Gynecologic and Obstetric Emergency

20190814

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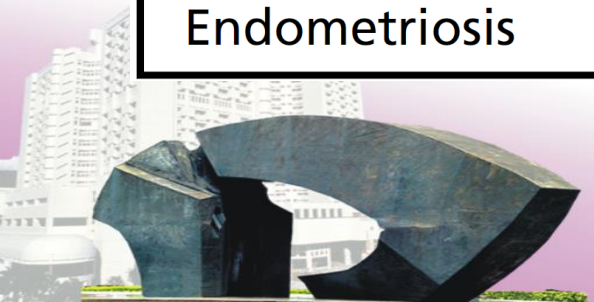
Acute pelvic pain

1 Ectopic pregnancy

Table 1
Gynecologic versus nongynecologic causes of pelvic pain

Gynecologic Causes	Nongynecologic Causes
Ovarian torsion 5	Appendicitis 4
Ovarian cyst 2	Nephrolithiasis
Pelvic inflammatory disease 3	Hernia
Tubo-ovarian abscess	Diverticulitis
Fibroid disease	Small bowel obstruction
Dysmenorrhea/menorrhagia	Cystitis/urinary tract infection
Malpositioned IUD	Adhesions/functional abdominal pain
Endometriosis	Musculoskeletal pain



Emerg Med Clin N Am 37 (2019) 207–218

Evaluation

- Pregnancy status
- Physical and pelvic examination - West J Emerg Med 2011;12(2):208–12.
- Laboratory tests- complete blood counts, chemistry panels, and urinalysis
- Image: ultrasound, CT scan, MRI

CT scan after ultrasound

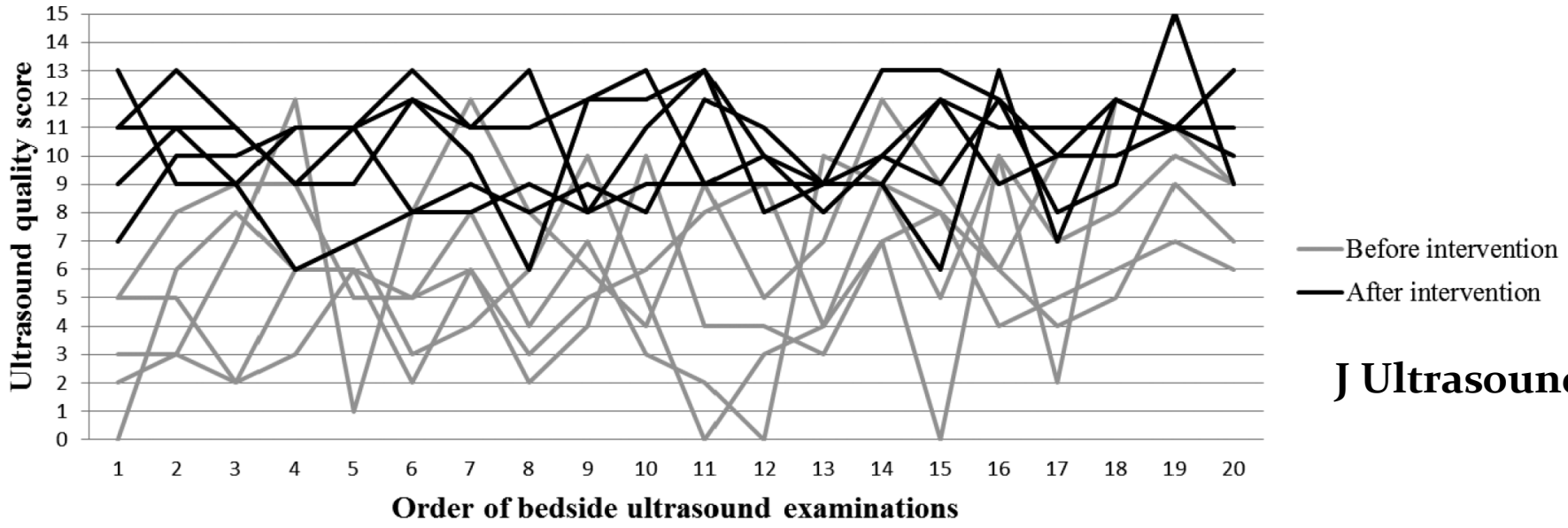
- If the suspicion for nongynecologic causes of pelvic pain is significantly higher than the gynecologic causes, **CT scans** offer superior diagnostic efficacy and can be performed first.
- If a **CT** is entirely negative, there is little to no utility in obtaining an immediate follow-up ultrasound.

-Clin Radiol 2013;68(11):e586–92; Ultrasound Q 2007;23(3):177–87.

Impact of Accreditation Training for Residents on Sonographic Quality in Gynecologic Emergencies

Table 1. Quality Scores for Standardized Emergency Sonograms Based on 15 Points

A1, View of the Morison Pouch	A2, Sagittal View of the Uterus	A3, View of the Right Ovary	A4, View of the Left Ovary
Liver visible	Uterus occupying > $^2/_3$ of total image size	Right side stated	Left side stated
Kidney visible	Uterine fundus visible	Ovary occupying > $^1/_3$ of total image size	Ovary occupying > $^1/_3$ of total image size
Ovoid section of kidney visible	Endometrial midline echo visible Endocervix visible	Follicle(s) visible Iliac vein visible	Follicle(s) visible Iliac vein visible
3 points	4 points	4 points	4 points



J Ultrasound Med 2015; 34:829–835

Routine ultrasound examination

Table 2 Diagnostic accuracy of physical examination, transvaginal ultrasonography, and both for diagnosing surgical emergencies

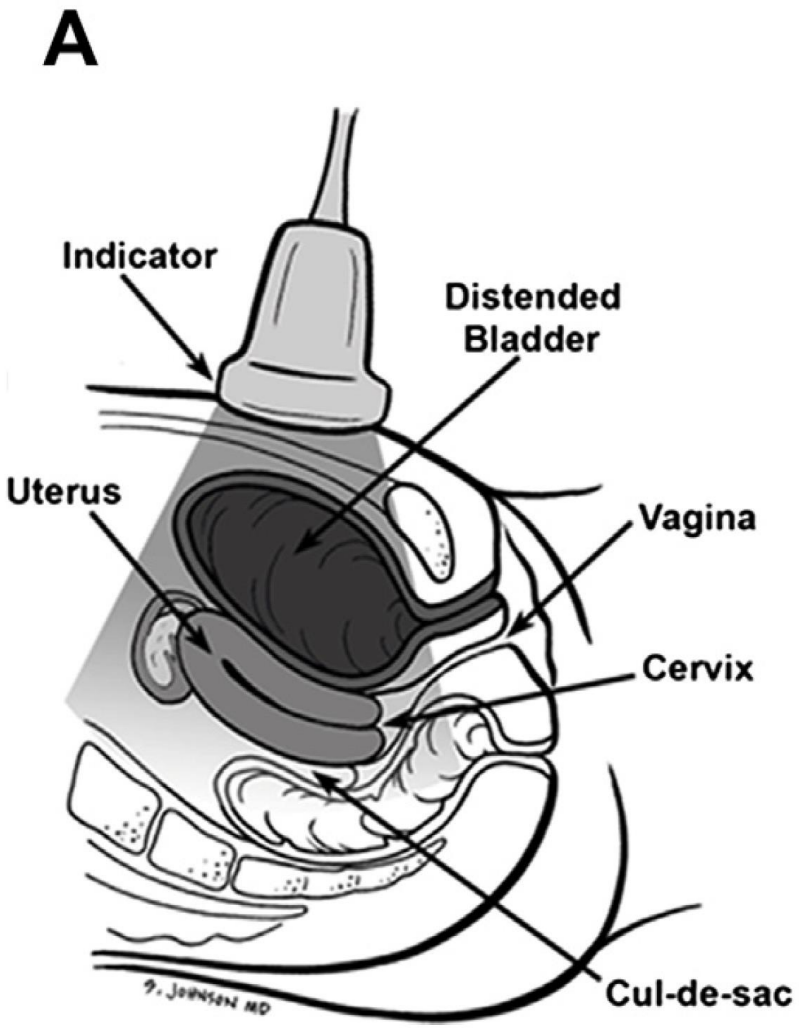
	Physical examination alone				TVUS alone				Strategy combining physical examination andTVUS[†]			
	Se% (n/N) [95% CI]	Sp% (n/N) [95% CI]	LR +	LR −	Se (n/N) [95% CI]	Sp (n/N) [95% CI]	LR +	LR −	Se (n/N) [95% CI]	Sp (n/N) [95% CI]	LR +	LR −
Overall population	87% (121/139) [82–93]	33% (31/95) [23–42]	1.3	0.4	94% (131/139) [90–98]	27% (26/95) [18–36]	1.3	0.2	99% (138/139) [98–100]	7% (7/95) [2–13]	1.1	0.1
Pregnant women	84% (81/97) [76–91]	42% (22/53) [28–55]	1.4	0.4	96% (93/97) [92–100]	13% (7/53) [4–22]	1.1	0.3	99% (96/97) [97–100]	6% (3/53) [0–12]	1.1	0.2
Non-pregnant women	95% (40/42) [89–100]	21% (9/42) [19–34]	1.2	0.2	91% (38/42) [82–99]	45% (19/42) [30–60]	1.6	0.2	100% (42/42) [92 – 100]	10% (4/42) [1–18]	1.1	0

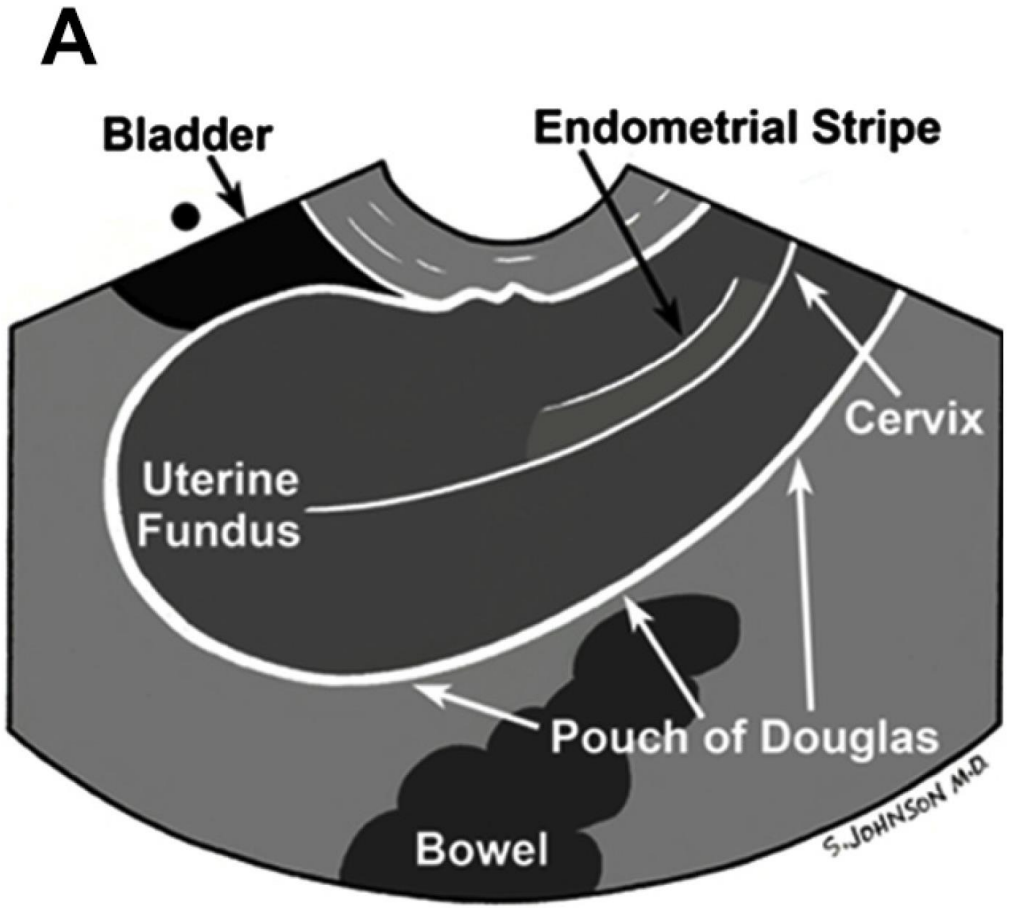
World Journal of Emergency Surgery 2013, 8:16

Table 3 Diagnoses in patients with a laparoscopy diagnosis of surgical emergency but had negative physical examination or negative transvaginal ultrasonography or negative with both examinations combined

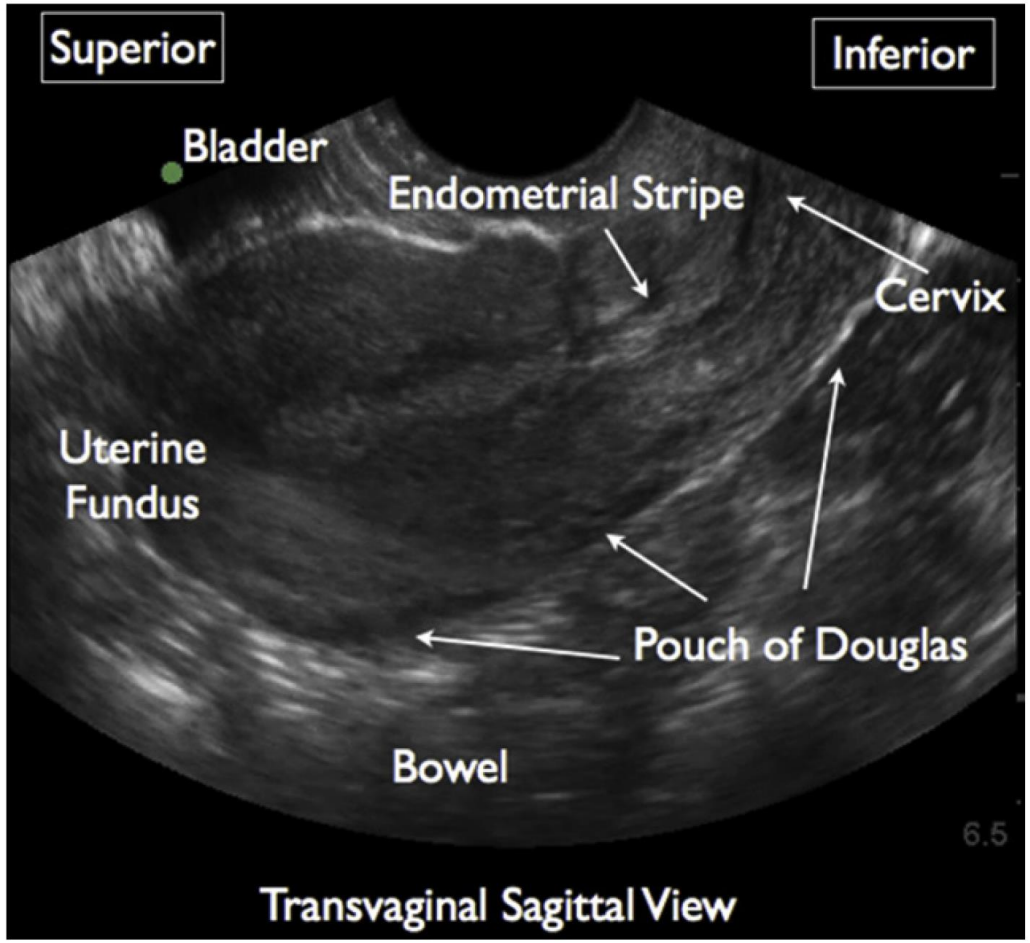
	FN, physical examination, n (%)	FN, TVUS, n (%)	FN, physical examination combined with TVUS†, n (%)	Total number of patients with surgical emergencies, N
Ectopic pregnancy	14 (15%)	1 (1%)	0	91
Pelvic peritonitis	0	1 (4 %)	0	25
Adnexal torsion	3 (20%)	3 (20%)	1 (7%)	15
Appendicitis	0	1 (25%)	0	4
Intestinal obstruction	0	2 (100%)	0	2
Ruptured hemorrhagic cyst	1 (50%)	0	0	2
Total	18 (13%)	8 (6%)	1 (0.7%)	139

World Journal of Emergency Surgery 2013, 8:16


A
Indicator
Distended Bladder
Uterus
Vagina
Cervix
Cul-de-sac
B
Superior
Inferior
Bladder
Uterus
Free Fluid
13



Transvaginal Sagittal View



Transvaginal Sagittal View

Potentially-life-threatening emergency

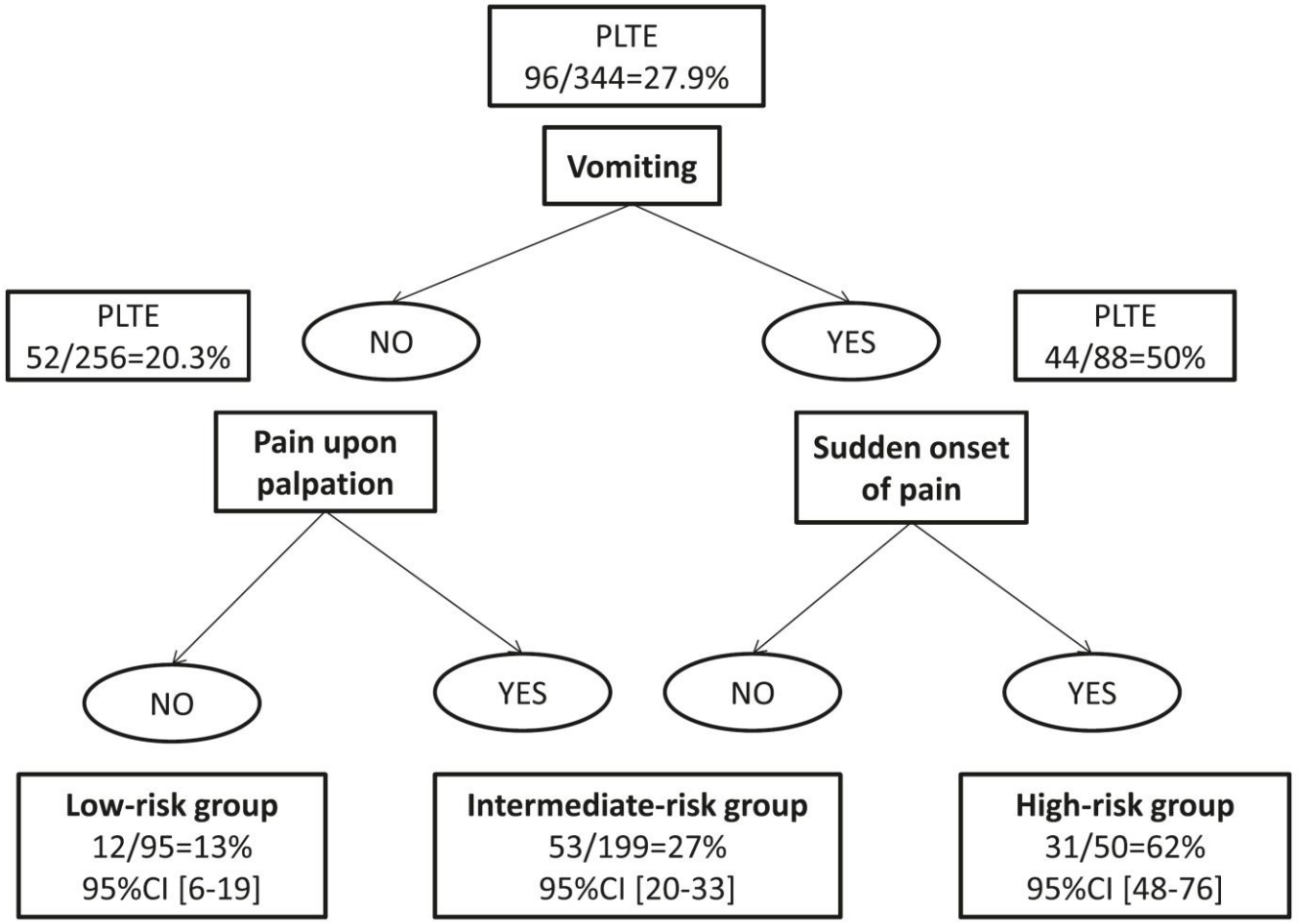


Figure 1 Decision tree for classifying the risk of potentially-life-threatening emergency in patients presenting to gynecological emergency rooms with acute pelvic pain.

World Journal of Emergency Surgery 2014, 9:46

Ectopic pregnancy

- Most prevalent Obs/Gyn emergent surgeries.
- Occur in 1% to 2% of pregnancies, but contribute to 3% to 4% of pregnancy-related mortality.

Am J Epidemiol 1999;149(11):1025–9.

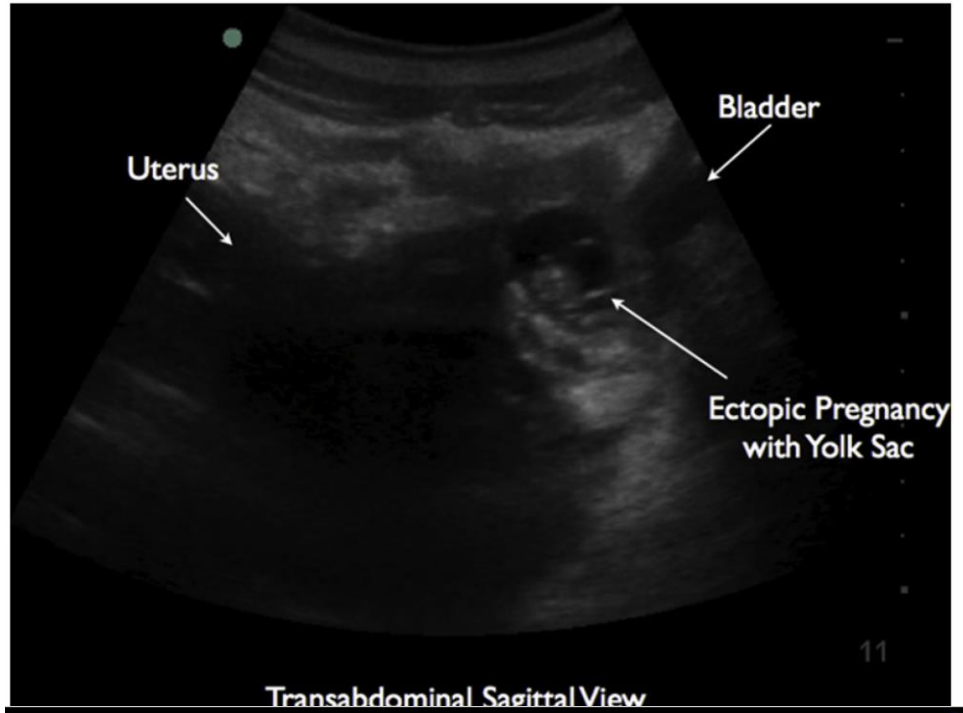
- Clinical: pregnancy is confirmed, no IUP, adnexal mass lesion/CDS fluid.
- β-hCG levels double every 1.5 days in the first 5 weeks of a regular gestation. After 7 weeks, the sequence for double titers is 3.5 days.
- TVS+serial quantitative β-hCG→ sensitivity of 96% and a specificity of 97%.

Am Fam Physician. 2005;72:1707Y1714.

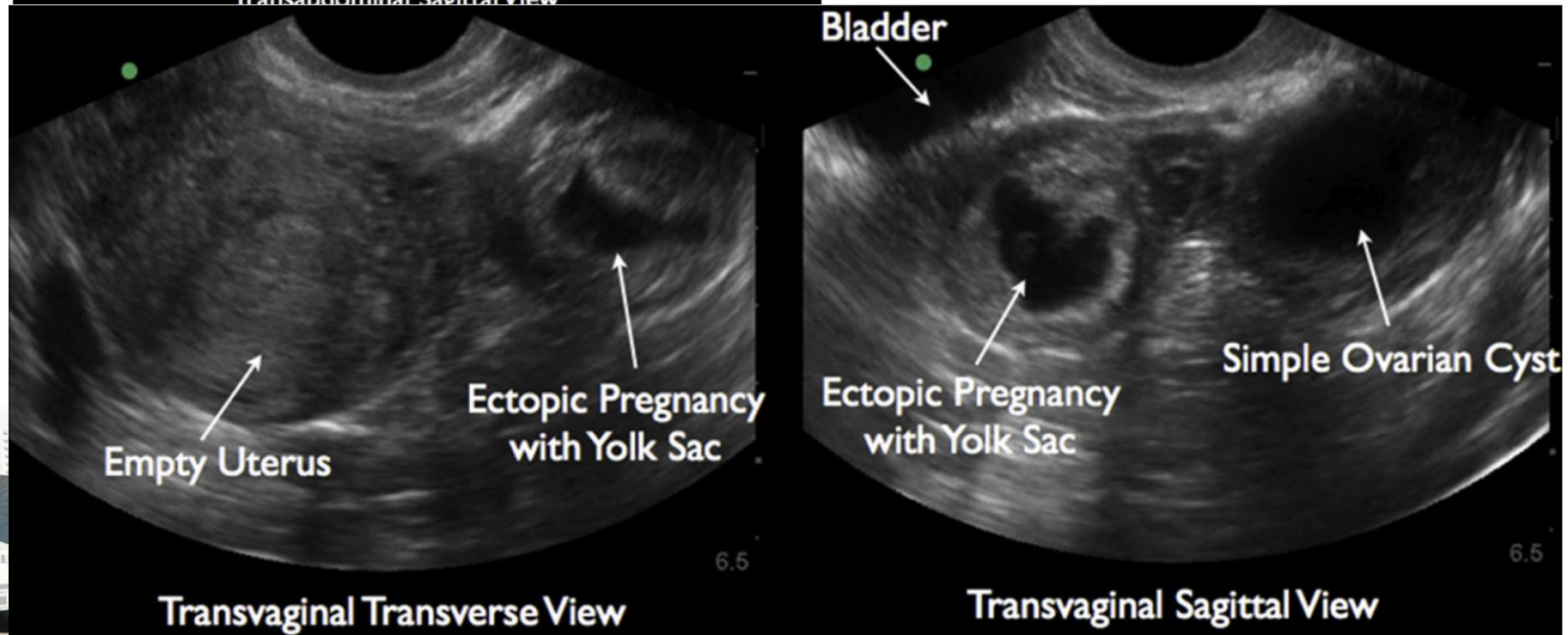
Table 1
Correlation of predicted HCG levels and expected sonographic findings with gestational age (GA) and mean gestational sac diameter (GSD)

GA (d)	Mean GSD (mm)	Predicted HCG Level (mIU/mL) (95% Confidence Interval)	Ultrasonographic Modality	Expected Sonographic Findings
31 (30–33)	5	1932 (1026–3636)	Endocavitary	Gestational sac
36 (34–38)	9	3785 (2085–6870)	Endocavitary	Yolk sac
41 (39–43)	15	10,379 (5766–18,682)	Endocavitary	Fetal pole and heart beat
49	19	20,337 (10,951–37,761)	Endocavitary, transabdominal	Embryonic torso and head

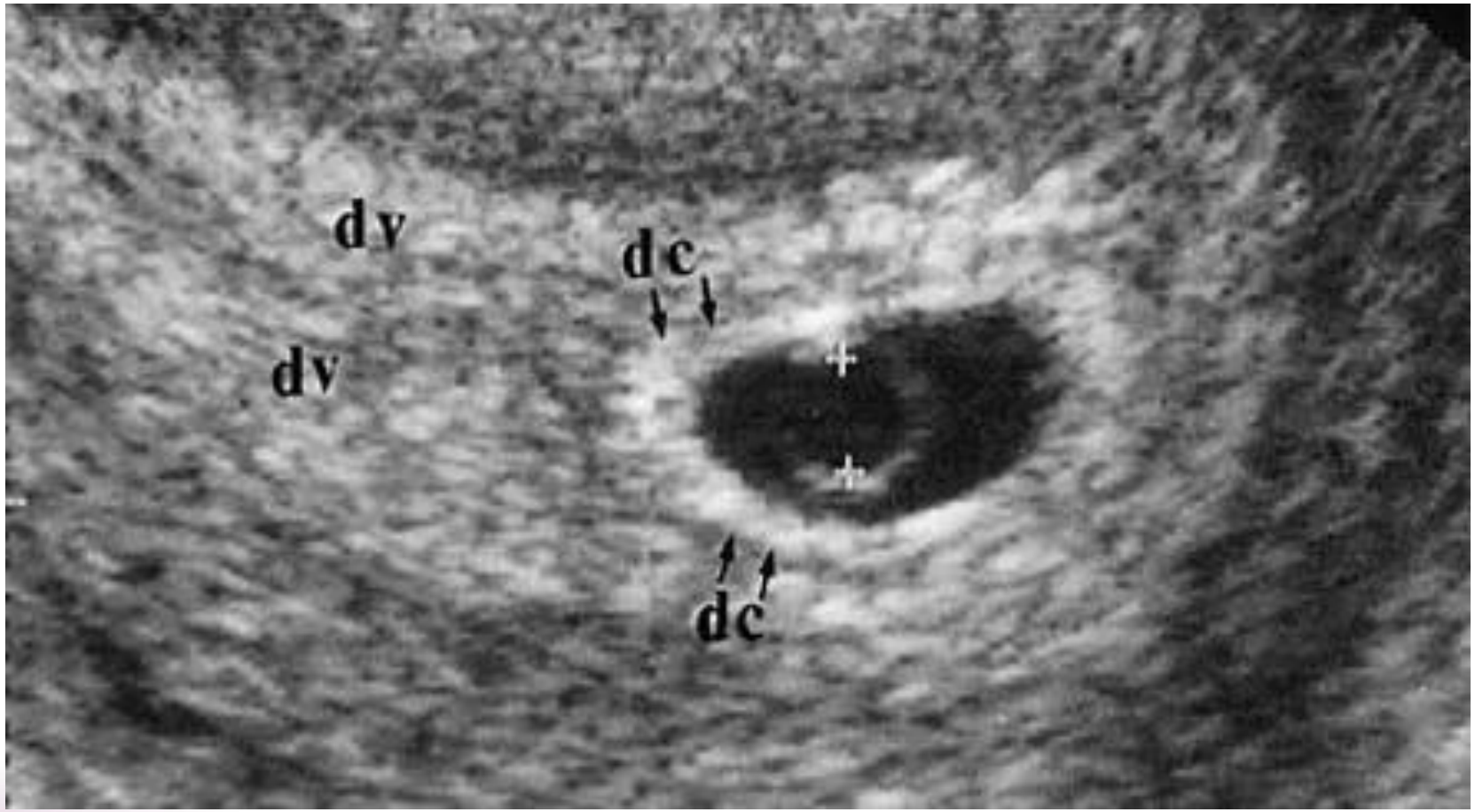
Br J Obstet Gynaecol 1990;97(10):899–903.



pregnancy is confirmed, no IUP, adnexal mass lesion/CDS fluid

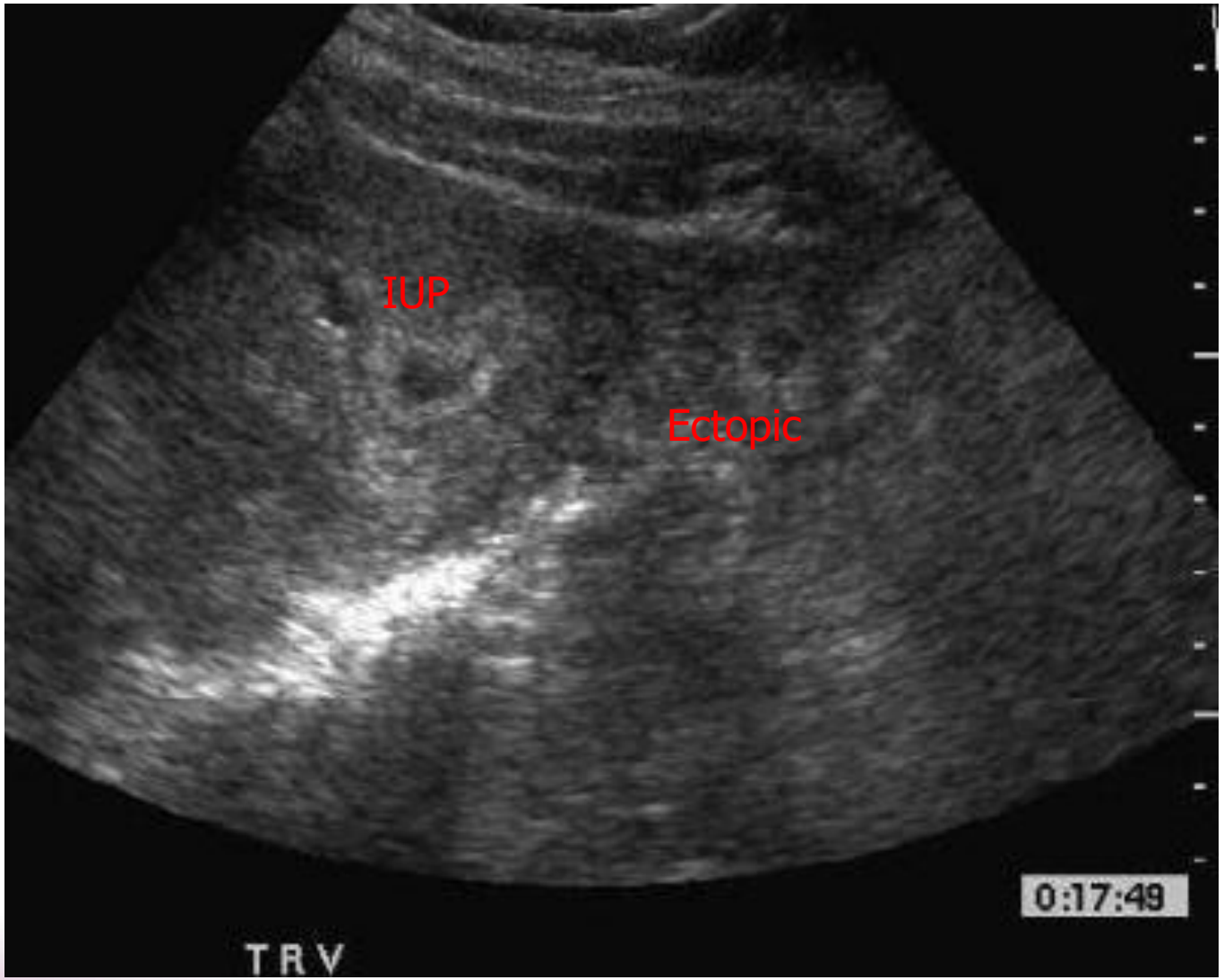


Mistaking yolk sac for embryo

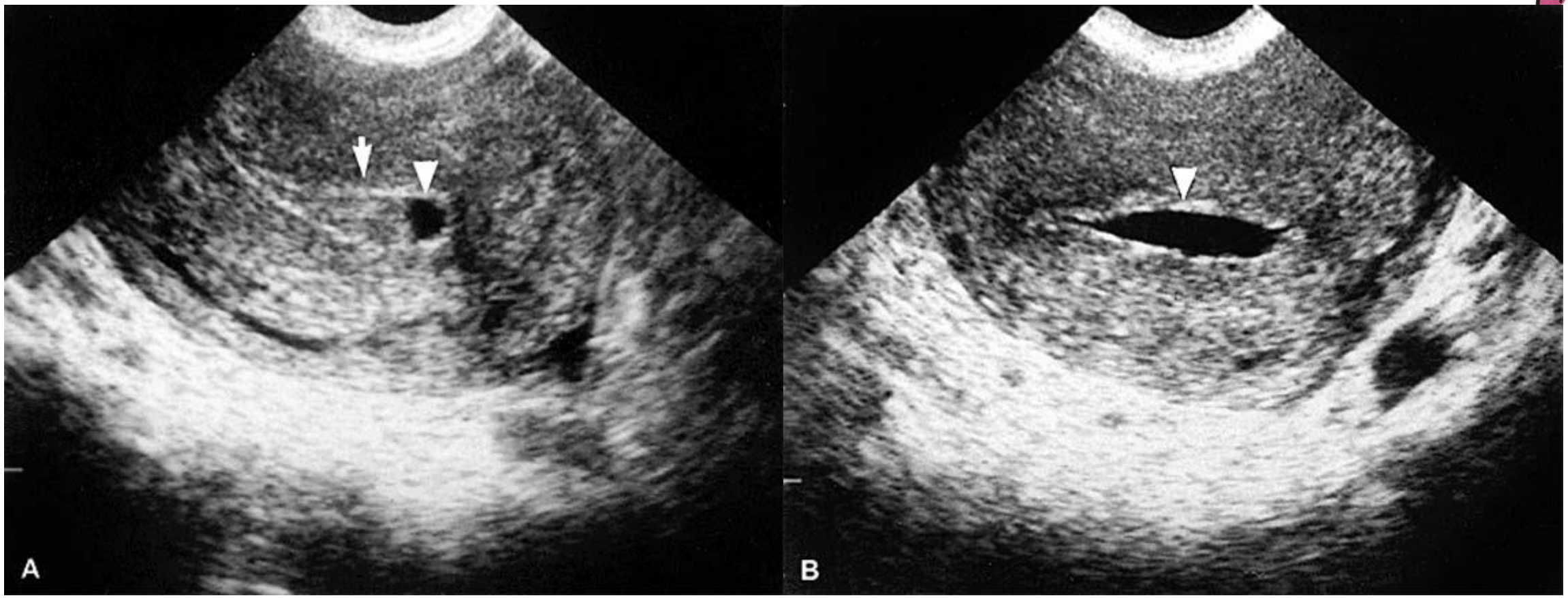


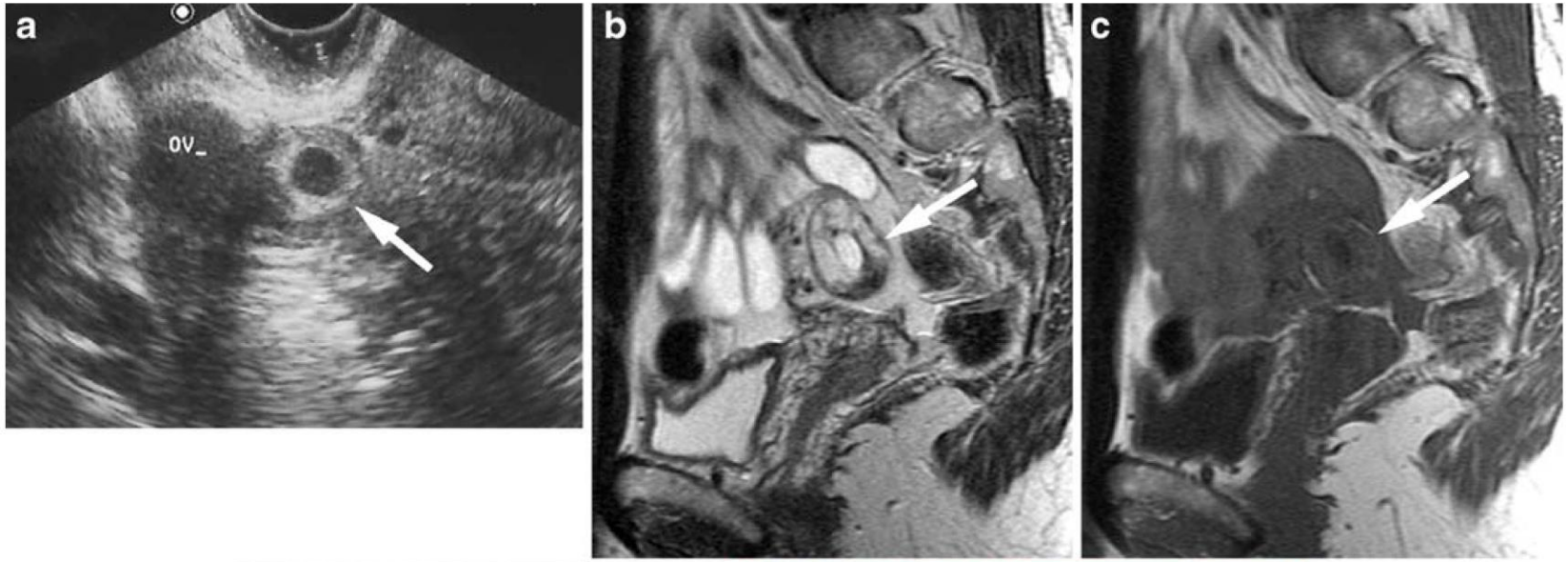
Mistaking subchorionic hematoma for gestational sac

Heterotopic pregnancy



Pseudo-sac



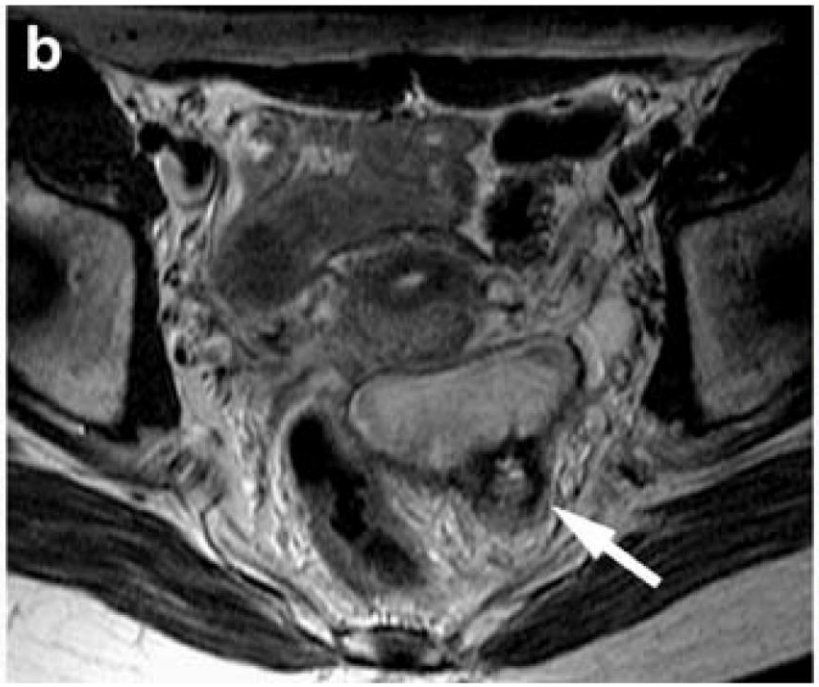


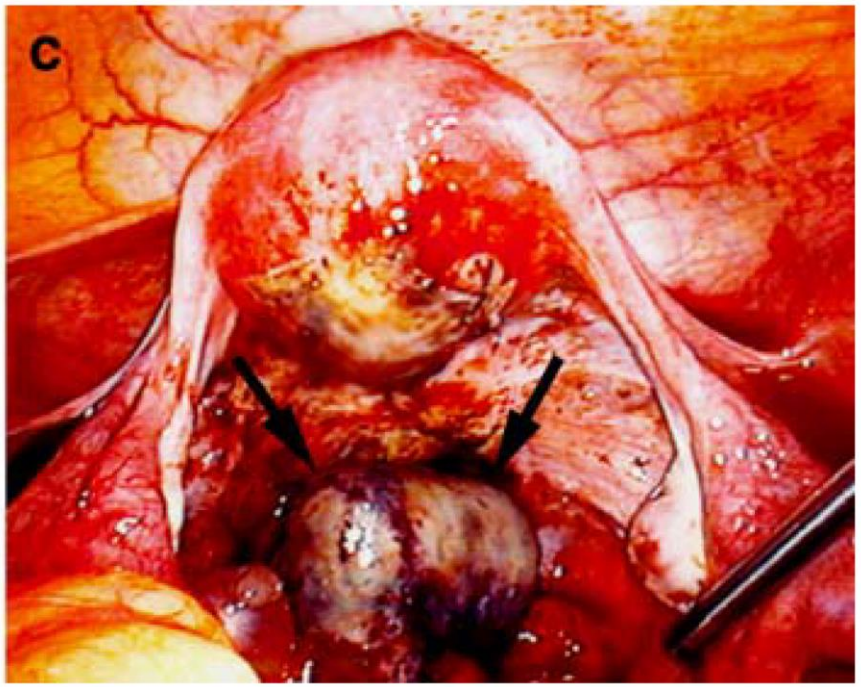
Left tubal pregnancy in a 38-year-old woman at 6 weeks' gestation.

Eur Radiol (2007) 17: 3236–3246

Transvaginal sonogram

T2-weighted





left adnexa suggesting hematoma, which mimics left tubal pregnancy

Eur Radiol (2007) 17: 3236–3246

TABLE 3
The 3 Pillars That Substantiate an Early Suspicion of Ectopic Pregnancy

Symptoms	Clinical Features	Laboratory
Nausea, breast fullness, fatigue, amenorrhea	Enlarged soft uterus	Positive pregnancy test
Lower abdominal pain, heavy cramping, shoulder pain	Adnexal mass	β-hCG <6000 mIU/mL at 6 wk
Uterine bleeding, spotting	Absence of GS intrauterine when β-hCG >2500 mIU/mL	Less than 66% increase in β-hCG in 48 h
Pelvic tenderness	Gestational sac extrauterine	Serum progesterone <25 ng/mL

TABLE 2
Ultrasound Imaging Findings in Early Ectopic Pregnancy

Ultrasound Imaging Findings	Sensitivity	Specificity
Abdominal ultrasound[5]	81%	77%
Transvaginal ultrasound		
No intrauterine GS[16]	100%	89%
Noncystical adnexal mass[13]	84%–90%	94%–95%
Separate from ovary	93%	99%
Cardiac activity	20%	100%
Yolk sac or embryo	37%	100%
Tubal ring/yolk sac or embryo	65%	99%
Tubal pregnancies[13]	99%	87%
Fluid in the pouch of Douglas[13]		
Any	63%	69%
Echogenic	56%	96%
Color-flow Doppler[13]	95%	98%
Specific findings (appearance in % of cases)		
Blob sign (inhomogeneous mass)[17]	60%	
Bagel sign (hyperechoic ring)[17]	20%	
Obvious GS fetal pole with/ cardiac activity[17]		
Single test diagnosis vs entire findings of ultrasound	74%	

Obstet Gynecol Surv.
2013 Aug;68(8):571-81

TVS+serial quantitative β-hCG

Ovarian cysts

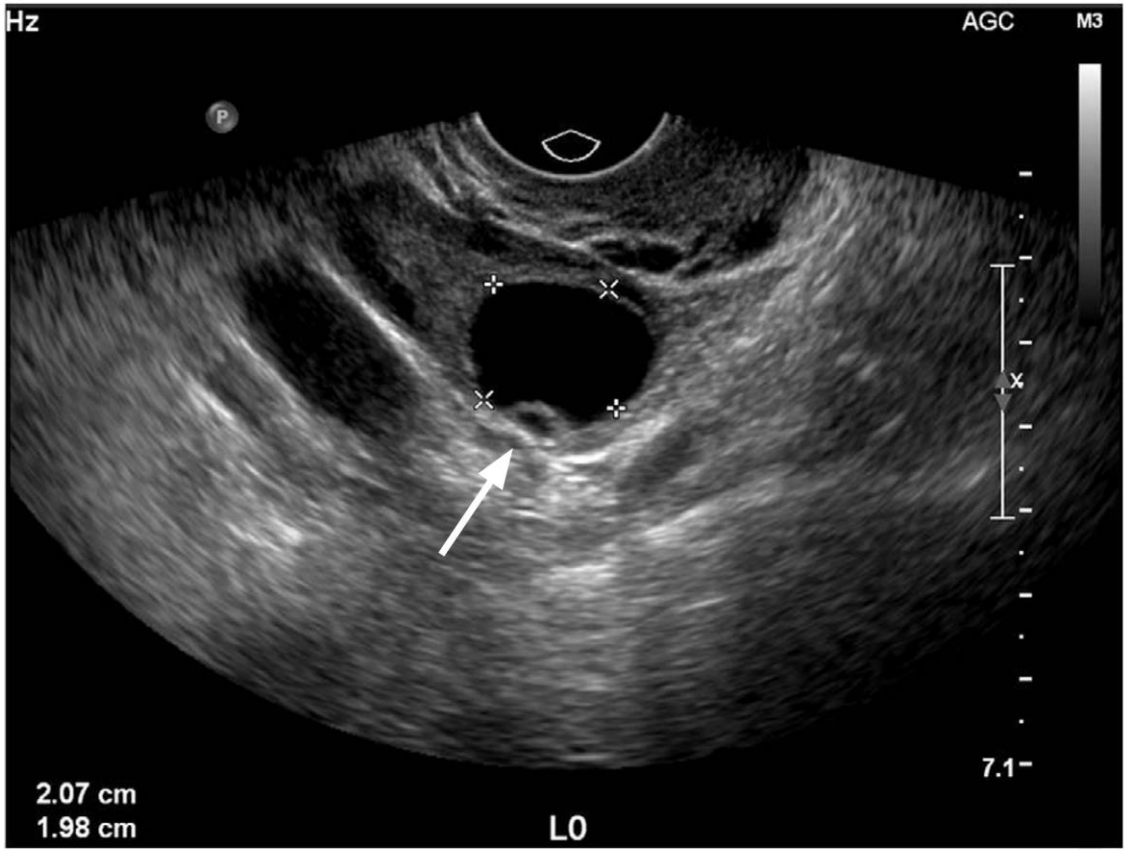
- Ovarian cysts : 22/335 (6.6%) (95% CI, +/- 2.7%) in a random sample of women 25-40 years old

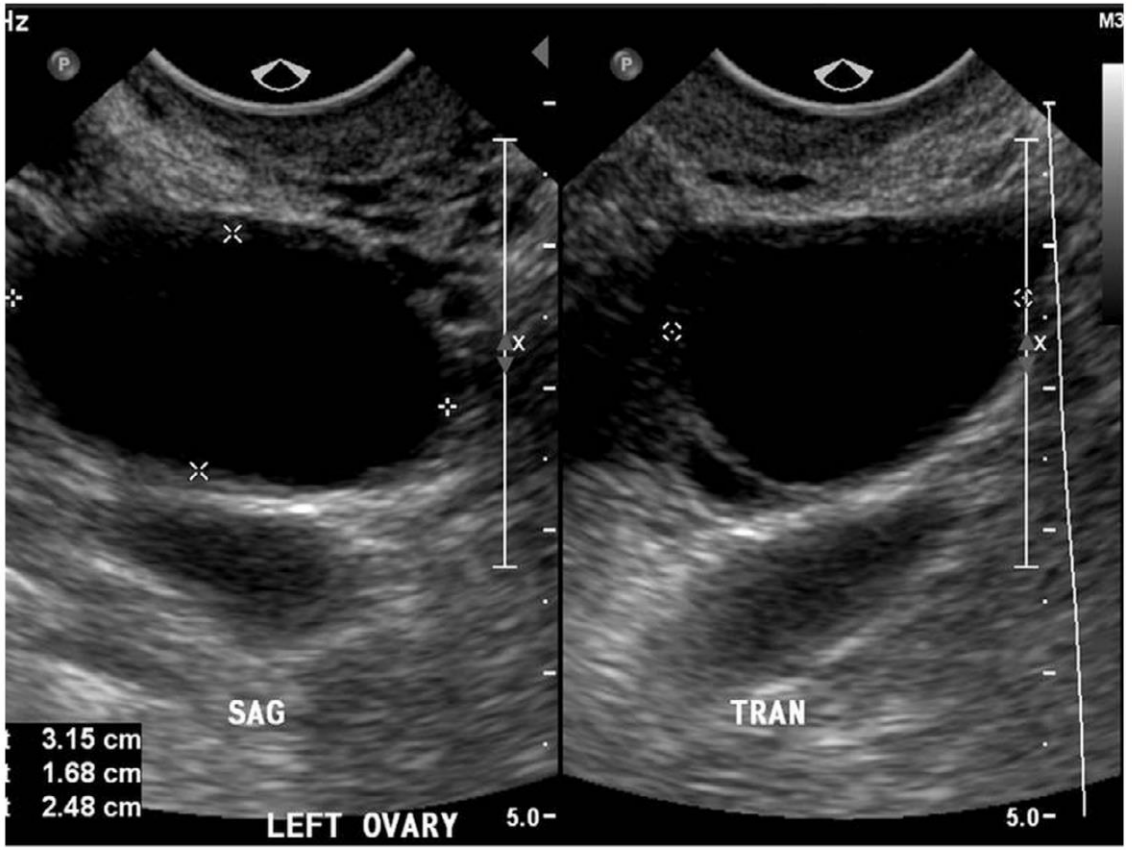
Ultrasound Obstet Gynecol. 1999;13(5):345.

- Ovarian cysts:2.5% in asymptomatic postmenopausal women.

Gynecol Oncol. 2004;92(3):965.

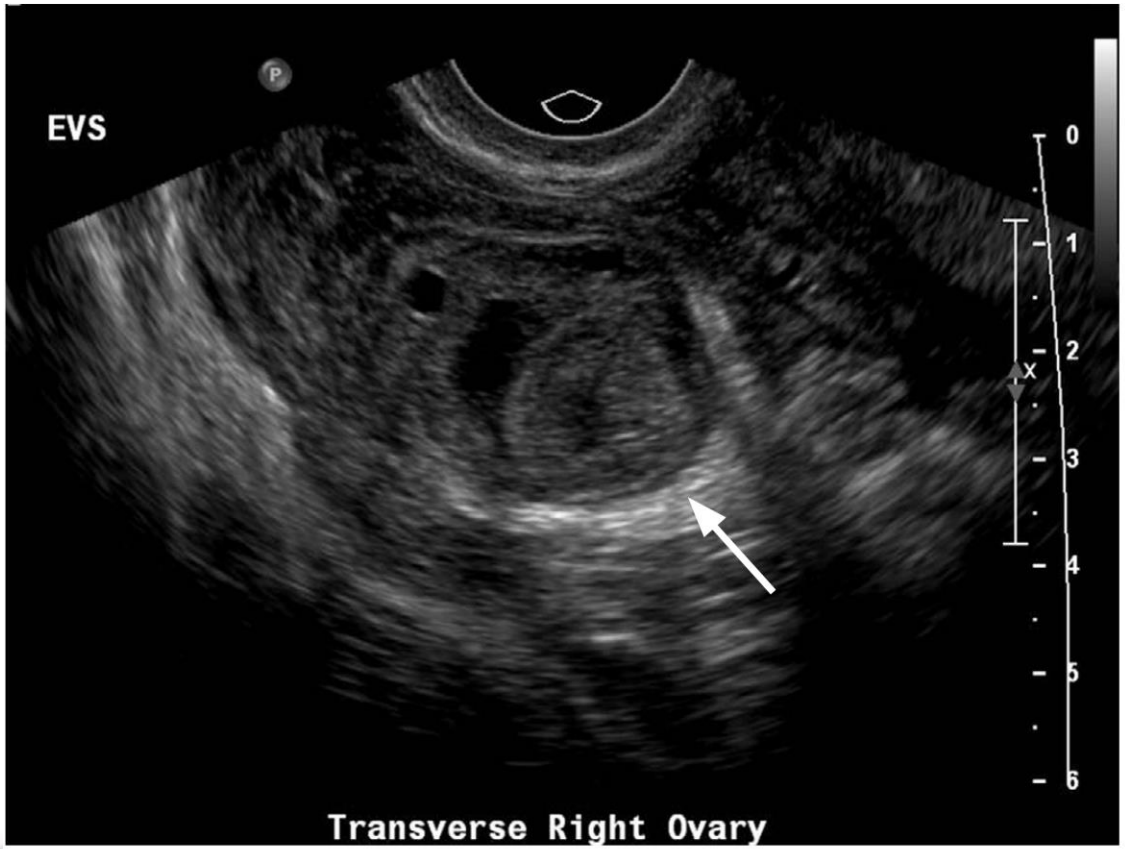
Follicular cysts

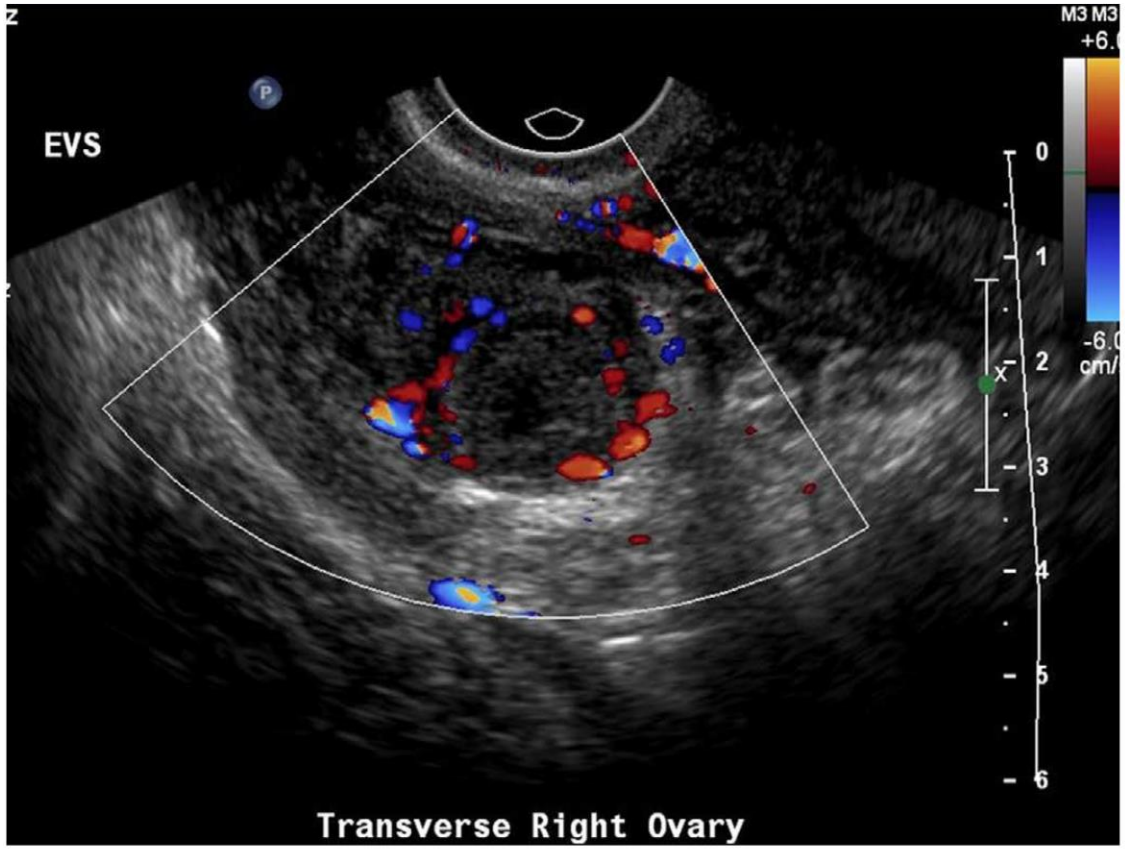




Homogenous echotexture and several small follicles at the periphery of the ovarian parenchyma.
Pain from these cysts may develop secondary to rapid cyst growth, hemorrhage, or rupture.

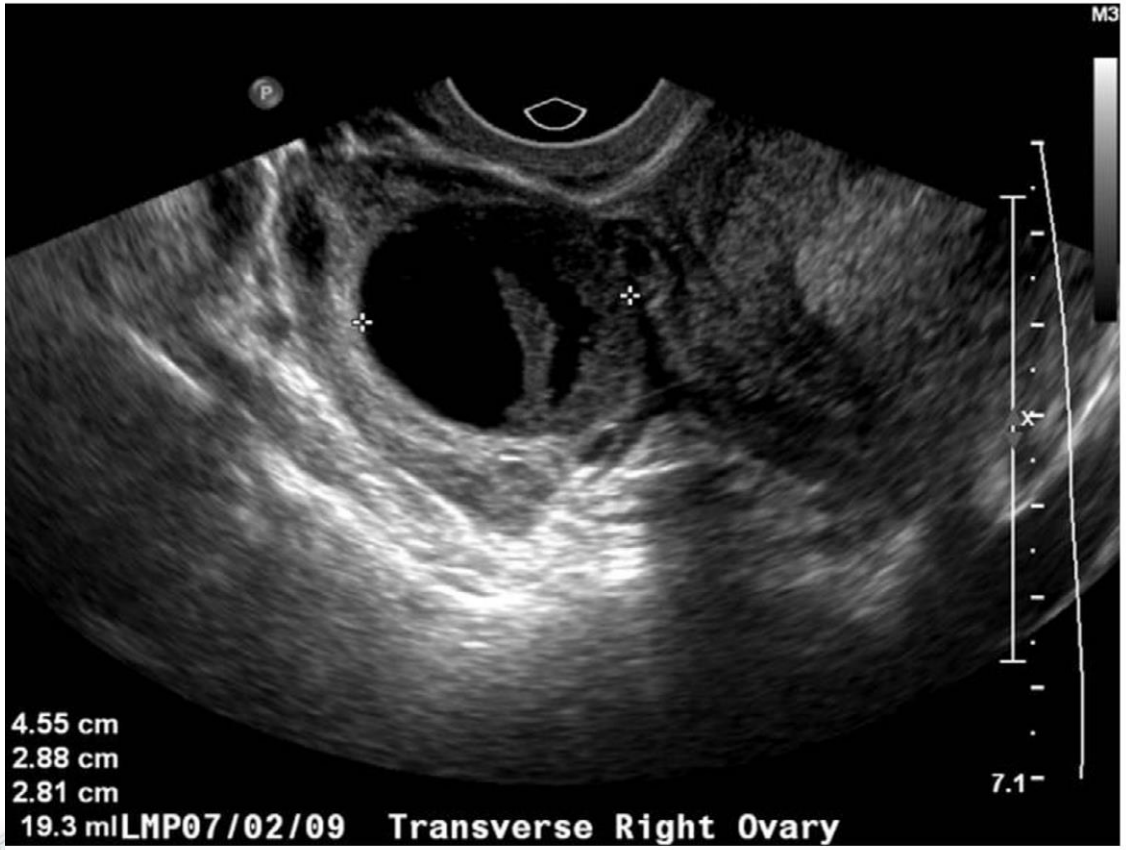
Corpus luteum



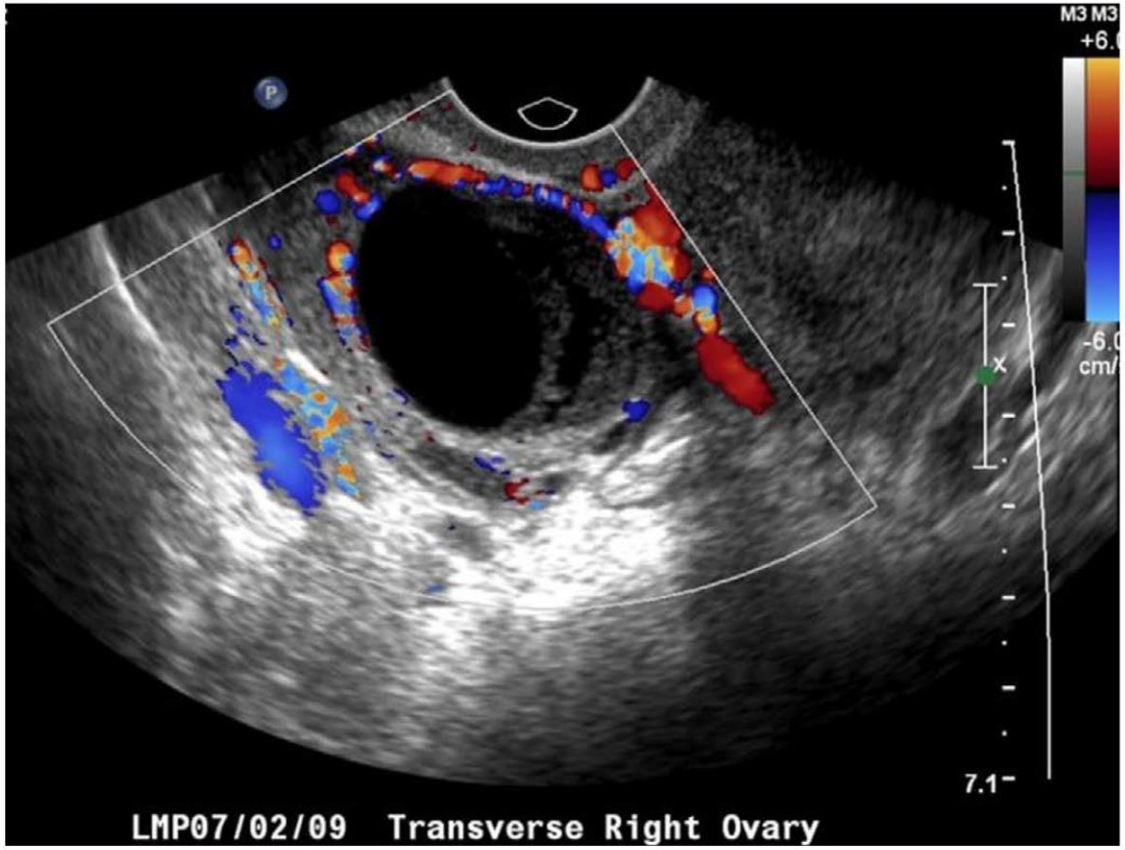


A a round, thick-walled structure (arrow) with a peripheral ring of vascularity on color imaging B

Hemorrhagic corpus luteum



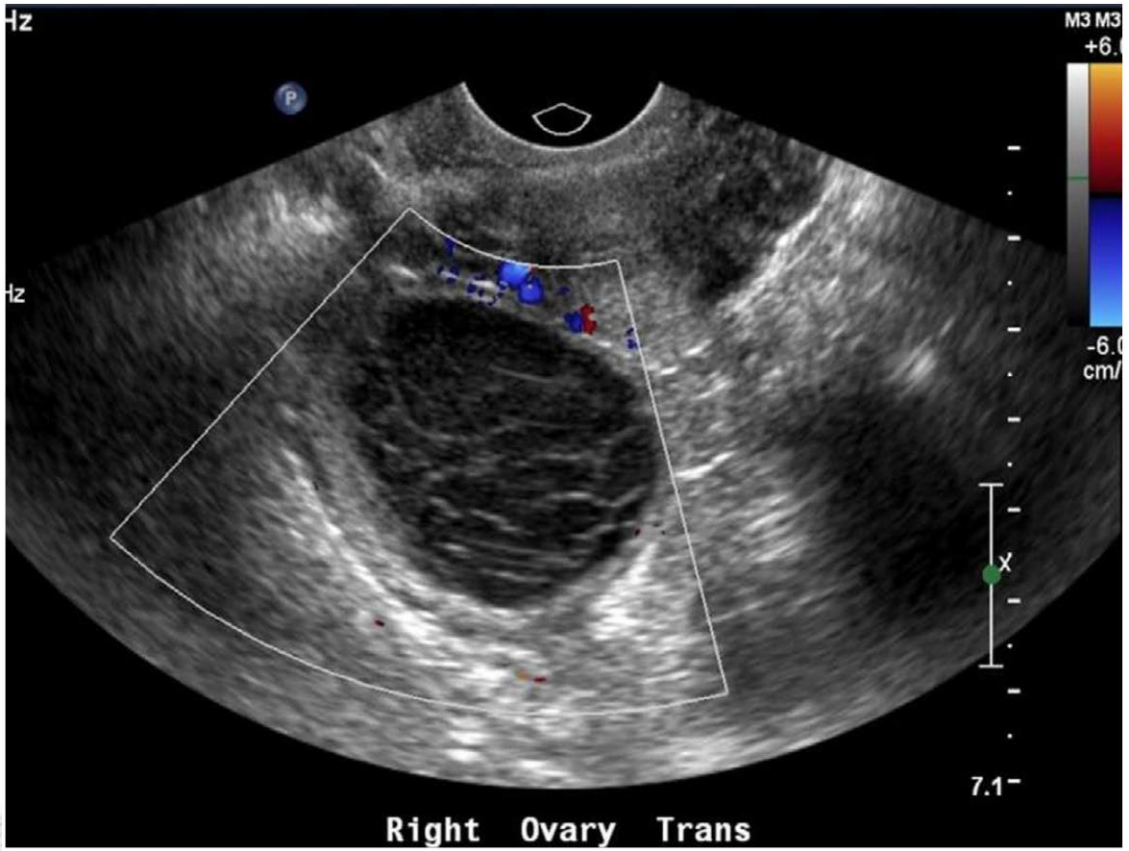
A

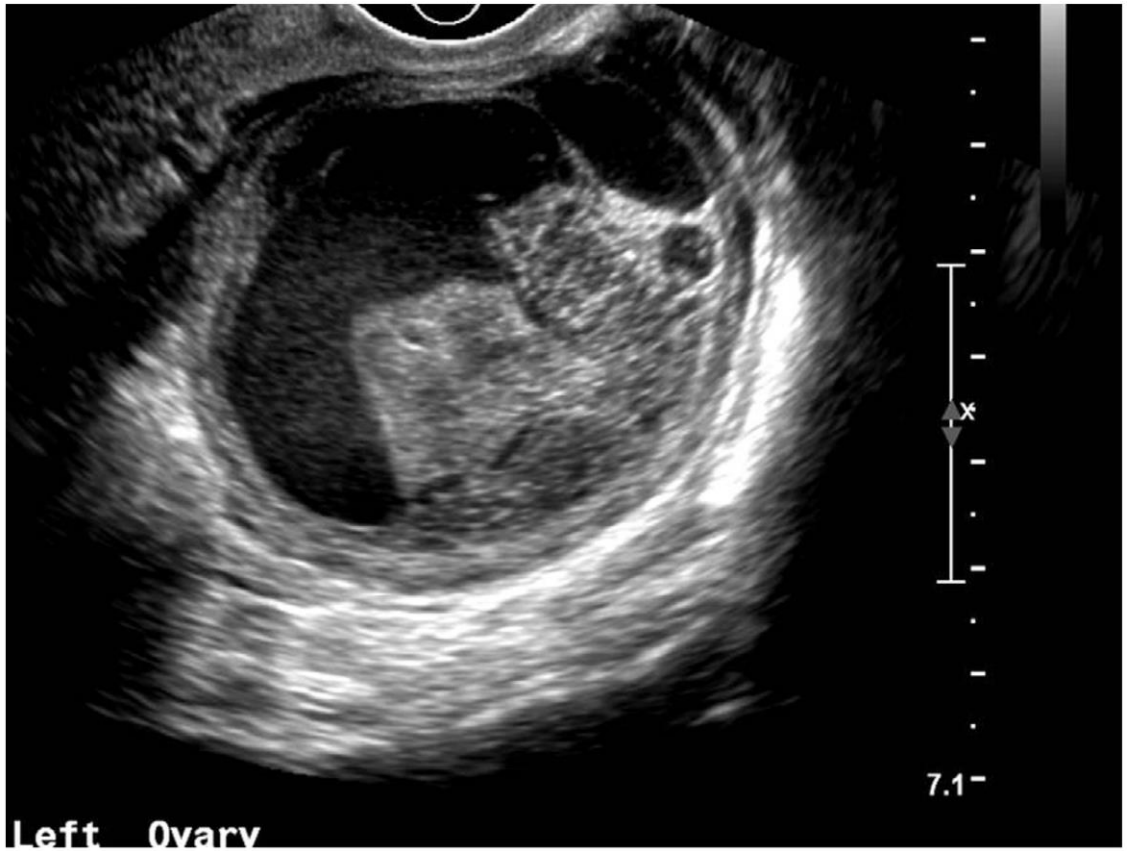


B

a complex cystic structure in the right ovary with heterogeneous internal echoes and peripheral solid components with a peripheral ring of vascularity

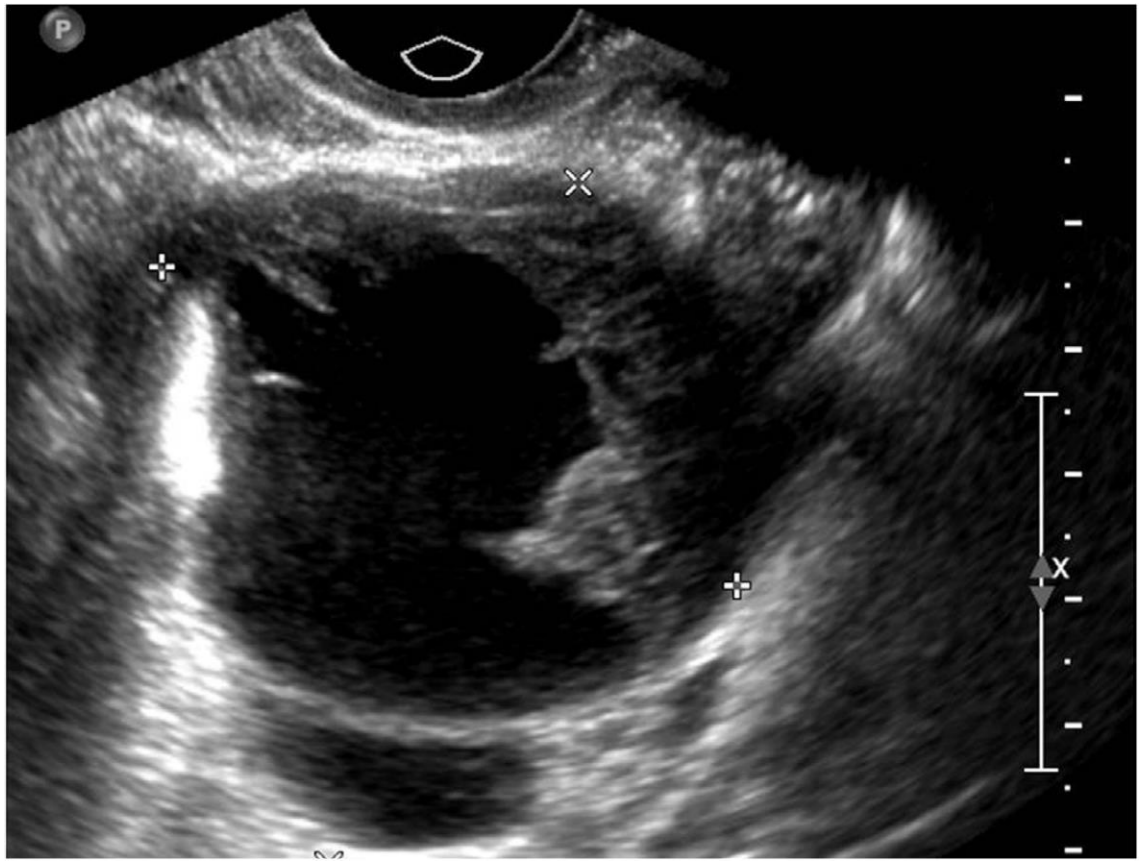
Hemorrhagic corpus luteum



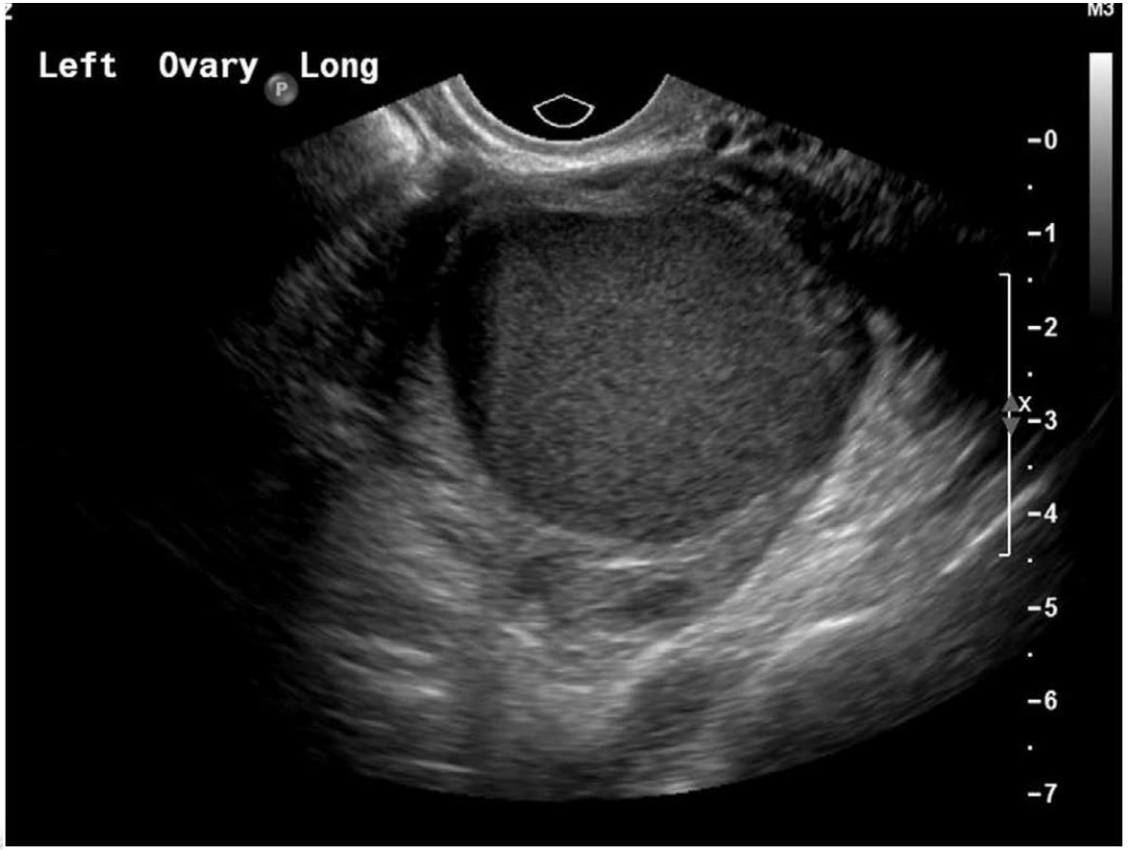


peripheral and solid-appearing retracting clot

Hemorrhagic corpus luteum



Endometrioma



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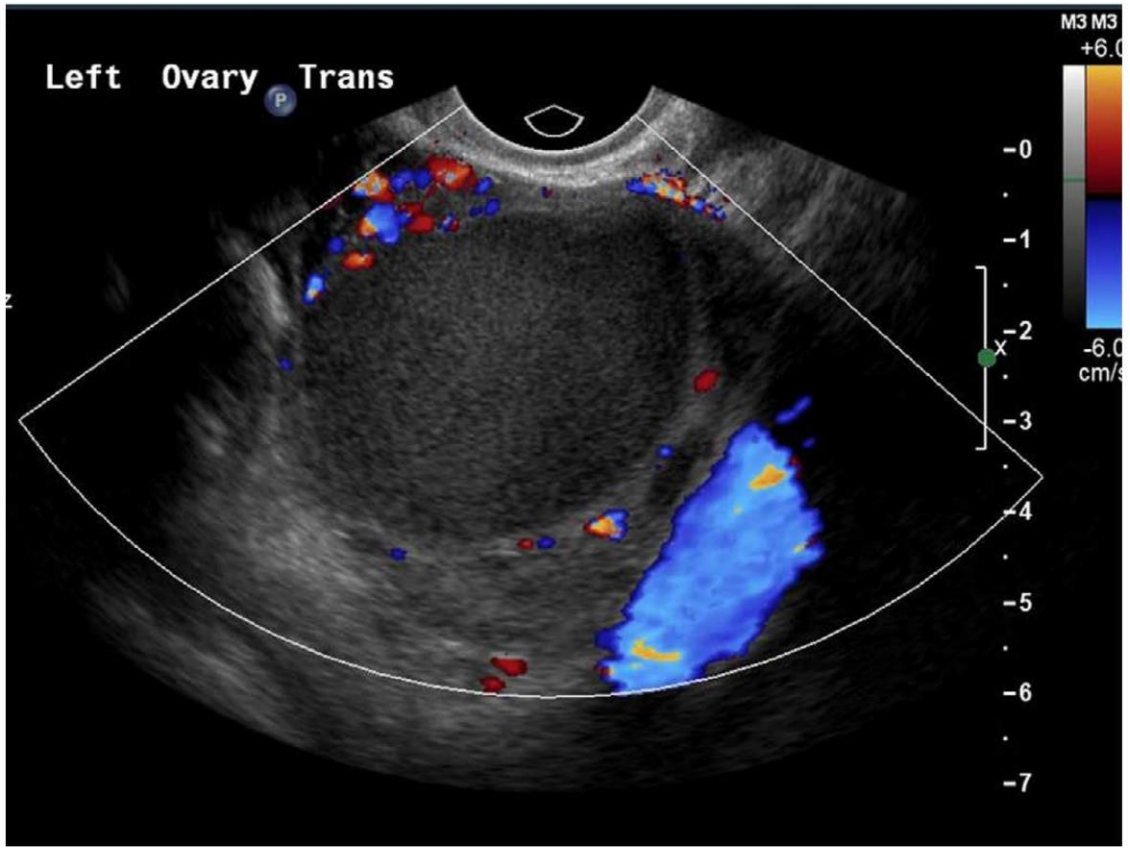


B

peripheral vascularity around a cystic mass with nearly homogenous low-level internal echoes

Rupture of ovarian cysts

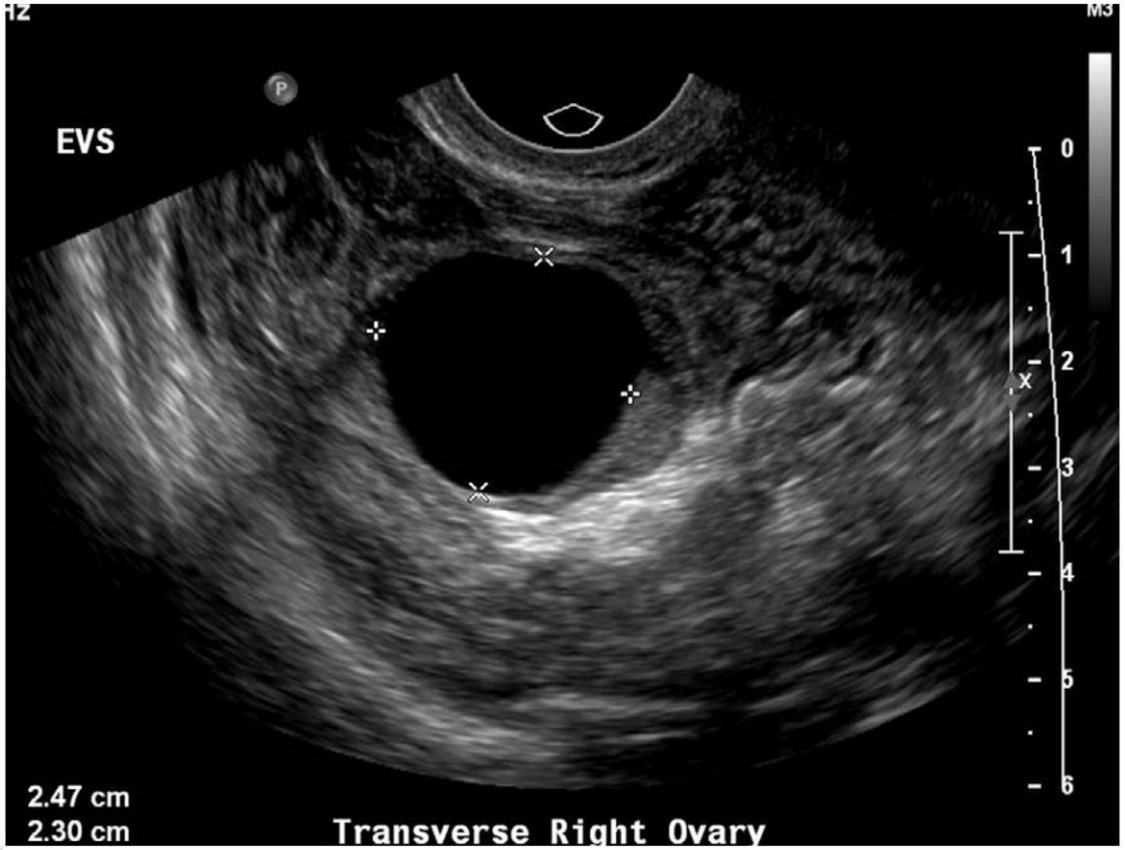
- Physiologic cysts, such as a follicular cyst or corpus luteal cyst, or pathologic cysts may rupture (endometriomas, cystic components of benign or malignant neoplasms).
- 63 % right side. **Saudi Med J. 2015 Jul;36(7):834-8.**
- Risk factor: exercise or sexual intercourse
- Symptoms: **unilateral** lower quadrant pain; **sharp and focal**; **shoulder pain or upper abdominal pain** is a feature due to **subphrenic blood extravasation**; **pain with sitting**, possible due to **psoas** irritation; a low-grade fever.

Rupture of ovarian cysts

- 15 of 78 were managed surgically.
- Patients who underwent surgery had a more rapid hemoglobin decrease over 4 hours (1.7 versus 1.3 g/dL), and needed transfusions more frequently than those who were managed conservatively (53 versus 11 %).

PLoS One. 2014;9(3):e91171

Ruptured hemorrhagic ovarian cyst



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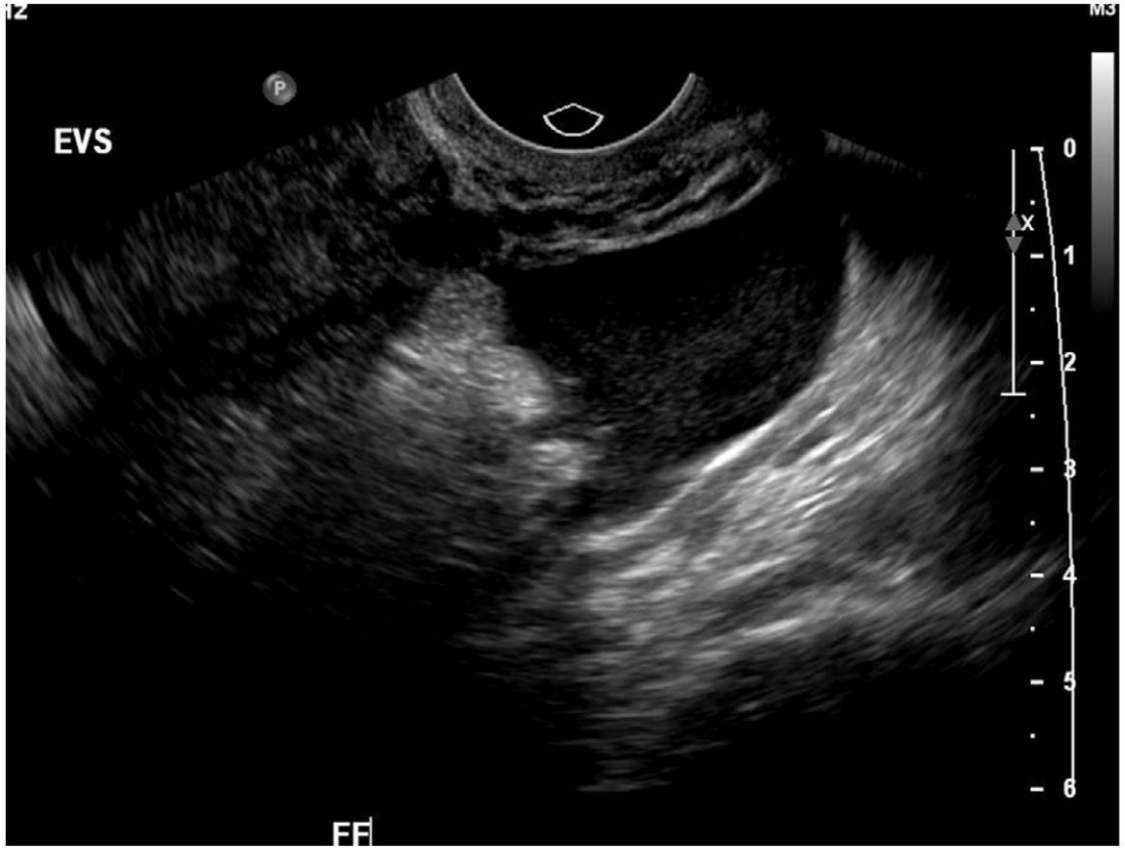

B

Ovarian torsion

- Ovary typically rotates around both the infundibulopelvic ligament and the utero-ovarian ligament; ovarian torsion accounted for 2.7% of emergency surgeries.
- Right ovary appears to be more likely to torse than the left(19 vs 10).

J Pediatr Surg. 2004;39(5):746.

- Strenuous exercise or a sudden increase in abdominal pressure.

Hum Reprod. 2003;18(8):1641; Am Fam Physician. 2008 Aug;78(3):379-80, 384; J Emerg Med. 2012 Apr;42(4):409-12. Epub 2011 Feb 21.

- Risk factor: > 5cm; but 6 to 8 cm in diameter more likely

Obstet Gynecol. 2007;109(2 Pt 1):355;J Ultrasound Med. 1997;16(7):447; Obstet Gynecol. 2005;105(5 Pt 1):1098.

Ovarian torsion

Clinical presentation: acute onset

- Pelvic pain (90 %)
- Adnexal mass (86 to 95 %)
- Nausea and vomiting (47 to 70 %)
- Fever with leukocytosis (2 to 20 %)
- Abnormal genital tract bleeding (4 %)

Ann Emerg Med. 2001;38(2):156; Emerg Med Australas. 2005 Jun;17(3):231-7; Eur J Obstet Gynecol Reprod Biol. 2012;162(2):203; Hum Reprod. 2012;27(8):2359.

Ovarian torsion

Table 2
Ultrasonographic findings in ovarian torsion

Early/Indeterminate Findings	Late/Diagnostic Findings
Ovary size >4 cm	"Follicular ring sign"
Hyperechoic stromal edema	"Whirlpool sign"
Peripherally displaced follicles	Venous flow impedance
Pelvic ascites	Arterial flow impedance

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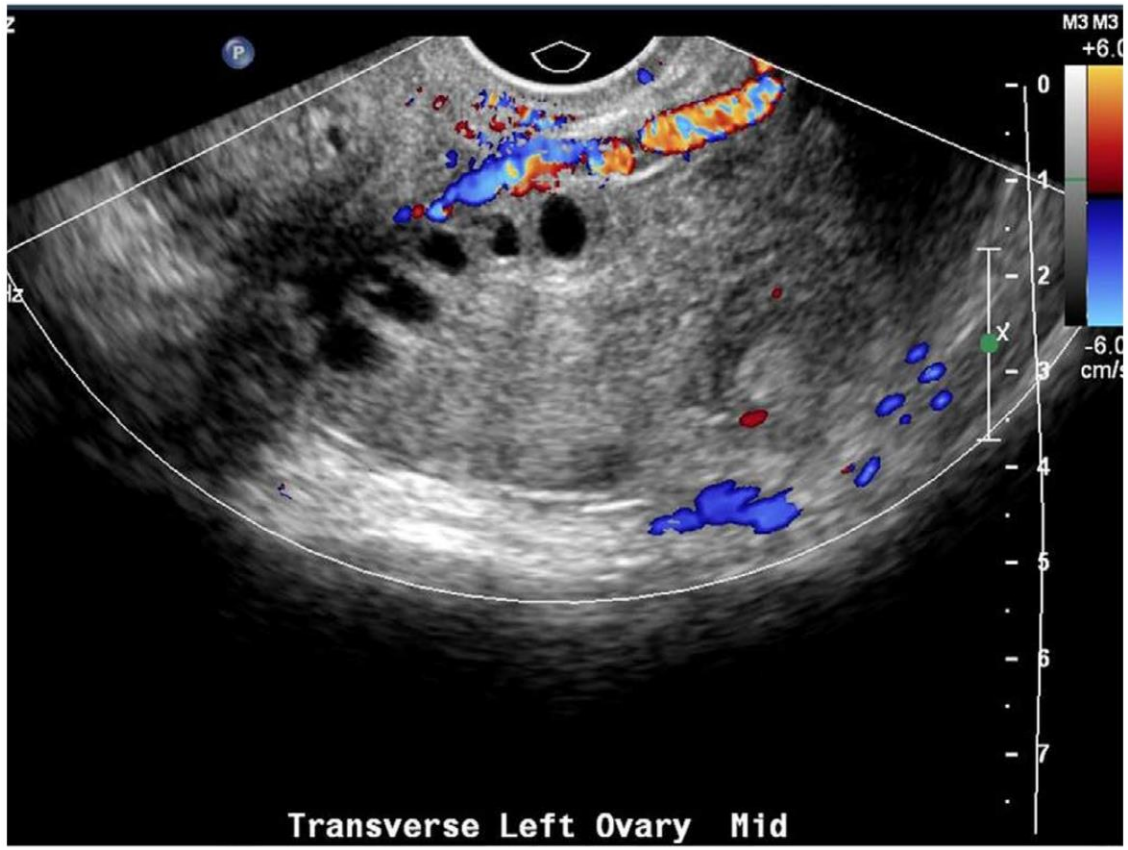
Detorsion in the operating room, there is an approximately 80% chance of normal follicular development on follow-up ultrasound.

J Obstet Gynaecol Res. 2017 Feb;43(2):298-302

Ovarian torsion

A

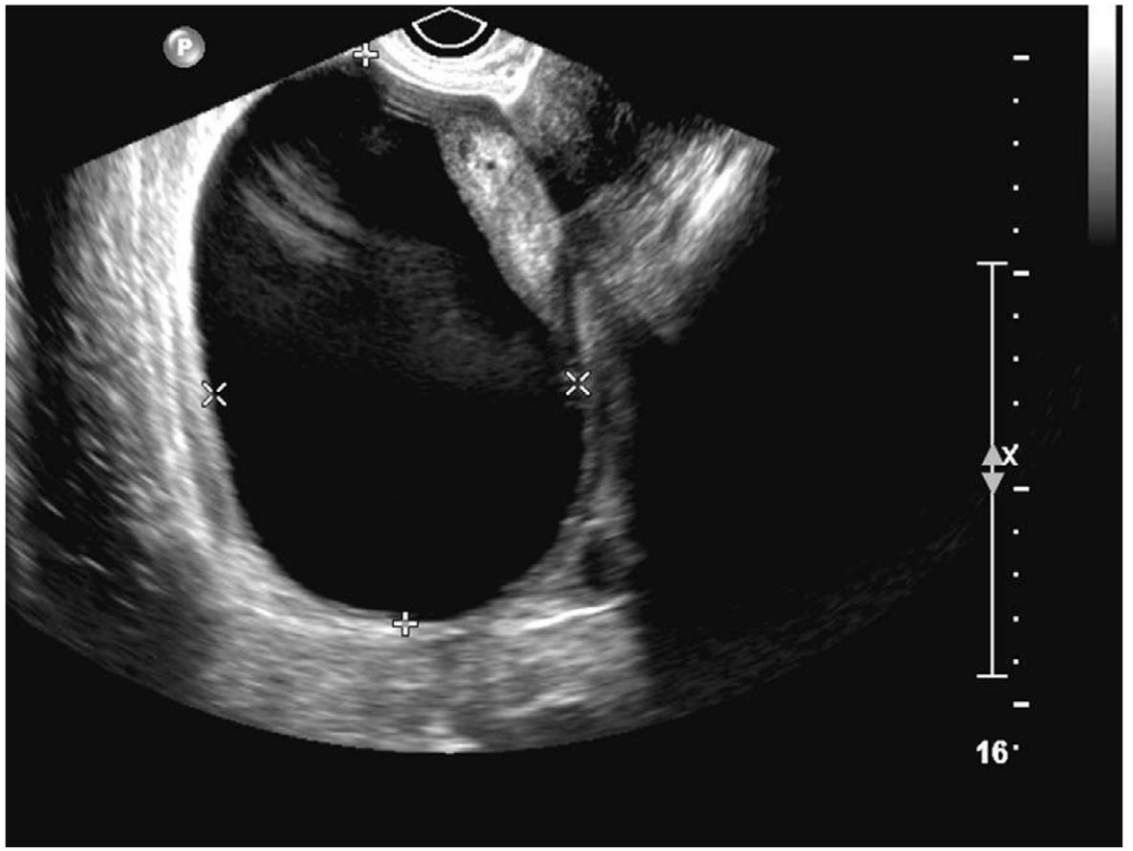


B

an enlarged ovary with prominent peripherally located follicles. The ovarian parenchyma is heterogeneous, and on color images there is a complete lack of parenchymal blood flow

Ovarian torsion

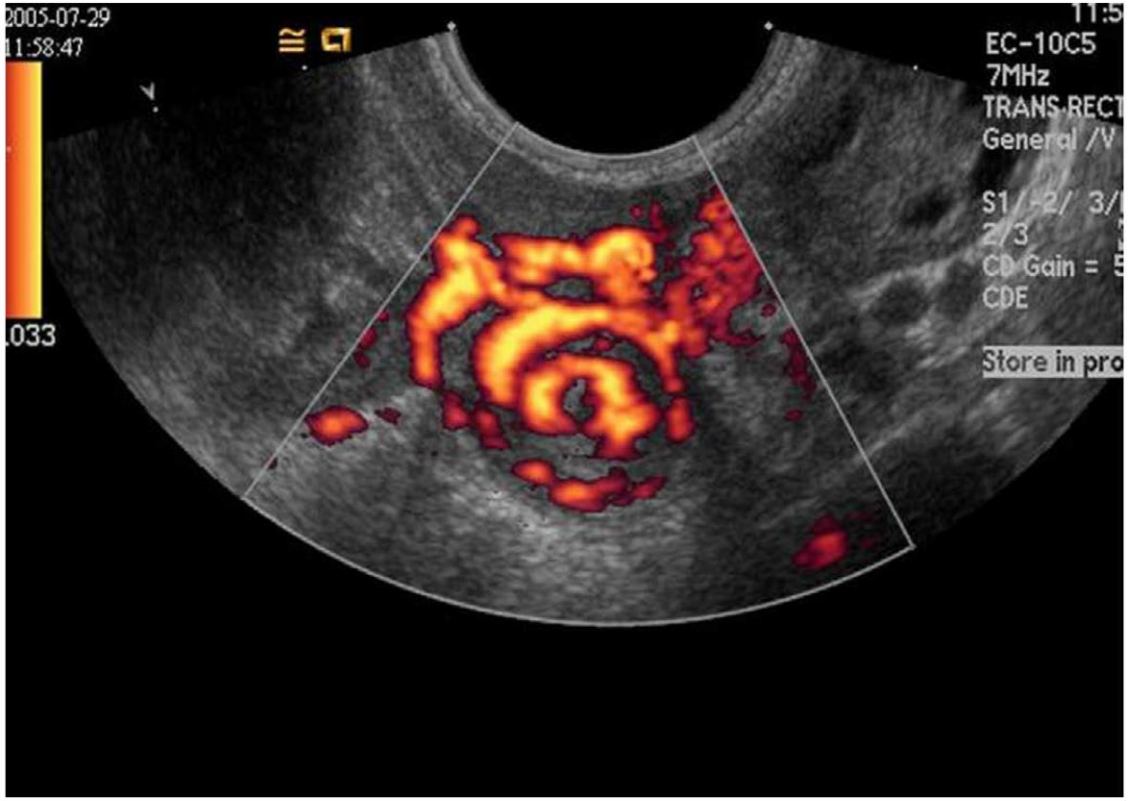
A



B

Ovarian torsion

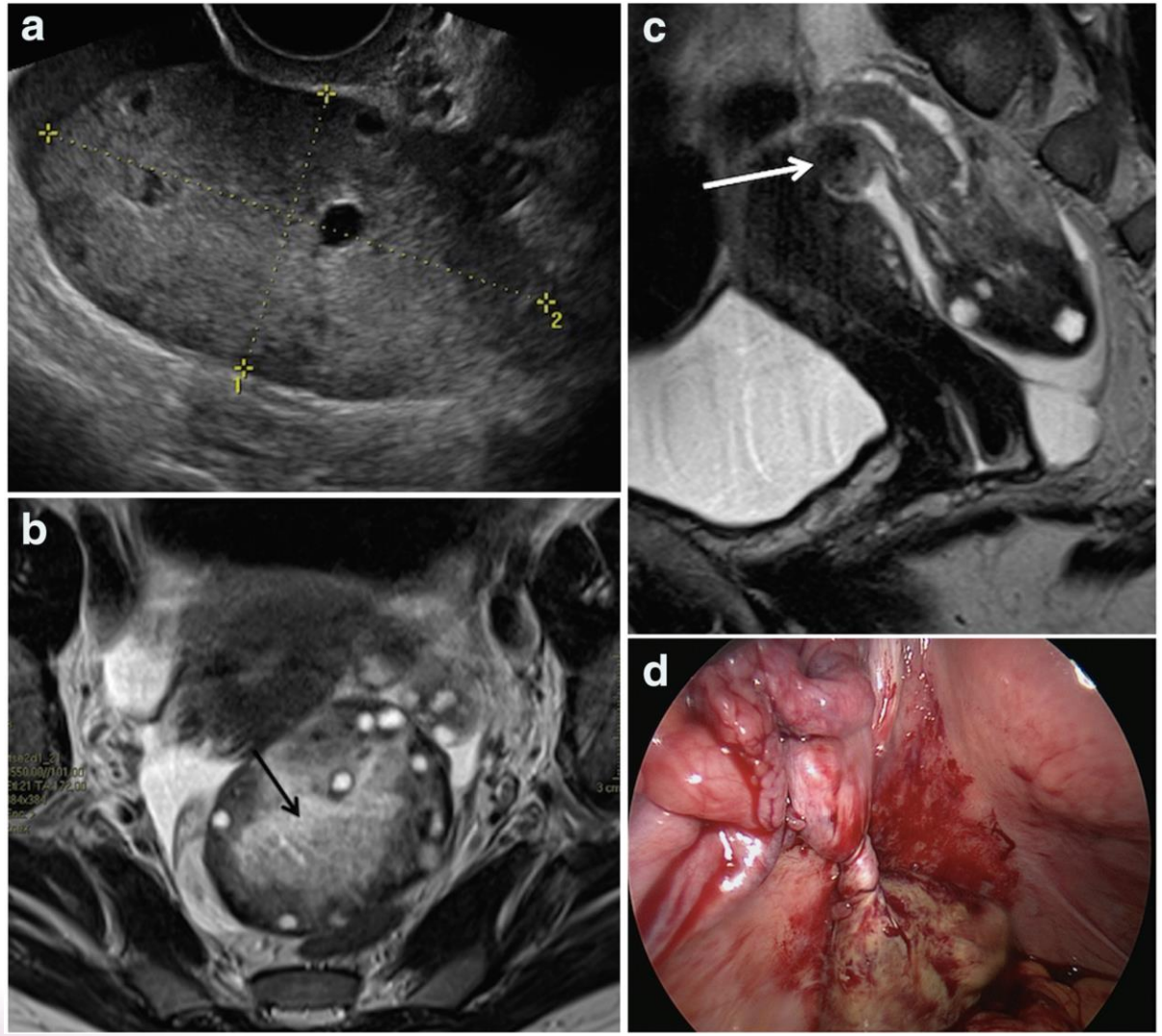
A



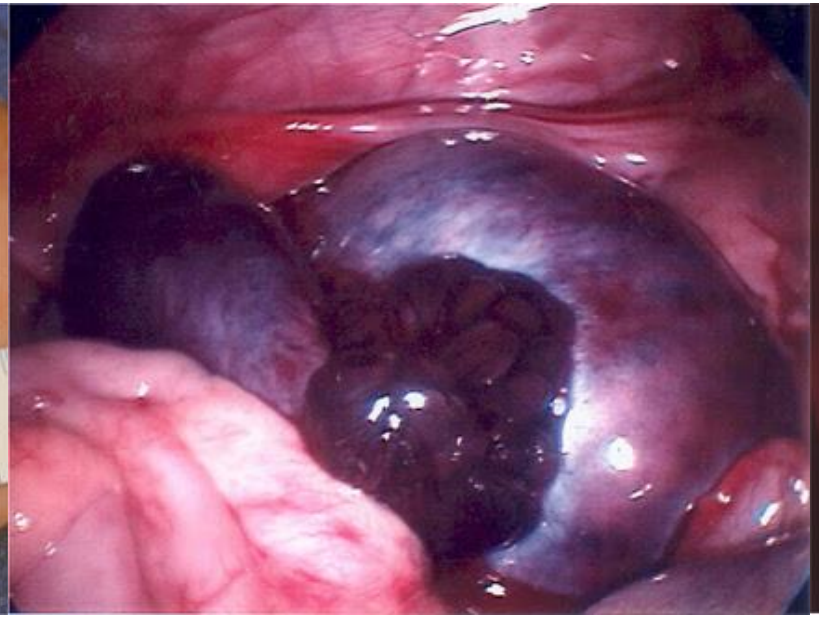
B

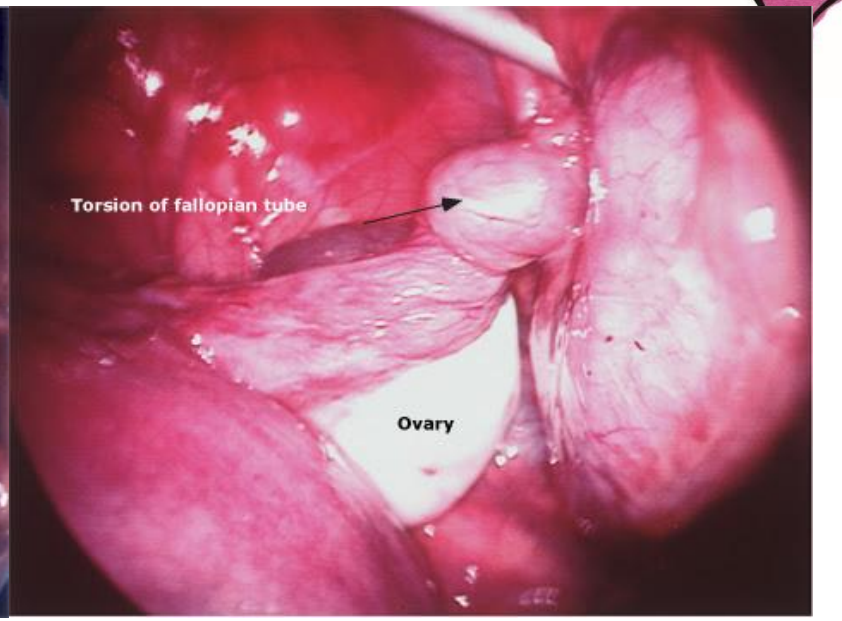
whirlpool sign

Ovarian torsion



Ovarian torsion





Pelvic Inflammatory Disease and Tubo-Ovarian Abscess

- Most acute infections (<30 days' duration) are attributed to untreated STIs, including N gonorrhoeae and C trachomatis or bacterial vaginosis-associated microbes.
- Serious complications can occur, such as Fitz-Hugh-Curtis syndrome (4%–6% of patients with PID) and TOA (3%–16% of patients hospitalized for PID).
- Sexually active.

Emerg Med Pract 2016;18(12):1–20.

Pelvic Inflammatory Disease and Tubo-Ovarian Abscess

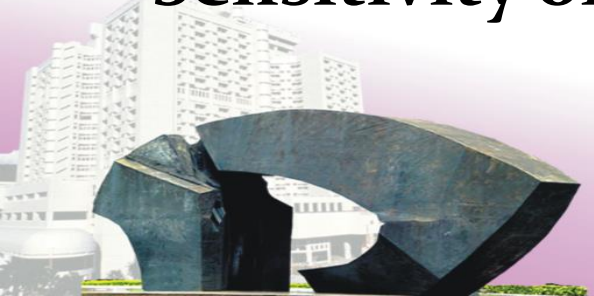
Table 3
Diagnosis of pelvic inflammatory disease

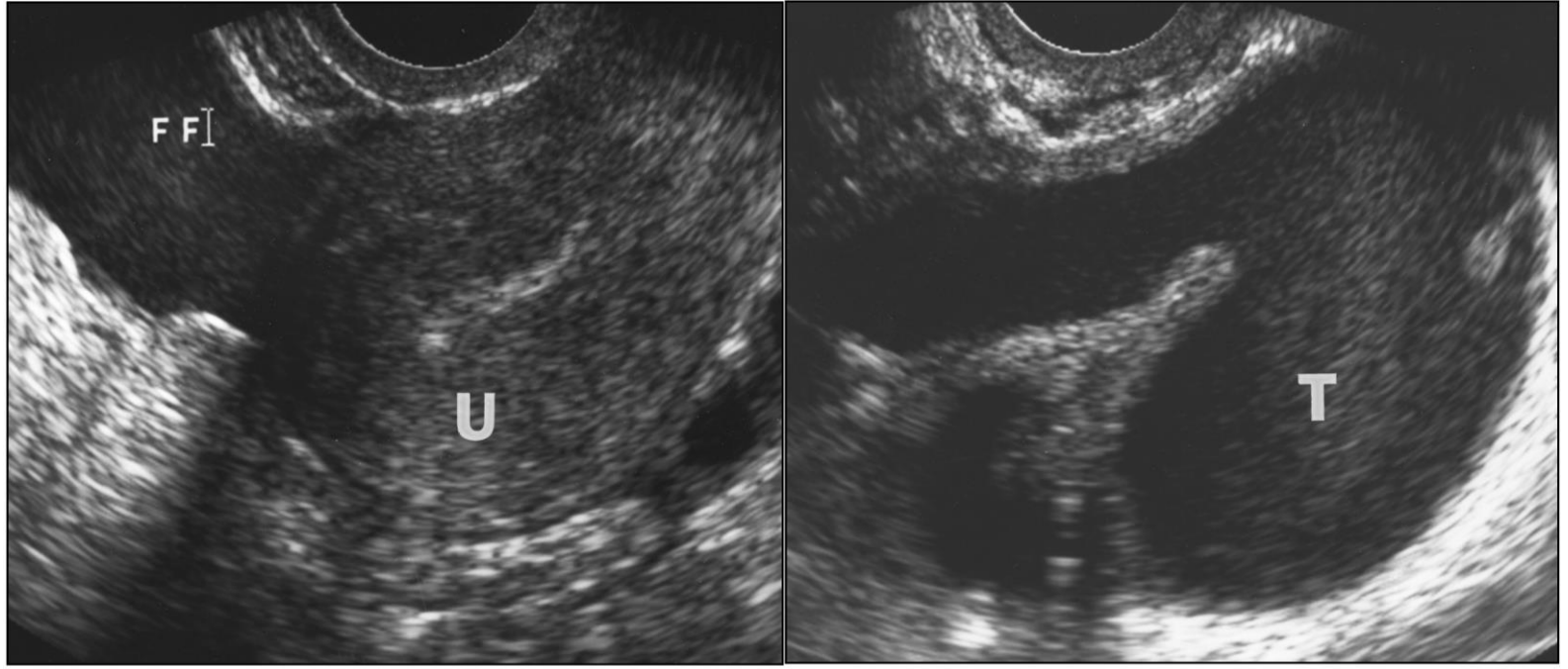
Unexplained pelvic or lower abdominal pain plus one or more minimum criteria on examination

Minimum criteria:	Additional criteria, not required:
• Cervical motion tenderness	• Oral temperature >101°F (38.3°C)
• Uterine tenderness	• Abnormal cervical discharge or cervical friability
• Adnexal tenderness	• Presence of white blood cells on microscopy of vaginal fluid
	• Elevated erythrocyte sedimentation rate
	• Elevated C-reactive protein
	• Cervical infection with *N gonorrhoeae* or *C trachomatis*

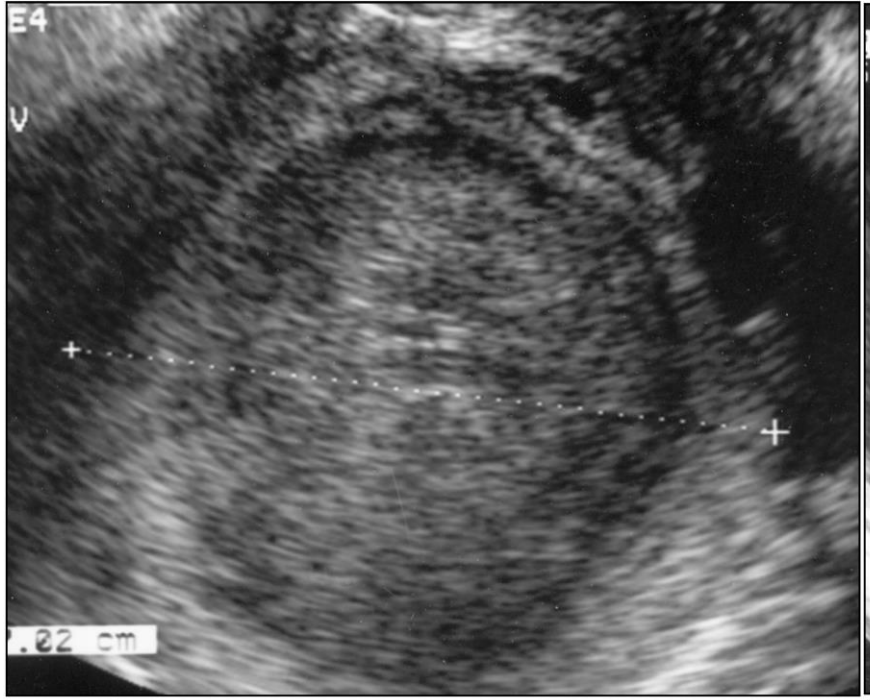
Sensitivity of greater than 95%.

Emerg Med Clin N Am 37 (2019) 207–218

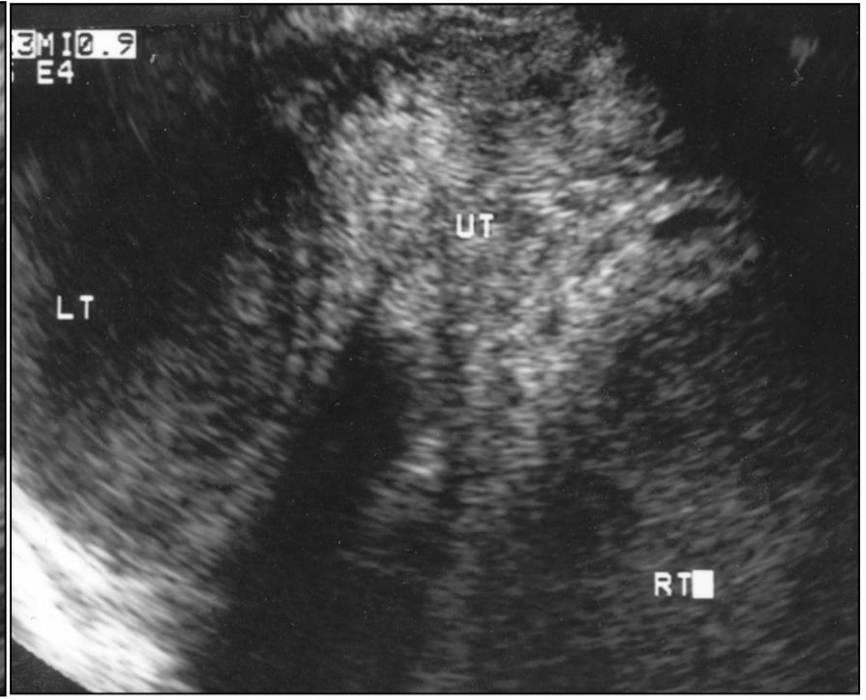




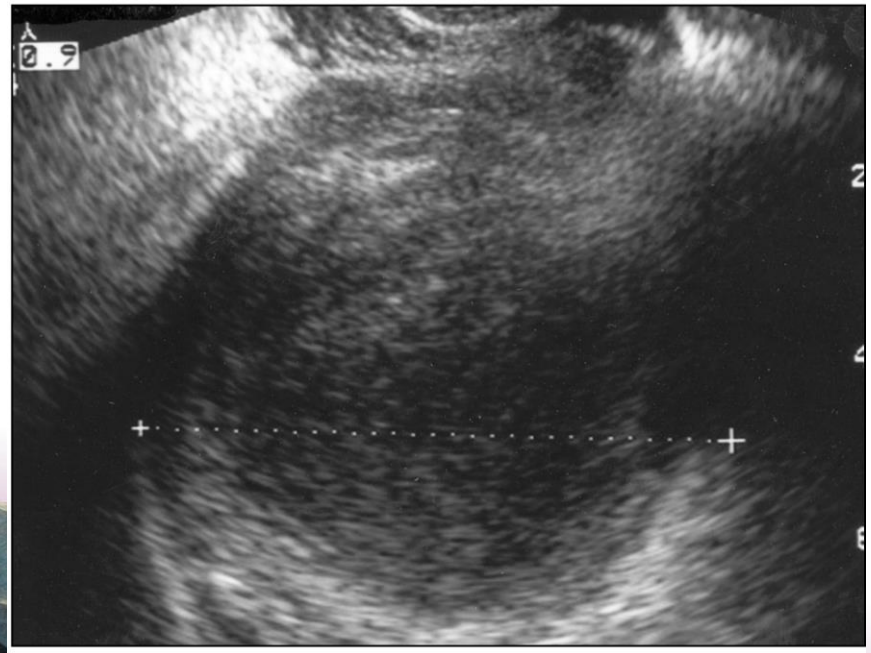
enlarged hyperemic ovary, a finding consistent with oophoritis.



B



A



C

complex multiloculated masses with variable septations, irregular margins, and scattered internal echoes.

Uterine causes

- **Dysmenorrhea**: **primary** dysmenorrhea usually occurs in adolescents and younger women, whereas **endometriosis** is the most common cause of **secondary** dysmenorrhea.

Am Fam Physician 2014;89(5):341–6.

- **Uterine fibroids**: a common source of menorrhagia, but they rarely cause acute pelvic pain unless they have degenerated, have torsed, or are associated with adenomyosis or endometriosis.

J Obstet Gynaecol Can 2015;37(2):157–78.

Uterine causes

- IUDs: rare; even rare→ perforation occurring in 1 to 2/1000 patients,

Non-gyn causes

- Appendicitis is the most common cause of abdominal pain that requires surgery→often mimic that of right adnexal torsion.

Emerg Radiol 2018;25(1):51–9.

- Nongynecologic causes → CT imaging.
- Nephrolithiasis, diverticulitis, cystitis/pyelonephritis, hernias, small bowel obstruction, musculoskeletal pain.

Abdominal and pelvic pathologic conditions often have poorly localizing symptoms.