FEMALE GENITAL SYSTEM

MUSEUM CATALOGUE

Department of Pathology, University of Adelaide, 2004

FEMALE GENITAL SYSTEM

INTRODUCTION

The female genital system includes uterus and cervix, fallopian tubes and ovaries, and vagina and vulva. A wide variety of abnormalities can affect these tissues, including of course problems related to pregnancy and the placenta. The vulva and vagina are lined by protective keratinising and non-keratinising stratified squamous epithelium respectively as they are essentially exposed to the external environment. The outer part of the cervix (ectocervix) is also lined by non-keratinising stratified squamous epithelium and the endocervix or endocervical canal is lined by simple columnar mucin secreting epithelium, the junction between being known as the squamocolumnar junction. In the endocervix, the lining simple columnar mucin secreting epithelium dips down into endocervical glands and merges with the simple columnar epithelium of the endometrium higher up at the entrance to the endometrial cavity. In the reproductive years, under the influence of oestrogens, the simple columnar endocervical epithelium in the lower endocervix protrudes out onto the ectocervix and undergoes metaplasia into stratified squamous epithelium (a physiological and not preneoplastic process), now being in the more hostile vaginal environment.
This region of the cervix, including the area of metaplastic squamous epithelium, endocervical epithelium around the external cervical os and the squamocolumnar junction, is known as the transformation zone.
Small mucus filled Nabothian cysts frequently form in the cervix due to obstruction of endocervical glands.
The endometrium comprises glands and a specialised stroma, both being under hormonal influence, undergoing cyclical changes every month during the reproductive years.
The Fallopian tubes are lined by simple columnar epithelium with both ciliated and non-ciliated cells, the non-ciliated cells having a secretory role.
In embryos with ovaries, the female genital tract develops from the paired paramesonephric ducts that have developed from invaginations of coelomic or peritoneal epithelium (mesothelium). The cranial unfused ends of the ducts develops into the lining of the fallopian tubes, their cranial ends opening into the coelomic or peritoneal cavity. Their caudal portions fuse to ultimately form the epithelium of the uterus and cervix.
Understanding the embryological origins of the lining of the female genital tract (essentially from coelomic epithelium/mesothelium) is important, as in adulthood, the peritoneal mesothelium may give rise to epithelial tumours of the ovary and peritoneum.

The premenopausal ovaries and uterus are bulky but shrink somewhat postmenopausally. Small cysts commonly develop in the ovary. Many of them derive from distension of developing or atretic follicles. Others probably develop from invaginations of the surface epithelium. However, many neoplastic processes in the ovary are also cystic.

Any comments on this catalogue are welcome. Please contact a member of the department.

HOW TO USE THIS CATALOGUE

This catalogue can be used as a tool to develop your knowledge, as well as provide an opportunity for revision.

It is divided into:

- Introduction and approach to specimens (pages 57-60).
- Index (pages 61-64). Examples of specific diagnoses can be found via the index.
- Core and classic disease processes (pages 65-83). This gives examples and discussion of core and/or classic diseases of the female genital system. These are the specimens that students should focus on being able to identify initially. However, it depends to some extent on what you have covered in lectures and practical classes or resource sessions as to what you should know. Some of the specimens and discussion are directed more towards clinical medical students.

- Main catalogue (pages 84-103). This section covers the specimens in numerical order. Questions and/or comments accompany some of the specimens to help you expand your knowledge. In order to fit more specimens in the museum, not all of the pots are in numerical order on the shelves, and large specimens are often found on the bottom shelves.

You might find it useful to work quietly with a few friends and to have a few textbooks handy (e.g. pathology, medical, anatomy). You will also find that you can learn some anatomy and clinicopathological correlation from the specimens and information given.

You do not have to examine every specimen in the museum. However, just as in clinical practice, you will not become proficient in diagnosing a condition if you have only seen one case. Exposure to a variety of cases (specific diagnoses can be found via the index) to experience the variability in morphology will help your learning greatly. In general the red and blue dots on the pots indicate basic and straightforward pathology, whereas yellow dots tend to indicate less readily diagnosable conditions. This is not a hard and fast rule, and you will find yellow dot specimens turning up in resource sessions/practical classes and even exams, if they represent classic pathology.

In general
- read the clinical information given
- look at the entire specimen, not just the front
- identify and orientate the organ or tissue (where possible)
- identify the abnormality and from your knowledge of pathology (which will come with time) look for relevant features to help you make the diagnosis. Of course to appreciate the abnormal you first need to have an appreciation of normal anatomy
- make a diagnosis or differential diagnosis using any clinical information given to you – it is often relevant – sometimes the diagnosis is only made with a knowledge of the clinical features. Even when you know the diagnosis, attempt to identify relevant features in the specimen and understand why this is the diagnosis.
- attempt to correlate the pathological features with the clinical features (clinico-pathological correlation) i.e. explain how the pathological features have caused the patients symptoms and signs (when relevant)
- try to answer any questions presented yourself before reading the answers.

You may prefer to look at the specimen 'blind', without reading the clinical information given first.

Limits to diagnosis on macroscopic examination

In all cases a diagnosis is given, but it is important to realise that sometimes the final diagnosis was only made based on the clinical history and histological examination. In some cases the macroscopic appearance is classic and even without the history and histology you should be able to make the diagnosis from the appearance, in others, it might only be possible to give a list of differential diagnoses or a more general diagnosis.

Remember that some of these specimens are very old, and some of the investigations and treatments mentioned may be out of date.

In relation to pathology pot specimens in examinations, you may be asked
- for a diagnosis
- for a description
- about the pathogenesis of the disease
- about the predisposing factors and/or causes of the disease

- about the potential complications of the disease and how they arise
- to explain a patient's clinical symptoms and signs or investigation results in light of the pathological abnormalities present
- to describe the expected histological abnormalities in the abnormal areas

or other searching questions that we can concoct.

BASIC APPROACH TO THE INTERPRETATION AND DESCRIPTION OF FEMALE GENITAL PATHOLOGY SPECIMENS

Pathology is all about understanding disease – how it arises, its patterns, complications and how it causes symptoms and signs. That understanding of disease is aided by a having a visual appreciation of the morphological changes in tissues.

Powers of observation and description are not just of use in pathology. These are important when examining patients also. As soon as a patient walks into a room you should be observing them (are they fat, thin, pale, yellow, short of breath etc). Specific site, size, colour, texture, appropriate terminology etc are also important for describing lumps and skin lesions on a patient, and knowledge of pathological features is important in radiological diagnosis, so the observational and descriptive skills which you learn in pathology have a broader application.

Students are expected to be able to give a brief succinct description of relevant macroscopic features of a specimen using appropriate terminology, as well as to arrive at a diagnosis or differential diagnosis. Even if not asked for a description, identification of relevant features is helpful in the diagnostic process. Your descriptive skills will improve with practice.
In any aspect of medicine, one needs to approach things in a systematic manner, otherwise important points may be omitted.

- Read the clinical history, it will often provide relevant information (although sometimes it is helpful to look at the specimen without any information and work out what is going on for yourself)
- Look at the front of the pot first (i.e. the one with the number and the dot), but always make sure to look at the back and sides as well.
- Identify and orientate the specimen. Identification of the organ/tissue should be possible for most specimens and is a handy skill as you are not necessarily told in exams. However, this is not possible for some of the specimens of ovarian pathology where the ovary has been totally replaced or destroyed by the tumour and no normal tissue is present to identify site. However, in some, a portion of fallopian tube is attached, and you should be able to recognise this. Also orientate the specimen, making sure you know which side is which where appropriate. For orientation, the round ligament of the uterus lies anterior to the fallopian tube and the round ligament of the ovary sits behind the tube. The peritoneal covering of the uterus dips down further posteriorly between the uterus and rectum than it does anteriorly where it is reflected over the bladder. You should also have an appreciation of the normal size of organs.
- Identification of and description of the abnormality.
    - Decide and state whether the organ is of normal size or too large or small (when relevant)
    - Assess where the abnormality is and decide whether it is focal, diffuse (involving an entire organ, region or tissue) or multifocal. You should describe the site of the lesion/s using appropriate anatomical terms, not for example, "at the top of the pot".
      The lesion itself should then be described.

      ### Focal lesion

      The description of a discrete or focal macroscopic lesion can incorporate a number of features.
      <u>Size:</u> Give an approximate measurement
      <u>Shape</u>

Colour: What colour is it? Is it all one colour or is it many colours (variegated)? Does it look homogenous (all the same the whole way through)?
Consistency: This is of course difficult when the specimen is in a pot and you are unable to touch it. But even just by looking you can get some idea: Does it look solid or firm? Does it look friable (as if it is falling to pieces) or are there bits missing or greyish areas (altered blood) to suggest necrosis? Firm pale tissue may be tumour or fibrosis.
Margins: Are they well defined/demarcated (suggesting a benign process), or irregular or diffuse (suggesting a malignant process)?
Cysts: Are there cysts? Cystic lesions are very common in the ovary.

Diffuse

Colour and consistency will also be relevant for a diffuse process, however, the other features may not.

- Identification of the major pathological process. In some cases it may be helpful to identify the general pathological process that the abnormality represents e.g. inflammatory or neoplastic (benign or malignant, primary or metastatic). This will be especially useful if you don't immediately know what the diagnosis is, at least you will be able to 'ball park' it. To do this it may be helpful to go through the surgical sieve.
- Identification of related lesions. By now you should have some idea of what you think the diagnosis, or at least the differential diagnosis, is. You should now think about what you know of this condition and look for, and describe, other relevant features that may confirm or refute this diagnosis. It may be useful to include relevant negatives in your description.
- Other pathologies. Have a look at the rest of the specimen to see if there are any other abnormalities. If they are present, describe them.
- Diagnosis. State your diagnosis or differential diagnosis. Be as precise and specific as possible. Use any relevant clinical information given to help you. Sometimes a precise diagnosis is not possible but a presumptive diagnosis based on the macroscopic and/or clinical findings is. If you can't decide on one diagnosis, give a list of reasonable differential diagnoses, in order of decreasing likelihood, give a more general diagnosis (e.g. malignant tumour), or at least attempt to identify the pathological process.

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CORE AND CLASSIC DISEASE PROCESSES

VULVA: CARCINOMA

CASE 4939

Clinical information
The patient was a woman aged 63 who had complained of vulval irritation for 2 months. A lump was present which was increasing in size. There was a watery discharge.

Describe the specimen
The specimen consists of the excised portion of the vulva with, in its central parts, a flat irregular ulcerated tumour 4cm in diameter and about 0.5cm in height.

What is the diagnosis?
Carcinoma of the vulva

What type of epithelium lines the vulva?
The labia majora are lined by keratinising stratified squamous epithelium and the lateral aspects of the labia minora by a thinly keratinised stratified squamous epithelium that merges with the non-keratinising stratified squamous epithelium of the vagina medially.

What type of tumour is this most likely to be?
Squamous cell carcinoma

What is the pathogenesis of this disease?
Some of these cancers arise in younger women, when they are associated with certain types of human papilloma virus (HPV) and dysplasia of the vulvar epithelium (vulval intraepithelial neoplasia or VIN). These women may also have similar cervical pathology.
Tumours arising in older women are less frequently associated with HPV but may be related to hyperplastic or atrophic lesions (lichen sclerosis et atrophicus) of the vulval epithelium.

CERVIX: BENIGN ENDOCERVICAL POLYP

CASE 9431

Clinical information
The patient was a woman aged 62 who developed a spinal meningioma and urinary infection.

Describe the specimen
The specimen is of the uterus, tubes, ovaries and upper vagina. A large fleshy polyp, 3x 3.5 x 2cm, protrudes from the external cervical os.

What is the diagnosis?
Benign endocervical polyp

How do these lesions present clinically?
They are often asymptomatic but can present with spotty vaginal bleeding related to ulceration.

What type of epithelium lines the cervix?
The endocervix (canal) is lined by simple columnar mucus secreting epithelium. The ectocervix is lined by non-keratinising stratified squamous epithelium.

CERVIX: CARCINOMA

CASE 3324

Clinical information
No clinical information is available.

Describe the specimen
The specimen consists of the uterus, cervix and vaginal fornices. The uterus and cervix together measure 8cm in length. An irregular ulcerated tumour measuring 3cm in diameter replaces much of the ectocervix.

What is the diagnosis?
Cervical carcinoma

What histological type of tumour is this likely to be and why?
Squamous cell carcinoma. This is by far the commonest type.

In which region of the cervix do these tumours arise and why?
Most of these tumours largely arise as a result of infection with particular strains of human papilloma virus (HPV) in the transformation zone of the cervix. This is the area where the glandular epithelium of the distal endocervix that has protruded out onto the ectocervix under the influence of oestrogens in the reproductive years (a normal process), undergoes metaplasia to stratified squamous epithelium (also essentially a normal process), as it is now exposed to the more hostile vaginal environment. It is this metaplastic squamous epithelium that is particularly susceptible to infection with the sexually transmitted HPV. Experimental data indicate that intracellular HPV proteins may then interfere with tumour suppressor proteins (RB and p53 proteins) of the host cell leading to dysplasia and ultimately invasive carcinoma.

What are the predisposing factors for this condition?
Factors that increase the likelihood of acquiring HPV include larger number of sexual partners of the woman or her male partners and early age of first intercourse. Immunosuppressed women (with T cell impairment in AIDS and with drug therapy post organ transplantation) are also at risk due to impaired immune responses to the virus.

How can the incidence of these tumours be reduced?
As well as encouraging safe sex, these tumours can be prevented by cervical screening with detection and appropriate management of premalignant lesions. The screening procedure involves sampling cells from the transformation zone of the cervix, smearing or filtering (depending on the method of collection) them onto a slide, then staining them. The slides, that contain hundreds of thousands of cells, are then examined by trained personnel. Premalignant cellular changes can be detected, but as cytological assessment is less accurate than histopathological assessment, need to be confirmed on biopsy, then treated before they progress to invasive carcinoma.

What is koilocytosis?
This term refers to the changes often seen in squamous cells infected with HPV. These cells have clearing of the cytoplasm around their large irregular nuclei. This appearance can be seen in both cytological and histological specimens.

What is CIN? How is it graded?
CIN is an abbreviation for Cervical Intraepithelial Neoplasia, an alternative term for cervical squamous dysplasia. There are 3 grades of CIN (1-3) that can be assessed cytologically and histologically.

Cytologically, it is graded depending on the N:C ratio and degree of nuclear atypia. Histologically it is graded depending on the extent of involvement of the thickness of the squamous epithelium:

- CIN 1 (mild): atypia and disorganisation confined to lower third of epithelium
- CIN 2 (moderate): atypia and disorganisation confined to lower two thirds of epithelium
- CIN 3 (severe, carcinoma in situ): atypia and disorganisation throughout full thickness of epithelium

The changes are really a continuum but grades give an estimation of the level of risk for developing invasive cancer if left untreated. CIN 1 is regarded as being low grade and CIN 2 and 3 are high grade, being more likely to progress, thus need treatment.

Comment

Dysplasia may also develop in the glandular epithelium of the endocervix leading to the development of adenocarcinomas. Glandular dysplasia can also be picked up on a cervical smear.

UTERUS: ADENOMYOSIS

CASE 17114

Clinical information
No clinical information is available.

Describe the specimen
The specimen comprises half a considerably enlarged uterus that measures 13cm in length and 8cm antero-posteriorly. Small spaces are present in the thickened myometrium that exhibits an ill-defined whorled appearance on cut section. There is a small Nabothian cyst near the external cervical os.

What is the diagnosis?
Adenomyosis

What is this condition and what is its clinical significance?
In this condition, islands of endometrial stroma and glands are present deep within the myometrium. It is of significance as it may cause pelvic pain.

UTERUS: ENDOMETRIOSIS

CASE 5007

Clinical information
No clinical information is available.

Describe the specimen
The specimen shows a portion of uterine fundus 5 x 6cm surrounded on one side by several cysts up to 3cm in diameter, one of which appears to be filled with old blood clot. Sectioned ovary is seen to the left of an empty cyst. Mounted separately are 2 encapsulated masses up to 4cm in diameter, which are filled with old blood, and a piece of blood clot.

What is the diagnosis?
Endometriosis

What is the pathogenesis of this disease?
Endometriosis is a condition where endometrial tissue is found outside the uterus, usually but not invariably within the pelvis (just beneath the serosal surface of ovaries, fallopian tube, pelvic peritoneum etc). It may also arise in laparotomy scars, and rarely in the vagina, vulva or appendix. This endometrium undergoes normal cyclic menstrual changes with bleeding, thus cysts filled with blood ('chocolate cysts') commonly develop. It is not certain how the endometrial tissue develops in these locations. It could be from retrograde menstruation along the fallopian tubes and out into the pelvis (which happens normally), or from abnormal differentiation of pelvic peritoneum. Very rare cases are found in the lungs or lymph nodes, possibly gaining access via blood or lymph.

What are the clinical consequences of this disease?
Endometriosis can cause severe pelvic pain, dysmenorrhoea and dyspareunia. It can also cause infertility from the scarring in and around the fallopian tubes and ovaries that can accompany the inflammation related to bleeding.

UTERUS: BENIGN ENDOMETRIAL POLYP

CASE 10886

Clinical information
The patient was a woman aged 61 who died of lymphoma.

Describe the specimen
The specimen is of the uterus and right tube and ovary. The uterine cavity contains a smooth surfaced dark haemorrhagic polyp 4cm long arising from the fundus. The endocervical canal is dilated and the external os appears very narrowed. The tube and ovary appear normal.

What is the diagnosis?
Benign endometrial polyp

What is this condition and how do they present clinically?
Benign endometrial polyps arise from localised areas of excessive endometrial proliferation. They may be asymptomatic, but may present with intermenstrual or postmenopausal spotting related to ulceration.

Comment
The discolouration in this polyp suggests venous infarction from twisting of the polyp about its base. Endometrial carcinomas can also be polypoid.

UTERUS: LEIOMYOMA AND SIMPLE OVARIAN CYST

CASE 23250

Clinical information

The patient was a 71-year old diabetic woman who died from cardiac failure as a consequence of ischaemic heart disease. The specimen was an incidental finding at post-mortem.

Describe the specimen

The specimen comprises a portion of the uterus with the fallopian tubes and ovaries. A well-circumscribed, pale, spherical tumour 4cm in diameter with a whorled cut surface is present in the left myometrium. The surrounding myometrium and adjacent uterine cavity are compressed by the tumour. Two similar but much smaller lesions are visible in the right side of the uterus. There is a simple cyst 4cm in diameter with a smooth lining in the right ovary that has become flattened over the lower surface of the cyst.

What is the diagnosis?

Leiomyoma and simple ovarian cyst

What are each of these conditions and how do they arise?

Leiomyomas are benign tumours showing smooth muscle differentiation. They are very common in the uterus but their cause is unknown. They are commonly multiple and may protrude through the serosa covering the myometrium (e.g. specimen 25231). They are generally asymptomatic but may cause menorrhagia, pain, or miscarriage when very large.

Benign simple cysts of the ovary are also common. Many of them derive from distension of developing or atretic follicles. Others probably develop from invaginations of the surface epithelium. They are usually asymptomatic. However, many neoplastic processes in the ovary are also cystic.

UTERUS: CARCINOMA

CASE 25446

Clinical information
The patient was a woman aged 93 with an 18-month history of lower abdominal pain, loss of weight and blood-stained vaginal discharge. On examination there was frank vaginal bleeding and a bulky friable cervix could be felt. She died suddenly on the 5th day.

Describe the specimen
The specimen consists of half the uterus and rectum divided in the median sagittal plane. The uterus and cervix together measure 85mm in length. Necrotic tumour extensively invades and replaces myometrium and it extends into the cervix. Posteriorly the tumour has invaded through the wall of the uterus towards the rectal wall.

What is the diagnosis?
Malignant tumour invading the uterus

What malignancies may arise in the uterus? Which is the commonest?
The commonest is endometrial carcinoma (now the commonest gynaecological malignancy in Western countries following the reduction in incidence of cervical carcinoma since the introduction of cervical screening programs). Others include leiomyosarcoma, malignant mixed Mullerian tumour and endometrial stromal sarcomas.

Comment
It is not possible to tell macroscopically that the tumour in this specimen is a carcinoma. However, the bulk of the tumour involves the uterus rather than the cervix so it is probably uterine in origin. As endometrial carcinoma is the most common uterine tumour, this is the most likely diagnosis. Histology showed a poorly differentiated adenocarcinoma in keeping with endometrial carcinoma.

What is the pathogenesis of endometrial carcinoma?
Most arise in peri and postmenopausal women in a background of endometrial hyperplasia which is oestrogen driven. Predisposing factors include systemic hypertension, diabetes mellitus, obesity (-> greater synthesis of oestrogen in body fats), long standing oestrogen use, in those with a history of anovulatory cycles and with oestrogen producing tumours. These endometrial carcinomas tend to be well differentiated. Another group of tumours arise in an older population without evidence of hyperoestrogenism or endometrial hyperplasia. These tumours tend to be poorly differentiated.

UTERUS: HYDATIDIFORM MOLE

CASE 15494

Clinical information
No clinical information is available.

Describe the specimen
The specimen consists of an enlarged globular uterus which measures 12cm in width and with the cervix measures 13cm in length. A window has been cut in the uterus to expose a mass of friable pale yellow-brown tumour tissue comprising fine cystic fronds filling almost the entire cavity. There is an area of recent haemorrhage on one side.

What is the diagnosis?
Hydatidiform mole

What is the pathogenesis of this disease?
Most hydatidiform moles arise following implantation of a conceptus with a 46 XX genotype, both sets of chromosomes being derived from the sperm. The embryo does not develop but the chorionic villi become cystically dilated and the trophoblast proliferates.

What is the natural history of this disease?
The woman initially believes she is pregnant. The uterus is often larger than expected for the duration of the pregnancy and these lesions produce high levels of human chorionic gonadotrophin. They are usually discovered in the 4th or 5th month of pregnancy, causing vaginal bleeding, but will be discovered earlier with ultrasound. Patients may have toxaemia of pregnancy. If unrecognised, the lesion may invade the uterine wall (invasive mole) and portions of the tumour can embolise once blood vessels have been invaded. They may also transform into choriocarcinoma (an aggressive malignancy).

FALLOPIAN TUBE: ECTOPIC PREGNANCY

CASE 25061

Clinical information
This is a surgical specimen. No clinical details are available.

Describe the specimen
The specimen is part of a dilated fallopian tube containing a foetus about 1cm in length surrounded by amnion and placental tissue.

What is the diagnosis?
Ectopic pregnancy

What is the clinical significance of this abnormality?
Ectopic pregnancies are those that develop outside the uterus. The most common site is in the fallopian tubes but they may occur in the ovaries and elsewhere in the peritoneal cavity. Because the tissues in which they implant cannot expand like the uterus as the conceptus grows, they will rupture, potentially leading to massive haemorrhage and death of the patient if not recognised.

OVARY: CYSTADENOMA

CASE 16355

Clinical information
No clinical information is available apart from that the specimen was removed at operation.

Describe the specimen
The specimen is part of multilocular cystic ovarian tumour measuring 11cm in diameter. Some of the cysts contain mucin.

What is the diagnosis?
Cystic tumour of the ovary, probably benign or borderline mucinous cystadenoma

Into what category of ovarian tumours does this fall?
This is an epithelial tumour of the ovary.

Comment
Neoplastic tumours of the ovary fall into 3 main groups:

- Epithelial: commonest
- Germ cell: demonstrating differentiation of cells involved in embryogenesis
- Sex cord-stromal: demonstrating evidence of differentiation along the lines of one of the sex cord or stromal elements

Epithelial tumours

Epithelial tumours can be subdivided further based on histological features of differentiation:

- Papillary serous (commonest)
- Mucinous
- Endometrioid
- Clear cell
- Transitional

Tumours of most of the above epithelial groups fall into one of 3 behavioural/histological patterns: benign, malignant and 'borderline' or 'uncertain malignant potential'.

The benign variants are cystic and may be multilocular. The malignant variants are also often multilocular but tend also to include solid areas and have a more complicated macroscopic architecture. They are of course diagnosed histologically. Because they are cystic, these tumours are known as cystadenoma or cystadenocarcinoma, with a prefix given as to the subtype (e.g. papillary serous cystadenoma).

Tumours that are 'borderline' or of 'uncertain malignant potential' show histological features intermediate between benign and malignant. Most of them behave in a benign fashion, however, occasional ones metastasise.

Epithelial tumours of the ovary are not uncommonly bilateral.

The macroscopic appearances of this specimen do not obviously convey its malignant or benign nature, as they often don't with ovarian tumours. However, its architecture is not particularly complex with few solid areas, so it is most likely to be benign or 'borderline' (uncertain malignant potential) in nature. The presence of mucin suggests that it is mucinous in type.

Histology reportedly showed mucinous cystadenoma.

(N.B. It is not immediately apparent that this specimen is ovarian)

Are there normally epithelial cells in the ovaries? If not, how are the epithelial tumours thought to arise?

There is not normally epithelium in the ovaries. Ovarian epithelial tumours are thought to arise from the modified surface 'coelomic' mesothelium. It is postulated that this undergoes 'mullerian differentiation', differentiating into any of the epithelial types of the adult female genital tract (serous (tubal), endometrioid (endometrium) and mucinous (cervical)) that arise from the embryonic paramesonephric (mullerian) ducts.

OVARY: CYSTADENOCARCINOMA

CASE 15973

Clinical information
The patient was a woman who presented with dyspnoea and ascites.

Describe the specimen
The specimen is half a large cystic ovarian tumour that measures 19cm in maximum diameter. There is a constriction near the centre of the tumour that divides it into two lobes. The right side is largely solid friable tumour with spaces containing mucin. The left side is mainly cystic with a more fleshy cellular protrusion at the waist of the specimen.

What is the diagnosis?
Cystic tumour of the ovary, probably cystadenocarcinoma

Into what category of ovarian tumours does this fall?
This is an epithelial tumour of the ovary.

Comment
Neoplastic tumours of the ovary fall into 3 main groups:

- Epithelial: commonest
- Germ cell: demonstrating differentiation of cells involved in embryogenesis
- Sex cord-stromal: demonstrating evidence of differentiation along the lines of one of the sex cord or stromal elements

Epithelial tumours

Epithelial tumours can be subdivided further based on histological features of differentiation:

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- Endometrioid
- Clear cell
- Transitional

Tumours of most of the above epithelial groups fall into one of 3 behavioural/histological patterns: benign, malignant and 'borderline' or 'uncertain malignant potential'.

The benign variants are often cystic and may be multilocular. The malignant variants are also often multilocular but tend also to include solid areas and have a more complicated macroscopic architecture. They are of course diagnosed histologically. Because they are cystic, these tumours are known as cystadenoma or cystadenocarcinoma, with a prefix given as to the subtype (e.g. papillary serous cystadenoma).

Tumours that are 'borderline' or of 'uncertain malignant potential' show histological features intermediate between benign and malignant. Most of them behave in a benign fashion, however, occasional ones metastasise.

Epithelial tumours of the ovary are not uncommonly bilateral.

The complex architecture of this ovarian tumour with many solid areas strongly suggests that it is malignant. The focal mucin suggests that it could be mucinous, however, histology reportedly showed a papillary serous adenocarcinoma forming mucin in some areas. (N.B. It is not immediately apparent that this specimen is ovarian)

Are there normally epithelial cells in the ovaries? If not, how are the epithelial tumours thought to arise?

There is not normally epithelium in the ovaries. Ovarian epithelial tumours are thought to arise from the modified surface 'coelomic' mesothelium. It is postulated that this undergoes 'mullerian differentiation', differentiating into any of the epithelial types of the adult female genital tract (serous (tubal), endometrioid (endometrium) and mucinous (cervical)) that arise from the embryonic paramesonephric (mullerian) ducts.

OVARY: MATURE TERATOMA

CASE 36

Clinical information
The patient had suffered from abdominal pain and vomiting and a mass was felt in the right vaginal fornix. Operation was performed in July 1932.

Describe the specimen
The specimen consists of an enlarged ovary measuring 7cm in maximum dimension. A tuft of hair focally projects from the surface and a window has been cut to show a well-formed tooth within the lesion.

What is the diagnosis?
Mature teratoma of the ovary

Into what category of ovarian tumours does this fall?
This is one of the germ cell tumours of the ovary.

Comment
Neoplastic tumours of the ovary fall into 3 main groups:

- Epithelial: commonest
- Germ cell: demonstrating differentiation of cells involved in embryogenesis
- Sex cord-stromal: demonstrating evidence of differentiation along the lines of one of the sex cord or stromal elements

Germ cell tumours

There are a variety of different types of germ cell tumour of the ovary.

The commonest is the mature teratoma. These benign tumours demonstrate a variety of mature tissues histologically. Epidermis, thyroid, hair follicles, teeth, neural tissue, cartilage and bone may be seen amongst others. Sometimes tissues are recognisable macroscopically e.g. teeth and hair. The vast majority are cystic with large spaces filled with keratin produced by squamous epithelium (hence the alternate name 'dermoid cyst'). Rarely malignant change can develop in one of the elements.

Sometimes similar tumours demonstrate embryonal tissues microscopically. These generally have a more solid architecture and are malignant. They are known as immature teratomas.

Other germ cell tumours of the ovary are the yolk sac tumour, embryonal carcinoma, choriocarcinoma and dysgerminoma.

OVARY: THECOMA

CASE 10641

Clinical information
No clinical information is available.

Describe the specimen
The specimen consists of half a well-circumscribed oval tumour that measures 10cm in maximum dimension. The cut surface shows pale brown cellular tissue containing scattered simple cysts with smooth walls measuring up to 15mm in diameter. There are scattered patches of congestion.

What is the diagnosis?
Ovarian sex cord stromal tumour

Comment
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Sex cord-stromal tumours
This group of ovarian tumours includes the fibromas, thecomas and granulosa cell tumours.

This specimen reportedly showed features of thecoma on histological examination. The specimen is not readily recognisable as ovary, nor as thecoma macroscopically.

Fibromas can often be distinguished from thecomas macroscopically as the latter tend to have a yellow colour, the colour being related to their lipid content, necessary in the synthesis of steroid hormones. Corpora lutea are yellow for the same reason. (Latin: luteus = yellow)

Some of these tumours can sometimes cause endometrial hyperplasia. How?
Granulosa and thecal cells of the ovary produce oestrogen. So too can tumours which differentiate along these lines. Oestrogen causes proliferation of endometrium which when excessive becomes endometrial hyperplasia. Prolonged unopposed stimulation can result in endometrial carcinoma.

OVARY: KRUKENBERG TUMOURS

CASE 18958

Clinical information

The patient was a woman aged 42 who had a partial gastrectomy for peptic ulcer 10 years previously. Nine years later she was readmitted with recurrent ulcer symptoms. Progressive severe abdominal pain and backache supervened. Laparotomy showed a large neoplastic ulcer in the gastric remnant and numerous secondary deposits in the liver. She died 5 months later. At post-mortem there were multiple metastases in the heart, liver, lung, kidney, para-aortic lymph nodes and in both ovaries.

Describe the specimen

The specimen is of the uterus, tubes and ovaries. Both ovaries are totally replaced by nodular masses of pale, firm tumour with intervening fibrosis. The peritoneal surfaces are irregularly nodular.

What is the diagnosis?

Krukenberg tumours of the ovaries

What is the pathogenesis of this disease?

Krukenberg tumours of the ovary are metastatic tumours, usually bilateral. The term is classically used for signet ring carcinomas of the stomach (diffuse gastric adenocarcinoma, linitis plastica) that have metastasised to the ovaries. Other primary sites include breast and large bowel.