Benign ovarian tumours

Ovarian tumours can be divided into three main groups:

- Functional.
- Benign.
- Malignant.

See the separate Ovarian Cancer article. See also the separate Ovarian Tumours and Fibroids in Pregnancy article.

Benign epithelial neoplastic cysts [1]

- Serous cystadenoma :
    - Develop papillary growths which may be so prolific that the cyst appears solid.
    - They occur in adults of all ages, with mean ages differing from 40-60 years.
    - They are bilateral in 10-20% of cases.
- Mucinous cystadenoma:
    - The most common large ovarian tumours and which may become enormous.
    - They are filled with mucinous material and rupture may cause pseudomyxoma peritonei. They may be multilocular.
    - Mucinous cystadenomas of the ovary occur mainly in women aged 20-50, but may occur in younger women.
    - They are bilateral in 5% of cases..

Benign neoplastic cystic tumours of germ cell origin

- Benign cystic teratoma; rarely malignant.
- They arise from primitive germ cells.
- A benign mature teratoma (dermoid cyst) may contain well-differentiated tissue - eg, hair, and teeth. Can undergo malignant transformation in 1-2% of cases.[2]
- May be bilateral.
- They are most common in young women.
- Poorly differentiated, malignant teratomas are rare.

Benign neoplastic solid tumours

- Fibroma (very few are malignant); small, solid benign fibrous tissue tumours. They are associated with Meigs' syndrome and ascites.[3]
- Thecoma (very few are malignant).
- Adenofibroma.
- Brenner's tumour:[4]
    - Rare ovarian tumours displaying benign, borderline or proliferative, and malignant variants.
    - Usually benign and mostly unilateral.
    - They may be associated with mucinous cystadenoma and cystic teratoma.

How common are benign ovarian tumours? (Epidemiology)

- Benign ovarian tumours occur in 30% of females with regular menses (eg, luteal cysts as incidental findings on pelvic scans) and 50% of females with irregular menses.
- Predominantly they occur in premenopausal women; they may also occur perinatally.

- Benign ovarian tumours are uncommon in premenarchal and postmenopausal women.
- The likelihood of malignancy in women of childbearing age is low and a large proportion of cysts are of functional origin, tending to resolve over time.[5]
- Benign neoplastic cystic tumours of germ cell origin are most common in young women.

Risk factors

- Obesity.
- Tamoxifen therapy has been associated with an increase in persistent ovarian cysts.
- Early menarche.
- Infertility.
- Dermoid cysts can run in families.

Benign ovarian tumour symptoms (presentation)

- Asymptomatic - chance finding (eg, on bimanual examination or ultrasound).
- Dull ache or pain in the lower abdomen, low back pain.
- Torsion or rupture may lead to severe abdominal pain and fever.
- Dyspareunia.
- Swollen abdomen, with palpable mass arising out of the pelvis, which is dull to percussion and does not disappear if the bladder is emptied.
- Pressure effects - eg, on the bladder, causing urinary frequency, or on venous return, causing varicose veins and leg oedema.

- Torsion, infarction or haemorrhage:
    - Causes severe pain.
    - Torsion may be intermittent, presenting with intermittent episodes of severe pain.
    - Ovarian torsion is a complication for persistent masses in pregnancy.[6]
- Rupture:
    - Rupture of a large cyst may cause peritonitis and shock.
    - Rupture of mucinous cystadenomas may disseminate cells which continue to secrete mucin and cause death by binding up the viscera (pseudomyxoma peritonei).
- Ascites - suggests malignancy or Meigs' syndrome.
- Endocrine - hormone-secreting tumours may cause virilisation, menstrual irregularities or postmenopausal bleeding. This is uncommon though.

Differential diagnosis

- Non-neoplastic functional cysts - eg, follicle cyst, corpus luteum cyst, theca lutein cyst.
- Any other cause of pelvic pain.
- Polycystic ovary syndrome.
- Endometrioma.
- Ovarian malignant tumour.
- Bowel - colonic tumour, appendicitis/appendix mass, diverticulitis.
- Gynaecological - pelvic inflammatory disease, tubo-ovarian abscess, uterine tumour (eg, fibroids), ectopic pregnancy, para-ovarian cyst.
- Pelvic malignancies - eg, retroperitoneal tumours, small intestine tumours and mesothelial tumours.

Investigations

It is important that some types of adnexal cysts (such as endometrioma, mature cystic teratoma, and paraovarian cysts) are diagnosed correctly as these may affect patients' fertility, may be associated with significant pelvic disease or may put the patient at risk for ovarian torsion.[7]

- Pregnancy test (uterine or ectopic pregnancy).
- FBC - infection, haemorrhage.
- Urinalysis - if there are urinary symptoms.
- Ultrasound - a pelvic ultrasound is the single most effective way of evaluating an ovarian mass. Transvaginal ultrasonography is preferable due to its increased sensitivity over transabdominal ultrasound.
- CT or MRI scan - usually required only if ultrasound results are not definitive or if intra-abdominal pathology is suspected.
- A recent meta-analysis found that the sensitivity and specificity of MRI for correct detection of malignancy may reach 92% and 88%, respectively.[8]
- Diagnostic laparoscopy may be performed in some cases.
- Fine-needle aspiration and cytology may be used to confirm the impression that a cyst is benign.

- Cancer antigen 125 (CA 125):

    - CA 125 does **not** need to be done in premenopausal women who have had an ultrasound diagnosis of a simple ovarian cyst made.
    - CA 125 is unreliable in differentiating benign from malignant ovarian masses in premenopausal women because of the increased rate of false positives and reduced specificity.
    - Diverticulitis, endometriosis, liver cirrhosis, uterine fibroids, menstruation, pregnancy, benign ovarian neoplasms and other malignancies (pancreatic, bladder, breast, liver, lung) can all result in elevated CA 125 levels.[9]
    - CA 125 is primarily a marker for epithelial ovarian carcinoma and is only raised in 50% of early-stage disease.
    - When serum CA 125 levels are raised, serial monitoring of CA 125 may be helpful, as rapidly rising levels are more likely to be associated with malignancy than high levels which remain static.
    - If serum CA 125 assay is more than 200 units/mL, discussion with a gynaecological oncologist is recommended.[10]
    - The main use of CA 125 is in assessing response over time to treatment for malignancy.

- Lactate dehydrogenase (LDH), alpha-fetoprotein (AFP) and human chorionic gonadotrophin (hCG) should be measured in all women under the age of 40 with a complex ovarian mass because of the possibility of germ cell tumours.

NB: although pelvic ultrasound is highly sensitive in detecting adnexal masses, its specificity in detecting malignancy is lower.[5]

Risk of Malignancy Index (RMI)

There are different risk of malignancy scores which can be used to assess an ovarian mass.

- The RMI I is the most effective for women with suspected ovarian cancer. This is also recommended by the National Institute for Health and Care Excellence (NICE) guideline on ovarian cancer.[11] It should not be used for premenopausal women though.
- RMI I combines three pre-surgical features: serum CA 125 (CA 125); menopausal status (M); and ultrasound score (U).
- The RMI is a product of the ultrasound scan score, the menopausal status and the serum CA 125 level (IU/mL) as follows:
  RMI = U x M x CA 125:
    - The ultrasound result is scored 1 point for each of the following characteristics: multilocular cysts, solid areas, metastases, ascites and bilateral lesions. U = 0 (for an ultrasound score of 0), U = 1 (for an ultrasound score of 1), U = 3 (for an ultrasound score of 2-5).
    - The menopausal status is scored as 1 = premenopausal and 3 = postmenopausal.
    - Serum CA 125 is measured in IU/mL.
- Recommendations are that those women suspected of having ovarian cancer who have an RMI score greater than 200 should have a CT of the abdomen and pelvis performed in secondary care.[12]

Benign ovarian tumour treatment and management

Many patients with simple ovarian cysts based on ultrasound findings do not require treatment.

Expectant management

- Women with small (less than 50 mm in diameter) simple ovarian cysts generally do not require follow-up, as these cysts are very likely to be physiological and almost always resolve within three menstrual cycles.[10]

- Women with simple ovarian cysts of 50-70 mm in diameter should have yearly ultrasound follow-up and those with larger simple cysts should be considered for either further imaging (MRI) or surgical intervention.[13]
- Even in postmenopausal women, as many as 80% of incidental adnexal masses will resolve over a period of several months. For those that are persistent, unchanged, less than 10 cm, and with normal CA 125 values, the likelihood of an invasive cancer is sufficiently low that observation should usually be offered.[14]
- However, ovarian cysts that persist or increase in size are unlikely to be functional and may need surgical management.

Oral contraceptives

- The oral contraceptive pill is **not** recommended, as its use has not been shown to promote the resolution of functional ovarian cysts.[15] Watchful waiting for two or three cycles is appropriate and if cysts persist then surgical management is often indicated.

Surgery

- If conservative measures fail or criteria for surgery are met, surgical therapy for benign ovarian tumours is generally very effective and provides a cure with minimal effect on reproductive capacity.
- Persistent simple ovarian cysts larger than 5-10 cm (especially if symptomatic), and complex ovarian cysts should be considered for surgical removal.
- In children and younger women (wishing to preserve maximum fertility), cystectomy may be preferable to oophorectomy.[16]
- Laparoscopic surgery for benign ovarian tumours is usually preferable to open surgery.[17]
- Although most adnexal masses are benign in pregnancy and usually resolve by 14-16 weeks gestation, when surgical management is chosen, laparoscopy can be safely performed.[6] [2]

- Ovarian torsion:[18]
    - Usually initially treated by laparoscopy with uncoiling of the affected ovary and possible oophoropexy.
    - Salpingo-oophorectomy may be indicated if there is severe vascular compromise, peritonitis or tissue necrosis.
- Immediate surgical intervention is indicated for a haemorrhagic cyst.
- Laparoscopy will need to be upgraded to laparotomy when malignancies are discovered.
- Pseudomyxoma peritonei has been traditionally treated by surgical debulking. However, this inevitably leads to recurrence and repeated surgery. Current recommended standard treatment consists of complete cytoreduction surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC).[19]

Complications

- Torsion of an ovarian cyst can occur.
- Haemorrhage is more common for tumours of the right ovary.
- Rupture of an ovarian cyst can occur.
- Infertility can occur as a result of ovarian tumours or their treatment. However, the role of cysts in infertility is controversial and the effects of surgical treatment are often more harmful than the cyst itself to the ovarian reserve. Surgery does not seem to improve pregnancy rates.[20]

Prognosis

- This is variable and depends on the type and size of tumour, associated complications and the patient's age.
- Most small ovarian cysts in premenopausal women will resolve spontaneously.[2]
- Ovarian torsion: if operated within six hours of onset of symptoms, tissue will usually remain viable.[18]

- Prognosis of surgically removed cysts ultimately depends on the histology.

Further reading

- The Management of Ovarian Cysts in Postmenopausal Women; Royal College of Obstetricians and Gynaecologists (2016)

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Originally Published: 20/11/2023	Next review date: 27/09/2023	Document ID: doc_1855