The pelvic mass: assessment and evaluation

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Abstract

A pelvic mass in a common condition and a thorough history and examination is important to identify possible causes. A combination of laboratory investigations and radiological imaging is helpful to reach a diagnosis and also triage cases of malignancy. In this review we consider common presentations, methods to assess the risk of malignancy and treatment strategies of a range of causes.

Keywords ovarian cancer; pelvic mass; risk of malignancy; tubo-ovarian abscess; ultrasonography; uterine malignancy

Introduction

A pelvic mass is a common disorder which represents a spectrum of conditions with many causes. A mass may be gynaecological or non-gynaecological in origin and the likely causes often vary according to age. In regards to gynaecology a pelvic mass most commonly arises from the ovary but may develop from the uterus or fallopian tube. A pelvic mass may present with symptoms or be detected incidentally on clinical or radiological examination. In all cases it is important to consider the possibility of malignancy and this should always be evaluated and managed accordingly.

Assessment

Clinical history and examination is vital to ascertain the possible causes of a mass. Pain is a common symptom. In cases of acute pain and an adnexal mass an ectopic pregnancy or ovarian torsion must be considered and managed immediately. Large masses may present with obstructive symptoms such as urinary or bowel dysfunction or even lower limb venous thromboembolisms. Masses that arise from the uterus can be associated with symptoms of vaginal bleeding or dyspareunia and dysmenorrhea. These symptoms may also represent the presence of an endometrioma. Malignant ovarian masses may present with vague symptoms of early satiety, weight loss and bloating.

Clinical abdominal examination may reveal a palpable mass or demonstrate ascites in the cases of ovarian malignancy. In women with an acute abdomen, torsion of an adnexal mass may be suspected. Vaginal examination is important and can reveal congenital malformations or a vaginal mass and imperforate hymen giving rise to haematocolpos in pubertal women. Nodularity of uterosacral ligaments and obliteration of the pouch of Douglas may suggest endometriosis.

There are many non-gynaecological causes of a pelvic mass and a detailed history can reveal subtle clues to guide appropriate investigations. Special attention should be given to a diverticular abscess, as this can be difficult to distinguish from a tubo-ovarian abscess. If surgical management is warranted involvement from the colorectal surgeons may be necessary (Table 1).

Gynaecological and non-gynaecological causes of pelvic mass

Gynaecological	
Benign ovarian	Follicular cyst
	Mature teratoma
	Ovarian torsion
	Polycystic ovaries
	Serous mucinous cystadenoma
Malignant ovary	Borderline tumour
	Epithelial carcinoma
	Ovarian germ cell tumour
	Sex cord tumour
Benign non ovarian	Ectopic pregnancy
	Endometrioma
	Hydrosalpinx
	Leiomyoma
	Tubo ovarian abscess
	Gravid uterus
Malignant non ovarian	Endometrial carcinoma
	Fallopian tube carcinoma
Non gynaecological	
Benign	Appendiceal abscess
	Appendicitis
	Bladder diverticulum
	Diverticular abscess
	Pelvic kidney
Malignant	Gastrointestinal carcinoma
	Krukenberg tumour
	Retroperitoneal sarcoma

Table 1

Investigations

Timely and appropriate investigations are important to characterize the mass and guide suitable management.

Radiology

Ultrasound is the standard modality for the assessment of a pelvic mass, and often a combination of abdominal and transvaginal imaging is required. Ultrasonography should assess the size and characteristics of the mass (cystic, solid), and its complexity (internal septae, solid elements and papillae). Ultrasonography is usually reliable in determining the origin of the mass and can also demonstrate associated findings such as the presence of ascites and even ureteric dilatation in large obstructing masses.

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Please cite this article as: Cass GK, Newton C, The pelvic mass: assessment and evaluation, Obstetrics, Gynaecology and Reproductive Medicine, https://doi.org/10.1016/j.ogrm.2020.02.010

In regards to adnexal mases, ultrasonographic features of a simple cyst consist of: round or oval shape, thin or imperceptible wall, posterior acoustic enhancement, anechoic fluid, and absence of septations or nodules. Ultrasound identification of a simple cyst establishes a benign process in 95–99% of post-menopausal women. An ovarian cyst is defined as complex in the presence of one or more features: complete septation (i.e. multilocular cyst), solid nodules or papillary projections.

Colour doppler study has a 84% sensitivity and 82% specificity in diagnosing malignancy in adnexal masses with malignant masses more typically demonstrating a central blood flow whilst peripheral flow is more common in benign lesions. Despite these figures some studies have demonstrated inconsistent reliability and thus it is not routinely recommended in isolation to aid triage of malignant versus benign masses.

In any pelvic mass where malignancy is suspected a Computed Tomography (CT) scan of the abdomen and pelvis with contrast is appropriate to investigate for distant disease and aid planning of surgery. CT imaging can assess for omental and peritoneal disease as well as demonstrate ascites and lymphadenopathy.

Magnetic resonance imaging (MRI) can help to further characterize intermediate pelvic masses and assessment with contrast-enhanced MRI increases sensitivity to 81 % and specificity to 98 % in cases of ovarian cancer. In regards to uterine masses MRI imaging has some benefit in pre surgical identification of malignant disease. MRI is also useful to assess local invasion and in particular has overtaken the use of clinical assessment in the staging of cervical cancer as it has a higher sensitivity.

Laboratory investigations

The most commonly used serum marker in assessment of a pelvic mass is cancer antigen (CA)-125. This marker is raised in over 80% of epithelial ovarian cancers. If a cut-off of 30 iu/ml is used, the test has a sensitivity of 81% and specificity of 75%. Although sensitivity remains high in pre-menopausal women it lacks specificity as it can be raised in other conditions such as endometriosis, inflammation, and benign masses that undergo torsion or haemorrhage (Table 2).

The finding of a complex adnexal mass amongst pre-menopausal women under 40 years of age should also require investigation of other tumour markers lactate dehydrogenase (LDH), alpha feto protein (AFP) and human chorionic gonadotropin (hCG) due to the possibility of a germ cell tumour in this younger age group.

Assessing risk of malignancy

In most cases of pelvic masses the risk of malignancy is low however appropriate triaging of women is important to ensure optimal treatment. In regards to assessing the risk of malignancy in adnexal masses, various scoring systems can be used, the most common being RMI (Risk of Malignancy Index) which is supported by the Royal College of Obstetricians and Gynaecologist. The RMI is a useful tool to guide the clinician both to the likelihood of malignancy as well as the most suitable place of management if surgery is undertaken. It is well established that the introduction of cancer centres with specialized multi-disciplinary treatment has improved survival outcomes for women with gynaecological malignancy.

Causes of raised CA 125

Benign Gynaecological conditions	Benign ovarian cyst
	Endometriosis
	Pregnancy
	Ovarian hyperstimulation syndrome
	Pelvic infection/inflammation
	Leiomyomata
	Adenomyosis
Malignant Gynaecological conditions	Epithelial ovarian cancer
	Endometrial cancer
	Cervical cancer
Non gynaecological causes	Congestive cardiac failure
	Liver disease
	Diabetes
	Breast, colon, pancreatic cancer

Table 2

The RMI combines three pre surgical features of an adnexal mass: serum CA 125 level (IU/ml), menopausal status (M) and ultrasound score (U). The ultrasound score is determined according to these features; multilocular cyst, solid area, evidence of metastases, presence of ascites, bilateral lesions with each feature scoring 1. These three figures are multiplied to give an RMI value.

$$RMI = CA125 \times M \text{ (pre-menopausal} = 1, \text{ post-menopausal} = 3) \times U \text{ (U} = 1 \text{ for score of 1, U} = 3 \text{ for a score of 2–5).}$$

An RMI score with a threshold of 200 (sensitivity 78%, specificity 87%) is recommended to predict the likelihood of ovarian cancer and to plan further management. Therefore for those women with a high RMI, their risk of malignancy is such that they should be offered referral for assessment at a cancer centre and offered further imaging in the form of CT scan. For those women with an intermediate score further assessment with second line imaging with MRI can be offered although at present there is no conclusive data relating to the performance of MRI in these circumstances. If there is concern, interpretation of ultrasound images by an expert clinician with expertize in gynaeoncology imaging must be sought (Table 3).

An alternative scoring system for adnexal masses with similar sensitivity and specificity is the IOTA classification. Ultrasound rules were derived to help classify masses as benign (if they demonstrate B-rules) or malignant (if they demonstrate M-rules). Using these morphological rules, the reported sensitivity was 95% and the specificity has been reported as 91%. Women with an ovarian mass with any of the M-rules ultrasound findings should be referred to a gynaecological oncology service (Table 4).

At present there is no effective screening tool for detecting of malignant adnexal masses. A ROCA (risk of ovarian cancer algorithm) test has been used in two clinical trials in addition to ultrasound and demonstrated a high sensitivity (85.8%) and specificity (99.8%) in detecting ovarian cancer. The ROCA test

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Risk of cancer according to RMI

Risk	RMI	Women (%)	Risk of cancer (%)
Low	<25	40	<3
Intermediate	25–200	30	20
High	>200	30	75

Source: Davies AP et al. Br J Obstet Gynaecol 1993; 100: 927-31.

Table 3

uses an algorithm to determine the likelihood of ovarian cancer using age, menopausal status, risk status and serial blood measurements of CA-125 over time. The UK Familial Ovarian Cancer Screening Study (UKFOCSS) demonstrated more early stage ovarian cancers being detected through screening with the ROCA as well as less women needing chemotherapy and complex surgery in women at increased risk of ovarian cancer. Mortality analysis revealed a reduction in death but this was not significant. Further long term data is awaited from UKCTOCS to demonstrate whether ROCA is cost effective and reduces mortality from ovarian cancer in the general population. At present routine screening in the general population is not recommended.

Management

Non-gynaecological masses should be referred and managed appropriately.

Ovarian or tubal masses are a leading cause for surgical intervention. Management of benign adnexal masses depends on a woman's age, size of mass, fertility aspirations and symptoms. In women of reproductive age expectant management is often appropriate with smaller benign lesions, to minimize the impact on potential fertility and reducing morbidity. When surgery is recommended, laparoscopic techniques are preferred and referral to a gynaecological oncologist is essential when malignancy is suspected.

In cases of uterine or cervical mass due to fibroids, surgery is generally favoured in women with symptoms as medical treatment of large fibroids is usually unsuccessful. Although uterine sarcoma is rare, it is important to evaluate for potential malignancy prior to planning the surgical approach, as minimally invasive surgery often requires tissue morcellation which can upstage the disease and have an impact on survival. MRI is a helpful imaging modality to evaluate for features of malignancy, although this can only be confirmed on post-operative histology. In smaller masses or where fertility is desired uterine preserving surgery such as trans-cervical resection of fibroid, myomectomy or uterine artery embolization may be favoured and associated with less morbidity and inpatient stay.

IOTA group ultrasound rules for ovarian cyst classification

B Rules	M Rules
Unilocular cyst	Irregular solid tumour
Presence of solid components when largest if <7 mm	Ascites
Presence of acoustic shadowing	At least four papillary structures
Smooth multilocular tumour with largest diameter <100 mm	Irregular multilocular solid tumour with largest diameter >100 mm
No blood flow	Strong blood flow

Source: Timmerman D et al. Ultrasound Obstet Gynecol 2008; 31(6):681-90.

Table 4

The adnexal mass in young and pregnant women

All prepubescent girls with an adnexal mass should be referred to a specialist with experience in paediatric gynaecology. If surgery is required this should take place with the appropriate expertize, and typically with both a paediatric surgeon and gynaecologist.

Management of adnexal masses in women of reproductive age depends on pregnancy status and the size and complexity of the mass.

The use of routine ultrasound during pregnancy has led to an increase in detection of adnexal masses. The most common masses found during pregnancy are functional or corpus luteal cysts that are likely to resolve in time and in most cases a follow up ultrasound is recommended. Nonetheless these cysts may appear complex with solid and haemorrhagic areas. The risk of ovarian cancer in pregnancy is <3% however tumour markers have a low specificity in pregnancy making triage of masses more difficult. Tumour markers are frequently elevated due to the effects of pregnancy. RMI is therefore not useful and if there is concern over the characteristics of the cyst then MRI may be helpful to further characterize the nature of the cyst and likelihood of malignancy. Benign cysts should be managed conservatively where possible, and those that persist throughout the pregnancy can be followed up in the post-natal period with surgery offered based on the size and extent of symptoms. If surgery becomes necessary because of complications such as torsion, the early mid to late second trimester is ideal due to the reduced risk of miscarriage at this gestation without complex difficulties with operative exposure due to the gravid uterus. In any case joint care with experienced obstetrician and gynaecologist is important to ensure optimal care of the woman and her fetus. If it is likely that surgery will be required in the post-natal period, for example if there is a large dermoid cyst, then it is very helpful to discuss the option of treatment of the cyst at the time of caesarean section should this be the required mode of delivery. A full discussion with the patient should be had in the antenatal period, including the surgical plans of ovarian cystectomy or oophorectomy, so that she can make an informed decision about her care in a non-emergency setting. In the case of an emergency caesarean section, treatment for the adnexal mass should only be carried out if there is appropriate expertize available at the time. The woman should be informed of the small chance that this may not be possible, even if it has been planned.

Complex ovarian masses in young women may arouse the suspicion of germ cell tumours. These heterogenous tumours are rare, comprising only 1–2% of all ovarian malignancies. Surgery is the main stay of treatment for these women followed by chemotherapy, except in those with stage 1A disease where surveillance following surgery is the gold standard. Serum

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tumours markers hCG, α-FP, LDH and cancer antigen 125 (CA 125) can provide prognostic information so should be measured preoperatively. Overall survival is high >90% and adverse factors include age >45 years, stage > I, incomplete surgical resection and yolk sac tumour (YST) histology. Surgery usually involves unilateral salpingo-oophorectomy with preservation of the uterus and contralateral ovary in young women to preserve their fertility. These tumours are highly chemosensitive so lymphadenectomy is not routinely recommended (Table 5).

Women who are systemically unwell who present with a mass may have a tubo-ovarian abscess (TOA). A TOA is an inflammatory mass involving the tube and ovary and represents a severe form of pelvic inflammatory disease (PID). It may also be caused by other abdominal causes such as perforated diverticular abscess, appendicitis or as an infective complication in the postoperative period. A raised white cell count, C reactive protein along with a fever and abnormal discharge should prompt investigations. A TOA is usually detected on ultrasonography which appears as a complex solid cystic mass. A pyosalpinx may be seen as an elongated, dilated, fluid-filled mass with partial septae and thick walls. There may also be a 'cogwheel' sign resulting from thickened folds in the tube. CT imaging may be required to ascertain the extent of disease. In all cases microbiology samples are imperative in order to target antibiotic therapy.

In cases where a TOA is associated with PID the most common cause is polymicrobial but *Escherichia coli,* bacteriodes and streptococcus organisms are frequent. Actinomyces must be considered in the presence of an intra uterine device, and in these cases histology is the best method of confirming the diagnosis. A TOA is most common in younger women, and if present in post -menopausal women malignancy must be excluded. Treatment first consists of managing sepsis with intravenous antibiotics and appropriate resuscitation and systemic support as required. Antibiotics are needed for extended periods of up to two weeks or beyond, and collections may take several months to resolve, therefore clinical follow up is required on discharge. Surgery may be necessary if there is no response to treatment usually after 48 −72 h in order to drain collections and confirm the diagnosis. Full exploration of the abscess, with break down of all the loculations together with copious irrigation is essential to clear the infection. Care must be taken not to damage the surrounding structures which are often odematous, inflamed and fragile. Radical excision may be required in some resistant cases or those women who no longer require fertility. Long term complications include adhesions, pain and subfertility.

Occasionally a TOA can occur in the absence of overt signs of infection. This is usually when an infection has been partially treated. This clinical picture can mimic malignancy.

WHO classification of germ cell tumour

Dysgerminoma	Yolk sac tumour
Embryonal carcinoma	Mature and immature teratoma
Nong-gestational choriocarcinoma	Mixed germ cell tumour

Table 5

Malignant uterine masses

Uterine sarcomas are a rare group of tumours from the mesenchymal cells and diagnosis is often made retrospectively after histology from surgery for a presumed benign disease. The most common type is leiomyosarcoma and rarer types include endometrial stromal sarcoma, undifferentiated uterine sarcoma and adenosarcoma. These tumours are often aggressive and respond less well to adjuvant treatment compared to endometrial adenocarcinoma and there is an associated worse prognosis with 5 year survival rates between 60 and 30% at 5 years depending on stage. A rapidly growing fibroid in a peri- or post-menopausal woman should trigger suspicion of sarcomatous change, especially if they are not taking HRT. However other symptoms may be subtle or include vaginal bleeding and pressure effects secondary to the mass. Efforts should be made to triage risk of malignancy to prevent inappropriate surgical treatment such as laparoscopy and morcellation. Ultrasonography and MRI imaging can be helpful to characterize sarcomas. Leiomyosarcomas commonly manifest as heterogeneous hypointense masses on T1-weighted images, with irregular margins. On T2-weighted images they show intermediate-to-high signal intensity, with central hyperintensity indicative of extensive necrosis and haemorrhage. Surgical management consists of total abdominal hysterectomy and removal of any extra-uterine disease. Systematic lymphadenectomy is not required, although any enlarged suspicious nodes identified on imaging, or at the time of surgery should be removed. It is not always necessary to remove the ovaries, and often the ovaries are conserved in younger women suspected of having sarcoma. All cases should be manged with the input of specialist sarcoma MDTs. Adjuvant treatment in the form of chemotherapy is offered dependant on stage and histological subtype and has been demonstrated to provide a small reduction in relapse rates and increase overall survival in advanced cases.

Simple adnexal masses

In premenopausal women with simple cysts of <5 cm follow up is not required as they are likely to resolve. Women with larger simple cysts between 5 and 7 cm may be offered yearly follow up with ultrasonography. Women with cysts greater than 7 cm should be referred for MRI assessment as it is difficult to obtain adequate views on ultrasound imaging. Surgical intervention is usually recommended in these larger cysts due to the risk of ovarian torsion or pressure effects. Cysts that increase in size over time or persist may warrant surgery as are they are less likely to be functional.

Aspiration of simple cysts is less effective than ovarian cystectomy, with a high risk of recurrence, and is therefore not recommended. Wherever possible surgery should be offered using a minimal access approach if malignancy is not suspected. Even very large cysts can be managed through the minimal access approach as the cyst can be drained prior to completing the cystectomy.

Post-menopausal women with simple cysts <5 cm with a normal CA 125 can be managed conservatively with up to 50% of these cysts resolving over 3 months. Women in this group can be followed up over a year with 3−4 monthly ultrasounds and discharged if the cyst remains unchanged.

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In post-menopausal women with a low RMI (<200) conservative versus surgical management can be discussed with the decision for surgery based on presence of symptoms, co morbidities and surgical complexity and morbidity. Surgery should involve bilateral salpingo-oophorectomy in favour of ovarian cystectomy and ideally be carried out laparoscopically without spillage of cyst contents in case of occult malignancy.

Ovarian malignancy

Ovarian cancer is a diverse disease and epidemiology, risk factors, pattern of spread, response to treatment and prognosis vary significantly according to histological subtype.

Ovarian cancers can be divided into five categories; epithelial, germ cell, sex cord stromal, metastatic and miscellaneous depending on their origin. The most common type of ovarian malignancies are epithelial in origin (carcinomas).

The five main histological subtypes of epithelial ovarian carcinoma are high-grade serous (HGSC, 70%), endometrioid (EC, 10%), clear-cell (CCC, 10%); mucinous MC, 3%); and low-grade serous (LGSC, <5%) carcinomas. HGSC is the most common type accounting for around 70% of cases.

The different histological subtypes of ovarian cancer are associated with distinctive molecular features and HGSC often have inactivation of p53 (a tumour suppressor gene) and may be associated with BRCA mutations (germline and somatic) (Table 6).

A combination of cytoreductive surgery and platinum and taxane chemotherapy is the treatment of choice for ovarian cancer. Optimal surgery aims to achieve complete resection of disease, thus removing all visible disease or only leaving macroscopic disease <1 cm in size. This may involve hysterectomy, bilateral salpingo-oophorectomy, appendicectomy, omentectomy and in many cases bowel resection, diaphragmatic stripping, splenectomy and peritoneal resection.

Complete cytoreduction at surgery is the most important prognostic factor for survival. The Gynaecological Oncologic Group (GOG) trials demonstrated that those patients with no residual disease had improved overall survival (OS) compared to those with <1 cm residual disease (64 months vs 29 months). However the morbidity of surgery due to the advanced nature of the disease may mean that neoadjuvant chemotherapy is offered to reduce tumour bulk. Results of the EORTC trial revealed no significant overall survival advantage for those women with stage IIIc and IV disease undergoing primary surgery vs neoadjuvant chemotherapy. In fact postoperative morbidity and mortality was less after interval debulking surgery.

Case study

A 53-year-old woman presented with a 3-month history of bloating, weight loss, reduced appetite and stress incontinence. Her past medical history consisted of asthma for which she used inhalers infrequently. She had a laparoscopy 6 years ago for a history of pelvic pain and was diagnosed with endometriosis. She has two children, both born normally and her smears in the past were always normal. Clinical examination at presentation revealed normal observations and a large mass to the umbilicus which was fixed on vaginal examination. There was no ascites or lymphadenopathy. Laboratory investigations revealed a CA 125 1879. An ultrasound demonstrated a large (12.1 × 10.6 × 10.5 cm) pelvic cyst containing echogenic fluid and more solid elements suggestive of a clot (Figure 1).

RMI: P = 1, U = 3, CA 125 1879 = 5637

She was discussed at a gynaeoncology MDT in view of her RMI score and discussion was had regarding options for surgery;

FIGO staging ovarian cancer 2014

STAGE 1: Tumour confined to ovaries	
IA	Tumour limited to 1 ovary, capsule intact, no tumour on surface, negative washings
IB	Tumour involves both ovaries otherwise like IA
IC: Tumour limited to 1 or both ovaries	
IC1	Surgical spill
IC2	Capsule rupture before surgery or tumour on ovarian surface
IC3	Malignant cells in the ascites or peritoneal washings
STAGE II: Tumour involves 1 or both ovaries with pelvic extension (below the pelvic brim) or primary peritoneal cancer	
IIA	Extension and/or implant on uterus and/or fallopian tubes
IIB	Extension to other pelvic intraperitoneal tissues
STAGE III: Tumour involves 1 or both ovaries with cytologically or histologically confirmed spread to the peritoneum outside the pelvis and/or metastasis to the retroperitoneal lymph nodes	
IIIA: Positive retroperitoneal lymph nodes and/or microscopic metastasis beyond the pelvis)	
IIIA1	Positive retroperitoneal lymph nodes only IIIA1(i) Metastasis ≤10 mm IIIA1 (ii) Metastasis >10 mm
IIIA2	Microscopic, extrapelvic (above the brim) peritoneal involvement ± positive retroperitoneal lymph nodes
1IIB	Macroscopic, extrapelvic. peritoneal metastasis s 2 cm ± positive retroperitoneal lymph nodes. Includes extension to capsule of liver/spleen
IIIC	Macroscopic, extrapelvic. peritoneal metastasis >2 cm ± positive retroperitoneal lymph nodes. Includes extension to capsule of liver/spleen
STAGE IV: Distant metastasis excluding peritoneal metastasis	
IVA	Pleural effusion with positive cytology
IVB	Hepatic and/or splenic parenchymal metastasis, metastasis to extraabdominal organs (including inguinal lymph nodes and lymph nodes outside of the abdominal cavity)

Source: FIGO Committee, J Gynecol Oncol 2015; 26(2):87-89.

Table 6

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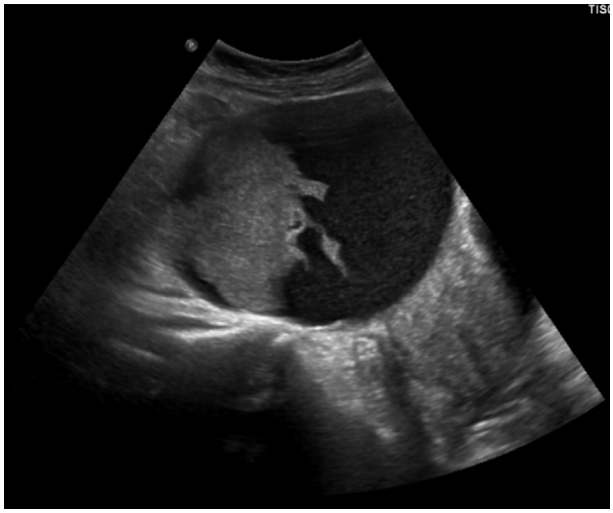

Figure 1 Ultrasound of an ovarian cyst.

either a two stage approach consisting of a bilateral salpingo-oophorectomy and await histology or a staging laparotomy. However, the raised CA 125 was felt to potentially be related to endometriosis and an MRI was undertaken. This demonstrated a 12 × 14 cm complex cystic lesion in the midline of the pelvis. The solid echogenic component on ultrasound demonstrates significant enhancement suggesting this is solid mural complement rather than clot. The cyst also contains punctate haemorrhagic content. Bilateral hydronephrosis is noted (Figure 2).

The MRI increased the concern regarding a malignancy and the possibility of a clear cell component arising in an endometrioma therefore a CT TAP (thorax, abdomen, pelvis) was done as part of the staging protocol to ascertain whether there was any evidence of extra-ovarian spread of tumour, and to help determine the most appropriate initial management option. The options included either primary/upfront cytoreductive surgery or surgery biopsy (laparoscopic or image-guided) with a view to neoadjuvant chemotherapy in the case of widespread disease.

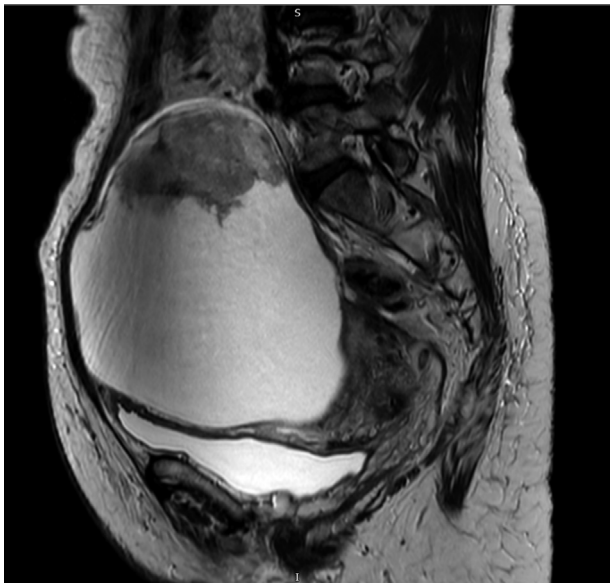

Figure 2 MRI or ovarian mass.

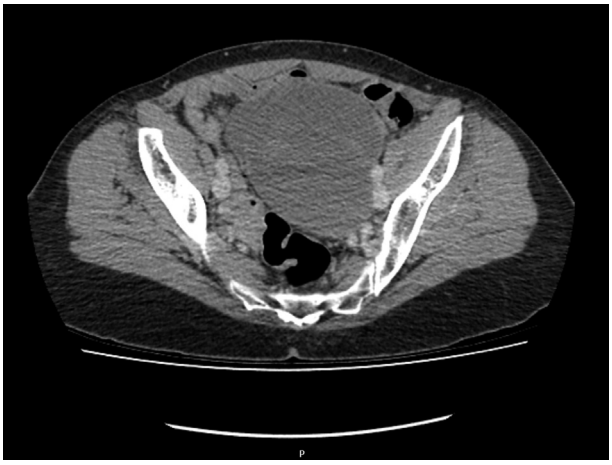

Figure 3 CT of the pelvis.

The CT TAP demonstrated the cystic lesion 12 × 11 × 9 cm in midline of pelvis. There was no peritoneal disease or ascites demonstrated. The liver, pancreas, spleen, kidneys and adrenals were normal (Figure 3).

In view of no evidence of extra ovarian disease she was counselled regarding a staging laparotomy and underwent a laparotomy, total abdominal hysterectomy, bilateral salpingo-oophorectomy, appendicectomy and omentectomy and peritoneal washings. Histology revealed stage 2 clear cell carcinoma of the left ovary with associated endometriosis with positive peritoneal washings. Adjuvant chemotherapy of carboplatin and paclitaxel commenced.

Clear cell carcinoma of the ovary represents around 10% of all epithelial ovarian cancers. There is an established association between endometriosis and clear cell carcinoma. It is more common in younger women and although it is more likely to present at an earlier stage than high grade serous carcinoma, women have a poorer prognosis due to the relative resistance to platinum chemotherapy. Like all epithelial ovarian cancers, treatment consists of surgery and chemotherapy however there are few papers investigating targeted treatment for this small subset in isolation. ◆

Practice points

- There are many causes of pelvic masses and a thorough history and examination is important to narrow down possible diagnoses
- In all cases of a pelvic mass malignancy must be considered and excluded
- Ultrasonography is the initial investigation of choice in the majority of cases
- RMI is the recommended mode of assessing the risk of malignancy and helpful to triage cases
- Any cases where there is a high index of suspicion of malignancy referral to the appropriate multidisciplinary team is necessary
- Surgery is the most common form of treatment and mode and extent depends upon patient wishes, comorbidities and nature of the mass.

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