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.

This is an intracavitary adenomyoma

Many Faces of Degenerating Fibroids

Degenerating fibroid mimicking endometrioma
Abn. Located IUDs may be a common cause of pain and bleeding

Where is the IUD?

Some IUDs 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?

<table>
<thead>
<tr>
<th>Indication for scan</th>
<th>Bleeding</th>
<th>Pain</th>
<th>Either bleeding and/or pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUD Imbedded</td>
<td>10/28</td>
<td>11/28</td>
<td>21/28</td>
</tr>
<tr>
<td></td>
<td>35.7%</td>
<td>39.2%</td>
<td>70.4%</td>
</tr>
<tr>
<td>IUD Not Imbedded</td>
<td>21/139</td>
<td>27/139</td>
<td>48/139</td>
</tr>
<tr>
<td></td>
<td>15.1%</td>
<td>19.4%</td>
<td>34.5%</td>
</tr>
<tr>
<td>Fisher Exact test</td>
<td>p = 0.02</td>
<td>p = 0.03</td>
<td>p = 0.0001</td>
</tr>
</tbody>
</table>


How to use the IUD shaddow to find the device

Using the shadow

Using 3D to see that the IUD is upside down
**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).


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**IUD perforating left horn of septate uterus**

**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
The Ovary - Adnexa

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- Tubo-ovarian abcess - PID
- Ectopic pregnancy

Hemorrhagic cyst with Clot

Torsed Ovary

Tubo-ovarian abcess - PID

Typical endometrioma & hydrosalpinx (common)

Similar case in different patient

Ectopic pregnancy
Endometrioma

Cystadenoma

Is this endometriosis?

Streaming?

Endometrioma with calcified clot mimicking dermoid

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
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
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;267

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


Transvaginal scan in deep endometriosis in 10 different pelvic sites

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

<table>
<thead>
<tr>
<th>Endo focus</th>
<th>Sensitivity %</th>
<th>Specificity %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder</td>
<td>61</td>
<td>99</td>
</tr>
<tr>
<td>Recto-vaginal septum</td>
<td>52</td>
<td>96</td>
</tr>
<tr>
<td>Rectal</td>
<td>65</td>
<td>99</td>
</tr>
<tr>
<td>Sigmoid</td>
<td>69</td>
<td>98</td>
</tr>
</tbody>
</table>

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

198 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.


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.


The Adnexa

- Hemorrhagic cyst / hemorrhagic corpus luteum
- Torsed ovary or tube (w/out mass)
- Endometriosis
- Hydrosalpinx
- Adhesions - peritoneal inclusion cyst
- Tubo-ovarian abscess - 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
- Inflammatory bowel disease
- Adhesions

Crohn’s disease

Diverticulitis & abscess – 3 different patients
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!

References