

Diagnostic Imaging Pathways - Adnexal Masses (Incidental)

Population Covered By The Guidance

This pathway provides guidance on the imaging investigation of incidental ovarian and other adnexal masses.

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Quick User Guide

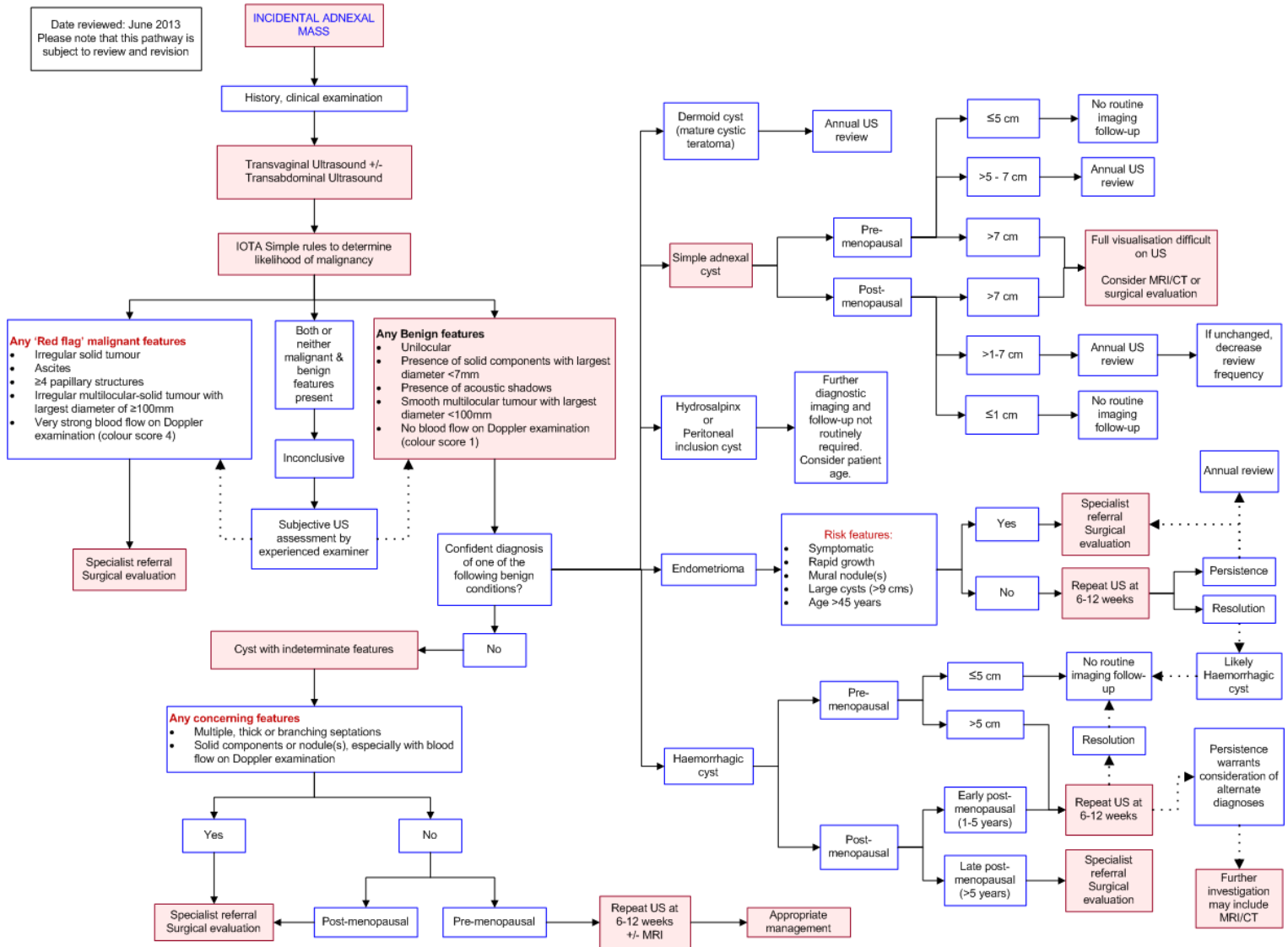
Move the mouse cursor over the **PINK** text boxes inside the flow chart to bring up a pop up box with salient points.

Clicking on the **PINK** text box will bring up the full text.

The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram

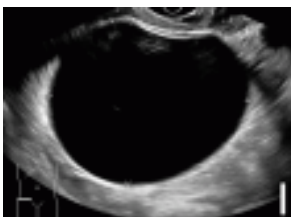


!-- Tool tip 9 -->

Image Gallery

Note: These images open in a new page

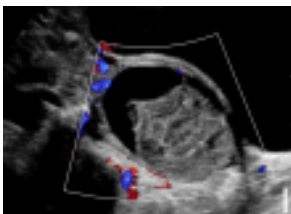
1



Simple adnexal cyst

right ovary, 68x56x68mm. Round anechoic structure with smooth, thin walls and no septations, solid components or internal vascularity. Scale: 10mm

2a



Haemorrhagic cyst

right ovary, maximal diameter 58mm. Echogenic contents with concave margins in keeping with retracting clot and no internal vascularity. Scale: 10mm.

2b  **Haemorrhagic corpus luteal cyst**

left ovary, 20x23x18mm, demonstrating a typical reticular internal pattern (white arrow) with circumferential but no internal vascularity. Scale: 10mm.

3  **Endometrioma**

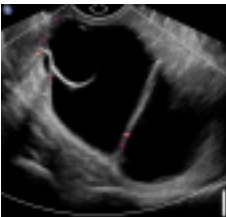
left ovary. Unilocular cyst with homogenous ground-glass internal echos and no associated vascularity. Scale: 10mm.

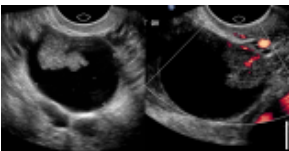
4  **Mature cystic teratoma (dermoid cyst)**

right ovary, maximal diameter 19mm. Echogenic contents typical of fat. Dermoid cysts may exhibit fat-fluid levels and calcification. Scale: 10mm.

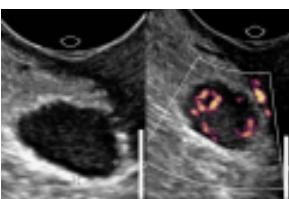
5  **Hydrosalpinx**

right adnexa, diameter 15mm. Tubular anechoic structure seen separate to the ovary (not visualised). Scale: 10mm.

6  **Indeterminate smooth multilocular cyst with anechoic contents, right adnexa, 92x61x57mm. Septations demonstrate some vascularity. Scale: 10mm.**

7  **Suspicious thin-walled complex cyst, right ovary, 53x30x39mm, with several solid, irregular shaped outgrowths, the largest (right) and marked vascularity. Histopathology revealed a low-grade borderline serous tumour arising from a serous cystadenoma. Scale: 10mm**

8  **Suspicious complex cystic and solid mass, right ovary, 17x11x15cm. Despite regular borders the cyst has several septations and marked vascularity. Histopathology revealed a benign mucinous cystadenoma. Scale: 10mm**

9  **A solid adnexal mass with vascularity is an indication for specialist referral and surgical evaluation. Differentials include fibroma, thecoma, Brenner tumour and metastasis (if bilateral). Scale: 10mm**

Teaching Points

- While most incidental adnexal masses are benign, ovarian cancer is often diagnosed at an advanced stage due to the non-specific nature of symptoms and lack of effective tests for population-based screening. Any incidental ovarian or other adnexal mass warrants early and careful evaluation
- Ultrasound assessment is the initial modality of choice. Most adnexal masses can be characterised using grey-scale sonography +/- colour Doppler evaluation
- MRI and CT are useful for further evaluation. Patients may progress directly to surgical evaluation
- Where image-based follow-up is recommended, timing is consensus-based [7](#). Further research is needed to elucidate the natural history of incidental adnexal cysts deemed benign and followed up with imaging, to inform optimal surveillance and management

Adnexal Masses

- Incidental adnexal masses diagnosed on ultrasound, CT or MRI performed for an unrelated reason have increased in frequency with increased use of cross-sectional imaging [8](#)
- The majority are benign, even in patients with known malignancy or postmenopausal women.⁸ However it is important to reliably differentiate malignant from benign lesions to avoid delays in treating ovarian cancer and prevent unnecessary interventions in benign lesions
- Risk of ovarian cancer increases with age and post-menopausal status, with 82% of Australian women aged ≥50 years at diagnosis (median age 63 years). [9](#) A relatively high proportion of ovarian cancer diagnoses occur at an advanced stage due to the non-specific nature of symptoms and lack of effective tests for population-based screening. 5-year survival has only modestly improved from 32% to 43% over the last 20 years. [9](#) The 5-year survival rate is approximately 93%, 72% and 27% for localised, regional and distant disease respectively [9](#)
- When an incidental adnexal mass is identified, further management will depend on whether the lesion is clearly benign or malignant, or indeterminate. Menstrual status, family history, tumour markers (e.g.CA 125) and development of symptoms also play a major role in determining further investigations
- Changing tumour characteristics on serial imaging, development of symptoms, presence of clearly malignant features on imaging and rising tumour markers are the main indications that should warrant a prompt surgical evaluation
- Watchful waiting with image-based follow-up is the mainstay of incidental adnexal mass management. Even in asymptomatic post-menopausal women

where reported prevalence of adnexal cysts varies from 2.5-17%, half resolve on follow-up. If they persist most remain unchanged and risk of malignancy is <1% [5,6](#)

Ultrasound

- First-line imaging modality in the evaluation of incidental adnexal mass
- Transvaginal is superior to transabdominal approach but both approaches may be needed to adequately visualise the entire lesion. Once cyst size is >7cm, other imaging modalities may also be required
- Use of colour or power Doppler further improves the characterization of suspicious or indeterminate adnexal masses identified on gray-scale ultrasound compared to histological reference standard, [10](#) but use of Doppler alone without morphology assessment is not recommended [11,12](#)
- 3D ultrasonography (pooled 93.5% sensitivity, 91.5% specificity) is superior to 2D ultrasonography (pooled 85.3% sensitivity, 87.4% specificity) in detecting adnexal lesions [12-14](#)
- Several ultrasound-based morphology scoring systems to differentiate benign versus malignant adnexal lesions have been developed from a symptomatic and asymptomatic study population; the International Ovarian Tumour Analysis (IOTA) prediction models (LR1, LR2, simple rules) are the most widely validated. [1,12,15](#) Other scoring systems based on a combination of ultrasound, clinical and biochemical indices (e.g. risk of malignancy index, RMI) have not proven superior. [12,16](#) External validation in the same cohort found IOTA prediction models more sensitive than the RMI and randomised controlled trials are underway to see if its use can reduce unnecessary surgical intervention [17,18](#)
- The IOTA simple rules (applicable to 76% of tumours), with subjective assessment by experienced examiners when rules did not apply, have an approximate 90-92% sensitivity and 90-93% specificity in differentiating malignant from benign lesions [1,2](#)
- A consensus statement by the Society of Radiologists in Ultrasound on adnexal masses in asymptomatic non-pregnant women recognized the following six benign cystic lesions based on specific characteristics found on ultrasound [7](#)
 - Simple adnexal cysts
 - Haemorrhagic cysts
 - Endometriomas
 - Dermoid cysts
 - Hydrosalpinx
 - Peritoneal inclusion cysts
- Compared to histology of surgically removed adnexal masses, a specific diagnosis based on ultrasound was possible in 84% of cases in one

- prospective study, with specificity and sensitivity for common benign cysts ranging from 94-100% and 77-86% respectively [19](#)**
- **Lesions not showing the characteristics of the above benign lesions but without any malignant features were classified as ‘indeterminate cysts’ which were further classified based on their likelihood of being benign or malignant. Further evaluation of indeterminate cysts depends mainly on patient’s menopausal status [7](#)**
 - **Features suggestive of malignancy on ultrasound**
 - **Multiple, thick (?3mm) or branching septations with or without vascularity**
 - **Solid nodules with vascularity**
 - **Echogenic fluid contents, especially if varying echogenicity between locules, not consistent with a definitively benign lesion**
 - **Associated ascites**
 - **Combined gray-scale and Doppler ultrasound has equivalent diagnostic performance to MRI in primary adnexal mass evaluation, but MRI is useful for sonographically indeterminate or suspicious masses and in infirm, obese patients where US may be of limited value [12,13,20](#)**
 - **Advantages: highly sensitive, widely available, inexpensive and not associated with ionizing radiation**
 - **Disadvantages: operator and body-habitus dependent and other areas of the abdomen are less well imaged**

Magnetic Resonance Imaging (MRI)

- **Preferred imaging modality for further evaluation of adnexal masses. MRI is the most useful second imaging test for (gray-scale) sonographically indeterminate masses compared to CT and Doppler US. [20,21](#) It is often used in pre-operative characterisation or post-surgical resection follow-up**
- **MRI is not significantly superior to CT in adnexal mass characterisation [12,13,22,23](#) but has superior contrast resolution, allowing better soft tissue visualisation, and is not associated with ionising radiation**
- **1.5T MRI was 95.2% sensitive, 98.4% specific and 97.6% accurate in ovarian mass characterisation compared to histopathology as the reference standard in one prospective study. [22](#) Recent metaanalysis reported a pooled 91.9% sensitivity and 88.4% specificity in the diagnosis of adnexal masses. [12](#)**
- **Features suggestive of malignancy on MRI [24](#)**
 - **Longest diameter >4cm**
 - **Solid components with heterogeneous enhancement**
 - **Cystic mass with vegetations and internal structures**
 - **>3mm wall or septations thickness**
 - **Lobulated masses**
 - **Presence of necrosis**

- Heterogeneously enhancing papillary projections
- Heterogeneously enhancing tumour vasculature
- Amorphous calcifications within the mass
- Ascites, peritoneal disease or lymphadenopathy
- An MRI examination should be done in 2 planes to make it an adequate examination. T1-weighted and T2-weighted acquisitions are essential to assess the pelvic anatomy and best characterise lesions. Contrast-enhancement using gadolinium-based agents is used to further classify a solid mass or to detect solid components in a cystic lesion [24,25](#)

Computed Tomography (CT)

- CT is not significantly less accurate than MRI in primary adnexal mass evaluation [12,22,23](#) but has lower soft tissue resolution and is associated with ionising radiation, a disadvantage particularly in younger women
- 16 slice MDCT is 90.5% sensitive, 93.7% specific and 92.9% accurate in ovarian mass characterisation compared to histopathology as the reference standard in one prospective study. [22](#) Recent metaanalysis reported a pooled 87.2% sensitivity and 84% specificity in the diagnosis of adnexal masses [12](#)
- It is useful [11,26](#)
 - Where extra-ovarian disease is suspected or needs to be excluded
 - In ovarian mass characterisation when MRI is unavailable or contraindicated
 - To characterise mature cystic teratoma by the presence of macroscopic fat and calcifications.
 - In staging, pre-treatment planning and follow-up of ovarian cancer.

Positron Emission Tomography / CT

- Not recommended for the primary ovarian cancer detection and adnexal lesion characterisation because of high false positive and false negative results, but hyper-metabolic ovarian uptake in a postmenopausal women should be considered suspicious for malignancy [26,27](#)
- Pooled 67% sensitivity and 79% specificity in the diagnosis of adnexal masses on recent metaanalysis [12](#)
- Combined PET/CT is most useful in detecting suspected ovarian cancer recurrence [27,28](#)

Surgery

- Where surgical management of a presumed benign ovarian cyst is indicated, a laparoscopic approach has a lower post-operative morbidity and shorter recovery time and is preferred to laparotomy in suitable patients [29](#)
- Laparotomy is the preferred choice of approach when the likelihood of malignancy is high or when surgical staging and management is planned when malignancy has been confirmed
- Accuracy and adequacy of surgical staging by laparotomy and or laparoscopic approaches appear to be comparable and neither confers a survival advantage, but intraoperative tumour rupture which risks peritoneal tumour spread has been more frequently reported in patients undergoing laparoscopy [30](#)
- The majority of benign adnexal masses can be managed expectantly and rarely require excision for clinical reasons [7](#)

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Date of literature search: June 2013

The search methodology is available on request. [Email](#)

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