The Role of Imaging for Gynecologic Emergencies

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Objectives

• Emphasize the critical value of good cross-disciplinary communication
• Define specific clinical presentations whereby acumen becomes ‘stuck’ without reliable diagnostic imaging
  • Pelvic pain
  • Pelvic mass
  • Pelvic inflammatory disorders
  • Abnormal first trimester pregnancies

Pelvic Pain

• Common
  • Affects 1 in 7 women (Mathias – Gallup 1996)
  • 5 million women in the US (asthma, LBP)
  • 10% of all gynecologic referrals
  • 12% of all hysterectomies (fibroids → 40%)
  • 40% of all laparoscopies

• Costly
  • $880 million/year (not incl. disability…)
  • $2.2 billion if consider indirect costs

Case Presentation 1

28 year old nulligravida female, previously well, presents with a 1 day history of progressively worsening RLQ pain. Denies fever, but admits to some anorexia. Hurts more when lying on her right side, but has been more episodic rather than constant, until the last few hours.

She appears quite uncomfortable and has moderate tenderness on abdominal exam in the RLQ and her right adnexa is exquisitely tender on bimanual exam

Common Causes of Acute Pain

• Ovarian cysts – typically functional
• Endometriosis – especially a ‘leaky’ endometrioma, often mistaken for a ruptured ovarian cyst due to fluid in CDS
• Adnexal torsion

Imaging for Endometriosis

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Diagnostic accuracy</th>
<th>LR+</th>
<th>LR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound</td>
<td>0.78±0.20</td>
<td>0.91±0.10</td>
<td>0.85±0.09</td>
<td>5.00</td>
<td>0.73</td>
</tr>
<tr>
<td>Transvaginal US</td>
<td>0.73±0.04</td>
<td>0.70±0.08</td>
<td>0.74±0.05</td>
<td>3.05</td>
<td>0.53</td>
</tr>
<tr>
<td>MRI</td>
<td>0.80±0.05</td>
<td>0.90±0.09</td>
<td>0.85±0.08</td>
<td>8.08</td>
<td>0.34</td>
</tr>
<tr>
<td>CT</td>
<td>0.85±0.07</td>
<td>0.90±0.11</td>
<td>0.90±0.09</td>
<td>11.33</td>
<td>0.31</td>
</tr>
<tr>
<td>Hysteroscopy</td>
<td>0.77±0.05</td>
<td>0.90±0.09</td>
<td>0.85±0.08</td>
<td>5.20</td>
<td>0.54</td>
</tr>
<tr>
<td>Laparoscopy</td>
<td>0.88±0.06</td>
<td>0.78±0.08</td>
<td>0.74±0.05</td>
<td>3.05</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Note: LR+ = positive likelihood ratio; LR- = negative likelihood ratio; US = ultrasonography; MRI = magnetic resonance imaging; CT = computed tomography; Hysteroscopy = hysteroscopic examination; Laparoscopy = laparoscopic examination; Ultrasound = transvaginal ultrasound; CT = computed tomography; MRI = magnetic resonance imaging; US = ultrasonography.
Pelvic Pain in Young Teens

- A review of 112 adolescent females who underwent laparoscopy for pelvic pain
  - Acute pain
    - 89% with (+) findings:
      - 31% functional cysts, 25% PID
  - Chronic pain
    - 73% with (+) findings:
      - 33% PID, 19% endometriosis
  - Pain and dysmenorrhea correlated with endometriosis
  - No pelvic pathology – 1/3 of cases

Right Adnexa on TVUS (Doppler)

Patient Course

- Torsion suspected both clinically and by imaging despite improvement in pain and well-appearance prior to surgery
- Intraoperative findings – torsion of right adnexa, including oviduct. Both appeared ischemic, but oviduct revascularized quickly. Ovary was observed with minimal change.
- Cystectomy was performed with dermoid enucleated. Normal tissue was hemorrhagic, edematous, but bled. Ovary was preserved. She was discharged in stable condition.

Questions:

- Should the ovary have been removed?
- What is risk of recurrent torsion?
- Should an oophoropexy have been performed?
Abnormal Early Pregnancy

- Missed abortion
- Incomplete abortion
- Complete abortion
- Ectopic gestation
- Pregnancy of unknown location

Case Presentation 2

34 year old nulligravida female presents to the ER with some mild spotting and cramping, having missed her period approximately 6 weeks ago. She appears well and is clinically stable. A small amount of blood is noted on speculum exam, and her uterus and adnexa are not full, nor are they tender.

β-hCG: 2300

Mid-Sagittal Uterus

Right Ovary (corpus luteum)

Mass Adjacent to Right Ovary

Color Doppler of the Mass
Patient Course

Ectopic pregnancy with fetal pole and cardiac activity – clear surgical indication. Taken to OR and 4cm unruptured ectopic was documented in the ampullary portion of the oviduct. Salpingectomy was performed.

Patient was discharged in stable condition.

Questions

• What is the risk of subsequent ectopic?
• Should salpingectomy be performed?
• What about pregnancy of unknown location?

PID does this...

• 2.5 million outpatient visits
• 5.8/1000 women – ED visits
• 200,000 hospitalizations
• 100,000 procedures
• $5 billion

Prevalence of PID

• US Annual Statistics
  • > 1,000,000 incident cases acute PID
  • 150 PID-related deaths
  • Risk for adolescent 1:8
  • Risk for women > 25 years 1:80
  • Screening for women < 25 years
  • Postmenopausal – CA, DM, GI disease

Diagnostic Criteria

Clinical...

Abdominal Pain
  - Mild
  - Diffuse
  - Postmenstrual

• Fever > 101°
• Abdominal distension
• Vaginal discharge
• Elevated ESR

Canvass of tenderness
OR
Vaginal discomfort
OR
Abdominal discomfort

Is there evidence to support clinical diagnosis?

• All characters are poor predictors

• Pretest probability of PID with abdominal pain was ONLY 79% (cardinal marker...)

• Most predictive: ESR, fever, adnexal tenderness [LR 65% (CI 61,69) vs. laparoscopically diagnosis]
Specific Diagnostic Tools

- Endometrial biopsy...
  - Endometritis
- TVUS/MRI...
  - Thickened, fluid filled oviducts, TOA
- Laparoscopic findings...
  - Inflammatory changes
  - Filmy to dense adhesions
  - TOA

Inter-observer reproducibility is POOR compared to histopathology (picks up 2/3-3/4 cases)


Imaging

- .37 pts with Suspected PID by Laparoscopy
  - MRI sensitivity: 95%
  - specificity: 85%
  - US sensitivity: 81%
  - specificity: 78%


Doppler Ultrasound

- Predictive findings vs hydrosalpinges:
  - Doppler – hyperemia & lower pulsatility index
  - Thickened wall >5 mm (salpingitis)
  - Incomplete septae
  - Cogwheel sign (chronic pyosalpinx)
  - Free fluid in CDS

93% accuracy


Hysterosalpingography

- NO prophylaxis if:
  - (-) STI history
  - Normal US
- Doxycycline if:
  - Known hydrosalpinx
  - Prior STI and dilated tubes during HSG
  - 5 day regimen

Adhesions & Pelvic Mass
Pelvic Mass

- Primary concern... is it a malignancy ???
  - Age
  - Appearance
  - Other non-gynecologic CA
  - Genetic risk
  - Ascites

Malignant Neoplasms

- Age stratified
  - 25-40 years: 6-10% are malignant
  - > 50 years: 29-35% are malignant
  - <10yoa: ~50% are malignant

- Tumor types
  - Epithelial (60-70%), Germ cell (15-20%), Stromal (5-10%), metastatic (5% - GI)

What to Expect from Imaging

- Transvaginal US picks up ~90% of malignant lesions
  - LMP and struma ovari are tough

- AHRQ review

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<thead>
<tr>
<th>Type</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelvic Exam</td>
<td>45%</td>
<td>90%</td>
</tr>
<tr>
<td>TVUS</td>
<td>86-91%</td>
<td>68-83%</td>
</tr>
<tr>
<td>MRI</td>
<td>91%</td>
<td>88%</td>
</tr>
<tr>
<td>CT</td>
<td>90%</td>
<td>78%</td>
</tr>
<tr>
<td>CA 125</td>
<td>78%</td>
<td>78%</td>
</tr>
</tbody>
</table>

Myers ER, et al. AHRQ Publication No. 06-E004; February 2006.

‘Incidentalomas’ in Menopausal Women

- Studies of > 25,000 women screened
- Majority had simple ovarian cysts
- Path: serous cystademon
- Most resolved spontaneously
- May detect earlier stage EOC, but the number needed to treat is HIGH
- Expectant Management is REASONABLE

Ovary or Fibroid?

You don’t want to be here...
...and so at the end of the day...

We truly rely on our imaging colleagues to help guide therapy

Conclusions

• The ER is a breeding ground for unusual cases that keep us sharp.
• Diagnostic technologies have enabled better detection and early intervention.
• Although clinical acumen directs us, imaging frequently points us in the right direction.
• Initiate and maintain collegial exchange for ongoing learning and improved patient care.