# How to evaluate the patient with pelvic pain by ultrasound

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## Disclosures

**Beryl Benacerraf**

**Relevant Financial Relationships:**
**NONE**

## Learning Objectives

After completing this presentation, the learner will be able to:

1. Use ultrasound effectively to evaluate patients with pelvic pain, using a combination of imaging, physical exam and pain guided imaging.

2. Understand how to use ultrasound to evaluate patients with all different manifestations of endometriosis.

3. Use 3D ultrasound as an essential tool in evaluating the patient who presents with pelvic pain.



## Lecture Outline

1. Uterine causes of pelvic pain
   1. Adenomyosis
   2. Degenerating fibroids
   3. Embedded IUD
2. Non-GYN causes pain
   1. Adhesions
   2. Hernia
   3. Appendicitis
   4. Ureteral stone
   5. Bowel diseases
3. Adnexal causes of pelvic pain
   1. Endometriosis (intra and extra ovarian, deep infiltrating endometriosis)
   2. Ovarian cyst
   3. Hydrosalpinx
   4. Ovarian or tubal torsion
   5. Adhesions and peritoneal inclusion cyst
   6. PID, TOA



## Introduction

- Pelvic pain is a public health problem affecting ≥15% of women.
- Many patients never get a diagnosis and live with chronic pain, affecting their quality of life.
- Patients with pelvic pain deserve more than just a series of standard pictures of the uterus and ovaries. Individualizing the exam using a problem solving approach is essential for many of these patients.

## Get a history during the exam

- Acute or chronic
- Diffuse or focal
- Cyclical or constant
- Sharp or dull or cramping
- ? Prior surgery
- Menopausal and hormonal status
- Could she be pregnant?

## During the scan

- How tender is the patient?
- Where is the tenderness? Focal?
- Do organs slide past each other?
- Push deliberately on each part of the pelvis with probe and other hand to see where the pain comes from.
- Talk to the patient!

## The uterus

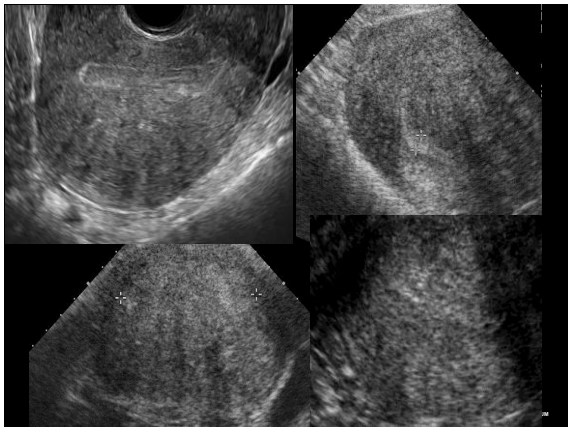
- Adenomyosis
- Degerating fibroids
- Prolapsing fibroids
- Abnormally placed IUD

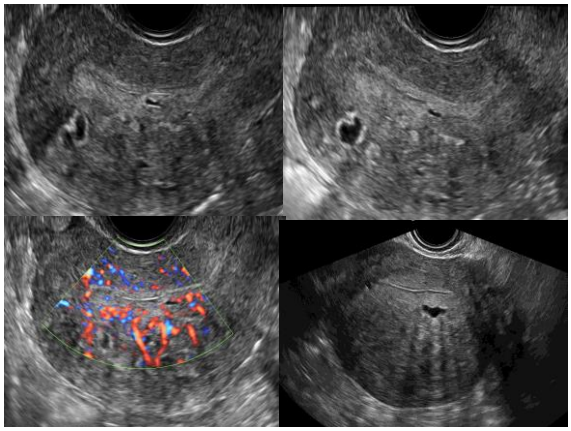
## Adenomyosis:

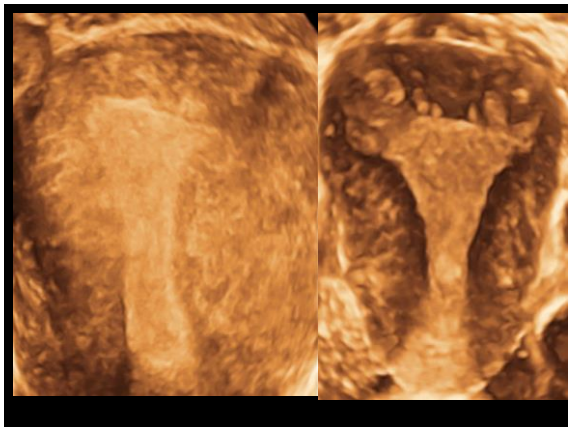
- Endometriosis of the uterus.
- Characterized by invasion of endometrial glands into the neighboring myometrium.
- Symptoms: Dysmenorrhea abnormal bleeding, uterine enlargement and tenderness.

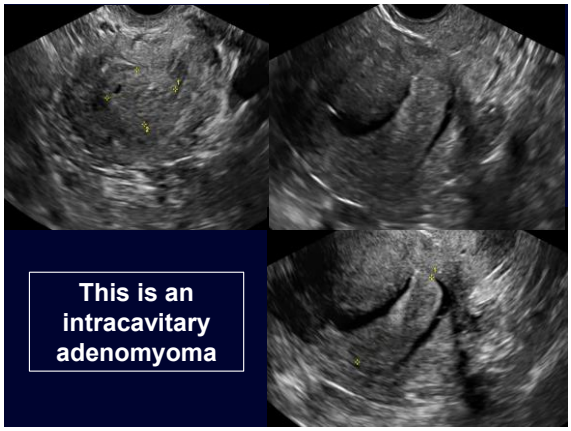
## Adenomyosis – Ultrasound Appearance

- Mottled inhomogeneous myometrium
- Globular & asymmetrical uterus,
- Small subendometrial cysts
- Indistinct endometrial stripe.



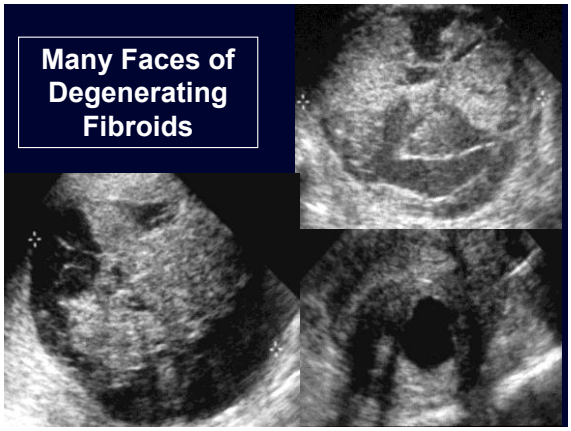


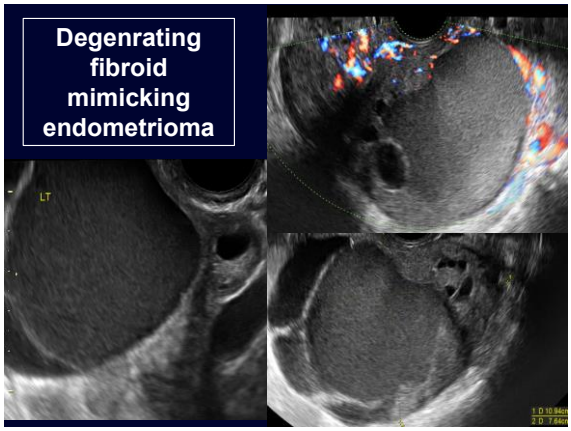


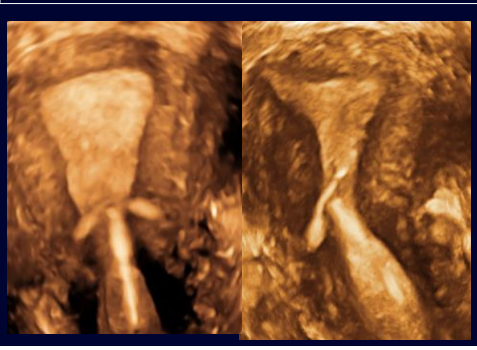

## Fibroids

- Very common - most do not cause pain (bleeding more likely)
- Positioning of fibroid or degeneration may make them symptomatic.
- Size of fibroid may cause discomfort due to pressure, such as hydronephrosis.

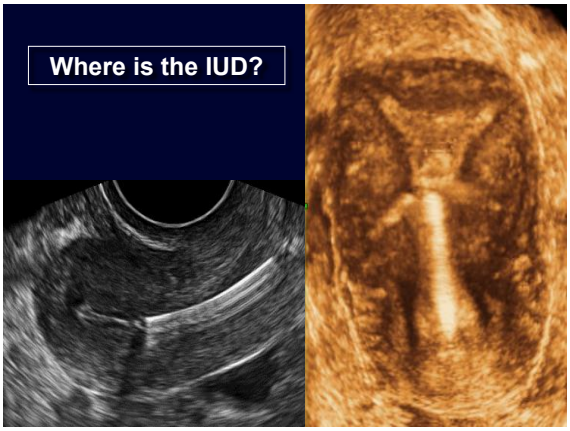


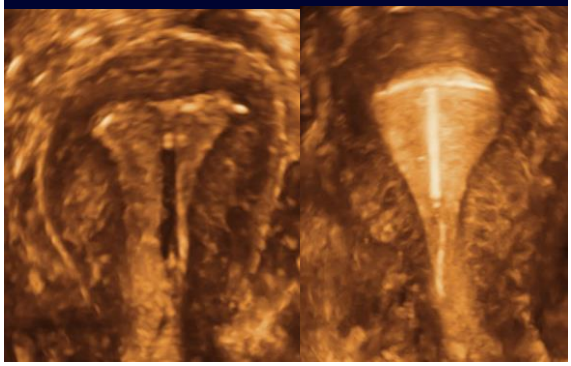
## Abn. Located IUDs may be a common cause of pain and bleeding



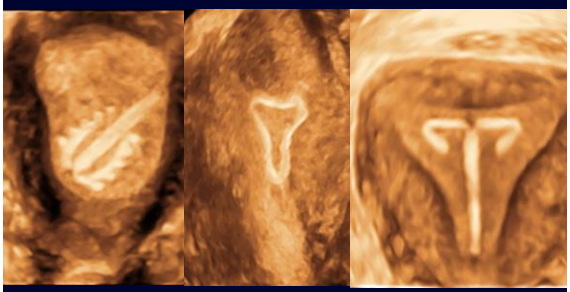
## Where is the IUD?



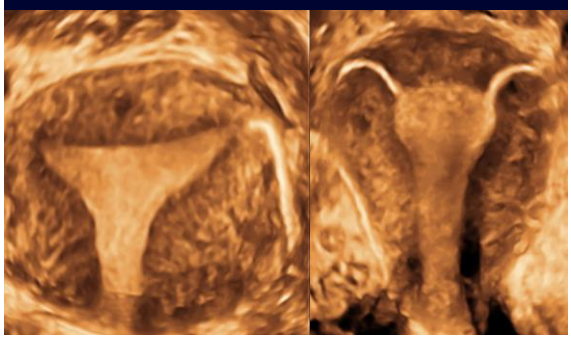
## Some IUD s are easier to see than others



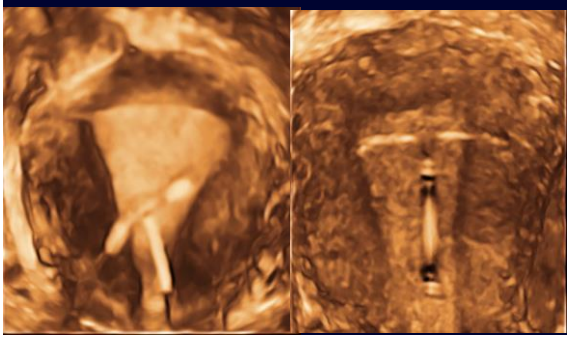
## IUDs from outside US



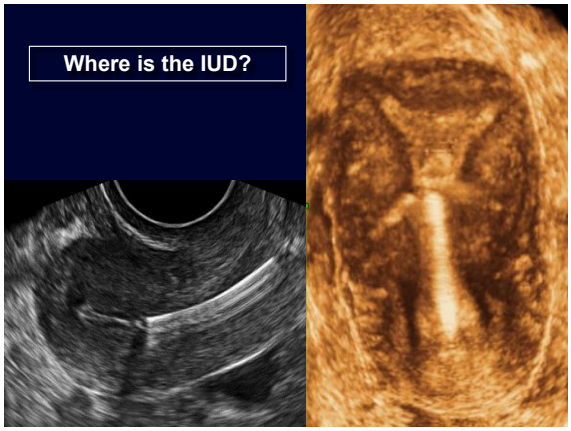
## Placement of tubal coils



## Localization of IUD using 3D reconstructed coronal view of uterus



Where is the IUD?

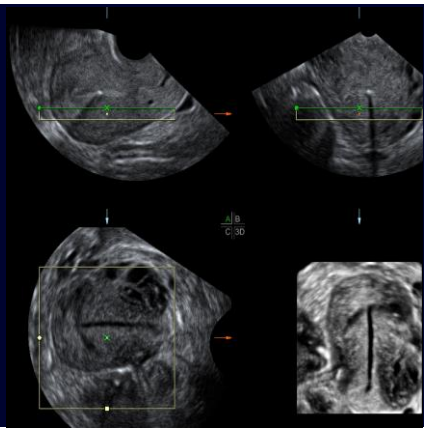


Where is the IUD?

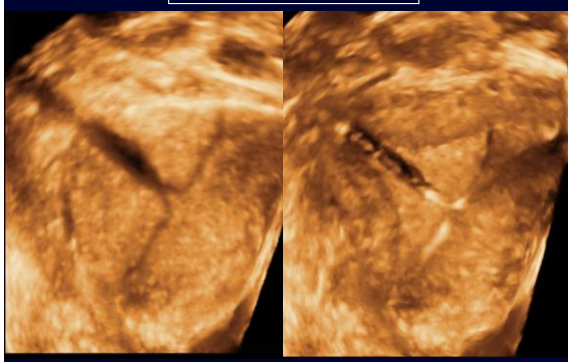
| *Indication for scan* | *Bleeding* | *Pain* | *Either bleeding and/or pain* |
|---|---|---|---|
| *IUD Imbedded* | 10/28<br>35.7% | 11/28<br>39.2% | 21/28<br>70.4% |
| *IUD Not Imbedded* | 21/139<br>15.1% | 27/139<br>19.4% | 48/139<br>34.5% |
| *Fisher Exact test* | *p = 0.02* | *p = 0.03* | *p = 0.0001* |

Benacerraf et al. Ultrasound Obstet Gynecol 2009; 34;110.

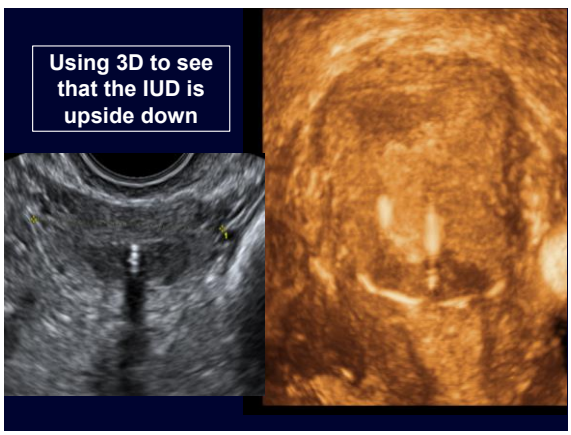
How to use the IUD shaddow to find the device



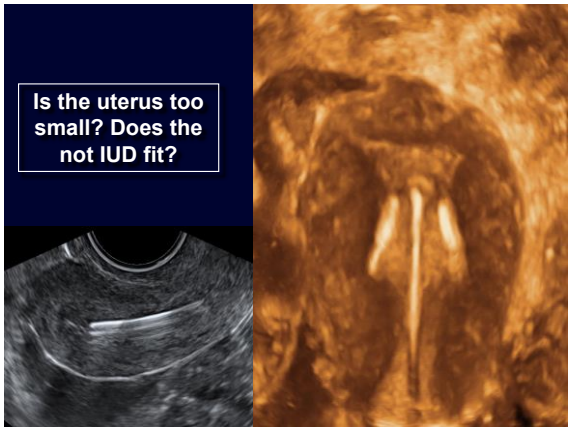
Using the shadow



Using 3D to see that the IUD is upside down



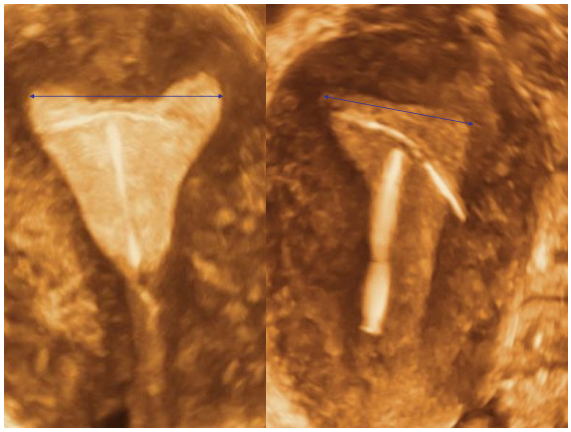
Is the uterus too small? Does the not IUD fit?



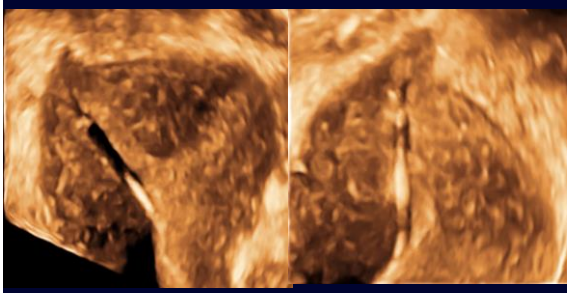
## Size of normal uterine cavity - 221 consecutive premenopausal patients

- The mean width of normal uterine cavity: 29mm
- The mean is 27 mm in nulliparous women compared to 32 mm in those ≥ 1 pregnancy).
- There was no appreciable relationship between the width of the uterine cavity and prior C-section or patient age (in patients who were never pregnant).

*Benacerraf, et al. Obstet Gynecol 2010;116:305*



## IUD perforating left horn of septate uterus



## Septate uterus – IUD stuck in lower uterine segment


## The Ovary - Adnexa

- Hemorrhagic cyst / hemorrhagic corpus luteum
- Torsed ovary or tube (w/wout mass)
- Endometriosis
- Hydrosalpinx
- Adhesions - peritoneal inclusion cyst
- Tubo-ovarian abcess – PID

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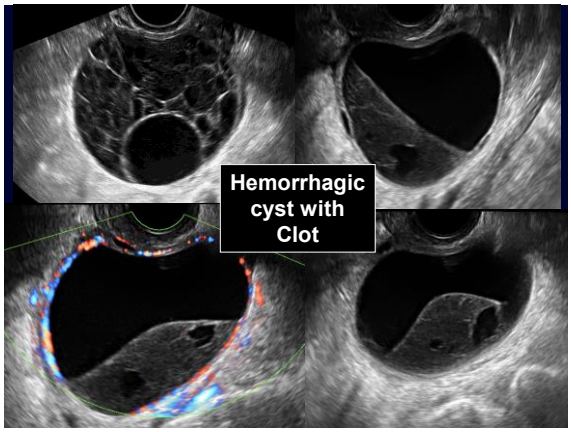
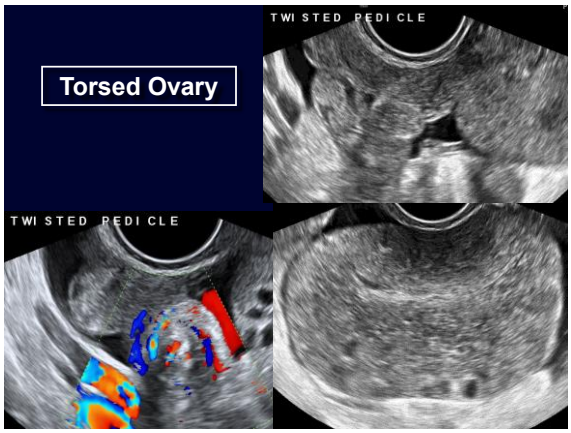



Torsed Ovary

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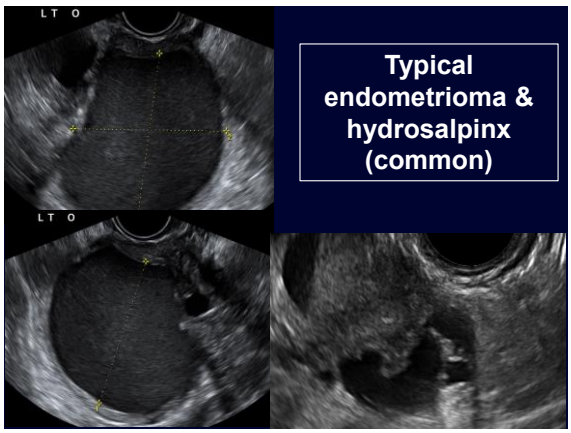
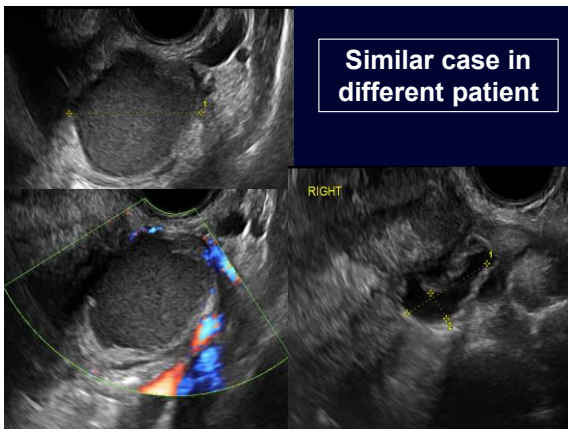



Typical endometrioma & hydrosalpinx (common)




Similar case in different patient

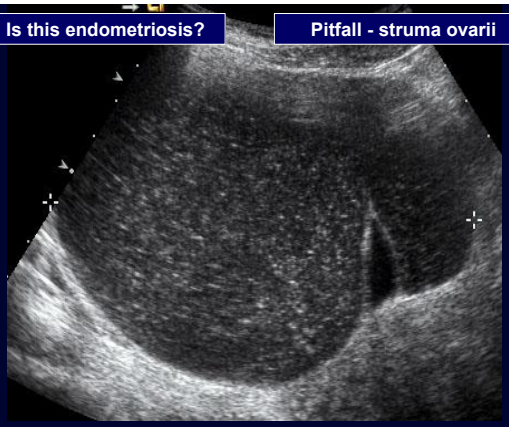
Cystadenoma

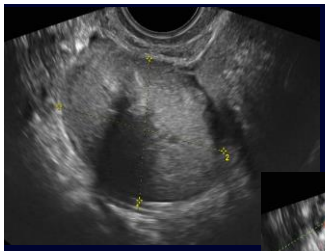
Endometrioma

Streaming?

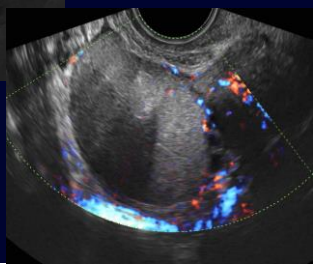
Is this endometriosis?

Pitfall - struma ovarii





Endometrioma with calcified clot mimicking dermoid

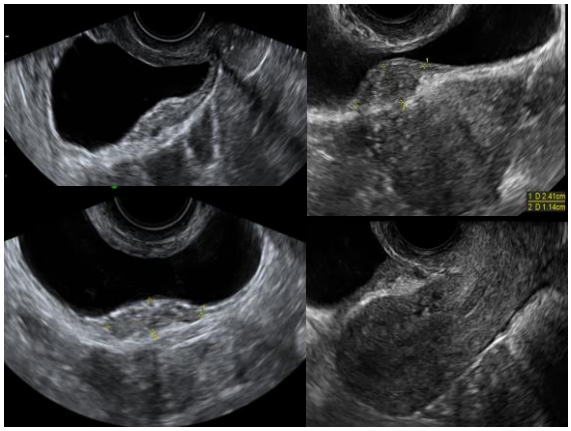


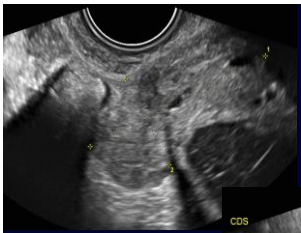
Is this endometriosis?

Unusual Sites of Endometriosis

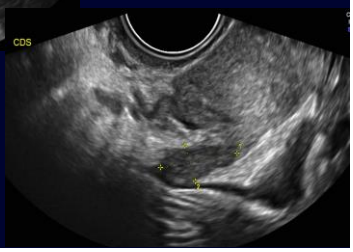
Cul de sac endometriosis

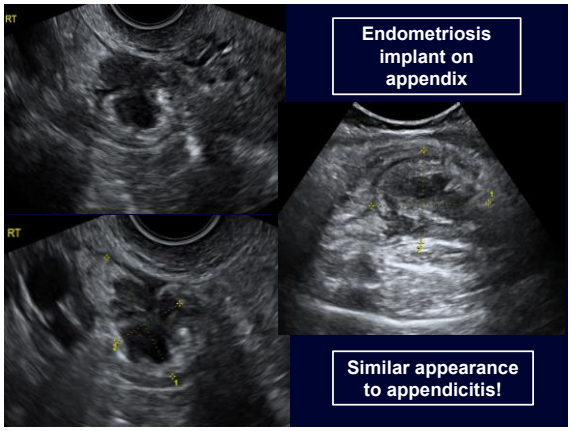
Bladder wall endometriosis

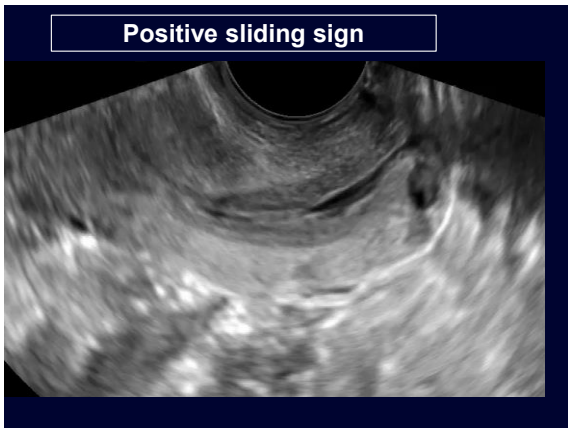


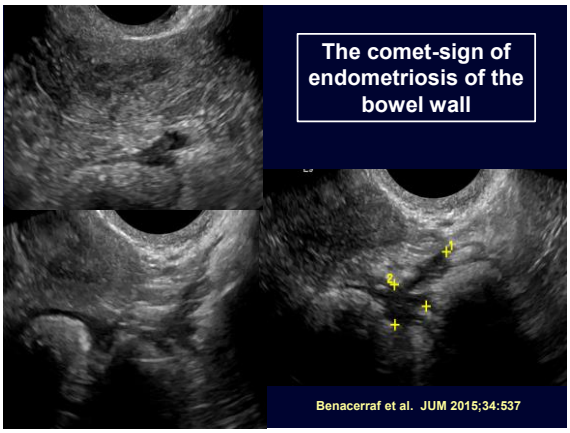


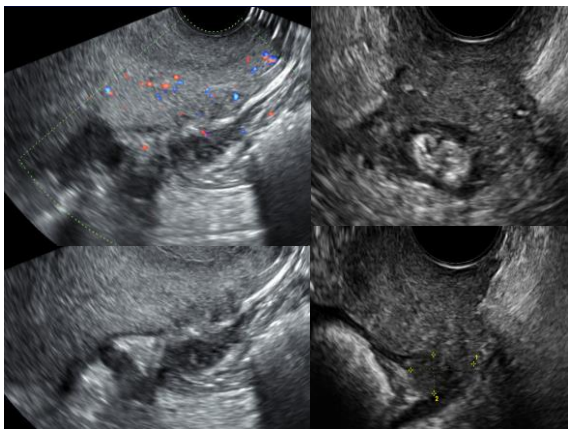
Extensive endometriosis of tube and utero-sacral ligament in a 24 year old patient

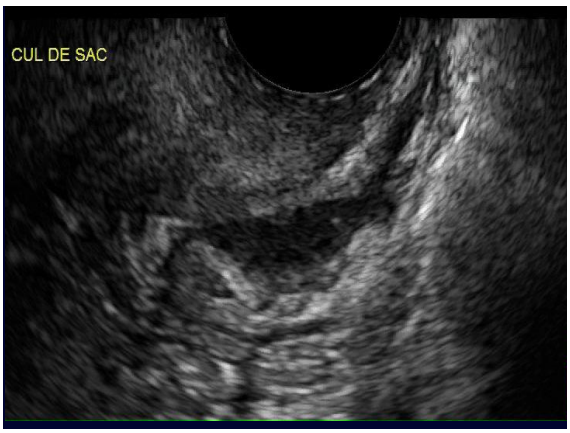


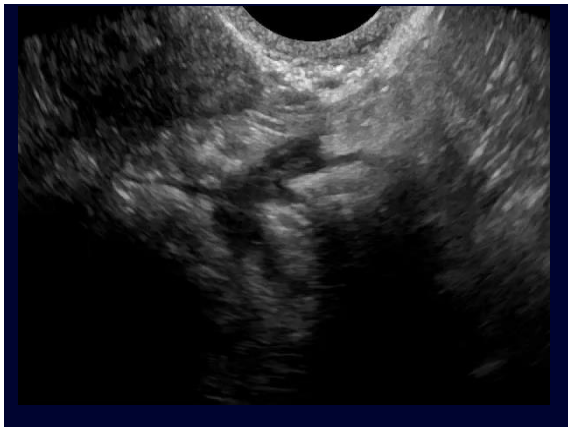

RT
RT
Endometriosis implant on appendix
Similar appearance to appendicitis!

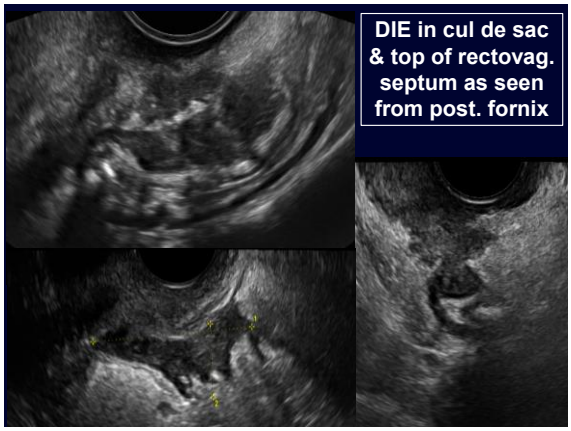

Positive sliding sign

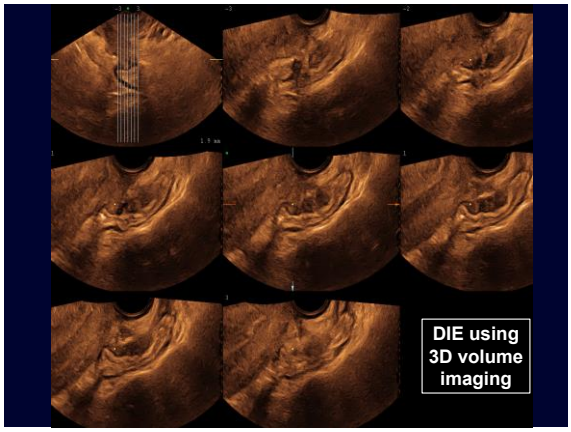

The comet-sign of endometriosis of the bowel wall
Benacerraf et al. JUM 2015;34:537




CUL DE SAC






## Ultrasound for detecting deep pelvic endometriosis in 79 cases

- Ultrasound sensitivity and specificity for detecting the disease was 78.5% and 95.2% respectively.
- The sensitivity was best for intestinal and bladder disease and slightly less accurate for utero-sacral and - rectovaginal lesions

Bazot et al. Obstet Gynecol 2004;24:180-5

## Detection of Bowel Endometriosis 10 prospective studies – 1106 pts – prevalence of bowel endo 24-73%

| | |
|---|---|
| Sensitivity | 71-98% (pooled data 91%) |
| Specificity | 92-100%(pooled data 98%) |
| Accuracy | 81-99% |
| +LR | 30.36 |
| -LR | 0.09 |

Hudelist et al UOG 2011;37;257

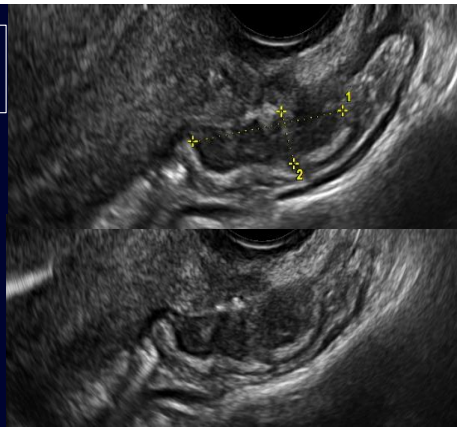
## Transvaginal scan in deep endometriosis in 10 different pelvic sites

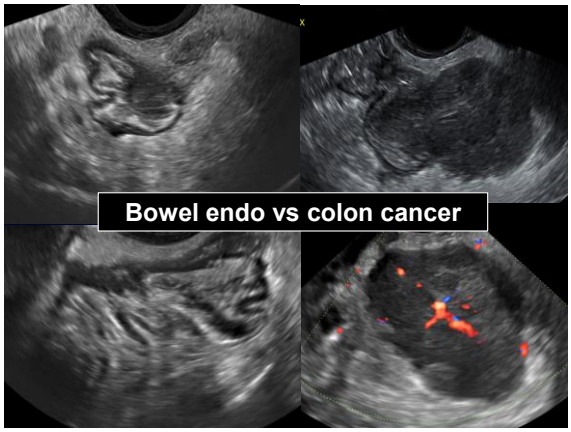
420 pts having ultrasound and laparoscopy (gold standard) for pelvic pain and infertility.

| Endo focus | Sensitivity % | Specificity % |
|---|---|---|
| Bladder | 61 | 99 |
| Recto-vaginal septum | 52 | 96 |
| Rectal | 65 | 99 |
| Sigmoid | 69 | 98 |

Fratelli et al. UOG 2013;41:69-75

Recto-vaginal septum





Bowel endo vs colon cancer

## Ultrasound vs. MRI
## I98 pts with surgically proven endometriosis

- Transvaginal ultrasound has a sensitivity, specificity and accuracy of 98%, 100% and 99%
- MRI has a sensitivity, specificity and accuracy of 83% 98% and 90% for recto-sigmoid endometriosis.

Abrao et al. Hum Reprod. 2007;22:3092-7

## Ultrasound vs. MRI for detecting endometriosis

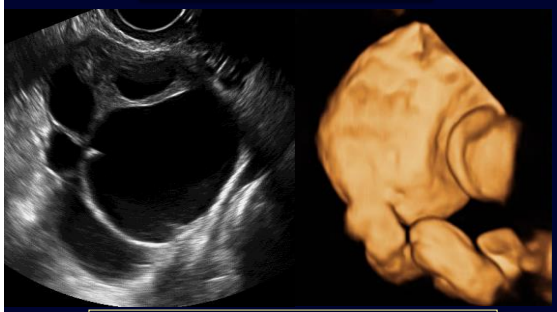
The sensitivity and specificity for detecting deep endometriosis by *tenderness guided* ultrasound was - 86% and 73% respectively while for MRI it was - 90% and 73% respectively.

Saba et al. J Magn Reson Imaging. 2012 35:352-60.

## The Adnexa

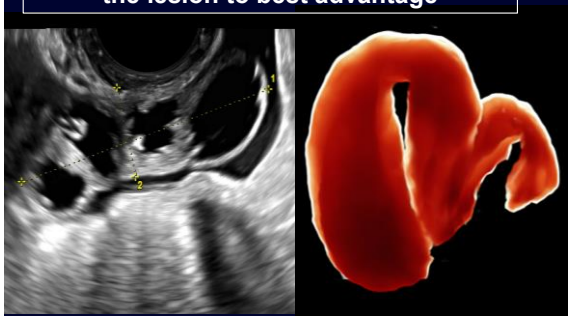
- Hemorrhagic cyst / hemorrhagic corpus luteum
- Torsed ovary or tube (w/wout mass)
- Endometriosis
- Hydrosalpinx
- Adhesions - peritoneal inclusion cyst
- Tubo-ovarian abcess - PID
- Ectopic pregnancy

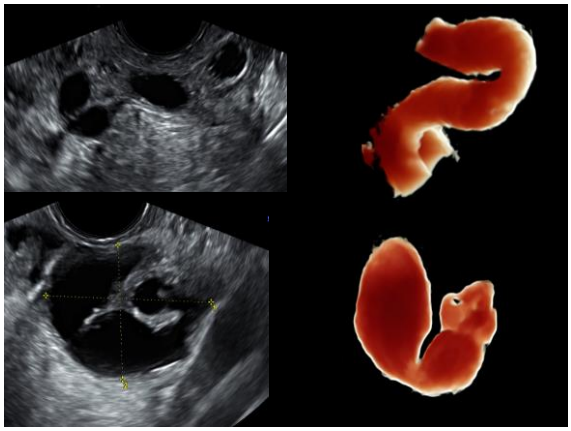
## Ovarian cyst ?



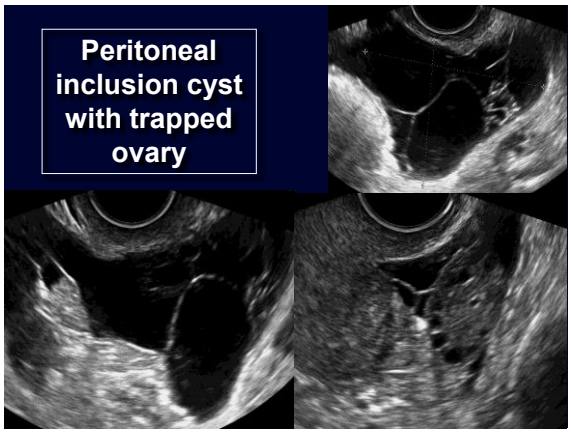
Inverse mode - Hydrosalpinx

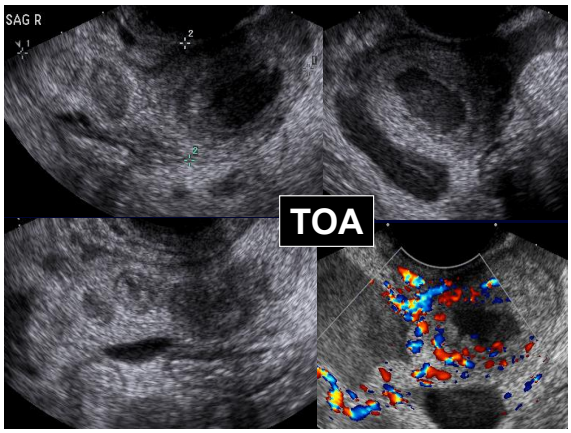
2D and 3D images of a hydrosalpinx. 3D inverse reconstructed view shows the lesion to best advantage



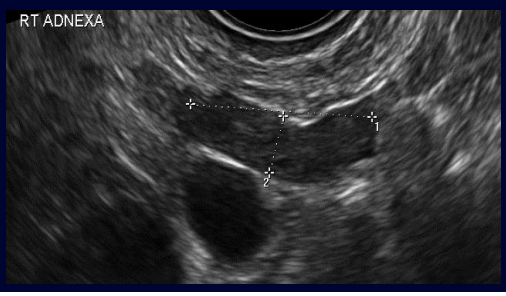


Peritoneal inclusion cyst with trapped ovary

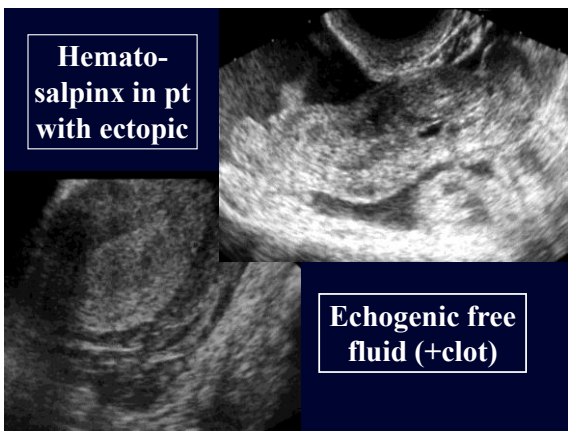





Focal Pain when tube is moved: Salpingitis at laparoscopy



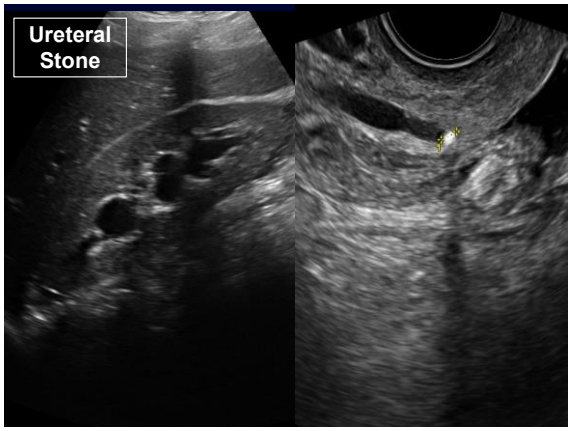

Hemato-salpinx in pt with ectopic



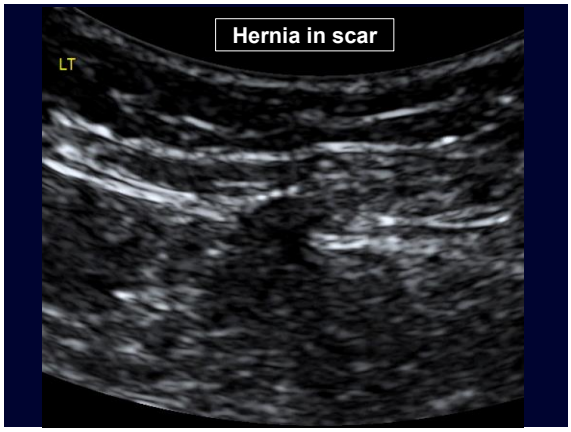
Echogenic free fluid (+clot)

## Non-GYN causes of pain

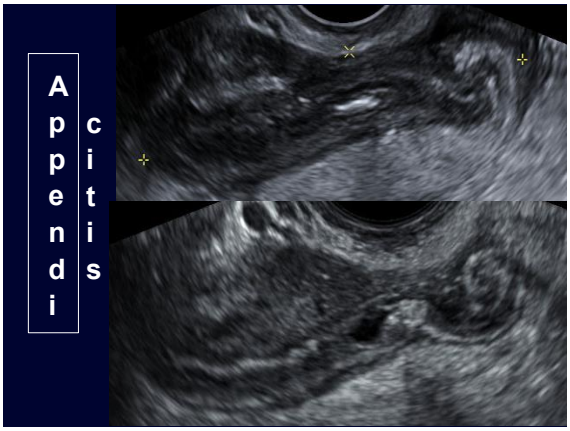
- Ureteral stone
- Cystitis
- Irritable bowel syndrome
- Diverticulitis
- Inflamatory bowel disease
- Adhesions

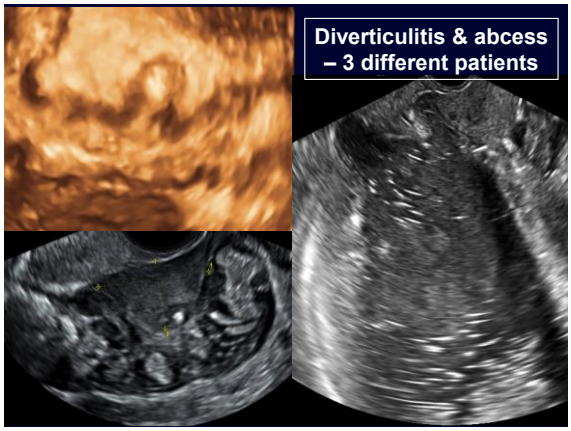



## Crohn's disease


## Appendicitis





## Conclusions

- Pelvic pain is common and impairs quality of life.
- Accurate Dx requires a combo of ultrasound, phys. exam and history.
- Patients with pelvic pain deserve more than just a series of standard pictures of the uterus and ovaries.
- Those that we help are among the most grateful of all our patients!

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- Guerriero S, et al. Accuracy of transvaginal ultrasound for diagnosis of deep endometriosis in uterosacral ligaments, rectovaginal septum, vagina and bladder: systematic review and meta-analysis. Ultrasound Obstet Gynecol. 2015;46:534-45.
- Reid S, Lu C, Condous G. Can we improve the prediction of pouch of Douglas obliteration in women with suspected endometriosis using ultrasound-based models? A multicenter prospective observational study. Acta Obstet Gynecol Scand. 2015;94:1297-306.


Benacerraf