in whom the ectopic pregnancy is considered to be live and mea - sures ≥ 35 /uni00A0 mm. Surgical options include a salpingectomy (removal of the fallopian tube) or salpingostomy (opening of the fallopian tube and extraction of the pregnancy tissue) (Figure 87.8). This is ideally performed laparoscopically in a stable patient as it - -

Figure 87.6 Ultrasound image of an ovarian ectopic pregnancy. Figure 87.7 Laparoscopic image of a tubal ectopic pregnancy. Figure 87.8 Laparoscopic salpingostomy.

is associated with shorter operative times, less intraoperative blood loss, shorter hospital stays and similar subsequent intra uterine pregnancy rates. A laparotomy may be required if the woman is haemodynamically unstable. A salpingectomy is the preferred technique in the presence of a contralateral healthy fallopian tube. A salpingostomy is associated with an 8% risk of persistent tr ophoblastic tissue, intra-abdominal bleeding and an increased risk of a repeat ectopic pregnancy . These patients are subsequently followed up with serial serum β HCG levels until a negative result is obtained to exclude the presence of residual trophoblastic tissue. If a further ectopic pregnancy occurs within the same fallopian tube, then a salpingectomy is recommended regardless of the condition of the contralateral fallopian tube. The management of non-tubal ectopic pregnancies (e.g. interstitial ectopic pregnancies [Figure 87.9], caesarean sec tion scar ectopic pregnancies) can be complex and associated with more significant complications, such as bleeding, leading to an increased risk of a hysterectomy . These cases ar managed in tertiary centres. The management

plan will be guided by the haemodynamic stability of the patient and the location of the ectopic pregnancy , including the expertise of the clinician managing the case. These patients should be counselled regarding their increased risk of further ectopic pregnancies in subsequent conceptions. In view of this, they are encouraged to present as early as possible in any subsequent pregnancy to establish its location. Anti-D immunog lobin should be administered to non-sensitised rhesus (Rh)-negative women.

Figure 87.9 Laparoscopy of an interstitial ectopic pregnancy.

FURTHER READING

FURTHER READING

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Introduction

Introduction

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Learning objectives

Learning objectives

To understand: Pelvic anatomy • Early pregnancy complications (ectopic pregnancy) • Common causes of an acute abdomen and chronic • abdominal pain

Mesh

Mesh

In the UK, mesh-related surgery is considered to be a high-vigilance operation, whereby use of synthetic mesh to treat SUI or urogynaecological prolapse has been restricted nationally secondary to a number of safety concerns that have been raised: /uni25CF pain or sensory change in the back, abdomen, vagina, pelvis, leg, groin and/or perineum; The Manchester repair was introduced at St Mary’s Hospital for Women and Children, Manchester, UK. Milton Lawrence McCall , 1911–1963, obstetrician, Magee-Women’s Hospital, Pittsburgh, PA, USA. /uni25CF vaginal problems, including discharge, bleeding, dyspareu - nia, penile trauma or pain in sexual partners; /uni25CF urinary problems, including recurrent infections, inconti - nence, retention, di ffi culty or pain during voiding; /uni25CF bowel problems, including di ffi culty or pain on defecation, faecal incontinence, rectal bleeding or passage of mucus. In view of this, an MDT approach is recommended to man - age complex pelvic floor dysfunction and mesh-related prob - lems. For women with a confirmed mesh-related complication or unexplained symptoms after a mesh procedure, referral should be made to regional centres specialising in the diagnosis and management of mesh-r elated complications. Continence surgery requiring mesh usage such as transvaginal tapes and

Complications Bleeding Infection Fistula formation Voiding dysfunction Unmasking of occult SUI Failure Recurrence Bleeding Infection Injury to the bladder, bowel or ureters Voiding dysfunction Dyspareunia Failure Recurrence Conversion to a laparotomy A Manchester repair can speci /f_i cally be associated with infertility, miscarriage and dystocia Bleeding Infection Rectal or small bowel injury (/f_i stula formation) Dyspareunia Failure Recurrence Bleeding Infection Injury to the bowel or ureter Unmasking of occult SUI Right buttock pain Sexual dysfunction Bleeding Infection Rectal or small bowel injury (/f_i stula formation) Dyspareunia Failure Recurrence

continence surgery in the form of colposuspension or insertion of an autologous fascial sling. Uterine prolapse and vaginal vault prolapse surgery requiring the use of mesh during hys teropexy and sacrocolpopexy procedures can be undertaken following detailed counselling and MDT agreement.

Morcellation

Morcellation

This is the process whereby larger tissue is broken down into smaller pieces, facilitating their removal through smaller inci sions in the abdomen. In gynaecology , this is usually o ff ered in the context of a laparoscopic myomectomy to remove fibroids or a laparoscopic subtotal hysterectomy to remove the bod the uterus. This procedure is undertaken with an instrument called a morcellator. The risks associated with morcellation include parasitic spread of tissue where the cut tissue deposits of previously undiagnosed malignancies (noting that this is also considered a risk during an open myomectomy if the fibroid - capsule is breached), as well as missed malignancies owing to lost anatomy . Retrieval bags have been proposed to prevent dissemination of the tissue but the evidence regarding their use is currently awaited. In view of this, careful case selection is important. The risk of an uterine sarcoma increases as age increases, in the perimenopausal and postmenopausal stages of - BRCA mutations and Lynch syndrome, life, in the presence of and in the context of rapidly growing fibroids non-responsive to oestrogen deprivation.

Figure 87.22 Magnetic resonance imaging of uterine /f_i broids.

Ovarian cancer

Ovarian cancer

Ovarian cancer is the sixth most common malignancy in women, behind breast, lung, bowel, uterine cancer and malig nant melanoma. In the UK, over 7000 women are diagnosed with ovarian cancer each year. Over 90% of cancers arise from the surface epithelium of the ovary (whic h has the same embryological origins as the peritoneum); the majority arise sporadically rather than secondary to inheritance. The peak incidence is in the age range 65–69 years. The overall 5-year survival rate is <50% because approximately two-thirds of women present with advanced disease. The common presenting symptoms are: /uni25CF abdominal distension and/or pain; /uni25CF change in appetite; /uni25CF weight gain and increased girth (ascites); /uni25CF urinary obstruction. Over half of all women, however, present initially to a speciality other than gynaecology , with often vague symp toms caused by metastatic disease, e.g. shortness of breath, gastrointestinal disturbance or a change in bow el habit. Con sequently , it is important to include ovarian cancer in the di ff er ential diagnosis of any woman presenting with a recent onset of persistent, non-specific, abdominal symptoms (including those whose abdomen and pelvis appear nor mal on clinical examination). A pelvic mass in conjunction with ascites usually indicates ovarian cancer but may also be indicative of Meigs’ syndr ome (a benign fibroma with ascites and the presence of a pleural e ff usion). Summary box 87.4 addresses the basic tests that can be conducted to diagnose ovarian malignancy . CA-125 is a glycoprotein expressed on tissue derived from coelomic and Müllerian epithelia; the normal cut-o ff value is 35 /uni00A0 U/mL. Elevated levels are found in 50% of patients with stage I disease and >90% of those with advanced disease. It primarily detects epithelial o varian cancers. However, CA-125 is a non-specific marker with raised levels also seen in other cancers, e.g. pancreatic, breast, lung and colon. Levels may Basic tests on suspicion of ovarian malignancy /uni25CF /uni25CF /uni25CF β α α β also be increased during menstruation; in benign conditions such as endometriosis, PID and liver disease; if ascites or other e ff usions are present; and after a recent laparotomy . Combining menopausal status, ultrasound features and CA-125 measurements using the risk of malignancy index (RMI) algorithm (Summary box 87.5) can help guide management and identify those who require an onward referral to a gynaecological oncologist in a cancer centre. - Summary box 87.5 Risk of malignancy index (RMI) /uni25CF There is currently no national screening programme for ovarian cancer in the UK (including for women at high risk of the disease) because no test has been identified to reliably pick up ovarian cancer at an early stage. The UK Collabora - tive Trial of Ovarian Cancer Screening aimed to establish the e ff ect of early detection of the disease by screening on ovarian - cancer mortality . The pr eliminary study recruited over 200 /uni00A0 000 women aged between 50 and 74 years and randomised them - to either a control arm or one of two screening strategies: pri - - mary screening using measurement of serum CA-125 levels followed by TVUS as a second-line test; or TVUS alone. The two scr eening procedures were found to be similar in terms of sensitivity for all primary ovarian and fallopian tube cancers, but specificity was higher with combined screening. Some genetic mutations are known to predispose women to ovarian cancer, e.g. BRCA1 and BRCA2 and the mismatch repair genes associated with Lynch syndrome families. BRCA1 mutations confer

a 39% lifetime risk of ovarian cancer up to the age of 70 years; this is 11–17% for BRCA2 mutations up to the age of 70 years. The mismatch repair genes confer an increased lifetime risk of ovarian cancer of 9–12% in addi - tion to the increased risk of endometrial cancer. Referral to a specialist cancer genetics service is advisable. Women at high risk of ovarian cancer may be o ff ered risk-reducing surgery in the form of prophylactic bilateral salpingo-oophorectomy ,

Ultrasound scan is considered the /f_i rst-line investigation (Table 87.12) A staging CT or MRI is carried out prior to surgery to determine the extent of disease Tumour markers, including HCG, lactate dehydrogenase, alpha-fetoprotein (FP), CA-125, CA-19-9 and carcinoembryonic antigen (CEA), should be measured. Lactate dehydrogenase, FP , inhibin and HCG are particularly recommended in women <40 years old with a suspected complex ovarian mass, to exclude germ cell tumours RMI = U × M × CA-125 U, ultrasound features scoring 1 for each malignant feature (multilocular, solid components, metastases, ascites, bilateral lesions); M, menopausal status with 1 for premenopausal and 3 for postmenopausal; CA-125, CA-125 level in U/mL

cer with some evidence suggesting that an oophorectomy can reduce the risk of breast cancer in these women. Surgical staging of ovarian cancer (Table 87.15) is per formed at laparotomy via a midline incision if disease is sus pected preoperatively by: /uni25CF careful evaluation of all peritoneal surfaces; /uni25CF four washings of the peritoneal cavity: diaphragm, right and left abdomen, pelvis; /uni25CF infracolic omentectomy; /uni25CF selected lymphadenectomy of the pelvic and para-aortic lymph nodes; /uni25CF biopsy and/or resection of suspicious lesions, masses and adhesions; /uni25CF random blind biopsies of normal peritoneal surfaces, including that from the undersurface of the right hemi diaphragm, bladder reflection, cul-de-sac, right and left paracolic recesses and both pelvic side walls; /uni25CF total abdominal hysterectomy and bilateral salpingo oophorectomy; /uni25CF appendicectomy for mucinous tumours; if a routine appendicectomy results in an intraoperative suspicion of a mucinous tumour, the surgeon should take washings and a biopsy from suspicious area(s). The general principle is cytoreductive surgery followed by combination chemotherapy; only a minority of patients with ovarian cancer require a bowel resection during the primary procedure or surgery for recurrent disease. The only excep tion to this rule is a young woman with stage I disease or a borderline tumour who requests a unilateral oophorectomy to conserve her fertility . stimulation with oocyte or embryo cryopreservation has been undertaken in patients with low-grade tumours (grade IA/B) who wish to preserve their fertility; however, the e ff ect of this on - the underlying disease process is not known, with the additional - risk of seeding the cancer during oocyte retrieval. This must, therefore, be carried out with caution and under the guidance of oncological specialists. Ovarian tissue cryopreservation at the time of cytoreductive surgery has also been undertaken, holding the promise for in vitro maturation of oocytes in the future. Autologous transplantation would be contraindicated as it has the risk of cancer recurrence.

TABLE 87.15 Condensed staging of ovarian cancer. Stage I Growth limited to the ovaries Growth involving one or both ovaries with pelvic Stage II extension (uterus, bladder, sigmoid colon, rectum) or primary peritoneal cancer but not including the lymph nodes Tumour involving one or both ovaries with Stage III histologically con /f_i rmed peritoneal implants outside of the pelvis including spread to retroperitoneal lymph nodes (pelvic and/or para-aortic) only Stage IV Growth involving one or both ovaries with distant metastases

TUMOURS Benign ovarian tumours and cysts

TUMOURS Benign ovarian tumours and cysts

Overall, 90% of ovarian tumours are benign, with an increased risk of malignancy in older women: the malignant potential of an ovarian cyst in a premenopausal woman is 1:1000, increasing to 3:1000 at the age of 50 years. Ovarian tumours are subdivided into five main categories according to the World Health Organization’s classification system (Table 87.13 /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Benign ovarian tumours are often asymptomatic and may present incidentally , for example when an abdominal radiograph reveals the appearance of a tooth in the abdomen or pelvis. Conversely , they may present with pain, abdominal swelling, pressure-type symptoms, nausea or vomiting. Sudden- onset pain with vomiting and raised inflammatory markers can be more diagnostic of ovarian torsion (see Adnexal torsion Management will depend on the age of the woman and the characteristics of the cyst (Summary box 87.3). In older women, a conservative approach is only reasonable if the risk of malignancy is low (see Ovarian cancer). In perimenopausal as many will regress. If there is uncontrollable pain, haemody - namic compromise, suspicion of tor sion or the cyst does not regress, then surgical management is advised. In most cases - this would involve a laparoscopic ovarian cystectomy with con - servation of o varian tissue as the treatment of choice. As the vast majority of oocytes lie within 5 /uni00A0 mm of the surface of the ovary , a carefully carried out cystectomy can leave a normally functioning ovar y (Figure 87.24). Summary box 87.3 Management of benign ovarian cysts /uni25CF /uni25CF). /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF). /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF

TABLE 87.13 Classi /f_i cation of ovarian tumours. Surface epithelial Represent approximately 65% of all tumours ovarian tumours and 90% of ovarian malignancies Further classi /f_i ed by cell type (serous, mucinous, endometrioid, clear cell, transitional cell, epithelial–stromal [undifferentiated]) and atypia (benign, borderline or malignant) Germ cell tumours Represent approximately 15% of all ovarian neoplasms Mature teratomas are the most common type of ovarian germ cell tumour (benign), often called a dermoid cyst. They most commonly occur in women of reproductive age and contain a variety of tissues, including skin, hair follicles, sweat glands, bone and teeth Malignant germ cell tumours include immature teratomas, dysgerminomas, yolk sac tumours, choriocarcinomas and embryonal carcinomas Sex cord–stromal Represent approximately 10% of all tumours ovarian neoplasms Metastatic tumours Represent approximately 5% of ovarian malignancies; usually arise from breast, colon, endometrium, stomach and cervical cancers Other/miscellaneous A small number of other types of neoplasms, which develop from ovarian soft tissue or non-neoplastic processes Commonly, an incidental /f_i nding, but may be suggested by symptoms and signs A pregnancy test should be performed to exclude an ectopic pregnancy (however, it is important to note that HCG can also be positive in dysgerminomas and

choriocarcinomas) TVUS is the mainstay diagnostic tool with high sensitivity and speci /f_i city in being able to differentiate a benign mass from a malignant one (Table 87.14). If the results are indeterminate, an MRI or CT scan may help; an MRI is more useful than a CT scan for the assessment of complex cysts/endometriosis. Masses with radiographic characteristics of cancer (e.g. cystic and solid components, surface excrescences, multilocular appearance, irregular shape) require removal Tumour markers may help in the diagnosis of speci /f_i c masses (see Ovarian cancer) In women of reproductive age, simple, thin-walled cystic adnexal masses of a maximum diameter of 50 /uni00A0 mm without characteristics of cancer do not require further investigation unless they persist for >3 months. A follow-up scan can be arranged after 4 months to check for resolution. In postmenopausal women, this is conducted every 4 months in conjunction with a serum blood test for the cancer antigen 125 (CA-125) for a duration of 1 year; if no change is detected, the women can be discharged Perimenopausal women with simple cysts measuring 50–70 /uni00A0 mm in diameter should undergo annual ultrasound follow-up Women with larger cysts (>70 /uni00A0 mm) or persistent cysts may bene /f_i t from an MRI scan or surgical intervention Cyst removal (ovarian cystectomy) is preferably performed laparoscopically. Cyst aspiration is associated with a high risk of recurrence but can be considered after detailed counselling if the woman wishes to retain her fertility. Bilateral salpingo- oophorectomy is preferable for postmenopausal women if surgery is indicated An oophorectomy may become necessary if the cyst cannot be surgically removed from the ovary TABLE 87.14 International Ovarian Tumor Analysis (IOTA) group classi /f_i cation for the ultrasound assessment of ovarian cysts. Benign features (B-rules) Malignant features (M-rules) Unilocular cysts Irregular solid tumour Solid components, the Ascites largest of which is <7 /uni00A0 mm Minimum of four papillary structures Acoustic shadowing Smooth multilocular tumour Irregular multilocular tumour <100 /uni00A0 mm ≥ 100 /uni00A0 mm No blood /f_l ow Blood /f_l ow

Figure 87.24 Ovarian cystectomy.

UROGYNAECOLOGY Urinary incontinence

UROGYNAECOLOGY Urinary incontinence

- Urinary incontinence is defined as the involuntary leakage of urine. It is said to a ff ect approximately 30% of women, with a higher prevalence seen in older age groups. It can have a significant impact on quality of life. oman Incontinence can be classified into: /uni25CF - stress urinary incontinence (SUI) (involuntary leakage of urine secondary to increased intra-abdominal pressure, e.g. coughing, sneezing); /uni25CF - overactive bladder (OAB); urinary urgency , usually with urinary frequency and nocturia, with or without urinary incontinence; /uni25CF mixed urinary incontinence (combination of both OAB and SUI). It can result from both functional and anatomical causes, including: /uni25CF multiparity; - /uni25CF childbirth complications and vaginal delivery; /uni25CF risng female age - menopause; /uni25CF fistulae; y of /uni25CF urethral diverticulum/congenital anomalies, e.g. ectopic ureters; /uni25CF immobility , constipation or urinary tract infection; /uni25CF chronic medical conditions, e.g. congestive heart failure, diabetes mellitus, multiple sclerosis; /uni25CF medications, e.g. loop diuretics; /uni25CF secondary to pelvic masses; /uni25CF obesity and weight gain. Common symptoms and complaints include: /uni25CF storage symptoms: /uni25CF frequency (increased frequency of more than eight times during the day) /uni25CF urgency /uni25CF nocturia (increased frequency of voiding more than once a night) /uni25CF emptying symptoms: /uni25CF hesitancy /uni25CF slow stream /uni25CF incomplete emptying /uni25CF straining to urinate /uni25CF urinary leakage with exertion/coughing gations should be performed to rule out malignancy). Investigations include: /uni25CF urinary incontinence-specific symptom and quality of life questionnaire, including a bladder diary; /uni25CF digital examination; /uni25CF urine analysis and a midstream urine sample for micro scopy , culture and sensitivity; /uni25CF urodynamics, including an assessment of postvoid residual volumes – if conservative measures have failed, the type of incontinence is unclear or there is a recurrence of symp toms following surgical intervention; /uni25CF ultrasound of the kidneys, ureters and bladder in patients with recurrent urinary tract infections/haematuria; /uni25CF cystoscopy if pathology is suspected. Management can be divided into conservative methods, medical therapy or surgical intervention (Tables 87.9–87.11 The treatment of choice is dependent on the under lying cause. Treatments can be combined and are individualised for the patient. Should initial therapy be unsuccessful or repeat pr ocedures be required, then the patients should be discussed within a multidisciplinary team (MDT) setting. /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF β /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Edvard Laurits Ehlers , 1863–1937, dermatologist, Copenhagen, Denmark. Henri-Alexandre Danlos , 1844–1912, dermatologist, Paris, France. Antoine Bernard-Jean Marfan ,

1858–1942, paediatrician, Paris, France. /uni25CF /uni25CF /uni25CF - /uni25CF - /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF). /uni25CF /uni25CF /uni25CF /uni25CF

TABLE 87.9 Management options for overactive bladder (OAB). Lifestyle changes (i.e. limit /f_l uid intake, avoid Conservative diuretics such as tea/coffee, weight loss) Behavioural modi /f_i cation (e.g. bladder drills) for a minimum of 6 weeks Review of coexistent medications (e.g. diuretics) Pelvic /f_l oor training (physiotherapy) for at least 3 months, comprising at least eight contractions three times per day Bladder catheterisation-intermittent self catheterisation if increased post void residuals Medical Anticholinergics (e.g. oxybutynin [avoid therapy in elderly frail women at risk of cognitive impairment], tolterodine); side effects include a dry mouth and constipation Selective - adrenoreceptor agonist (e.g. 3 mirabegron) for the management of urge incontinence Desmopressin speci /f_i cally used to treat symptoms of nocturia Surgical Intravesical botulinum toxin A Neuromodulation (tibial nerve stimulation or sacral neuromodulation) Bladder reconstruction (augmentation cystoplasty – risks include bowel disturbance, metabolic acidosis, mucus production and/or retention in the bladder, urinary tract infection, urinary retention and malignancy) Urinary diversion only when non-surgical management has failed and if botulinum toxin type A, percutaneous sacral nerve stimulation and augmentation cystoplasty are not appropriate or are unacceptable incontinence (SUI). Conservative Pelvic /f_l oor training (physiotherapy) for at least 3 months, comprising at least eight contractions three times per day Management of a persistent cough Bladder catheterisation-intermittent self catheterisation if increased post void residuals Medical Serotonin and noradrenaline (norepinephrine) therapy reuptake inhibitors (e.g. duloxetine) (can be used when conservative measures have failed and surgical treatment is contraindicated or declined) Surgical Colposuspension (bladder neck suspension) Autologous rectus fascial sling procedures and retropubic midurethral mesh slings Periurethral bulking agents Arti /f_i cial urinary sphincter Do not offer: anterior colporrhaphy; needle suspension; paravaginal defect repair; porcine dermis sling; the Marshall–Marchetti–Krantz procedure TABLE 87.11 Management options for speci /f_i c conditions causing urinary incontinence. Pelvic masses Surgical approach, e.g. myomectomy or hysterectomy Recurrent Antibiotics – treatment, low dose urinary tract prophylaxis, rescue course infections 3 month course of vaginal oestrogen in post menopausal women Fistulae or Surgical correction ectopic ureters

Uterine fibroids (leiomyoma)

Uterine fibroids (leiomyoma)

Fibroids are usually benign, well-circumscribed, smooth muscle tumours of the uterus. Less than 1% of fibroids undergo malignant transformation (leiomyosarcoma). They are more common in certain populations (African–Caribbean women) and vary in size and number. They are typically found in the following locations (Figure 87.21): /uni25CF Subserosal: may cause pressure-type symptoms; if pedun - - culated, they can be di ffi cult to distinguish from an ovarian - tumour. /uni25CF Intramural: may similarly cause pressure-type symptoms; can be associated with infertility and heavy periods if they lead to endometrial distortion. - /uni25CF Submucosal: associated with infertility , recurrent pregnan - cy loss and heavy periods; if pedunculated, they may occa - sionally extrude through the cervical os. - /uni25CF Rare: sites include the broad ligament and cervix. and/or irregular menstrual bleeding, anaemia, pressure-type symptoms or infertility , especially if the fibroid is distorting the uterine cavity . The pressure-type symptoms can include pel vic discomfort, urinary incontinence, frequency and retention, constipation and backache. When large fibroids are present, back pressure may cause or exacerbate varicosities. Although these symptoms are common, it is important to note that some women with fibr oids are asymptomatic. Rarely , women may present acutely with pain arising from torsion of a peduncu lated fibroid or red degeneration, especially in pregnancy . A diagnosis can usually be made on bimanual and/or abdominal examination, in the presence of an enlarged uterus with attached swellings. The principal di ff erential diagnosis is an ovarian tumour; in general, if an ovarian tumour is present, the uterus is felt separately on vaginal examination, although not if the structures are adherent to each other. A pelvic ultra sound scan is the first-line investigation with high sensitivity and specificity . An MRI can be performed if an ultrasound is declined by the patient or is inconclusive (Figure 87.22). Treatment can be divided into: conservative if the w is asymptomatic; medical to reduce the quantity of menstrual bleeding; hormonal manipulation to control menstrual bleed ing or to shrink the fibr oids; or surgical (uterus-preserving or non-uterus-preserving methodologies) (Table 87.7). The choice of treatment depends upon the woman’s age and fer tility intentions, the size and number of fibr oids as well as their location. Emergency surgical treatment is only required if there is substantial menstrual bleeding or uncontrollable pain; these are rare events.

Uterovaginal prolapse

Uterovaginal prolapse

Pelvic organ prolapse refers to the protrusion or displacement of the pelvic organs from their normal anatomical position into or through the vagina to varying degrees (Figure 87.23). It is said to a ff ect up to 40% of women at some point in their lifetime. A prolapse can have a detrimental impact on normal organ performance, including anorectal, urinary and sexual function. A prolapse is more common in certain groups, including: /uni25CF older women; /uni25CF parous women, increased parity , prolonged labours, vagi - nal deliveries; /uni25CF obese women; /uni25CF women who have chronic constipation; /uni25CF women with occupations that involve heavy lifting; /uni25CF women with oestrogen deficiency; /uni25CF women with a family history or genetic risk; /uni25CF women with connective tissue disorders, e.g. Ehlers–Danlos syndrome, Marfan syndrome. (a) (c) (e) Women with minor prolapses may be asymptomatic, but those with more significant degrees may present with a sensation of ‘something coming down’. A cystocele (bladder prolapse) and a cystourethrocele (prolapse of the bladder and urethra) can lead to the sensation of a lump in the vagina and may be associated with urinary urgency (OAB symptoms) and recurrent urinary tract infections. Uterine descent can lead to a lump in the vagina or a dragging sensation; with complete prolapse of the uterus (procidentia) there may be associated vaginal discharge, ulceration of the vaginal mucosa and bleeding. A rectocele (prolapse of the rectum into the vagina) may cause di ffi culties with defecation or a sensation of incomplete emptying, which can be relieved by digital reduction of the prolapse. The degree of prolapse is graded in terms of descent. Cur rently , the commonly used grading system is the Pelvic Organ Prolapse Quantification System (POP-Q): /uni25CF grade 0: no prolapse is demonstrated; /uni25CF grade 1: the most distal portion of the prolapse is >1 /uni00A0 cm above the level of the hymen; /uni25CF grade 2: the most distal portion of the prolapse is ≤ 1 /uni00A0 cm (b) above or below the level of the hymen; /uni25CF grade 3: the most distal portion of the prolapse is >1 /uni00A0 cm below the level of the hymen but 2 /uni00A0 cm less than the total vaginal length; /uni25CF grade 4: maximal descent. Non-surgical management of a uterovaginal prolapse includes: lifestyle changes (avoidance of constipation); physio - therapy to help strengthen the pelvic floor muscles for at least 16 weeks for those with grade 1 or 2 organ pr olapse; topi - cal oestrogen replacement for oestrogen deficiency to help increase tissue strength and elasticity; and vaginal pessaries . There are a number of di ff erent pessaries a vailable and they are replaced every 3–6 months, with the ring pessary being the most frequently used. It is inserted between the posterior fornix - and the pubic bone. The main complications are of vaginal ulceration and infection leading to discharge and bleeding; it is advisable, therefore, to replace the ring frequently . Surgical management aims to correct the prolapse. The surgical procedures are intended to restore the uterovaginal anatomy and position. They may be carried out using a vaginal or abdominal (open or laparoscopic) appr oach (Table 87.12).

(c) (e) (d) Figure 87.23 Uterovaginal prolapse: (a) urethrocele/cystocele (arrow); (b) uterine prolapse (arrow); (c) enterocele (arrow); (d) vaginal vault prolapse (arrow); (e) rectocele (arrow).

/uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Approximately 30% of women in their lifetime report a recurrence of their symptoms following surgical treatment. This figure increases with subsequent procedures.

Condition Treatment Urethrocele/cystocele An anterior vaginal wall repair (anterior colporrhaphy) (Figure 87.23a) without the use of mesh Uterine prolapse If the patient’s family is complete, a vaginal (Figure 87.23b) hysterectomy with or without vaginal sacrospinous /f_i xation can be performed Uterus-preserving surgery includes: amputation of the cervix with suturing of the transverse cervical ligaments vaginally (Manchester repair); laparoscopic plication of the uterosacral ligaments (McCall suture); or hysteropexy, which may be vaginal (attaching the cervix to the sacrospinous ligaments using non- absorbable sutures) or laparoscopic/abdominal (sacrohysteropexy using a polypropylene mesh to suspend the uterus to the sacral promontory) A colpocleisis can be considered in women who no longer wish to have penetrative intercourse Enterocele A similar technique to repair of a hernia is used. The (Figure 87.23c) vaginal mucosa is opened and the hernial sac repaired Vaginal vault prolapse Sacrospinous /f_i xation performed vaginally: the (Figure 87.23d) vault is attached to the right sacrospinous ligament using a non-absorbable suture/mesh, avoiding the rectosigmoid colon on the left Sacrocolpopexy performed abdominally or laparoscopically: the vaginal vault is attached to the sacral promontory using a mesh A colpocleisis can be considered in women who no longer wish to have penetrative intercourse Posterior colpoperineorrhaphy without mesh: the Rectocele posterior vaginal wall is opened, the rectum returned (Figure 87.23e) to its normal position and redundant vaginal mucosa excised SUI, stress urinary incontinence.