AMSER Case of the Month: July 2019

Abdominal Distention and Pain During Infertility Treatment

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Patient Presentation

- HPI: Pt is a 29 y/o female, G1P0000 gestational age 5 weeks based on LMP, who presented to the ED with 6 days of increasing abdominal distention and generalized abdominal pain accompanied by dyspnea with ambulation. She had been undergoing treatment with a reproductive endocrinologist (REI) for infertility, receiving FSH injections with hCG trigger shots. Her last trigger shot was 2 weeks prior to presentation. At presentation, the pt was mildly tachycardic HR 111. Labs were significant for **β-hCG of 1099**, WBC 14.7, Hgb 14.3/**Hct 43**, **Plt 542**, **Na 130**, Cr 0.98.
- PMH: Secondary panhypopituitarism, Hypoestrogenism, Cushing's disease with transsphenoidal resection, Hypothyroidism, Heterozygous PT gene mutation with PE
- Surg Hx: Transsphenoidal resection
- Meds: hCG trigger shots, FSH
- Allergies: NKDA
- Family Hx: Father –, Mother –
- Social Hx: No drugs, alcohol, tobacco
- PE: +Tense, distended abdomen, +Palpable ovaries

What Imaging Should We Order?

Variant 1: **Gynecological etiology suspected, serum β-hCG positive.**

Radiologic Procedure	Rating	Comments	RRL*
US pelvis transvaginal	9	Both transvaginal and transabdominal US should be performed if possible.	O
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US duplex Doppler adnexa	8		O
MRI pelvis without IV contrast	6	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI abdomen and pelvis without IV contrast	6	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI pelvis without and with IV contrast	1		O
MRI abdomen and pelvis without and with IV contrast	1		O
CT pelvis without IV contrast	1		☢☢☢
CT pelvis with IV contrast	1		☢☢☢
CT pelvis without and with IV contrast	1		☢☢☢☢
CT abdomen and pelvis without IV contrast	1		☢☢☢
CT abdomen and pelvis with IV contrast	1		☢☢☢
CT abdomen and pelvis without and with IV contrast	1		☢☢☢☢

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level

ACR Appropriateness Criteria

US would be the most appropriate initial imaging for a pregnant patient with acute nonlocalized abdominal pain due to lack of radiation.

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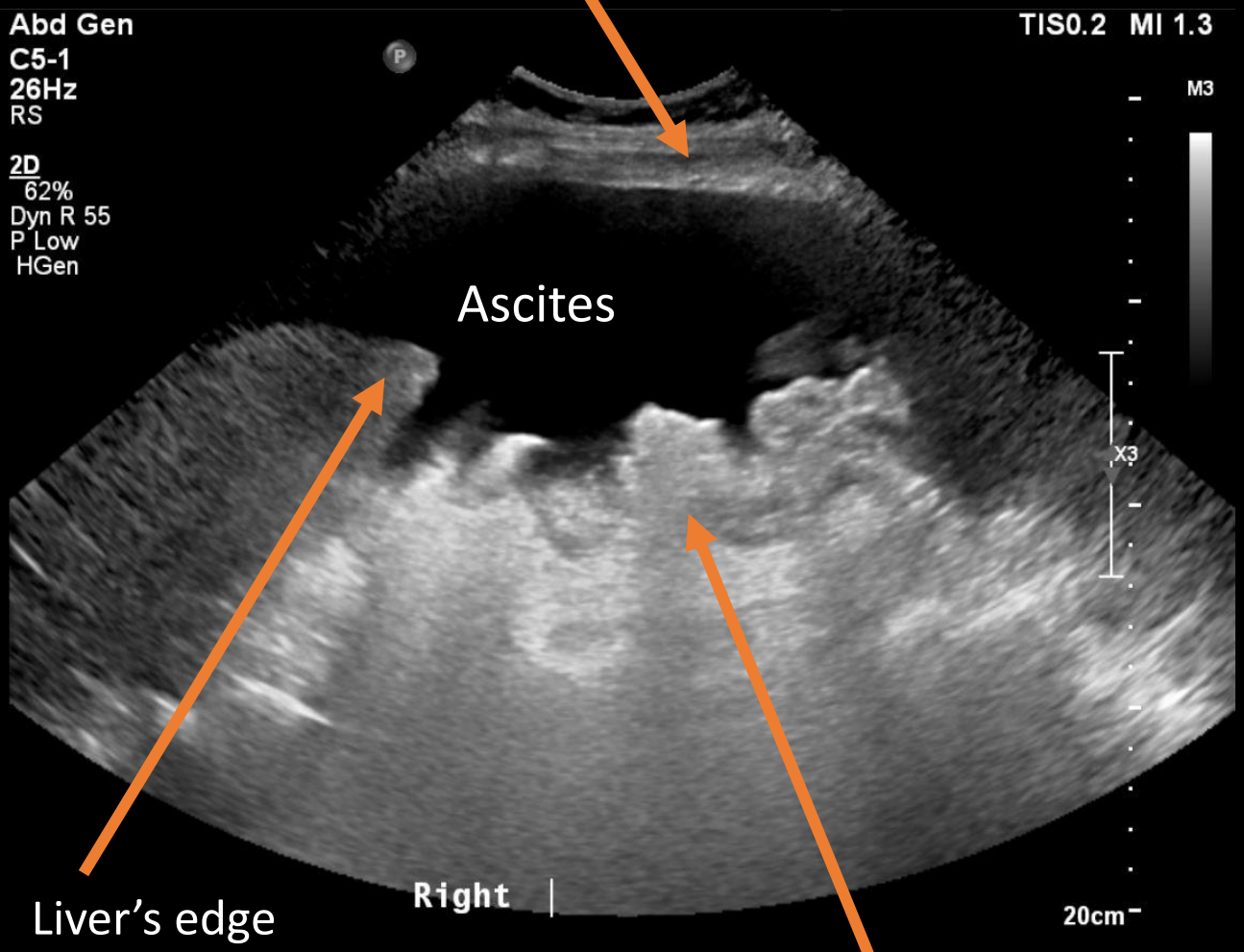
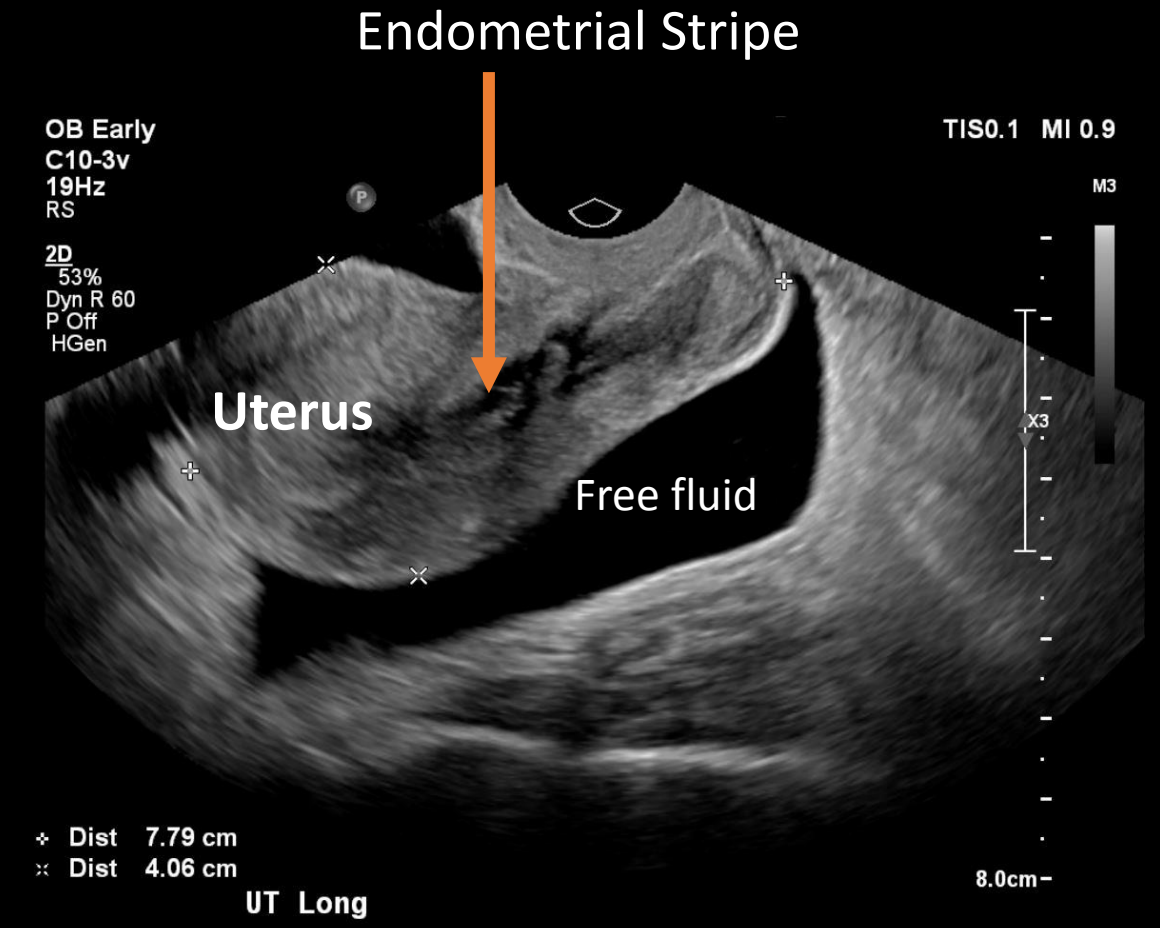
Findings: Unlabeled

Findings: Labeled

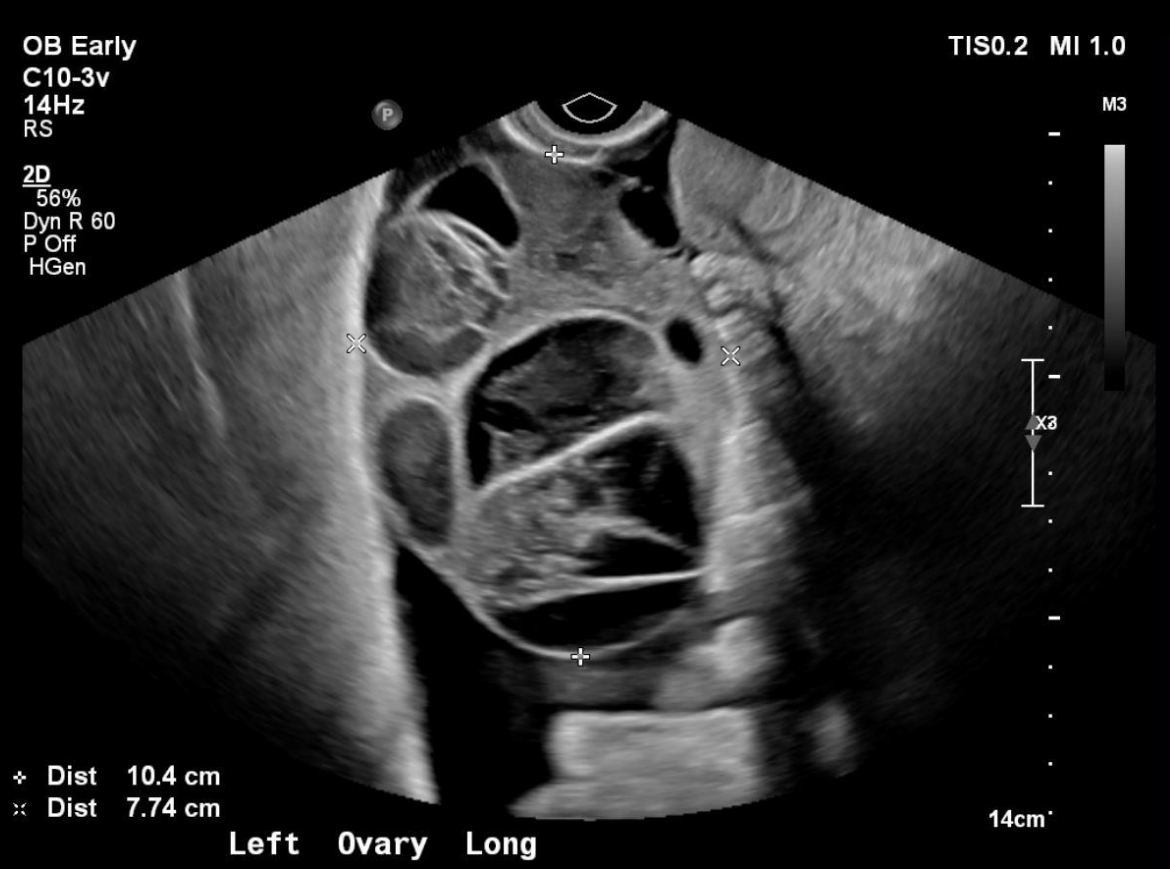


Abdominal US was used to guide paracentesis of the patient's ascitic fluid.



Transvaginal US of the uterus demonstrates no intra-uterine pregnancy.

Findings: Unlabeled



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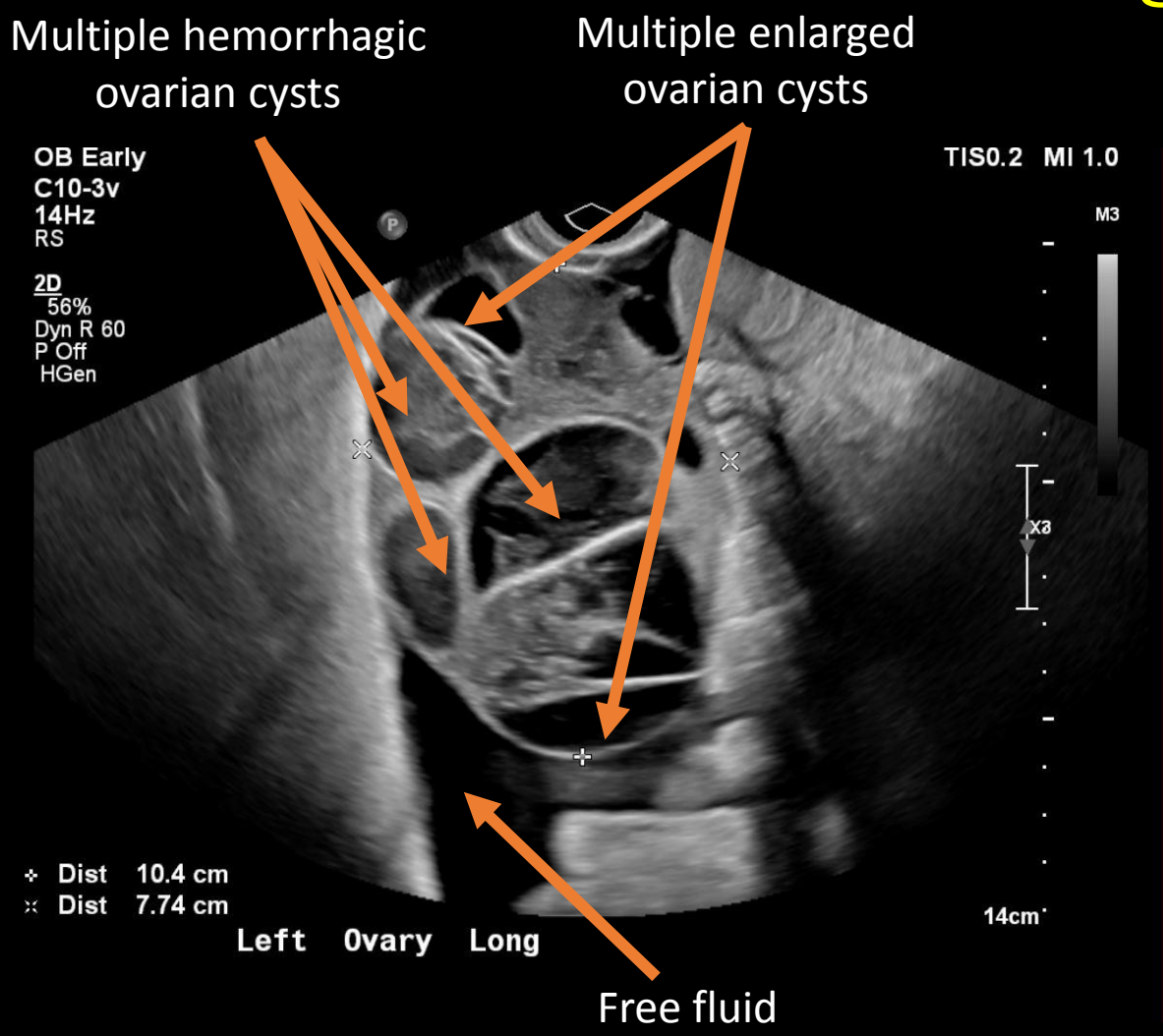

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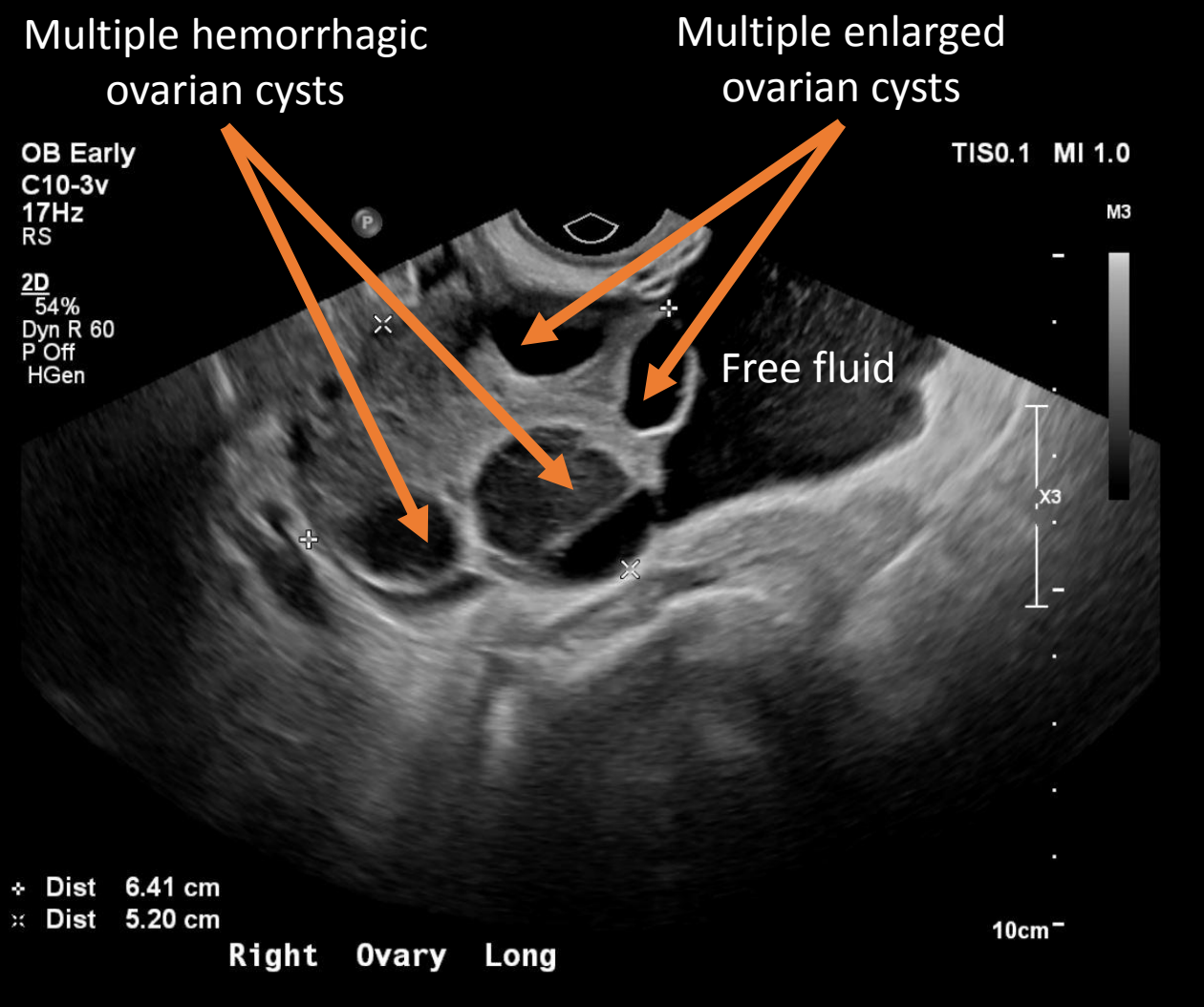

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Transvaginal US shows an enlarged 14.0 cm x 10.4 cm x 7.7 cm, multi-cystic left ovary and an enlarged, multi-cystic 10.0cm x 6.4cm x 5.2cm right ovary. Both demonstrate classic “spoke-wheel” appearance. A typical pre-menopausal ovary measures 3.5 cm x 2.5 cm x1.5 cm.

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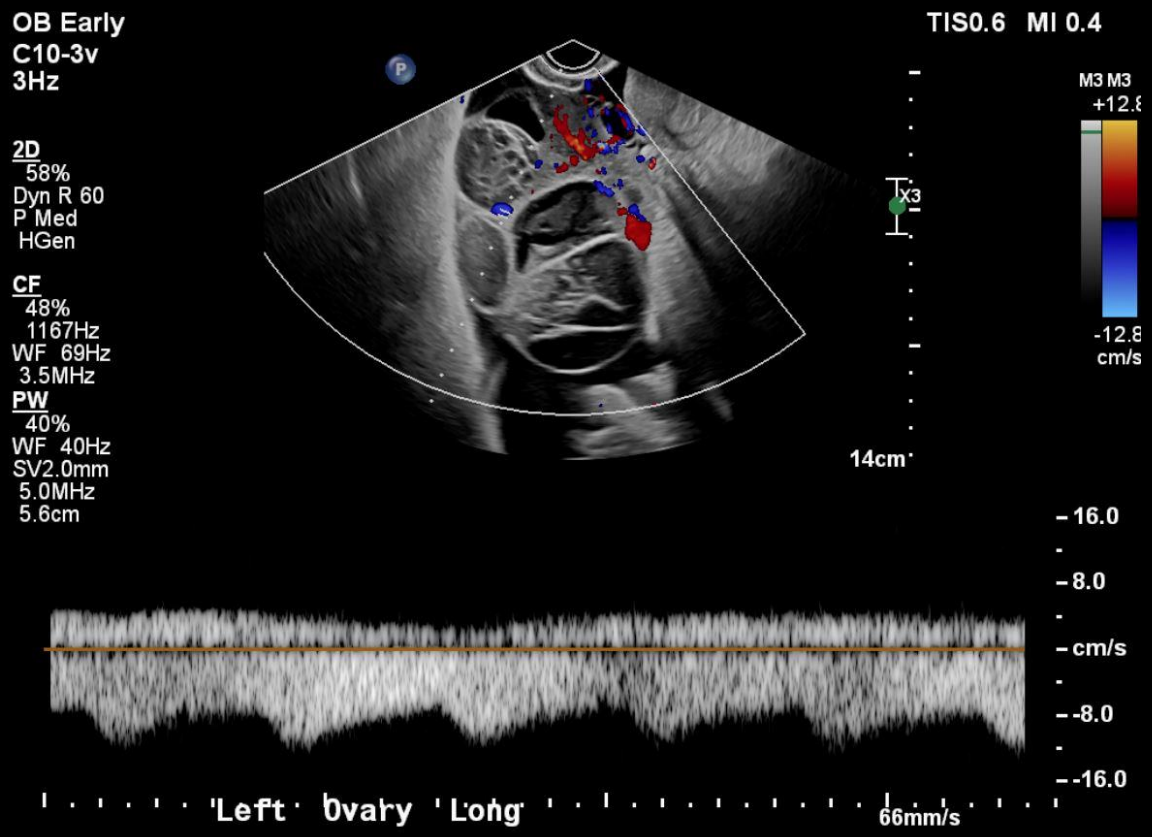
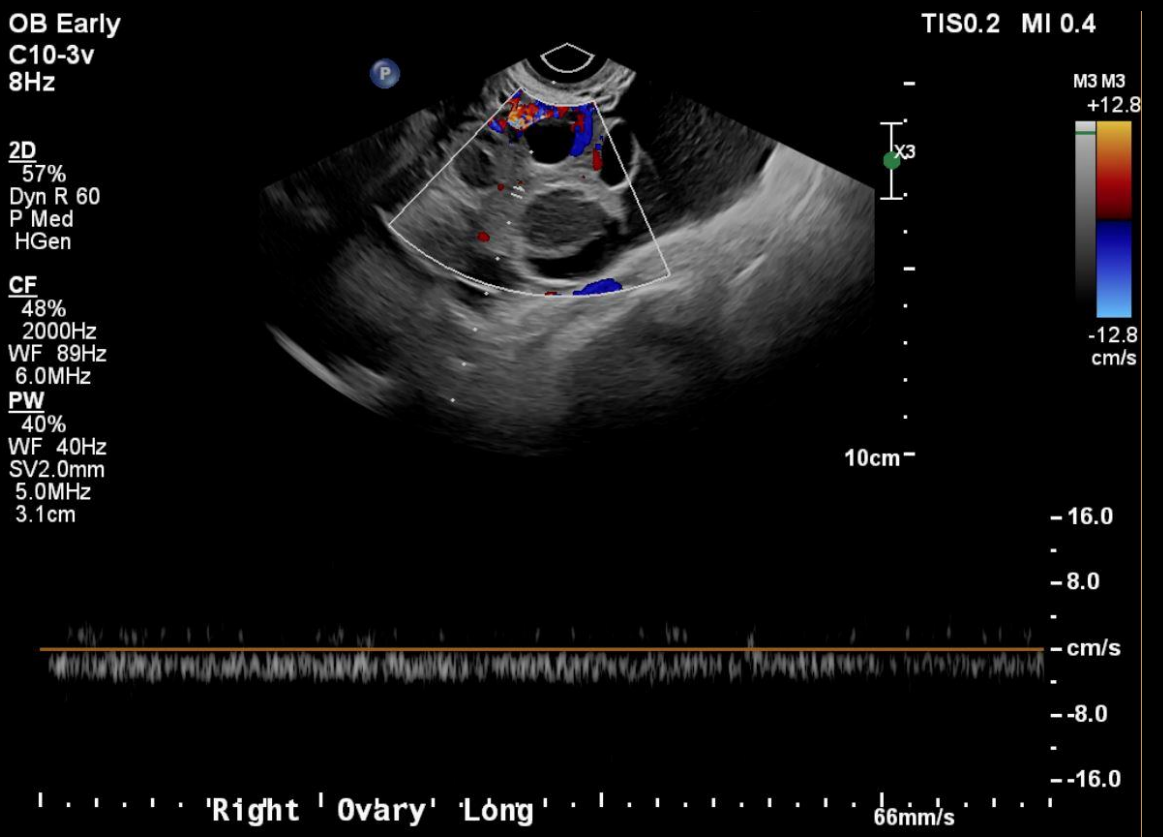
Findings: Unlabeled





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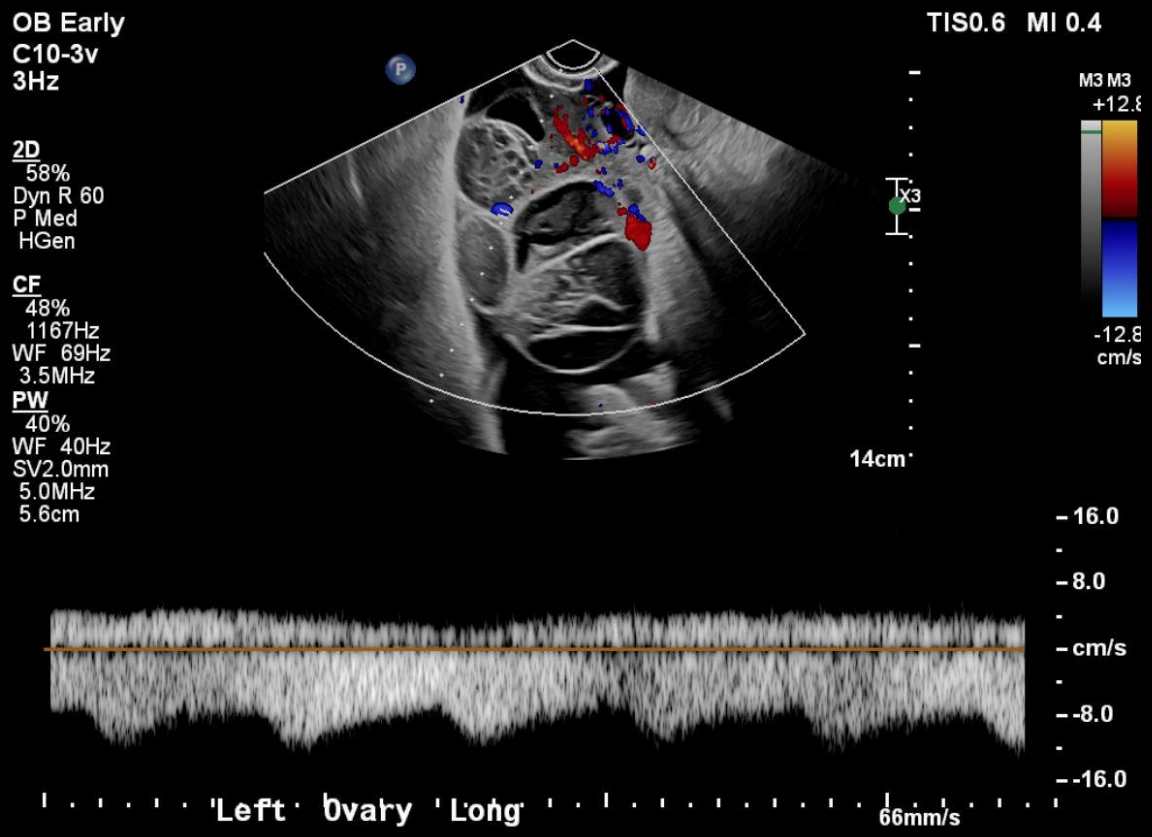

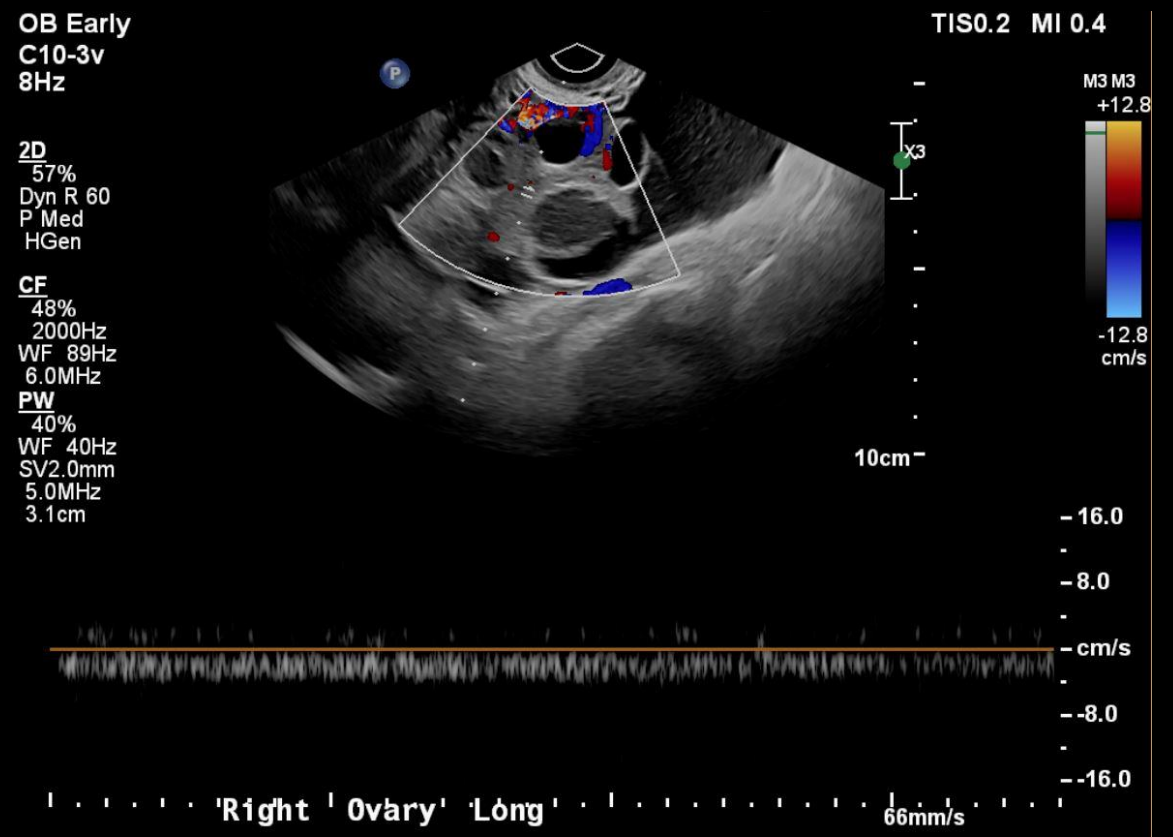

Venous and arterial blood flow were present in both ovaries (arterial flow not shown for right ovary here).

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Diagnosis

Severe Ovarian Hyperstimulation Syndrome (OHSS)

Case Discussion

- Initial Presentation
  - Young female (<30) with increasing abdominal distention, generalized abdominal pain, and dyspnea on ambulation
  - History of infertility treatment regimen including hCG trigger shots and FSH injections
  - + Pregnancy, hCG 1099, 5 weeks gestational age based on LMP
  - OHSS broad spectrum of symptoms include: abdominal distention and discomfort, increasing abdominal girth, ascites, enlarged ovaries, N/V, dyspnea

- Ultrasound findings
  - Bilaterally enlarged, multi-cystic (both simple and hemorrhagic) ovaries with classic spoke-wheel appearance
  - Ascites
  - No intrauterine pregnancy was identified on transvaginal imaging. This is best interpreted as a pregnancy of unknown location. This is the term used to describe the early pregnancy state during in which no definite IUP is visualized at US and the adnexa are normal, and may represent an early IUP, a spontaneous abortion, or an occult ectopic pregnancy. Serial β-hCG measurements and follow-up US are required to differentiate these possibilities. A single β-hCG level does not allow differentiation.

Case Discussion

- Ovarian Hyperstimulation Syndrome is an iatrogenic complication of ovarian stimulation from infertility treatment that leads to increased vascular permeability causing third spacing. Extravasation of fluid from the intravascular compartment into the third space leads to the broad range of symptoms such as hemoconcentration, ascites, pleural effusion, electrolyte imbalance, hypovolemia, thromboembolism, and hepatorenal insufficiency.

- hCG follicular stimulation of ovaries causes secretion of vasoactive mediators, specifically VEGF, and activates the ovarian renin-angiotensin system.

- Evidence of ascites from the third spacing of OHSS can be seen on trans-abdominal US. The fluid was removed using US-guided paracentesis. Fluid and abdominal pressure reaccumulated requiring another ultrasound guided paracentesis.

- Enlarged ovaries with cysts of varying sizes giving the spoke-wheel appearance is a classical finding in OHSS. No solid component or vascularity was evident in the ovarian cysts. Enlarged, cystic ovaries have an increased risk of torsion.

Case Discussion

- Diagnosis of severe OHSS included abdominal pain, hyponatremia 130, tense ascites, and ovarian size >12cm. Severe OHSS requires hospitalization.
- Typically, patients with OHSS require conservative management and will recover in approximately 2 weeks.
- Evidence of resolution includes normalization of Hct, reduction of ascites on US, and alleviation of clinical symptoms.
- However, pregnancy typically prolongs recovery from OHSS and increases severity of symptoms due to rising endogenous hCG levels. Later imaging demonstrated presence of dichorionic diamniotic twins in this patient.
- Studies suggest OHSS pregnancies have higher rate of miscarriage and complications such as gestational DM and pregnancy-associated HTN. Thus, this patient will be followed by MFM throughout the rest of her pregnancy.

References:

- American College of Radiology. ACR Appropriateness Criteria for Acute Pelvic Pain in the Reproductive Age Group. Available at https://acsearch.acr.org/docs/69503/Narrative/. Accessed May 25 2019.
- Balakumar, Vidhya, et al. “Ovarian hyperstimulation syndrome.” *Obstetrics, Gynaecology, & Reproductive Medicine,* vol. 27, no. 12, Dec. 2017, pp. 357-362.
- UptoDate. Management of ovarian hyperstimulation syndrome. Accessed May 26, 2019.