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# Ovarian Torsion

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# Agenda

- Case Presentation
- Anatomy of the female pelvis
- Differential Diagnosis
- Ultrasound Evaluation of an Ovary
- The use of Color Doppler Flow in the diagnosis of ovarian torsion
- The use of CT in the diagnosis of ovarian torsion

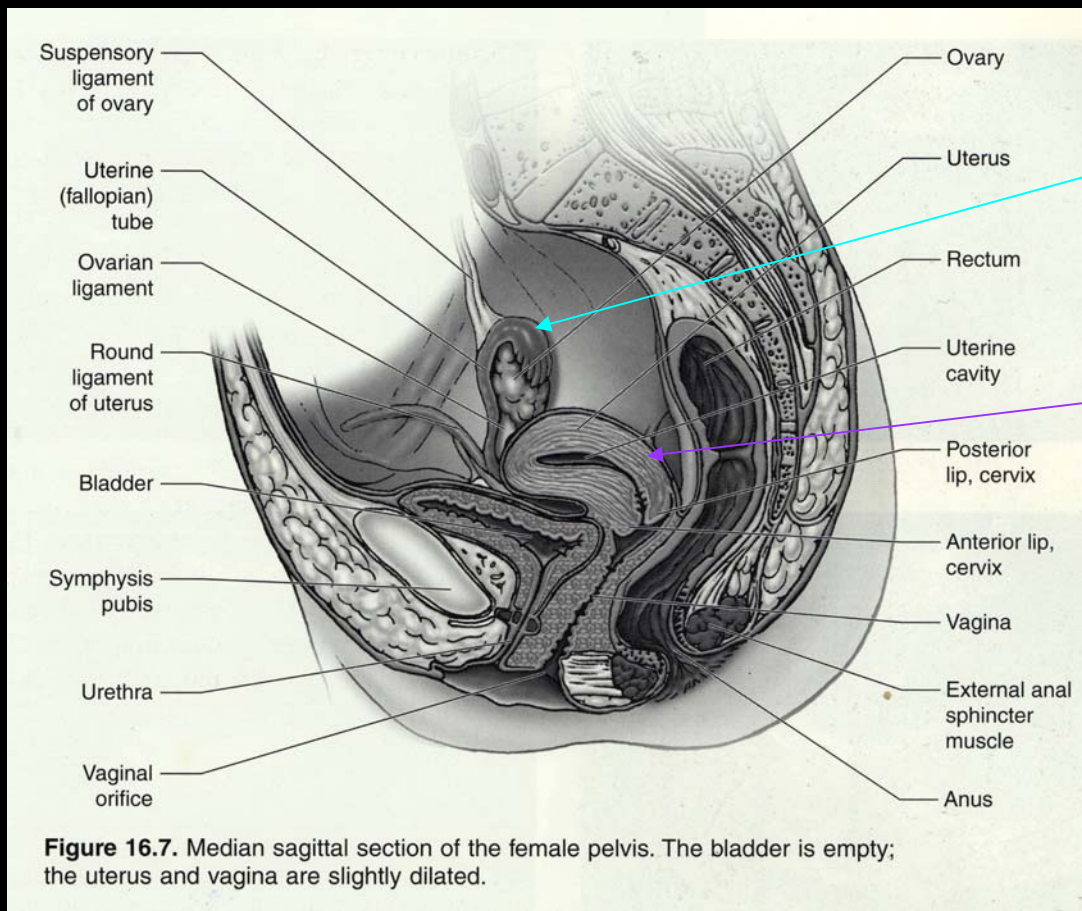


# Patient Presentation

- The Ms. T is a 24 yo G2P2 presenting with an acute onset of severe intermittent right-sided lower quadrant pain, accompanied by nausea and vomiting



# Anatomy of the Female Pelvis



Ovary

Uterus

Novelline RA. Squire's Fundamentals Of Radiology. 6<sup>th</sup> Edition. Harvard University Press. Feb. 2004. Pg 415



# A Surgeon's Differential for Right Lower Quadrant Pain in a Female

- Appendicitis
- Diverticulitis
- Inflammatory Bowel Disease
- Urinary Tract Stone
- Cystitis
- Pelvic Infection



# A Gynecologist's Differential of RLQ Pain

- Pregnancy complications (ie Ectopic)
- Ovarian neoplasm
- Ovarian torsion
- Ovarian vein thrombosis
- Ruptured Ovarian Cyst
- Intracapsular or extracapsular ovarian hemorrhage

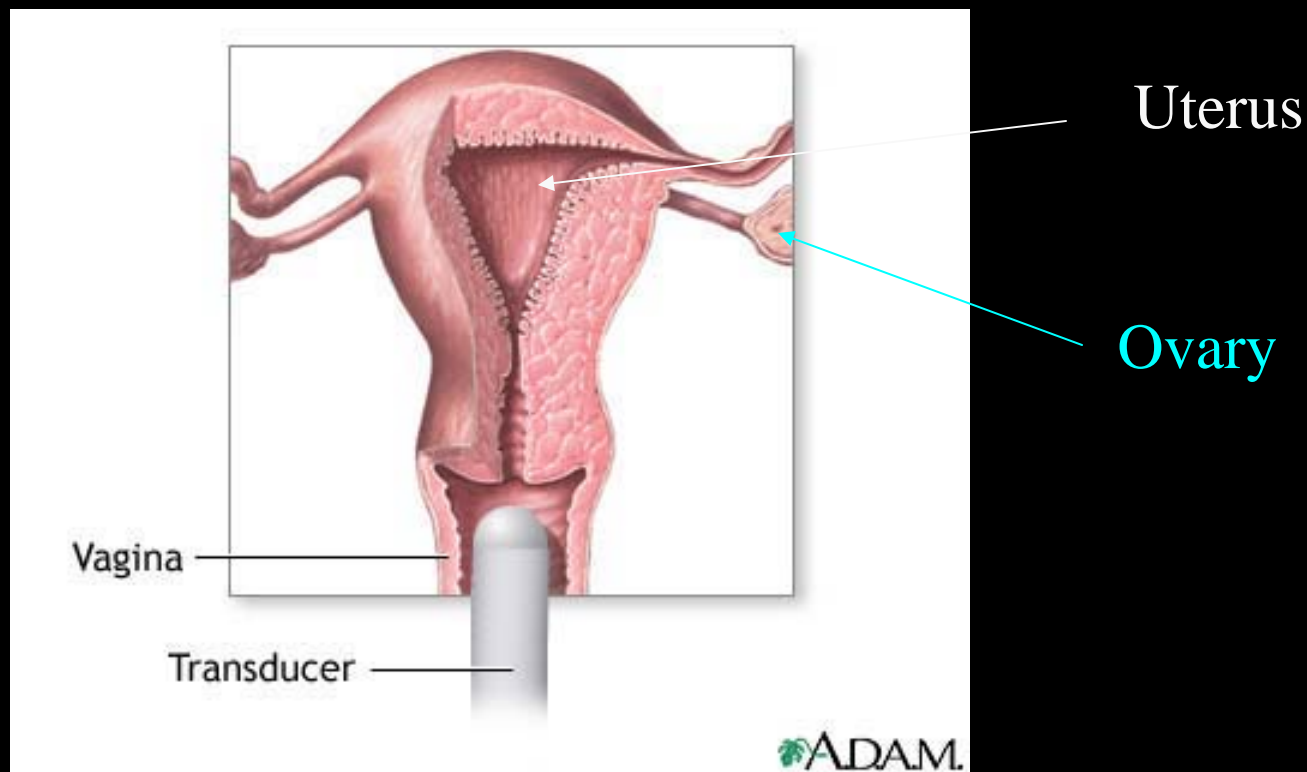


# What is the Preferred Imaging Test?

- Abdominal Ultrasound
- Transvaginal Ultrasound
  - Noninvasive method
  - Full bladder is not necessary
  - Gain considerable detail
  - Total ovary size
  - Number of developing follicles



# Transvaginal Ultrasound



Medline Plus, Medical Encyclopedia

<http://www.nlm.nih.gov/medlineplus/ency/imagepages/9987.htm>





# Evaluate this Ovary: 47 yo RLQ pain



•2.74 X 1.84 X 2.6 cm  
(6.7 ml) Normal Ovary

Courtesy of Deborah Levine, MD



# Appearance of the Ovary on Ultrasound

- Depends on age and stage of the menstrual cycle
- Pubertal ovary may have numerous large cysts
- Postmenopausal women have smaller ovaries with absence of follicular structure



# Evaluate this Ovary: 26 yo with RLQ pain

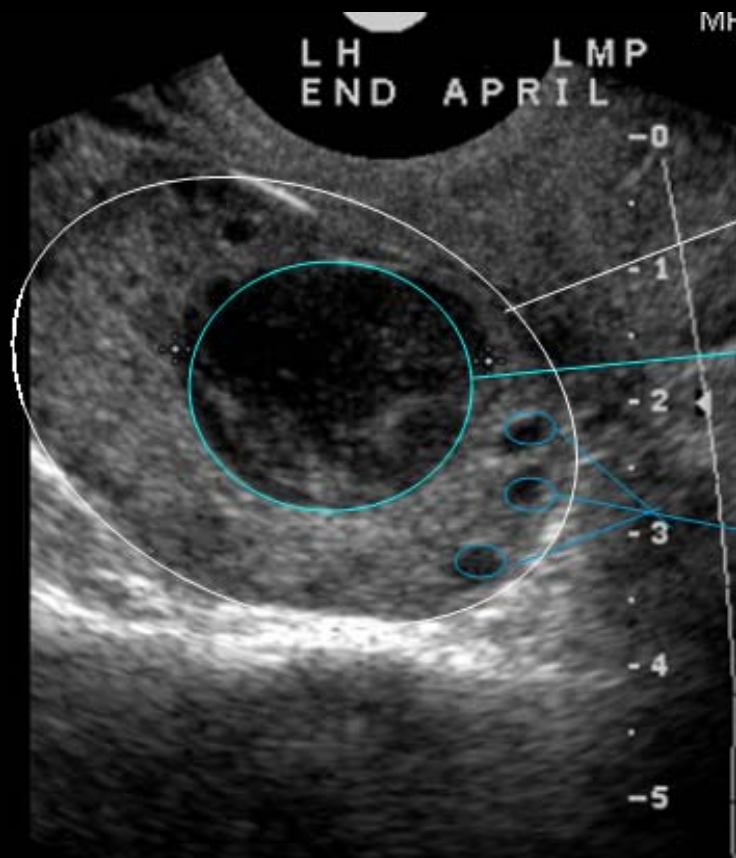


- 2.9 X 2.7 X 2.7 cm (11 ml)
- heterogeneously echogenic cyst with central areas of decreased echogenicity which demonstrates a cobweb appearance

Courtesy of Deborah Levine, MD



# Evaluate This Ovary: The Case of Ms. T



- 7.5 x 2.7 x 3.0 cm (31.6ml) Ovary
- 2.0 X 1.9 X 2.3 cm Hemorrhagic Cyst
- Peripheral Follicles

Courtesy of Colin McArdle, MD



# Why is it Important to Understand the Difference Between these Ovaries?

- The hemorrhagic cyst resolved within six months without intervention
- Ovarian torsion is a surgical emergency



# What Findings Aid in the Diagnosis of Ovarian Torsion?

- Enlarged ovary (>15 ml)
- Multiple Peripheral follicles (8-12mm)
- Complex cystic mass
- May mimic the morphology of the underlying lesion
- May see fluid in the cul-de-sac



# Are the Cyst and the Torsed Ovary Related?

- Secondary torsion account for 50-81% of cases
- Most common association is a benign cystic ovarian tumor (follicular cysts, corpus luteum and theca lutean cysts, and endometrial cysts)
- Other associations include ovarian hyperstimulation syndrome, malignant neoplasm and benign ovarian neoplasms such as dermoids,
- Primary torsion may result from a hypermobile adnexa



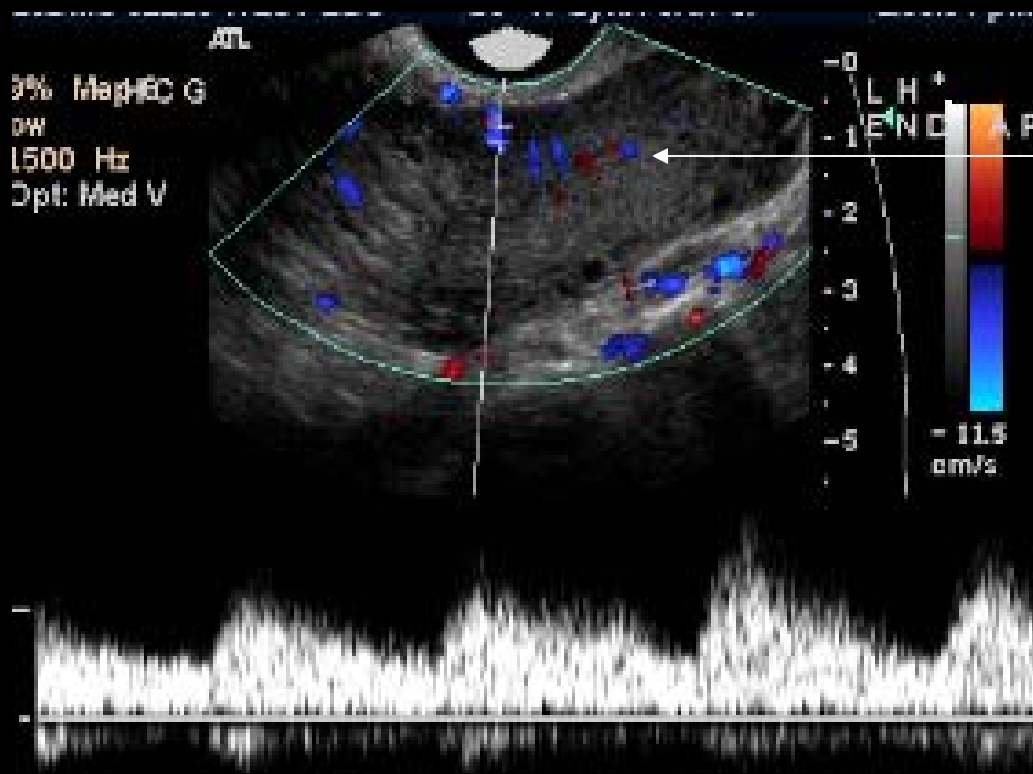
# Is Color Doppler Flow Imaging (CDFI) diagnostic?

- A complex cystic mass without torsion may appear similar to one with torsion making torsion difficult to diagnose
- Torsion is due to adnexal rotation with venous, arterial and lymphatic obstruction
- Therefore, it has been suggested that CDFI may help assess venous stasis and aid in the diagnosis of torsion





# Doppler Image of Ms. T's Right Ovary



Normal Doppler  
Flow

Courtesy of Colin McArdle, MD



# Is Color Doppler Flow Imaging (CDFI) diagnostic?

- CDFI aids in the diagnosis of torsion if no flow is detected
- Unfortunately, it is not reliable if flow is detected. In one study flow showed in 9 out of 20 torsed ovaries. Another study showed flow in 6 out of 10 torsed ovaries
- It has however been suggested that flow in an ovary may indicate the ovary may be saved by untwisting of the adnexa



# Possible Explanations for Normal Flow in Torsed Ovaries

- Venous thrombosis from torsion may lead to symptoms prior to arterial thrombosis
- Flow may be provided through a dual ovarian blood supply
- Intermittent torsion
- Unlike the testicle, the ovary lacks a confining capsule and may increase in size substantially before intraorgan pressure affects the circulation



# Flow on CDFI is not Reliable

- The presence of flow may delay diagnosis
- A delay in diagnosis may increase the risk of infertility, necrosis with peritonitis, and even death



# What other imaging modalities could aid in the Diagnosis?

- CT
- MRI



# CT Findings in Ovarian Torsion



Large, predominately solid, oval mass with low density center

**Gittleman AM, Price AP, Goffner L, Katz DS. Ovarian Torsion: CT Findings in a child. *J Pediatr Surg.* 2004 Aug;39(8):1270-2**



# CT Findings in Ovarian Torsion



High density periphery with multiple small cysts consistent with follicles

**Gittleman AM, Price AP, Goffner L, Katz DS. Ovarian Torsion: CT Findings in a child. *J Pediatr Surg.* 2004 Aug;39(8):1270-2**



# Three Other Suspicious Findings on CT and MRI

- 1) Lesion protrusion on the affected side where engorged blood vessels converge
- 2) Draping of the lesion by thick and straight blood vessels
- 3) Lesion nonenhancement
- Bonus: the presence of intravascular air within an ovarian tumor is rare but diagnostic





# Summary

- Ovarian torsion should be suspected in female patients with lower abdominal pain
- Ultrasound is the primary imaging modality for Ovarian Torsion
- CDFI may aid in the diagnosis of ovarian torsion if flow is absent but is not reliable if flow is present
- CT findings may help diagnose ovarian torsion



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