



Laparoscopic Management of Benign Ovarian Tumours

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1 Introduction

The place and uniqueness of laparoscopy in the management of benign ovarian tumour are not in doubt. However, the task of the attending gynaecologic laparoscopic surgeon is proper case evaluation to ensure that the tumour is not malignant. Intraoperative spill of tumour cells could lead to spread of the tumour which may accelerate disease progression resulting in poor prognostic outcome. Laparoscopic surgery for benign ovarian tumour is associated with reduction in surgical injury, post-operative complications (fever, urinary tract infection), post-operative pain, hospital stay and total cost. Besides these known merits of laparoscopic surgery, the attainment of normal fertility after laparoscopic treatment for benign ovarian mass in premenopausal women is impressive.

2 Types of Benign Ovarian Tumour

Benign ovarian tumours include functional ovarian cysts (follicular cysts and corpus luteum cysts), epithelial cysts (serous cysts, mucinous

cysts, endometrioma), germinal cysts (dermoid cysts, ovarian stroma) and solid ovarian masses (ovarian fibroma, benign Brenner tumour).

3 Clinical Evaluation

A good assessment of patients with suspected ovarian tumour is a pertinent step towards confirming that the mass is indeed benign. Firstly, it is important to take into cognisance the menopausal status of the patient. Postmenopausal patients are women that have not menstruated in the last one year or patients aged 50 years and above who have had hysterectomy. History to be sought for include the following: irregularities in menstruation, pelvic pain, urinary symptoms, bowel symptoms, weight loss, abdominal fullness/swelling, easy satiety and family history of ovarian, bowel and breast cancer.

Examination should include the general outlook of the patient for signs of chronic disease, anaemia and leg oedema. Abdominal and pelvic examination should be carried out to check for abdominopelvic masses, hepatomegaly, splenomegaly, lymph node and ascites. The mass should be characterized in size, consistency, regularity, tenderness and mobility and if it is unilateral or bilateral. Benign ovarian masses are usually unilateral, smooth surfaced and mobile. The sensitivity of clinical examination in detecting an

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ovarian mass is as low as 15–51% which is based on tenderness, mobility, nodularity of the mass and demonstration of ascites. Malignant features that may be detected clinically are masses that are fixed, irregular, nodular, bilateral and hard with associated ascites.

4 Investigations

Specific investigations may include ultrasound scan, colour Doppler, tumour markers, computerized tomography (CT), positron emission tomography (PET) and magnetic resonance imaging (MRI). The relevance of these diagnostic methods will be discussed based on the menopausal status of the patient. Ancillary investigations like full blood count, liver function test and renal function test are also important.

4.1 Investigation of the Premenopausal Patient

Ultrasonography: Transvaginal scan (TVS) is most preferred in the evaluation of ovarian masses; however, transabdominal scan (TAS) may be complimentary in instances where the mass is big and there is need to assess for disease that may have gone beyond the ovary [1]. Employing colour Doppler has been found to be of limited use because the accuracy of diagnosis is not increased significantly, though when the mass is complex, there may be better accuracy when combined with 3-D imaging [1].

It is important to ascertain the following features of an ovarian mass from an ultrasound scan: unilocular or multilocular, evidence of solid areas, evidence of metastasis, ascites, bilateral or unilateral lesions. The International Ovarian Tumour Analysis (IOTA) Group (Table 1) came up with ultrasound findings classified into B-rules and M-rules, which are pointers to benign and malignant lesions, respectively. The IOTA group rules have sensitivity and specificity as high as 95% and 91%, respectively.

CA-125: The place of CA-125 in premenopausal women with ultrasound findings of simple ovarian cyst is limited [1]. CA-125 level of 35 IU/

Table 1 IOTA group simple ultrasound rules

Types of rules	Ultrasound rule
B-rules	Unilocular cyst, presence of solid components with the largest less than 7 mm, presence of acoustic shadowing, smooth multilocular tumour with the largest less than 100 mm in diameter, no blood flow on colour Doppler
M-rules	Irregular solid tumour, ascites, at least four papillary structures, irregular solid multilocular tumour with the largest diameter greater than 100 mm, prominent blood flow on colour Doppler

Table 2 Causes of raised CA-125

S/N	Causes
1	Pelvic inflammatory disease
2	Uterine fibroid
3	Endometriosis
4	Adenomyosis
5	Torsion ovarian cyst
6	Haemorrhage into ovarian cyst
7	Irritation of peritoneum from non-gynaecological causes: Tuberculosis, liver cirrhosis, hepatitis, pancreatitis, peritonitis, pleuritis, ascites
8	Irritation of peritoneum from primary tumour metastasis from breast, pancreas, lung, colon

mL is the cut-off reference value used routinely. When the ovarian cyst is not simple and the serum CA-125 is high but less than 200 IU/mL, further assessment is advocated to rule other pathologies that may cause raised CA-125 levels. Other than ovarian tumour, CA-125 may be high in premenopausal women because it is equally secreted by pathologies like endometriosis, adenomyosis, fibroids, pelvic infections and conditions that cause peritoneal irritation whether from benign non-gynaecological causes or primary tumours with metastasis to the peritoneum (Table 2).

At the other end of the spectrum, low levels of CA-125 are found in situations like smoking, caffeine intake and hysterectomy. This brings to the fore that the interpretation of high and low levels of CA-125 should be cautiously done. Serial measurement of CA-125 is suggested when the value is raised but less than 200 IU/mL and other causes

Table 3 Risk of malignancy index I (RMI I)

$RMI\ I = U \times M \times CA-125$
U is ultrasound result and a score of 1 point each is given for the following when present: Multilocular cyst, solid areas, metastases, ascites and bilateral lesion.
U = 0 for an ultrasound score of 0
U = 1 for an ultrasound score of 1
U = 3 for an ultrasound score of 2 to 5
M is menopausal status: 1 = premenopausal, 3 = postmenopausal
CA-125 is measured in the serum in IU/mL.

of high CA-125 are excluded, as evidence of rapidly rising levels may be a pointer to a malignant lesion. Very high levels of CA-125 would need referral to an oncologist. However, if there is presence of complex ovarian mass with a suspicion that it might be a germ cell tumour, it is important to assay for alpha-fetoprotein, human chorionic gonadotrophins and lactate dehydrogenase [1].

Imaging: The place of imaging like CT and MRI for routine evaluation of benign ovarian mass shows no added merit of improved accuracy over TVS in the diagnosis of malignancy, [2] though benefits may accrue with CT and MRI should the ovarian mass be complex.

It is essential to assess for risk of malignancy in patients with ovarian mass. The use of the risk of malignancy index I (RMI I) has been favoured because of its simplicity and reproducibility [2]. In spite of the odd against RMI I (Table 3) from other causes of raised CA-125 levels in premenopausal women, its sensitivity and specificity are as high as 78% and 87%, respectively, in detecting ovarian malignancy.

4.2 Investigation of the Postmenopausal Patient

Ultrasound: TVS is important and invaluable in the evaluation of ovarian cyst and TAS could be employed when the mass is beyond the field of view of TVS. Ultrasonic features of a simple ovarian cyst are round/oval shape, thin wall and absence of septations, anechoic fluid and acoustic enhancement posteriorly [2]. A complex ovarian

cyst features one or more of the following: multilocular cyst, solid nodules and papillary projections, if present, which are linked to the likelihood of malignancy. Accentuation of sonography with colour Doppler, pulse and spectral Doppler and 3-D sonography is not important in the routine and initial assessment because it is not associated with increased diagnostic accuracy [2]. Likewise, CT, MRI and PET-CT SCAN are not recommended for initial assessment of postmenopausal women with ovarian cyst [2, 3]. However, their place in the investigation of complex ovarian mass and where metastasis is suspected is not disputable.

CA-125: In postmenopausal women, CA-125 is the only tumour marker recommended for the initial routine assessment of ovarian cyst [2]. More so, because of its inclusion in the calculation of RMI I, which has a value of 78% pooled sensitivity and specificity in differentiating between benign and malignant, it is therefore still important to exclude other causes of raised CA-125. Use of other tumour markers are not routinely employed in the evaluation of postmenopausal ovarian cyst. In cases where the RMI I is 200 IU/mL and above, it is advisable to refer the patient to the gynaecology oncology unit.

5 Laparoscopic Surgical Treatment

Before arriving at a decision for surgical intervention, the patient should be considered for possible conservative management. In the premenopausal patient with simple ovarian cyst of less than 5 cm in diameter, which is likely a physiological cyst, a follow-up may not be required. However, if the simple ovarian cyst measures 5–7 cm, a follow-up every year is advocated [3, 4].

Further evaluation with imaging is required for larger cyst. In postmenopausal patients, simple unilateral and asymptomatic ovarian cyst of diameter less than 5 cm and normal CA-125 value may be managed conservatively and reevaluated in 4–6 months [3, 5].

5.1 Options of Laparoscopic Procedures

Aspiration, cystectomy, oophorectomy and salpingo-oophorectomy are possible surgical procedures that could be performed laparoscopically for benign ovarian tumours. In premenopausal patients, management of benign ovarian mass by laparoscopy is preferred because of the advantages of reduced postoperative morbidity and its cost-effectiveness, quick recovery and early discharge from the hospital. However, large-sized tumours and presence of solid components may warrant a decision to perform laparotomy. Although surgeons have reported successes in the management of huge benign ovarian tumours laparoscopically by placing the Veress needle in the left hypochondrium, safeguarding against inadvertent cyst rupture. However, some surgeons are of the opinion that the process of operating on a huge ovarian mass negates or diminishes the merits of laparoscopic surgery [3, 5]. In postmenopausal patients with benign ovarian cysts, patients with a low risk of malignancy based on RMI I less than 200 IU/

mL can be managed laparoscopically by performing a bilateral salpingo-oophorectomy and not aspiration or cystectomy [4].

5.1.1 Aspiration

Laparoscopic or vaginal aspiration of ovarian cyst is associated with recurrence due to re-accumulation. Aspiration of cyst to reduce tension and accidental spillage may be performed before cystectomy for large ovarian cysts. The surgeon may consider using tissue retrieval bags to avert spillage of cyst content. In postmenopausal women, aspiration of ovarian cyst is not recommended because of poor diagnostic value of cyst fluid cytology, recurrence of cyst and spillage of cancer cells in cases misdiagnosed as benign [4].

Technique: Immobilize the ovary by using an Endo Clinch grasper forceps to hold the ovarian ligament (Fig. 1).

Via the anti-mesenteric side of the ovary, the cannula or 5-mm aspiration needle for suction is introduced into the cyst. After suction the cavity of the cyst may be lavaged.

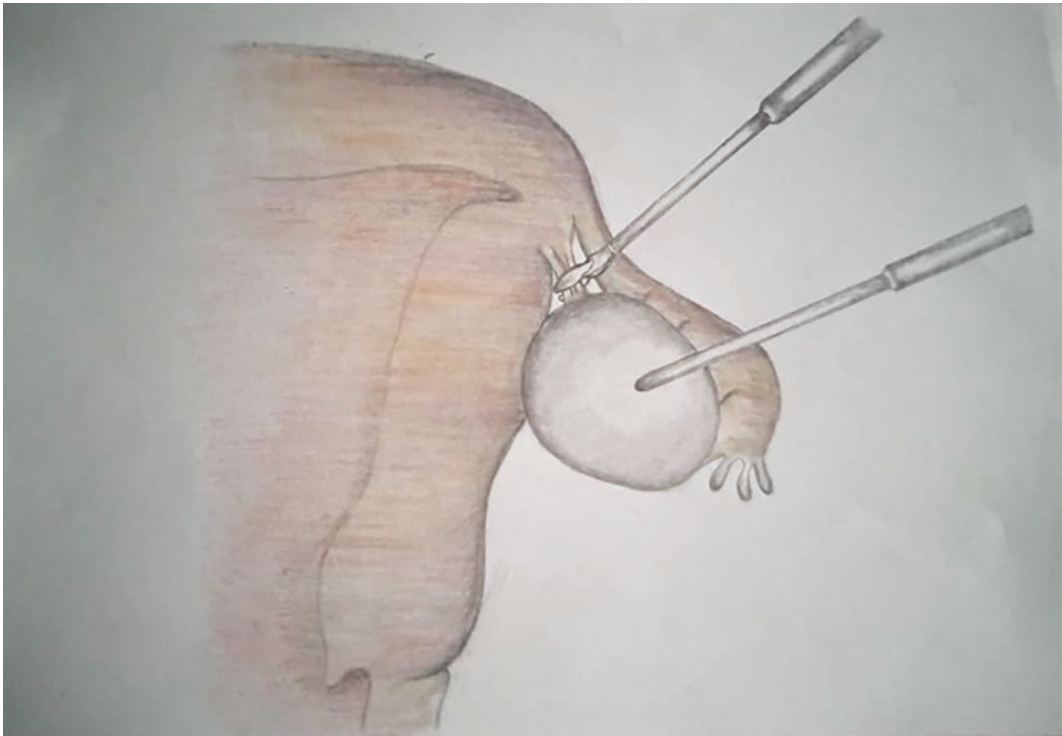


Fig. 1 Ovarian ligament stabilization before aspiration procedure for ovarian cyst

5.1.2 Cystectomy

In premenopausal patients, cystectomy is favoured for preservation of ovarian parenchyma around the hilum for future fertility [1]. In postmenopausal patients, cystectomy is not an option [2]. Inadvertent cyst rupture is of higher incidence at laparoscopy than laparotomy [4].

Technique: Uterine manipulator is put in place for ease of visualizing the adnexae. The ovary is mobilized from any adhesions and the ovarian fossa. An Endo Clinch grasper is used to hold the ovarian ligament; this is to allow for good exposure. Opposite the ovarian hilum, unipolar scissors is used to make an incision to reach the cyst wall. By grasping the ovarian cortex with atraumatic Markowitz or Dorsey grasping forceps, the cleavage plane is identified and dissection done with round-ended curved scissors (Fig. 2).

Bipolar coagulation of vessels supplying blood to the cyst is done before the cyst is removed intact. In instance of huge ovarian cysts,

aspiration of the cyst is done followed by cold-scissors incision into the ovarian cortex and cyst wall. The edges of the incision at opposite ends are grasped by atraumatic forceps for stabilization. Following identification of cleavage plane, the cyst capsule is stripped from the ovarian parenchyma using a Manhes forceps.

Bipolar energy is used to ensure haemostasis. Should ovarian tissue be found protruding, it is coagulated. Finally, if the ovarian margin overlaps, it can be left for spontaneous healing and if otherwise suture is applied to oppose the edges.

Caution should be taken when performing laparoscopic ovarian cystectomy for dermoid cyst. This is because the content of the cyst may inadvertently spill into the peritoneal cavity resulting in chemical granulomatous peritonitis [6]. Excising the cyst intact in a lap sac or endo pouch is advocated and subsequent removal of the cyst with a salvage bag [6]. Should iatrogenic rupture of the cyst occur, it is recommended to try

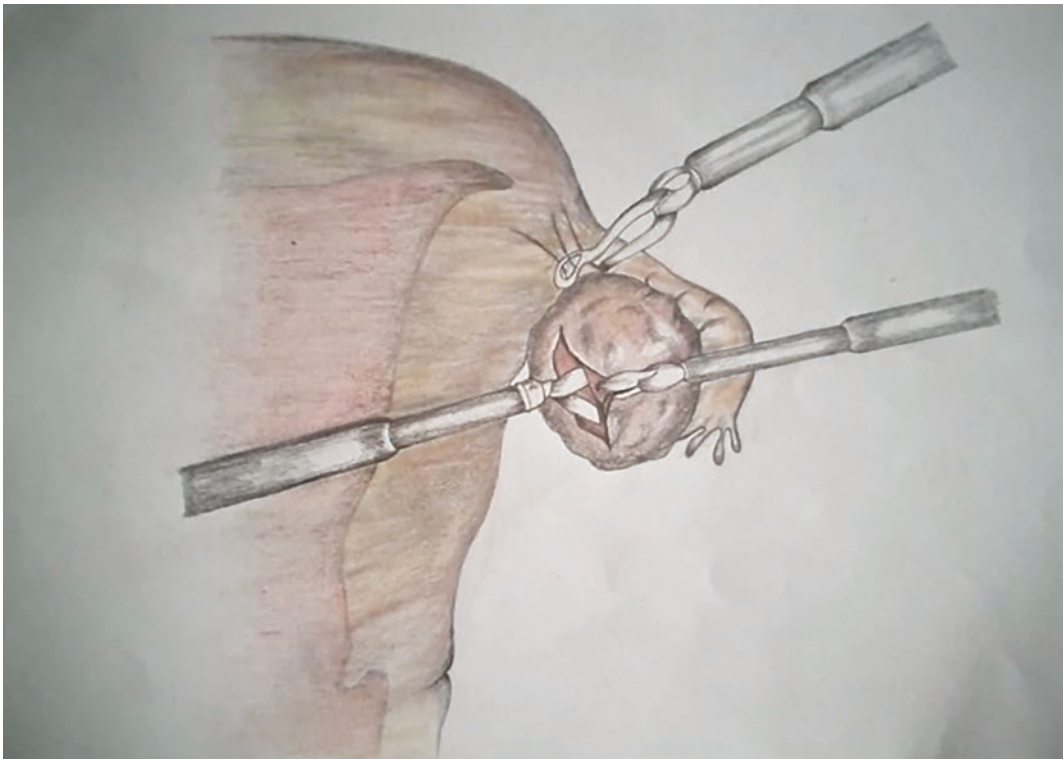


Fig. 2 Assess of cleavage plane during ovarian cystectomy procedure

to restrict the spill to the lower pelvis and not allow advancement to spaces in between the intestinal loops [6]. It is important to lavage with sodium chloride solution at body temperature until there are no fatty particles in the effluent. Lavage will decrease inflammatory reaction and adhesion formation [6].

5.1.3 Oophorectomy

For benign ovarian masses, oophorectomy in a premenopausal patient is only recommended when there is markedly insufficient or absent ovarian tissue to conserve [1]. The use of a laparoscopic retrieval bag is advised preferably through an umbilical port.

Technique: The ovary is immobilized with an Endo Clinch forceps. Bipolar forceps with a wide jaw is used to coagulate the ovarian pedicle. Starting from the uterine side, the mesovarium and mesosalpinx are held and coagulated in small portions till the fimbrial end is reached.

5.1.4 Salpingo-Oophorectomy

Salpingo-oophorectomy for benign ovarian masses is recommended in postmenopausal patients. In premenopausal patients, it could be an indication when the tube is taken up by the benign ovarian pathology.

Technique: The adnexa is lifted with traction and all efforts should be put into identifying the course of the ureter through the peritoneum. The ureter is displaced laterally away from the infundibulopelvic fold. The latter which contains the ovarian vessel is grasped with a wide-jaw bipolar forceps and coagulated. Cold knife is used to transect the vessel. The ovarian ligament and tubal isthmus are then clamped, coagulated and transected.

6 Conclusion

Benign ovarian tumours are common gynaecological conditions that may need surgical intervention. Contemporary management of benign ovarian tumour is by laparoscopy once malignancy is ruled out. Patients with malignancies should be referred to the gynaecology oncology

unit. Preservation of the ovary for reproduction is best achieved by laparoscopic management.

Learning Points

- Benign ovarian tumours are best managed by laparoscopy.
- Evaluation to rule out malignancy is essential before subjecting a patient to laparoscopic surgery.
- It is important to know the menopausal status of the patient and if the mass is simple or complex as a guide for subsequent evaluation.
- Where available, operative specimen should be subjected to frozen section to exclude malignancy.
- Where applicable, use of a laparoscopy retrieval bag is recommended to prevent intra-peritoneal spillage of cyst content and subsequent peritonitis.
- If iatrogenic rupture and spillage of dermoid cyst content occur, copious lavage with normal saline solution at body temperature should be performed.

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