**Benign Ovarian tumours:** **Ass Prof Dr Ban Hadi**

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**LEARNING OBJECTIVES:**

**Fifth year students should be able to:**

1. Describe the types of benign ovarian tumours
2. Summarize the important points in history and examination to reach the diagnosis
3. Predict the management option for different case scenarios according to their presentation

Ovarian masses are a frequent and common finding in general gynecology, and most are cystic. **Histologically**, ovarian cysts are often divided into:

1. Those derived from neoplastic growth, ***ovarian cystic neoplasms***
2. Those created by disruption of nor­mal ovulation, ***functional ovarian cysts*.** Differentiation of these is not always clinically apparent so using imaging tools or tumor markers may help.

The exact mechanisms leading to cyst formation are **unclear.** **Angiogenesis** is an essential component of both the follicular and luteal phases of the ovarian cycle. It also is a component of various pathologic ovarian processes, including follicular cyst formation, benign and malignant ovarian neoplasms.

**Incidence:**

The incidence of ovarian cysts ranges from 5 to 15 %. Functional ovarian cysts make up a large por­tion. Neoplasms constitute most of the remainder, and these predominantly are benign.

Approximately 7 % of gynecologic admis­sions are for benign ovarian cysts.

**Types of benign ovarian cysts:**

* **Functional**: Follicular cyst, Corpus luteal cyst, Theca luteal cyst
* **Inflammatory:** Tubo-ovarian abscess, Endometrioma
* **Germ cell**: Benign teratoma (dermoid cyst)
* **Epithelial:** Serous cystadenoma, Mucinous cystadenoma, Brenner tumour
* **Sex cord stromal**: Fibroma, Thecoma.

**Diagnosis:**

1. **History: Age, Symptoms and risk factors**

**Age:** The presentation of different types of benign ovarian tumours varies with age. Functional cysts are common in young girls, adolescents and women in their reproductive years. Germ cell tumours occur more commonly in young women, whereas benign epithelial tumours are more prevalent in older and postmenopausal women.

**Symptoms:**

1. Most women with ovarian cysts are **asymptomatic** and found incidentally on routine pelvic examination or during imaging studies for another indication**.**
2. If symp­toms develop, **pain** is common that could be:

**Dysmenorrhea** may indicate endometriosis with an associated endometrioma. **Intermittent or acute severe pain** with vomiting often accompanies torsion. Other causes of acute pain include cyst accidents (as rupture or hemorrhage) and tubo-ovarian abscess.

**Pressure or ache** may be the sole symptom and can result from ovarian capsule stretching.

3-**Increased abdominal girth** from an enlarged ovary.

4-In some women, evidence of **hormonal disruption** can be found. For example, excess estrogen production from granulosa cell stimulation may disrupt normal menstruation or initiate bleed­ing in prepubertal or postmenopausal patients. Increased andro­gens produced by theca cell stimulation can virilize women.

5- Pressure effect on the nearby organs

**Risk factors for ovarian malignancy:** as family history should be looked for by history

**B. Examination**:

**General:** vital signs can be altered in cases of cyst accidents.

Lymph nodes examination, left supraclavicular lymph node is suggestive of malignancy

Leg oedema in cases of large tumours due to pressure effect

Breast, neck and chest examination. Pleural effusion goes with malignancy

**Abdominal**: distension, tenderness and rebound tenderness, mass mobile arising from the pelvis , ascites is suggestive of malignancy.

**Pelvic:** Findings vary, but typically benign masses are mobile, cystic, nontender, and found lateral to the uterus. Tender mass in cases of cyst accidents.

1. **Investigations**:

1.**Ultrasound:** The first-line investigation for women with a suspected pelvic mass or pelvic pain is an USS. A transvaginal USS has better resolution for pelvic masses. A transabdominal ultrasound scan (TAUSS) is indicated in women who have never been sexually active, or in combinations with a TVUSS where large ovarian masses extending beyond the pelvis and into the abdomen are present.

Transvaginal color Doppler sonography (TV-CDS) may add information regarding lesion structure, malignant potential, and possible torsion.

**Features suggestive of benign cyst**: thin-walled, unilocular, unilateral cyst, no ascites, no omental mass or lymph nodes enlargement with normal Doppler flow

2.Additional imaging with **computed tomography (CT)** scanning or **magnetic resonance imaging (MRI)** can further characterize the nature of ovarian cysts, especially where they are thought to be potentially malignant.

3.**Serological tumour markers**: should also be taken to help determine the type of ovarian cyst and differentiate between a benign and malignant neoplasm eg: Ca 125, Ca 19-9, Inhibin, B-HCG, AFP.

4. **A pregnancy test (B-HCG)** should be performed to exclude pregnancy.

5. **Inflammatory markers**, such as C-reactive protein (CRP) and white cell count (WCC), are important if the differential diagnosis includes appendicitis or a tubo-ovarian abscess.

6. Other tests according to the case eg: renal function test, complete blood count, liver function test, virology screen before surgery.

**Tumour markers used in the investigation and follow-up of ovarian cysts:**

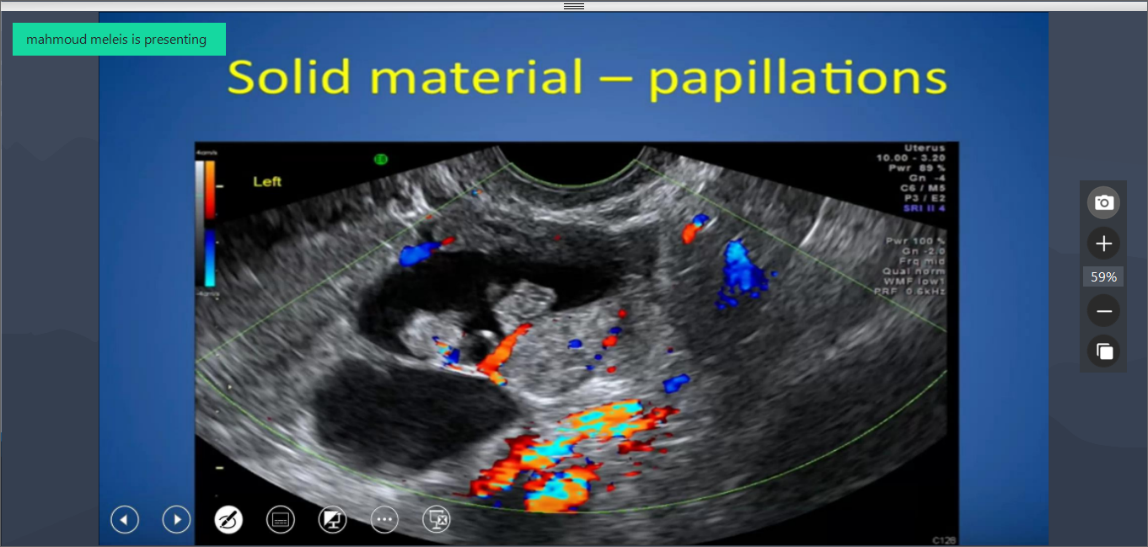


**Note: للاطلاع**

Tumor markers are typically proteins produced by tumor cells or by the body in response to tumor cells. Of markers used, CA125 is a glycoprotein produced by mesothelial cells that line the peritoneal, pleural, and pericardial cavities. CA125 serum levels are often elevated in women with epithelial ovarian cancer. Unfortunately, CA125 is not a tumor-specific antigen, and concentrations are increased in up to 1 percent of healthy controls. Levels may also rise in women with nonmalignant disease such as leiomyomas, endometriosis, adenomyosis, and salpingitis. Despite these limitations, serum CA125 determinations may be helpful and are often obtained if ovarian cysts are large or have sonographically worrisome signs. Cysts in patients who are postmenopausal or are BRCA gene mutation carriers may also warrant CA125 level evaluation. Of other markers, serum alpha-fetoprotein (AFP) levels can

**Note\*:** There is considerable morphologic similarity among cyst types and between those that are malignant and benign. For diagno­sis, ovarian cyst aspiration is usually avoided because of possible intraperitoneal seeding by early-stage ovarian cancer. Moreover, nondiagnostic, false-positive and false-negative results are com­mon. Accordingly, for many cases, excision of the cyst serves as the definitive diag­nostic tool.

**Note\*\*: Risk of malignancy index (RMI)** which is simply calculated using three criteria: serum CA 125 level (U/ml), the ultrasound scan result (expressed as a score of 0, 1 or 3) and the menopausal status (1 if premenopausal and 3 if postmenopausal). This index was statistically virtually as effective a discriminant between cancer and benign lesions.

simple ovarian cyst  complex ovarian tumour

**Treatment:**

However, despite continuous improvement in diagnostic methods, it is often impossible to clinically differentiate between benign and malignant conditions. Thus, management must bal­ance concerns of performing an operation for an innocent lesion with the risk of not removing an ovarian malignancy. **The treatment will depend on:**

1. Symptoms

2. Age

3. Menopausal status

|  |
| --- |
| 1. **Observation:** TVS repeated in 6–12 wks to document resolution; if persistent, then yearly TVS. |

* **The criteria for expectant management are:**  (1) Asymptomatic (2) sonographic evidence of a thin-walled, unilocular, unilateral cyst, no ascites, no omental mass or lymph nodes (3) cyst diameter ≤ 7 cm premenopausal and ≤ 5 cm postmenopausal, (4) no cyst enlargement during surveillance, (5) normal Doppler US and (6) normal serum CA125 level.
* In **prepubertal and reproductive-aged** women, most ovarian cysts are functional and spontaneously regress within 6 months of identification.
* For **postmenopausal women** with a simple ovarian cyst, expectant management may be reasonable if the above criteria are met for ovarian cyst.

**B. Surgery: indicated for symptomatic\* women or those not fill the criteria\* for expectant management** mentioned above.

**The decision for surgical technique is influenced by:**

lesion size, patient age, and intraoperative findings.

* **Premenopausal women**: as **fertility\*** is required and **malignancy risk is low\***, smaller lesions generally require only **cystectomy\*\*** with preser­vation of reproductive function. Larger lesions may necessitate **oophorectomy**\*\* because of increased risks of cyst rupture during enucleation, difficulty in reconstructing ovarian anatomy fol­lowing large cyst removal, and the greater risk of malignancy in these bigger cysts.
* **Postmenopausal women**, **oopho­rectomy\*\*** is preferred because the risk for **cancer is higher\*** and **fertility is not required\***.

**The surgical route is influenced by:** clinical factors.

* **Laparoscopy**: suitable for **small cysts**, has many patient advantages and is safe for cystec­tomy and oophorectomy in appropriately selected women. Thus, if benign disease is anticipated, this is a frequently used approach. However, large cysts may obstruct laparoscopic instrument mobility and may not fit into endo­scopic sacs for contained removal.

* **Laparotomy:** for **large cysts**. With a greater potential for malignancy, a **midline vertical inci­sion** provides a surgical field large enough for oophorectomy without tumor rupture and for surgical staging if malignancy is found. In those with a low risk of malignancy and a moderate-sized cyst, laparotomy through a **low transverse incision** may be appropriate and offer the advantages of this incision.

**Note\*:** With **suspected ovarian cancers**, optimal surgical resection and proper **staging laparotomy** by a gynecologic oncologist during the pri­mary operation are major factors in long-term patient survival. Thus, women with pelvic masses and preoperative findings suspicious for malignancy are generally referred to gynecologic oncologist.

**Note\*\*:** **Clinical findings of an unexpected malignancy at the time of surgery include**: Multiple small lesions studding the peritoneal surface, ascites, and exophytic growths extending from the ovarian capsule should prompt collection of peritoneal fluid for cytologic study and intraoperative frozen section analysis. If cancer is found, gynecologic oncologists are ideally consulted intraoperatively.

**The differential diagnosis of a pelvic mass:**

• **Gynaecological:** benign or malignant ovarian cyst; torsion; para-ovarian cyst; ectopic pregnancy; hydrosalpinx; pyosalpinx; tubo-ovarian abscess; tubal malignancy; pregnancy; fibroids; uterine malignancy.

**• Gastrointestinal**: small or large bowel obstruction; diverticular/appendicular abscess; intussusception; malignancy.

• **Urological:** full bladder, hydronephrosis; pelvic kidney; renal/bladder malignancy.

**• Other**: pelvic lymphocele; peritoneal cyst; psoas muscle abscess; lymphoma; neuroblastoma; aortic Aneurism

**Specific features of benign ovarian tumours:**

* **Ovarian torsion**

• Torsion of an ovary refers to a situation where there is rotation of the vascular pedicle supplying the ovary, which compresses and cuts its blood supply.

• Presenting symptoms are usually acute onset of lower abdominal pain associated with nausea and vomiting.

* Pelvic USS with Doppler measurement of blood flow may be useful in the diagnosis, to confirm the presence of a cyst and comment on blood flow to the ovary.

• Emergency surgical treatment to untwist the ovary and its attached pedicle is required to restore blood flow, and the ovarian cyst should then be removed. However, if this complication is not recognized within a few hours of presentation, infarction and gangrene may result, necessitating removal of the necrotic ovary.



* **Functional ovarian cysts**

This group of ovarian cysts includes **follicular, corpus luteal** and **theca luteal cysts.** The 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 ultrasound

Corpus luteal cysts occur following ovulation and may present with pain due to rupture or haemorrhage, typically late in the menstrual cycle. Treatment is expectant, with analgesia.

Occasionally, surgery may be necessary if there has been significant bleeding to wash out the pelvis and perform an ovarian cystectomy.

Theca luteal cysts are associated with pregnancy, particularly multiple pregnancy, and are often diagnosed incidentally at routine ultrasound. They are often bilateral. Most resolve spontaneously during pregnancy

* **Inflammatory ovarian cysts**

they are usually associated with pelvic inflammatory disease (PID), and are most common in young women sexually active. The inflammatory mass may involve the

tube, ovary and bowel and can be described on imaging as a mass or an abscess.

Occasionally, the tuboovarian mass can develop from other infective causes, for example appendicitis or diverticular disease.

Diagnosis is similar to 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 has resolved, due to the risks of perioperative systemic infection and bleeding from handling acutely inflamed and infected tissue.

* **Endometrioma:**

often known as ‘chocolate cysts’ due to the presence of altered blood within the ovary. They have a characteristic ‘ground glass’ appearance on USS.

Management is laparoscopic cystectomy for symptomatic cases with high risk of recurrence.

* **Germ cell tumours:**

These are the most common ovarian tumours in young women aged 20–40 years, accounting for more than 50% of ovarian tumours in this age group with a peak incidence in the early 20s.

The most common form of benign germ cell tumour is the **mature dermoid cyst (cystic teratoma)**, which contains fully differentiated tissue types derived from all three embryonic germ cell layers (mesenchymal, epithelial and stroma). Hair, teeth, fat, skin, muscle, cartilage, bone and endocrine tissue are frequently present.

**Monodermal teratoma** is teratoma with single type of tissue like:

1. Primary carcinoid tumors of the ovary: give rise in 30% of cases to carcinoid symptoms% it rarely metastasize.
2. Stuma ovarii tumors predominantly composed of thyroid tissue,

Up to 10% of dermoid cysts are bilateral.

The risk of malignant transformation is rare (<2%), usually occurring in women over 40 years.

In general, **ovarian cystectomy** is indicated because spontaneous resolution is unlikely. It is indicated if the dermoid cyst is symptomatic, is more than 5 cm in diameter or is enlarging.

Cystectomy will prevent ovarian torsion and provide tissue for histological analysis.

* **Epithelial tumours:**

Benign epithelial tumours increase in frequency with age and are most common in perimenopausal women.

The most common epithelial tumours are **serous cystadenomas**, accounting for 20–30% of benign tumours in women under 40. Serous cystadenomas are typically unilocular and unilateral, whereas **mucinous cystadenomas** are large multiloculated cysts that are bilateral in 10% of cases

**Brenner** tumours are small tumours often found incidentally within the ovary. They contain urothelial like epithelium and may rarely secrete oestrogen.

* **Sex cord stromal tumours:**

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

Occasionally, patients may present with Meig syndrome (pleural effusion, ascites and ovarian fibroma). Following removal of the ovarian fibroma, the pleural effusion will usually resolve.

**Thecomas** are benign oestrogen-secreting tumours. They often present after the menopause with manifestations of excess oestrogen production, usually postmenopausal bleeding. Although benign, they may induce an endometrial carcinoma.

* **Other non-ovarian cysts**

Other non-ovarian cysts can occasionally present as ovarian tumours. **Fimbrial cysts** and **paratubal cysts** originate from the adjacent Fallopian tube and broad ligament.

**Pregnant women with ovarian tumors**

* Increase incidence of complication (torsion, bleeding,…).
* May prevent the presenting fetal part from engagement.
* May discover incidentally during U/S or C/S.
* No place to postponed operation if acute abdomen.
* If asymptomatic, it is wise to wait until 14 weeks gestation before removing it to ovoid the risk of removing a corpus luteal cyst.
* If cyst unresolved 6 week postpartum, surgery is undertaken.
* Ovarian cancer is uncommon during pregnancy, occurring in less than 3% of cyst. However, a cyst with features suggestive of malignancy on ultrasound, or one that is growing, should be removed surgically.
* CA 125 is not useful in pregnancy since it can be elevated normally.

Management may need to include a Caesarean hysterectomy, bilateral salpingo-oophorectomy&omentectomy.

**End of Lecture**