

Pitfalls of female pelvic ultrasound imaging: cystic lesions

Is it really what you think it looks like?

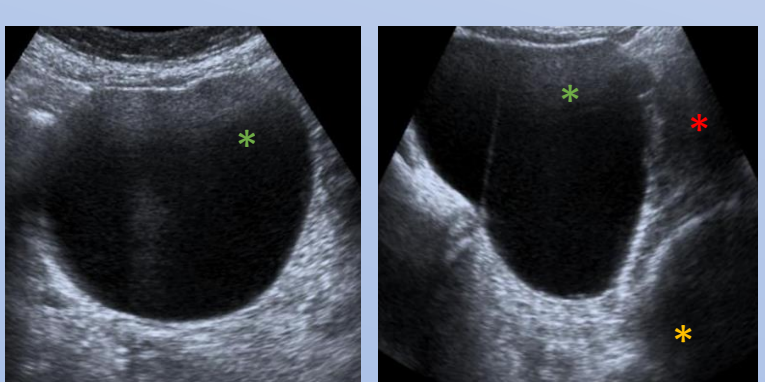
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BACKGROUND: Identifying the correct origin and nature of a cystic pelvic mass has important clinical impact. Whilst many cystic pelvic masses identified at pelvic ultrasound are likely to arise from an ovary, they may also arise from other pelvic structures. We illustrate some of the other structures they may arise from and suggest ways to avoid these pitfalls.

Urinary bladder vs ovarian cyst

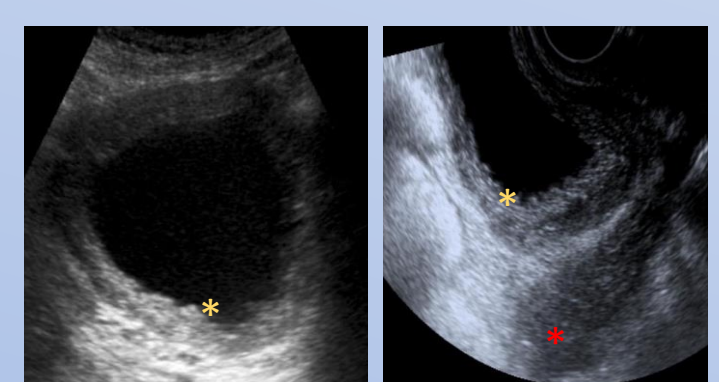
Is it the urinary bladder?

A thorough knowledge of normal pelvic anatomy can help avoid common pitfalls. If after application of normal anatomical knowledge there is uncertainty, further imaging should be obtained to clarify.



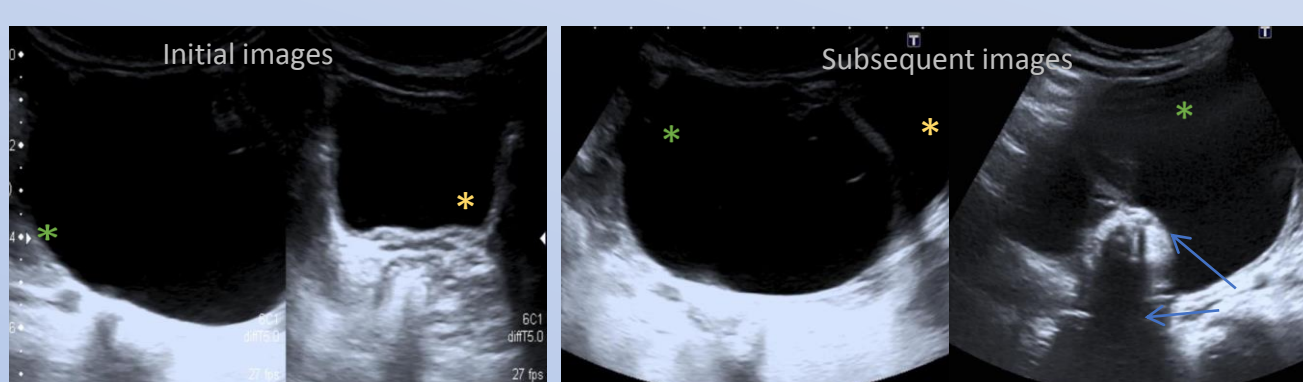
This cystic lesion (*) looks like the urinary bladder but lies posterior to the uterus (*) with the bladder (*) identified anteriorly. It proved to be an ovarian serous cystadenoma.

Learning point: Applying knowledge of anatomy can help avoid confusing bladder and cystic ovarian lesions.



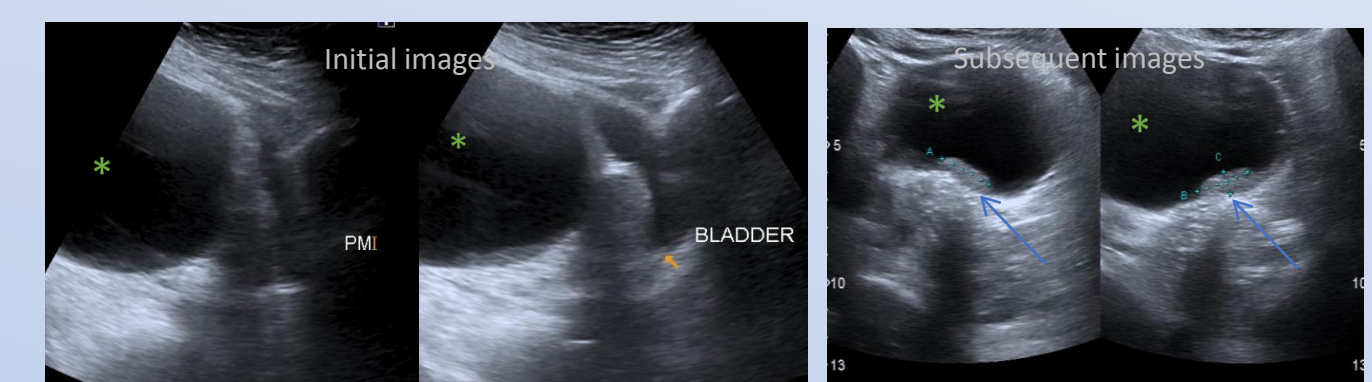
This structure (*) was thought to be a thick-walled ovarian cyst. It was difficult to interpret the anatomy on transabdominal images therefore a transvaginal scan was performed - which clearly demonstrates it to be the urinary bladder positioned anterior to the uterus (*).

Learning point: It is important to undertake both transabdominal and transvaginal scans.



This cystic lesion (*) was initially thought to represent the bladder with no adnexal mass seen. Follow-up imaging afterwards identified an echogenic nodule with posterior acoustic shadowing (blue arrow), within the cystic lesion confirming the true nature of this cyst as an ovarian dermoid cyst and separate of bladder (*).

Learning point: Both these cases emphasise the importance of both trying to empty the bladder and of scanning all the way through a cystic lesion to avoid missing solid nodules and reduce errors.

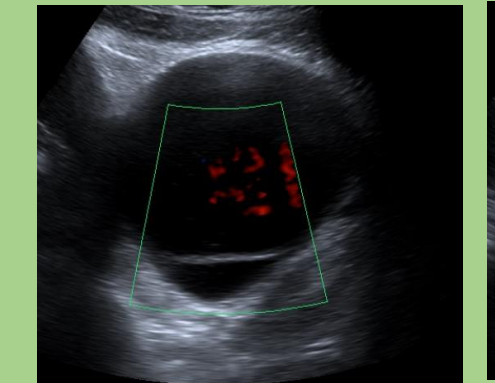
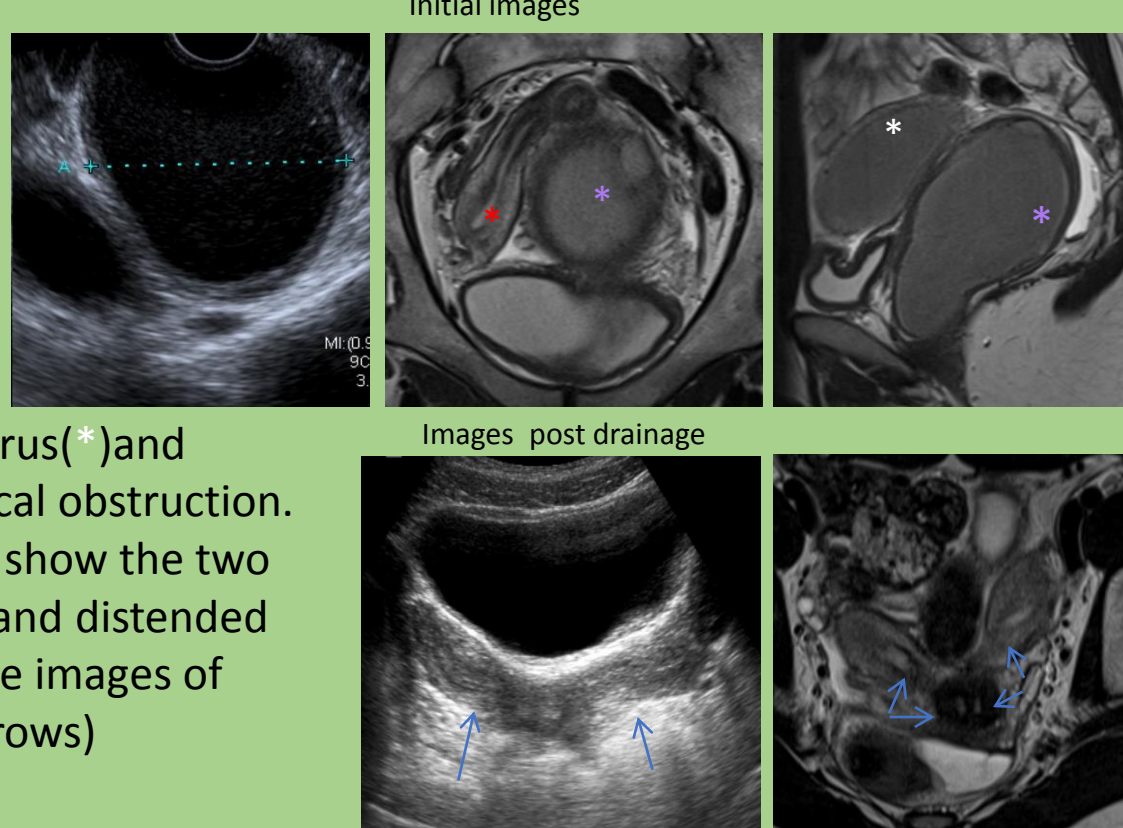


This cystic lesion (*) in the pelvis was identified on a renal ultrasound scan and was initially thought to represent a bladder diverticulum. Only at further imaging was this seen to contain a solid nodule (blue arrow), and recognised as a serous cystadenoma.

Uterus vs cyst

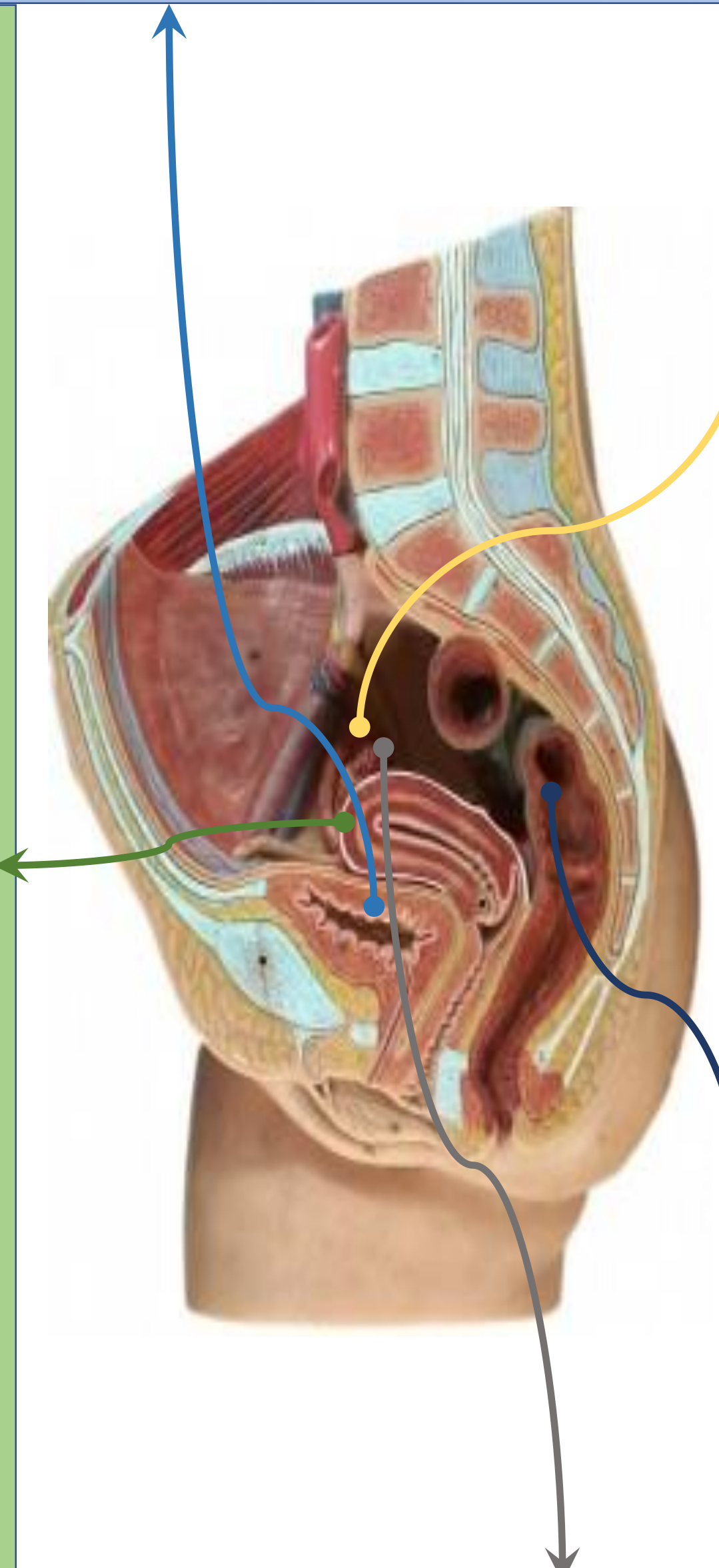
Uterine malformations are due to abnormal development of the paired Mullerian ducts which usually fuse during embryogenesis. Abnormal development can range from partial to complete failure of fusion or failure of resorption of the inter Mullerian septa. Congenital uterine abnormalities may be associated with urinary tract abnormalities such as renal agenesis.

Uterine didelphys is two separate uterine horns and cervixes with no communication between them. It is associated with haematometocolpos: blood-filled distended uterus (*) and vagina (*) due to mechanical obstruction. In this case, initial images show the two uterine horns; normal (*) and distended compared to post-drainage images of uterine didelphys (blue arrows).



The haematometocolpos in this young female can easily be mistaken for a cyst on ultrasound. The kidneys were not scanned. MRI showed it to be a haematometocolpos (*) secondary to uterine didelphys with obstructed hemivagina and ipsilateral renal agenesis (blue arrow), 'HOVIRA' syndrome. Obstruction was due to a transverse vaginal septum. Scanning the kidneys should alert the sonographer to renal agenesis and raise the possibility of associated uterine abnormality.

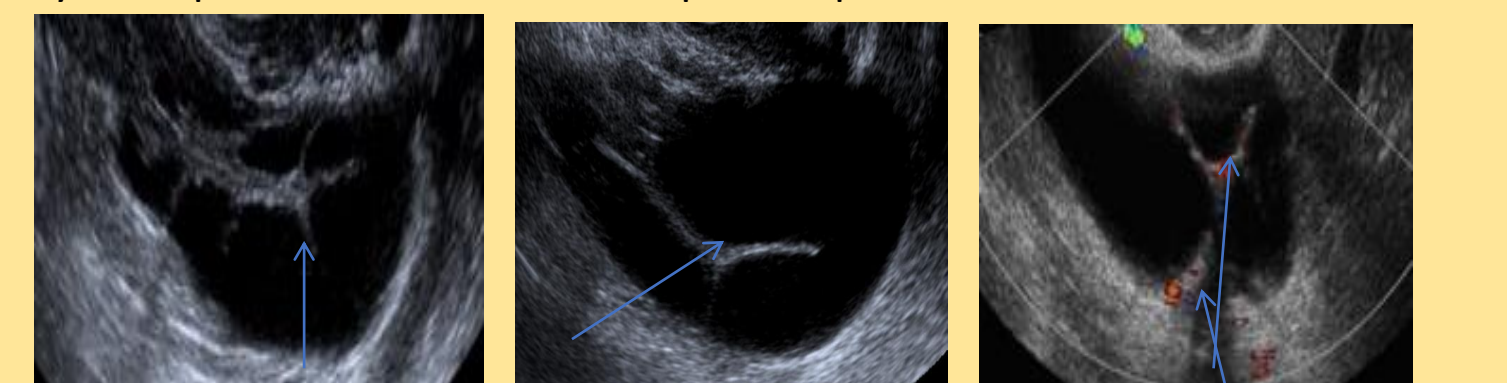
Learning point: Assess kidneys and if anomalous or /and uterus is lateralised, consider congenital malformation.



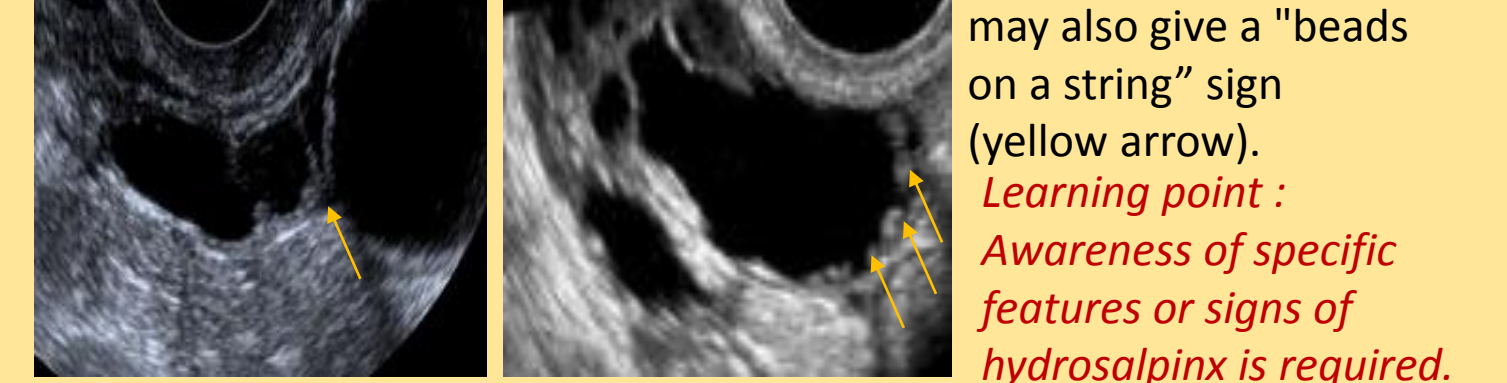
Fallopian tube vs ovarian cyst

A hydrosalpinx is a para-ovarian, tubular structure with wall folds that may have the appearance of incomplete septations of a complex ovarian cyst. Hydrosalpinges are tubular rather than oval. Establishing the presence of a separate ipsilateral ovary can help towards a diagnosis of hydrosalpinx rather than ovarian cyst.

The case shown below demonstrates the classic appearance of a hydrosalpinx: tubular with incomplete septations.



Thickened folds may produce a characteristic cogwheel appearance (blue arrow 3rd image).

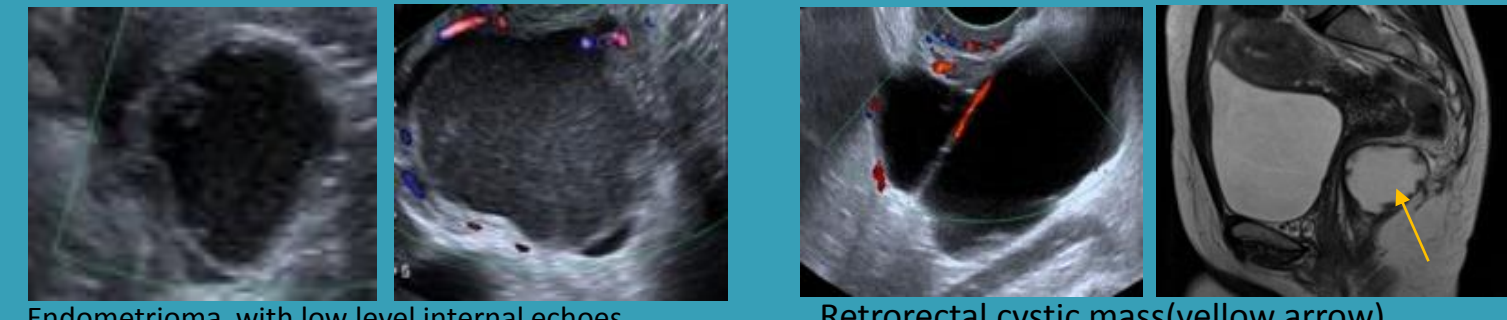


Incomplete septae may also give a "beads on a string" sign (yellow arrow).

Learning point: Awareness of specific features or signs of hydrosalpinx is required.

Endometrioma vs hind gut cyst

Endometriomas are common, resulting from ectopic endometrial tissue which bleeds cyclically, usually within the ovary. On ultrasound they have a homogeneous appearance with low-level echoes - blood products.



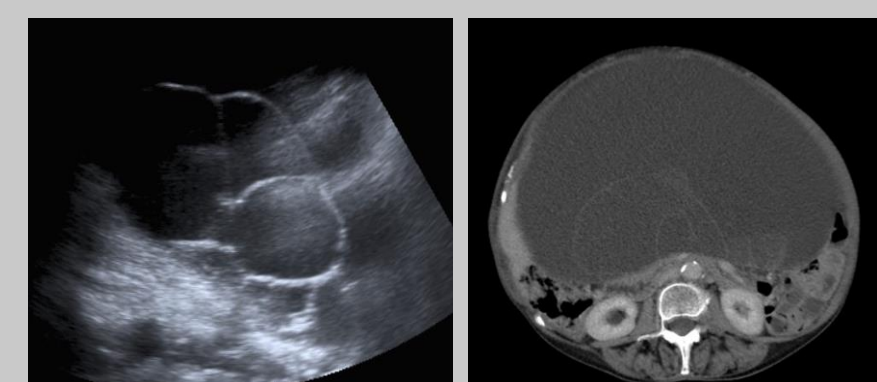
A hindgut cyst is rare but may look similar to an endometrioma; with internal echoes as a consequence of gelatinous material or inflammatory debris. They lie posterior to the rectum.

Learning point: Anatomy is important - hind gut cysts are retrorectal masses.

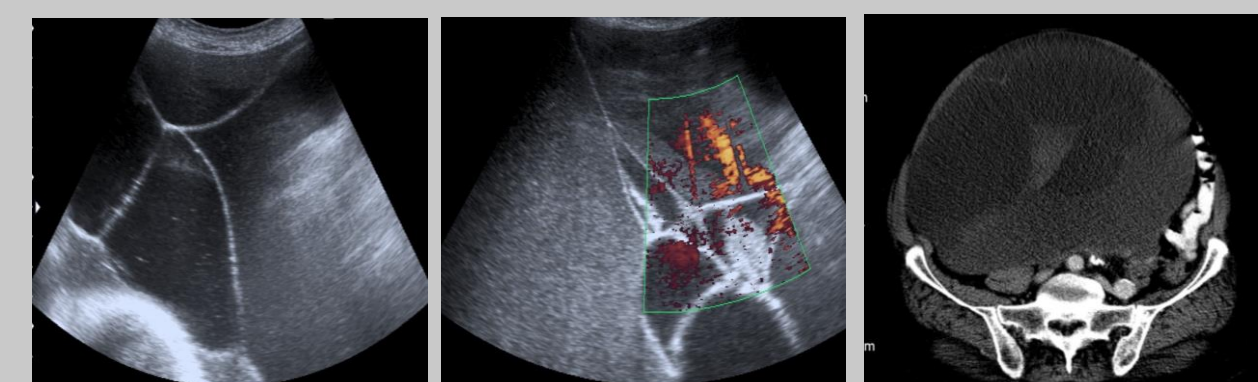
Ovarian cyst vs ascites

A complex ovarian cyst may be difficult to differentiate from loculated ascites. These cases emphasise the importance of scanning all the way through a cystic lesion to ensure it is seen in its entirety. Further imaging may be required if one is unsure of the margins of a cystic structure. The cases were of benign lesions but cystadenocarcinomas have a similar appearance and would not be biopsied because of the risk of peritoneal spread of malignant cells.

Is it an ovary? Is it free fluid? Is it both?



This large multiseptated lesion was found to be a mucinous cystadenoma; a benign ovarian cyst which can be very large.



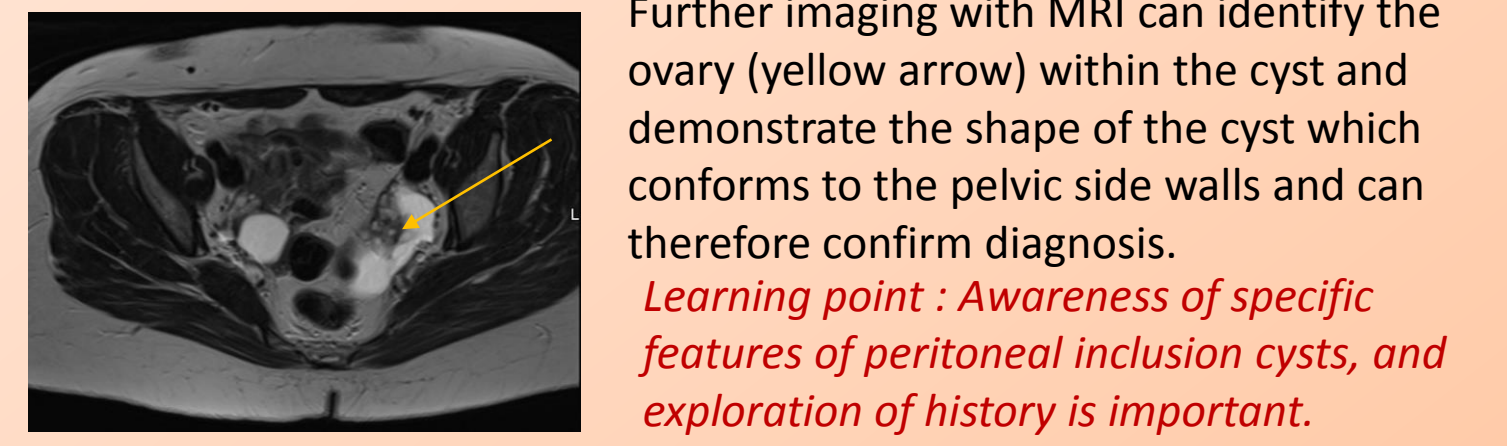
This was loculated ascites. It looks very similar to the case to the left: it is large, with multiple septae and extends out of the pelvis. Without further imaging (CT in this case) it would have been difficult to differentiate from a multilocular cyst.

Learning point: If the whole lesion is not clearly demonstrated, further imaging is required for full assessment.

Peritoneal inclusion cyst vs ovarian cyst

This cyst was thought to have a solid component at ultrasound although there was no flow seen. The concern was for an ovarian cystadenoma. The past medical history however revealed this patient had previously undergone multiple operations, and a peritoneal inclusion cyst was suspected.

A peritoneal inclusion cyst is a fluid collection formed by adhesions from prior surgery or inflammatory states such as endometriosis. The ovary is always closely associated and often contained within the apparent cyst. They do not require surgical intervention.



Further imaging with MRI can identify the ovary (yellow arrow) within the cyst and demonstrate the shape of the cyst which conforms to the pelvic side walls and can therefore confirm diagnosis.

Learning point: Awareness of specific features of peritoneal inclusion cysts, and exploration of history is important.

References:

1. Penelope L. Moyle, Masako Y. Kataoka, Asako Nakai, Akiko Takahata, Caroline Reinhold, Evis Sala et al. Nonovarian cystic pelvic lesions. *RadioGraphics* 2010; 30:921-938
2. Douglas L. Brown, Kika M. Dudiak, Faye C. Laing et al. Adnexal masses: US characterisation and reporting. *Radiology* 2010; 254:
3. El Saman, Ali M.a; Shahin, Ahmed Y.a; Nasr, Ahmed.a; Shaaban, Omar M.a; Fathalla, Mohammad M.a; Sadeldeen, Hazeema; Tawfik, Reda M. Müllerian duct anomalies: towards an 'adolescent-focused, treatment-based' classification system. *Journal of Evidence-Based Women's Health Journal Society*. 2012; 2 : 69-79

SUMMARY OF LEARNING POINTS:

- Correlate with **history** and review **anatomy**.
- Transabdominal and transvaginal **approaches** may be required. Consider **emptying the bladder**.
- **Examine the whole lesion** - if it extends beyond the pelvis consider a further modality.
- Be aware of developmental anomalies; **examine kidneys**.
- Be aware of **specific signs**.