ovarian tumours
Benign diseases of the ovary

• Most benign ovarian tumours will be diagnosed by the presence of a pelvic/abdominal mass.
• By symptoms such as pain or incidentally usually on ultrasound.

Causes of benign ovarian cysts

**Functional Follicular cyst**
Corpus luteal cyst
Theca luteal cyst

**Inflammatory Tubo-ovarian abscess**
Endometrioma

**Germ cell Benign teratoma**

**Epithelial Serous cystadenoma**
Mucinous cystadenoma
Brenner tumour

**Sex cord stromal Fibroma**
Thecoma
Diagnosis

**Symptoms** of pain or pressure on the bowel or bladder. Acute pain may represent torsion of a cyst, rupture or haemorrhage into it.

**Examination** may elicit a pelvic/abdominal mass separate from the uterus.

**Common investigations** include ultrasound scan (USS) (transvaginal or abdominal), CT scans or magnetic resonance imaging (MRI), as well as tumour markers. A pregnancy test should be performed to exclude pregnancy. Inflammatory markers, such as CRP and WCC
Tumour Marker Tumour type Uses
Ca 125 Epithelial ovarian cancer (serous), borderline ovarian tumours Preoperative, followup
Ca 19-9 Epithelial ovarian cancer (mucinous), borderline ovarian tumours Preoperative, followup
Inhibin Granulosa cell tumours Follow up
b-hCG Dysgerminoma, choriocarcinoma Preoperative, follow up
AFP Endodermal yolk sack, teratoma Preoperative, follow up
Functional ovarian cysts

- includes (follicular, corpus luteal and theca luteal cysts). The risk of developing functional cysts is reduced by the use of the oral contraceptive pill.
- diagnosis is made when the cyst measures more than 3 cm (normal ovulatory follicles measure up to 2.5 cm), they rarely grow larger than 10 cm and appear as simple unilocular cysts on USS.
- symptomatic, laparoscopic cystectomy may be performed. Corpus luteal cysts occur following ovulation and may present with pain due to rupture and or haemorrhage.
- Theca luteal cysts are associated with pregnancy, particularly multiple pregnancy.
Folicular cyst
Folicular cyst
**Inflammatory ovarian cysts**

- This is usually associated with pelvic inflammatory disease (PID).
- Most common in young women.
- The inflammatory mass may involve the tube, ovary and bowel and can be noted as a mass or an abscess. Occasionally, the tubo-ovarian mass can develop.
- Diagnosis is based on that for PID, inflammatory markers are helpful and treatment may include antibiotics, surgical drainage or excision. Definitive surgery is usually deferred until after the acute infection due to increased risk of systemic infection.
Germ cell tumours

These are the most common ovarian tumours in young women, peak incidence is in the early 20s accounting for more than 50 per cent of ovarian tumours in this age group. The most common form of benign germ cell tumour is the mature dermoid cyst (cystic teratoma). 10 per cent of dermoid cysts can be bilateral. Dermoid cysts are a combination of all tissue types (mesenchymal, epithelial and stroma). Any mature tissue type may be present and often hair, muscle, cartilage, bone or teeth may be noted. Because of the high fat content present in dermoid cysts, MRI is particularly useful in making the diagnosis. Treatment is often surgical excision
Dermoid cyst
Dermoid cyst
**Epithelial tumours**

Benign epithelial tumours increase with age and are most common in peri-menopausal women. The most common epithelial tumours are serous cystadenomas, accounting for 20–30 per cent of benign tumours in women under 40.

Serous cystadenomas are unilocular and rarely involve the opposite ovary.

Mucinous cystadenomas are large multiloculated cysts and are bilateral in 10 per cent of cases.

Brenner tumours are often small tumours found incidentally within the ovary. They may secrete oestrogen.
Sex cord stromal tumours

Ovarian fibromas are the most common sex cord stromal tumours. They present in older women often with torsion due to the heaviness of the ovary.

Meig syndrome (pleural effusion, ascites and ovarian fibroma). Following removal of the ovarian fibroma, the pleural effusion will often resolve.

Thecomas are benign oestrogen-secreting tumours. They often present post-menopause with manifestations of excess oestrogen production such as post-menopausal bleeding.
Malignant ovarian tumours

• Ovarian cancer is the second most common gynaecological malignancy and the major cause of death from a gynaecological cancer.
• The lifetime risk of developing ovarian cancer in the general population is 1.4 per cent (one in 70)
• mean age of presentation is 64 years, rare in young women and only 3 per cent of ovarian cancers occur in women under 35 years.
• there are variations in incidence with ethnicity.
Aetiology and risk factors

• Eighty per cent of ovarian cancers are derived from the ovarian epithelium.
• Epithelial ovarian cancer is due to malignant transformation of the ovarian epithelium.
• Gene mutations resulting in suppression of tumoursuppressor genes, such as p16 and p53, along with overexpression of oncogenes.
• There is a recognized association with germline mutations in BRCA1 and BRCA2 genes in hereditary EOC.
there are two main theories:

1 Incessant ovulation theory: This relates to continuous ovulation causing repeated trauma to the ovarian epithelium leading to genetic mutation and development of a cancer. This is supported by an increased incidence of EOC in nulliparous women, women with early menarche or late menopause and a reduction in incidence of EOC in multiparous women and in women who have used oral contraception.

2 Excess gonadotrophin secretion: This promotes higher levels of oestrogen which in turn leads to epithelial proliferation and malignant transformation of the ovarian epithelium.
<table>
<thead>
<tr>
<th>Decreased risk of ovarian canc</th>
<th>Increased risk of ovarian canc</th>
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<tbody>
<tr>
<td>Multiparity</td>
<td>Nuliparity</td>
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<tr>
<td>Oral contraceptive pill</td>
<td>Intrauterine device</td>
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<td>(RR reduced by 20% per 5 years use)</td>
<td>(RR 1.76)</td>
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<td>Tubal ligation</td>
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<td>Hysterectomy</td>
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<td>Obesity</td>
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Genetic factors in ovarian cancer

• It is estimated that at least 10–15 per cent of women with EOC have a genetic link.
• There are now at least three known forms of hereditary EOC – BRCA1, BRCA2 and Lynch syndrome.
• The lifetime risk of ovarian cancer in the general population is one in 70 or 1.4 per cent. This rises to one in 20 or 5 per cent if women have one family member affected and further increases to 40–50 per cent if two first degree relatives are affected.
• This syndrome is due to a mutation of tumour suppressor genes, the most common is BRCA1 (80 per cent) and BRCA2 (15 percent). Lynch syndrome is hereditary non-polyposis colorectal cancer (HNPCC) and is associated with endometrial cancer and a 10 per cent risk of ovarian cancers.
Management of women with a family history of ovarian cancer

• This depends on the women’s age, reproductive plans and individual risk.
• Women with a strong family history should be referred to clinical genetics for assessment of the family tree.
• If the pedigree suggests a hereditary cancer genetic testing for BRCA1 and BRCA2 may be offered. At present, screening is offered to women aged 35 and over.
• This is usually yearly transvaginal ultrasound and measurement of Ca125, however this strategy is not very sensitive or specific.
• Prospective studies are being carried out looking at 4–6-monthly measurements of Ca125.
• Prophylactic bilateral salpingo-oohorectomy has a role in patients who are found to be carrying a gene mutation and have completed their family.
Classification of malignant ovarian tumours

1 Epithelial ovarian tumours (80%)
   - Serous
   - Mucinous
   - Endometroid
   - Clear cell
   - Undifferentiated

2 Sex cord stromal tumours (10%)
   - Granulosa cell
   - Sertoli–Leydig
   - Gynandroblastoma

3 Germ cell tumours (10%)
   - Dysgerminoma
   - Endodermal sinus (yolk sac)
   - Teratoma
   - Choriocarcinoma
   - Mixed

4 Metastatic (including Krukenberg tumours)
FIGO staging system

Stage FIGO definition
I Growth limited to ovaries
IA Limited to one ovary: no external tumour, capsule intact, no ascites
IB Limited to both ovaries: no external tumour, capsule intact, no ascites
IC Either IB or IB, but tumour on surface of ovary or with capsule ruptured or with ascites positive for tumour cells
II Growth limited to pelvis
IIA Extension and or metastases to uterus or tubes
IIB Extension to other pelvic organs
IIIC As IIA or IIB, but tumour on surface of ovary or with capsule ruptured or with ascites positive for tumour cells
III Growth limited to abdominal peritoneum or positive retroperitoneal or inguinal lymph nodes
IIIA Tumour grossly limited to pelvis with negative nodes, but histologically confirmed microscopic peritoneal implants
IIIB Abdominal implants \(<2\,\text{cm in diameter}
\)
IIIC Abdominal implants \(>2\,\text{cm diameter or positive retroperitoneal or inguinal lymph nodes}
\)
IV Growth involving one or both ovaries with distant metastases
Must have positive cytology on pleural effusion, liver parenchyma.
Clinical features of epithelial ovarian cancer

Most women diagnosed with EOC have symptoms, however these symptoms are nonspecific. The difficulty with clinical diagnosis is the main reason that patients with ovarian carcinoma present with late stage disease (66 percent present with stage III disease or greater), this has a dramatic effect on survival. The most common symptoms are:

• persistent pelvic and abdominal pain;
• increased abdominal size/persistent bloating;
• difficulty eating and feeling full quickly.

Other symptoms such as change in bowel habit urinary symptoms, back ache, irregular bleeding and fatigue occur frequently and any women with persistence of these symptoms should be assessed by their GP.
Examination and investigations

• Pelvic and abdominal examination may reveal a fixed, hard mass arising from the pelvis.
• Chest examination is important to assess pleural fluid and the neck and groin should be examined for enlarged nodes.
• Full blood count, urea and electrolytes.
• Liver function tests and chest x-ray are essential.
• Tumour markers, Ca125 is the most common and is elevated in over 80 per cent of EOC.
• USS characterizes the morphology of the cyst, presence of bilateral tumours, ascites and omental deposits. In conjunction with Ca125 measurement and age, a risk of malignancy (RMI) score can be calculated.
• CT scan or MRI of abdomen
• Barium enema or colonoscopy if bowel symptoms are present or there is a possibility of a primary colorectal tumour.
Surgery for epithelial ovarian cancer

1-Primary surgery – to determine diagnosis and remove tumour
- total abdominal hysterectomy
- bilateral salpingo-oophorectomy
- infracolic omentectomy

2-Conservative primary surgery
- young, nulliparous, stage 1a disease
- no evidence of endometrial cancer
- unilateral salpingo-oophorectomy
3-interval debulking surgery
- women with bulky disease after primary surgery
- must respond after two to four courses of chemotherapy
- chemotherapy resumed after surgery
4-second look surgery
- at the end of chemotherapy
- no place in current management
5-borderline tumours
-ovarian cystectomy or oophorectomy adequate in young women
-hysterectomy and bilateral salpingo-oophorectomy in older women
Chemotherapy can be given as primary treatment, as an adjunct following surgery or for relapse of disease. First-line treatment is usually a combination of a platinum compound with paclitaxel. Most regimes are given on an outpatient basis, 3 weeks apart for six cycles. Carboplatin is now the main platinum compound used as it is less renal toxic and causes less nausea than cisplatin, but is equally as effective. Duration of remission is more than six months, carboplatin may be used, otherwise taxol can be given or other chemotherapy agents, such as topotecan or liposomal doxycycline.
Prognostic factors in ovarian cancer
Stage of disease
Volume of residual disease post-surgery
Histological type and grade of tumour
Age at presentation
<table>
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<tr>
<th>FIGO stage</th>
<th>5-year survival (%)</th>
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<tr>
<td>I</td>
<td>70–90</td>
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<tr>
<td>II</td>
<td>80</td>
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<td>III</td>
<td>30</td>
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<td>10–20</td>
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Sex cord stromal tumours

They are tumours of low malignant potential with a good long-term prognosis. Some morbidity may arise from the increased oestrogen production (granulose, theca or Sertoli cell) or androgen (Seroli-Leydig or steroid cell) causing precocious puberty, abnormal menstrual bleeding and an increased risk of uterine cancer. Commonly as irregular menstrual bleeding, postmenopausal bleeding or precocious puberty in young girls.

Treatment
This is based on the patient’s age and wish to preserve fertility. If young, unilateral salpingo-oophorectomy, uterine sampling and staging is sufficient.
Germ cell tumours

• occur mainly in young women
• The emphasis of management is based mainly on fertility preserving surgery and chemotherapy, often with preservation of fertility.
• Germ cell tumours should be suspected if a young woman presents with a large solid ovarian mass which may be rapidly growing.
• As most women presenting with a malignant germ cell tumour will still be within reproductive years, there may be a need to preserve fertility.
Dysgerminoma
Bilateral cystadenoma
Mucinous cyst adenoma
Eilhelial ovarian tumour
Mucinous cyst adenoma
Serous cyst adenoma