Non-Gynecologic findings at pelvic scans

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Pattern recognition

- Ultrasound, as almost all imaging modalities, is based upon training our brain to recognize shapes & patterns
- The “US pattern library” of imaging specialists depends upon prior exposure and training
- Obviously a well trained radiologists’ “US pattern library” is larger than that of an Ob/Gyn’s who deals mostly with the anatomy and pathology of the female pelvis

Pattern recognition

- Some shapes, forms, sono-textures represent obvious anatomic structures or pathologies, therefore easy to diagnose
- The objective of this lecture is to enrich the US pattern recognition library of the OB/Gyn practitioner

You recognize these structures since you saw them over and over again

What do we do if we see unfamiliar structures, shapes and sono-textures?

- How do you solve the problems?
- Let us get some help!!

Aids to get closer to the diagnosis

- Know the date of the LMP
- History (take one yourself - do not rely on the referral slip)
- Location of lesion (touch for pain)
- Doppler interrogation
- Use of 3D US
- Use the internet
Bladder, Kidneys, Ureters

History

• 67 y.o.
• Complaints of fever, lower abdominal pain
• Trouble urinating
• Occasional vaginal spotting

The diagnosis

• Acute cystitis and urinary retention (sludge in thick bladder)

Before & after catheterization very thick bladder wall

If unable to empty: Insert catheter

Keep bladder “comfortably” full

TAS

Bladder wall

Normal < 3 mm
Abnormal > 3 mm

Courtesy: Leslie Scoutt M.D.
Case

37 y.o.
Complaints of low fever, dull lower abdominal pain
Trouble urinating
Frequency, pain urinating

Emphysematous cystitis

Another case.....

Patient referred for routine pelvic scan after abdominal surgery for “cancer”
Referral slip: Pelvic scan.
Patient said: “I lost my uterus, ovaries, part of the vagina and part of the bladder”

Case

55 y.o.
Acute stabbing, lower abdominal pain in waves
Trouble urinating

Stone in ureter

Scan of the bladder
Answer: Bladder dome reconstruction using small bowel. Mucus is floating in the bladder

Shadowing
Transvaginal color Doppler sonography of the ureteral jets: a method to detect ureteral patency.

Timor-Tritsch, Haratz-Rubinstein, Monteagudo, Lerner, Murphy

Transvaginal gray-scale imaging of ureteral jets in the evaluation of ureteral patency.
Haratz-Rubinstein, Murphy, Monteagudo, Timor-Tritsch

Ureteric jets
- Observe bladder with color Doppler US for at least 5 minutes
- Pt must be well hydrated
- Do not have pt void
- Absence suggests complete obstruction
  - jet still visible w/ incomplete obstruction

Bladder calculi
- Migrate from kidney, nidus, urinary stasis
- Echogenic, shadowing, mobile

Bladder masses
- Roll patient

Bladder endometrioma

Previous dx of pelvic endometriosis or endometrioma?
- Infertility?
- Previous laparoscopy?
- Blood in the urine?

Bladder masses
- Roll patient

If it moves, it's clot

Ureteroccele
- Invaginations of the ureteral orifice into the bladder
- At the level of the trigone

Bladder calculi

Echogenic, shadowing, mobile

Bladder masses
- Roll patient

Bladder endometrioma

Previous dx of pelvic endometriosis or endometrioma?
- Infertility?
- Previous laparoscopy?
- Blood in the urine?
Bladder cancer

- √ blood flow

If there's blood flow, it's tumor

Courtesy: Leslie Scoutt M.D.

Hydronephrosis.

Kidney cysts

Almost daily “garden variety” kidney cysts

Pelvic Kidney

??

Left Kidney

Right Kidney

Left kidney??
Take home message
• Before or after every gyn exam scan the bladder and the kidneys!
• Identify the organ first
• Then try to diagnose the pathology

Aids to pattern recognition
• Location of the lesion

Pathologies in the abdominal cavity

Bowel diseases

Ask patient for history, signs & symptoms
• Learn to recognize NL bowel pattern
• Most common are: rectum and colon
  • Peristalsis seen: small bowel, no peristalsis: large bowel or rectum (rarely: paralytic ileus)
  • Serosa is echogenic, below: sonolucent muscle

Bowel disease
• Ask patient for known Hx, S & S
• Some of the pathologies are:
  • Dilated small bowel,
  • Crohn’s disease,
  • Diverticulitis
  • Hirschsprung’s disease
Colitis

Small bowel obstruction
- Necrosis
  - sloughing of mucosa
  - fecalization of small bowel contents

Appendicitis

Appendicitis vs. PID
- It is the major confrontational issue cast using friction between the Gyn and Surgical resident in the ER
- Dx best done by CT

Appendicitis
- Suspect it always if:
  - Sausage shaped structure
  - Disease is acute
  - Rt sided, unilateral finding
  - Clinical correlation exist
  - Sometimes a fecolith is seen

Be cautious, if reasonable: include it in the Diff. Dx.
**Periappendicular abscess**

- Suspect it always if:
  - Disease is acute
  - Rt sided, unilateral finding
  - Clinical correlation exist
  - Echogenic free pelvic fluid is seen
  - Check the Morrison’s space for fluid

**Sono markers:**
- Thick wall, sausage shape
- Fluid in lumen (echogenic)
- Abundant color flow pattern
- Free fluid (+ in Morrison’s space)

**Be cautious, if reasonable: include it in the Diff. Dx.**

**Take home message**

- If your Dx is PID, always keep appendicitis in the forefront of your Diff Dx
- Concentric hyper and anechoic rings on cross section mean: BOWEL
- Turn on Power Doppler to see
dilated sub-serosal vessels
- CT is more diagnostic than US

**THE TRICKY “TUBES”**
During a routine gynecologic, bimanual pelvic exam a right adnexa; mass was palpated in this 71 y.o. patient. Ultrasound exam in another country suggested a solid 5-6 cm right ovarian mass. The patient was asymptomatic. The family, however suggested that the patient lost weight.

**What is the diagnosis?**

Is it acute salpingitis?
Is it acute appendicitis?
Is it a foreign body granuloma?
Or something else? If so, what??

- Typical are:
  - pear or bottle shape, solid, layered texture called "onion skin" appearance & lack of blood flow

- Possible complication: Pseudomyxoma peritonei

**The diagnosis: Benign mucocele of the appendix**

CT image of the pelvis in the axial plane: the pear shaped structure is marked by the arrow.

The macroscopic pathologic specimen
Histo-pathologic specimen showing the goblet cells of the mucosa
Here is another one....

Mucocele of the appendix

- Sausage shaped structure
- Motion tenderness by TVS
- Sonographic appearance:
  - Layered “onion skin” (tx & sag)
  - Variable location!!

- The alternating hyper and hypoechoic rings on US are the result of the copious mucin excreted by the goblet cells of the mucosal coating the appendix and undergoing hardening and deposition in layers.

- US, with its pathognomonic features outperforms MRI & CT, therefore it should be the first-line diagnostic tool.
- In about 5-6% of the cases ascites is found. This represents gelatinous material and is equivalent with the diagnosis of pseudomyxoma peritonei which is a sign of cystadenoma or cystadenocarcinoma of the appendix

Take home message

- Pear shaped, right adnexal structure, with layered, “onion skin” appearance, without internal vessels is mucocele of the appendix (Aunt Minnie)

Complications: Pseudomyxoma peritonei

- Widespread intraperitoneal deposits of mucin
- Historically attributed to spread of a ruptured primary ovarian mucinous tumor
- Most often results from dissemination of an appendiceal mucinous tumor
- Cystic ovarian mucinous tumors associated with PP often are bilateral or right sided
New case: History

• 32 y.o. otherwise healthy patient
• Complained of her changing abdominal girth.

RT ovary
What is the differential dx?

• 1. Benign ovarian neoplasm: mucinous type
• 2. Malignant ovarian tumor: mucinous type (LMP)
• 3. Pseudomyxoma ovarii/peritonei

The diagnosis: Pseudomyxoma ovarii

• Pseudomyxoma ovarii:
  - Large pools of mucin with sparse inflammatory cellular reaction
  - Characteristically found in secondary ovarian tumors produced by pseudomyxoma peritonei, but can be found in some primary ovarian mucinous tumors

New case, same location

• 32yo P6006 irregular spotting s/p IUD placement 1 year ago
• Past OB: Cesarean Section, VBAC x 5
• Past gyn: 13/30/5, no h/o ovarian cysts, fibroids
• Past med: Hypothyroidism
• FH: no h/o cancer

Sonogram

• Multiple pelvic, multiloculated cysts, thin walls, anechoic content.
• Doppler values with borderline low resistance value.
• Both ovaries visualized in normal size and follicles.
• Suspicion for pseudomyxoma peritonei or mucinous tumor

Intraoperative
Histologic diagnosis:
Peritoneal inclusion cysts

Take home message
• Sometime you will be at a loss
• Use your best means and clinical common sense to come up with a list of pertinent differential diagnoses

Aids to pattern recognition
• Location of the lesion
Still the abdominal cavity...

Aids to pattern recognition
• History??????

Patient referred for “fibroids”; complains of ‘vague abdominal pain’

Case
• 51 yo P0030 LMP 5/06
• 6/06: fatigue, low grade fever, 20lb wt loss
• 6/15-21: admitted to medicine
• Microcytic anemia -> transfused 2 u prbc’s
  - Febrile to 101 -> suspect SBP, but neg cx, treated with Ceftriaxone
  - UGI -> nl esophagus, no ulcers
  - CT a/p -> ascites, low attenuation L adnexa
  - CT chest: sml R pleural effusion
  - TVUS (Rad) : R ovary w/int. echoes
What is the differential Dx?

• Is it primary peritoneal Ca.?
• Is it peritoneal sarcoidosis?
• Is it an inflammatory process?
• Are the ovaries and the uterus involved at all?

Management

• Pt sent to Gyn Onc for booking, presumed dx ovarian cancer
  - PMHx: HTN, DM, hyperlipidemia
  - Exam:
    • Breast density at 12 o’clock above L nipple
    • Tachycardia
    • Softly distended abdomen, + fluid wave
    • BME small av uterus no masses
  - Ca125: 251
  - Hct: 26 preop
  - Colonoscopy reportedly negative last year

At surgery....

Histology
Can you speculate now?

- Is it primary peritoneal Ca.?
- Is it peritoneal sarcoidosis?
- Is it miliary peritoneal TB?....
- Were the genital organs NL?

Diagnosis

- **Miliary Peritoneal TB**

Take home message

Remember the history?

Also remember - Normal ovaries, normal pelvic wall surface

Stick to your guns!

Aids to pattern recognition

Location of the lesion

- Retroperitoneal

Case

- Hx: Rt sided pelvic discomfort
- Bimanual palpation: soft rt vaginal wall structure, no motion tenderness
- CT: flat mass on right lower pelvis
Differential Diagnoses

- KTW
- Kasabach-Merritt Sy
  - Hemangioma
  - Thrombocytopenia
- Colonic/rectal hemangioma
- Lymphoma
- Angiomyxoma (aggressive)
- Hematoma
Correct dx after biopsy:
Angiomyxoma (aggressive)

Case
- 81 y.o patient with a history of breast cancer, on tamoxifen therapy referred for evaluation of a previously detected & regularly followed unilocular, thin walled simple appearing cyst, without papillations.
- The present scan: the cyst measured 6 x 5.4 x 4.4 cm.
- The Doppler flow indices were considered within the benign range.
- The endometrium was ill defined, measured 6 mm with some sub-endometrial (proximal myometrial) microcystic appearance attributed to the effect of the tamoxifen

The left ovarian finding
- Close to, or in the area of the right adnexa an elongated, solid appearing, non tender mass measuring 5.1 x 3.1 x 1.9 cm was seen.

The finding in the rt adnexa
- Color Doppler revealed ample flow signals with the following flow indices:
  - PSV = 7.2 cm/s
  - RI = 0.67
  - PI = 1.3
The finding in the rt. adnexa

- The right ovary was not seen
- The patient denied any bowel symptoms as well as the existence of any bowel disease
- Questioning her, she mentioned loss of appetite and fatigue

What are the differential diagnostic entities in this case?

1. Ovarian pathology
   1. Primary malignancy
   2. Metastasis from other primary site
2. GI pathology (probably malignancy)
3. Other, retroperitoneal pathology

Diagnosis

1. Benign simple cyst of the lt. ovary
2. Retroperitoneal pelvic lymphnode -malignant lymphoma

Similar case
Aids to pattern recognition
Location of the lesion
- Retroperitoneal or close to the pelvic sidewall

• 28 y.o. patient referred to rule out a right ovarian cystic teratoma and a known left adnexal mass
• The patient had a left ovarian teratoma, which was removed one year earlier
• No additional info in the requisition form
• The patient did not volunteer additional info

Report 1/2005
- Right ovarian benign teratoma
- Dx. Diff.: Possible recurrent teratoma in the left adnexa
- Suggested to have f/u scan in 12 months.
  - Patient was referred back after 5 months for additional pelvic sono + “3D if necessary”
  - Still no additional clinical information by MD or the patient
What are the differential diagnostic entities in this case?

1. Ovarian pathology
   a. Primary malignancy
   b. Metastasis from other primary site
2. GI pathology (probably malignancy)
3. Other, retroperitoneal pathology

After the power Doppler imaging was completed, one of our sonographers suggested that it appears as it would be a large lymph node.

At this time the patient “suddenly” volunteered the diagnosis she was suggested some time ago.

Diagnosis

- Enlarged lymph node in the left Adnexa
- Castleman syndrome

Castleman disease

- Sono features
  - Lobulated, ovoid shape
  - Relatively anechoic
  - Extremely vascularized, (they derive their vascular supply from the branches of the iliac artery, vessels enter from short axis of lymph node)

- Systemic symptoms:
  - Unicentric (30%) - fever, malaise, weight loss, anorexia, nausea
  - Multicentric (100%) - same + night sweats
Castleman disease

- Differential diagnosis:
  - Sarcoma
  - Unusual ovarian neoplasm
  - Endometriosis, endometrioma
  - Kaposi’s sarcoma
  - Metastasis
  - Lymphoma
  - Inflammatory mass

Case

- 50 yo G3P2012 complaints of pelvic pain and fullness
- Post two prior ROV cystectomies, as well as BSO in 2009 for recurrent ROV cyst. Pathology resulted as ovarian tissue with follicles.
- Referred for TVUS to evaluate symptoms.

History

- Upon presentation to the ultrasound unit, patient does not volunteer additional information regarding her presentation.
- Repeat TVUS reveals R adnexal cyst 6.3 x 4.1 5.4 cm, thin-walled, and avascular.
- Additionally, the following findings were noted on TVUS:
**Diagnosis**

- Follicular B Cell Lymphoma, Stage 3a, Grade 1/3

- Given overall asymptomatic state and fairly good survival rates, pt has been managed with surveillance alone since diagnosis in 2004.

**Take home message**

- If you see a scalloped, ovoid structure with blood vessel approaching from its short axis side: **think LYMPH NODE!**

- Systemic disease is your best bet

**Aids to pattern recognition**

**Location of the lesion**

- Retroperitoneal or close to the pelvic floor

**Case**

**TVS of “Lt adnexa”**

- Routine Gyn scan of an asymptomatic menopausal patient
The TVS US report:

- Normal gyn scan except a multicytic, anechoic, fluid filled cluster of different cyst sizes, thin septations with active power Doppler flow (NL velocity indices)
- We asked for help!
- CT scan: Lt cystic lymphangioma of the Lt. gonadal vein

Case

- 49 yo irregular menses, for f/u of fibroids
- Findings:
  - TAS + TVS
    - Uterine fibroids (Ut vol 600cc) described, measured
    - Rt ovary: small simple cyst
    - Lt ovary: 7cm endometrioma, Also 15 x 8 x 3 cm anechoic, multilocular, thin septated structure without blood flow

- Call to referring MD: Yes!..... known finding!

Dx: Retroperitoneal left lymphangioma
Dx: Retroperitoneal left lymphangioma

Take home message
- Systemic diseases should always cross your mind when infra or retroperitoneal structures are seen

Aids to pattern recognition
- Location of the lesion
  Posterior pelvic wall...

Tarlov cysts, AKA perineurial cysts, are CSF filled within the nerve-root sheath at the dorsal root ganglion.
- Often detected incidentally @ MRI or CT
- Etiology is not well understood
- Relatively common, usually asymptomatic
- Cysts >1.5 cm more likely to be symptomatic;
- No current Rx has proven to be effective.
- Current Rx options include CSF aspiration, complete or partial removal, fibrin-glue
- Occasionally seen in Marfan, Ehlers-Danlos and Loeys-Dietz syndromes.

Mistery pelvic cyst
- Location of the lesion
  In the posterior part of the pelvis
Case

- 31 year old patient
- Vague abdominal pain
- DUB
- Referring MD felt left adnexal mass close to the cul-de-sac
- Scanned on day 24 of the cycle

Our Dx:

- Diff. Dx:
  - Endometrioma
  - Mucinous cystadenoma
  - Non-typical teratoma
- CT was asked for
Diagnosis: Benign tail-gut cyst

Take home message

- Try your best
- Establish a differential diagnosis
- Ask for help: CT in this case

Aids to the diagnosis

Good history and...

A combination of non-Gyn findings...

Ovarian mass & Constipation

In the Morisson’s Pouch

Gall bladder
Dx: Ovarian carcinoma with metastatic lesion to the splenic flexure of the colon with a stent placed.

Aids to the diagnosis
Good history and...
A combination of non-Gyn findings...

Case

- Rt SO 14 days ago
- Presents to the ER with fever, abdominal discomfort, malaise

Diagnosis??
Hematoma c. clot? Abscess?
Relaparatomy

Foreign body (sponge)

Rare but keep in mind as a complication after surgery

Aids to pattern recognition

• Ask for additional imaging modalities

Aids to pattern recognition

• Doppler interrogation + use of 3D US

Case 1

Case

• Patient had D&C for molar pregnancy 3 m ago
• Lowest βhCG was 800, now rising to 3000
• Lump felt in the wall of the lower anterior vaginal wall
• US guided biopsy was planned before MTX treatment
• US was requested.
In summary

• Non gynecologic pathology seen during a GYN scan is not rare at all
• We, the gynecologists, are not trained in looking at these findings, much less to diagnose them
• History taking is crucial!
• Call the referring MD (referral slips are rarely helpful & may be even misleading)
• Do not be embarrassed to ask for help
• “Additional imaging” may help