



Weill Cornell Medicine

Hospital Medicine Point of Care Ultrasound (HM POCUS) Program

MONTHLY POCUS CONFERENCE

Alberto Rojas, MD

POCUS fellow

September 25, 2019

Case presentation

- ▶ 34 F w pmh POCS, on infertility treatment (HCG/Leuprolide), presented to ED c/w 2 days of abdominal pain, abd distention, dizziness and nausea. No fever or chills. She was seen in GYN outpatient clinic where culdocentesis was performed (1.4 L fluid removed) and was sent to ED for further evaluation.
- ▶ Meds: **HCG/Leuprolide cycles** (last Rx July, ~1m b. presentation), Cabergoline 5mg, Metformin 500mg BID, ASA 81mg.

Physical Exam

- ▶ **VS:** T 36.4 O₂sat: 97 RA RR16 BP: 96/67 HR 113
- ▶ **HEENT:** moist oral mucosa
- ▶ **Chest:** clear breath sounds
- ▶ **Heart:** normal s1s2, no MRG
- ▶ **ABD:** Diffuse abdominal tenderness with distention, no masses. No bruits.
- ▶ **Ext:** no pedal edema, +radial pulses b/l easily palpable

Labs

- ▶ **CBC: WBC 27.8 Hb 16.2 Plt 268**
- ▶ **LFT: Prot: 4.8 Alb 2.2 Bili 1.2 AST: 20 ALT:12
Alk Phos: 45**
- ▶ **Chem: Na 135 K 4.7 Cl 100 CO2:25 BUN:27
Cr: 2.1**

Procedure team contacted for paracentesis

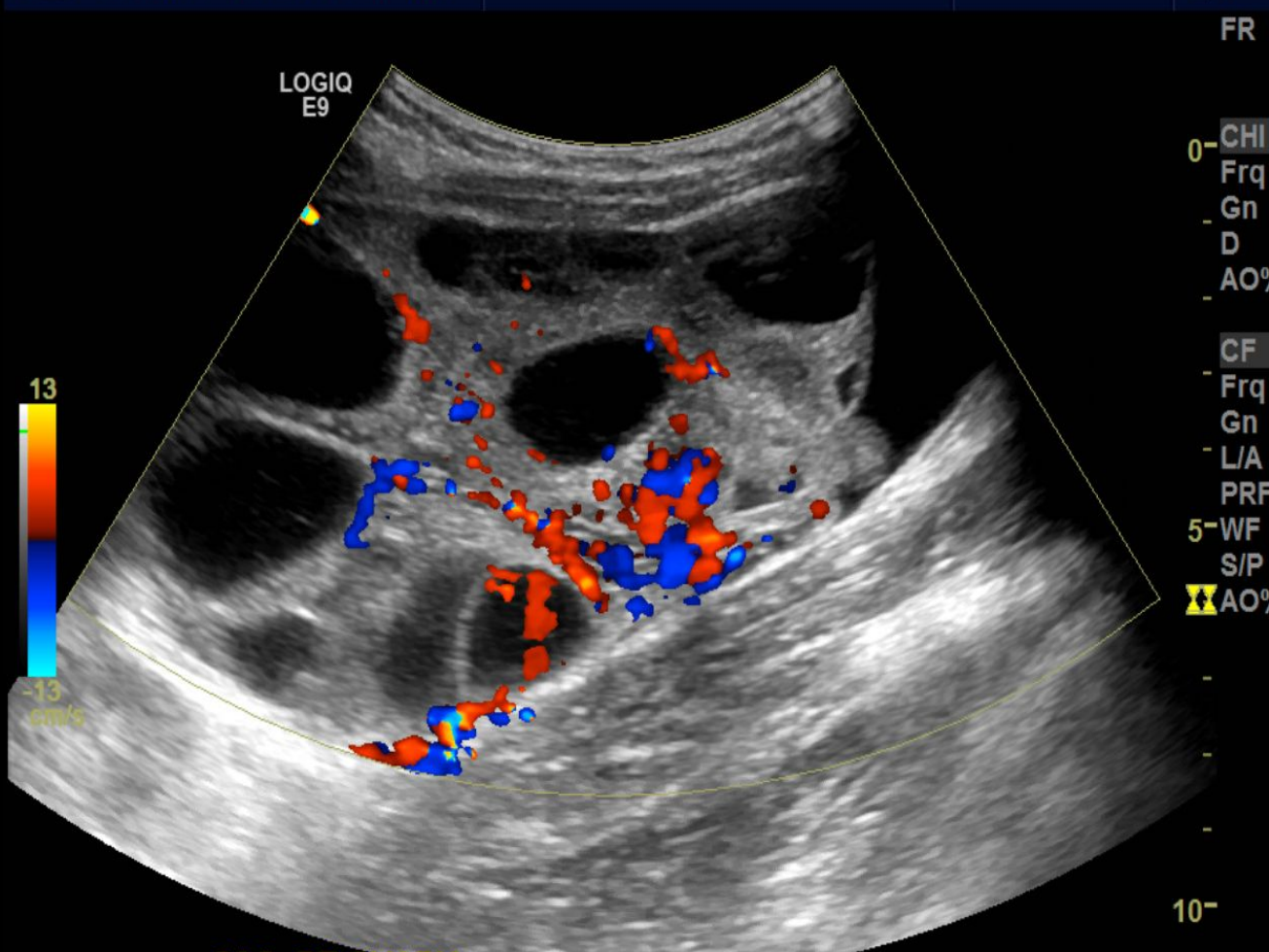
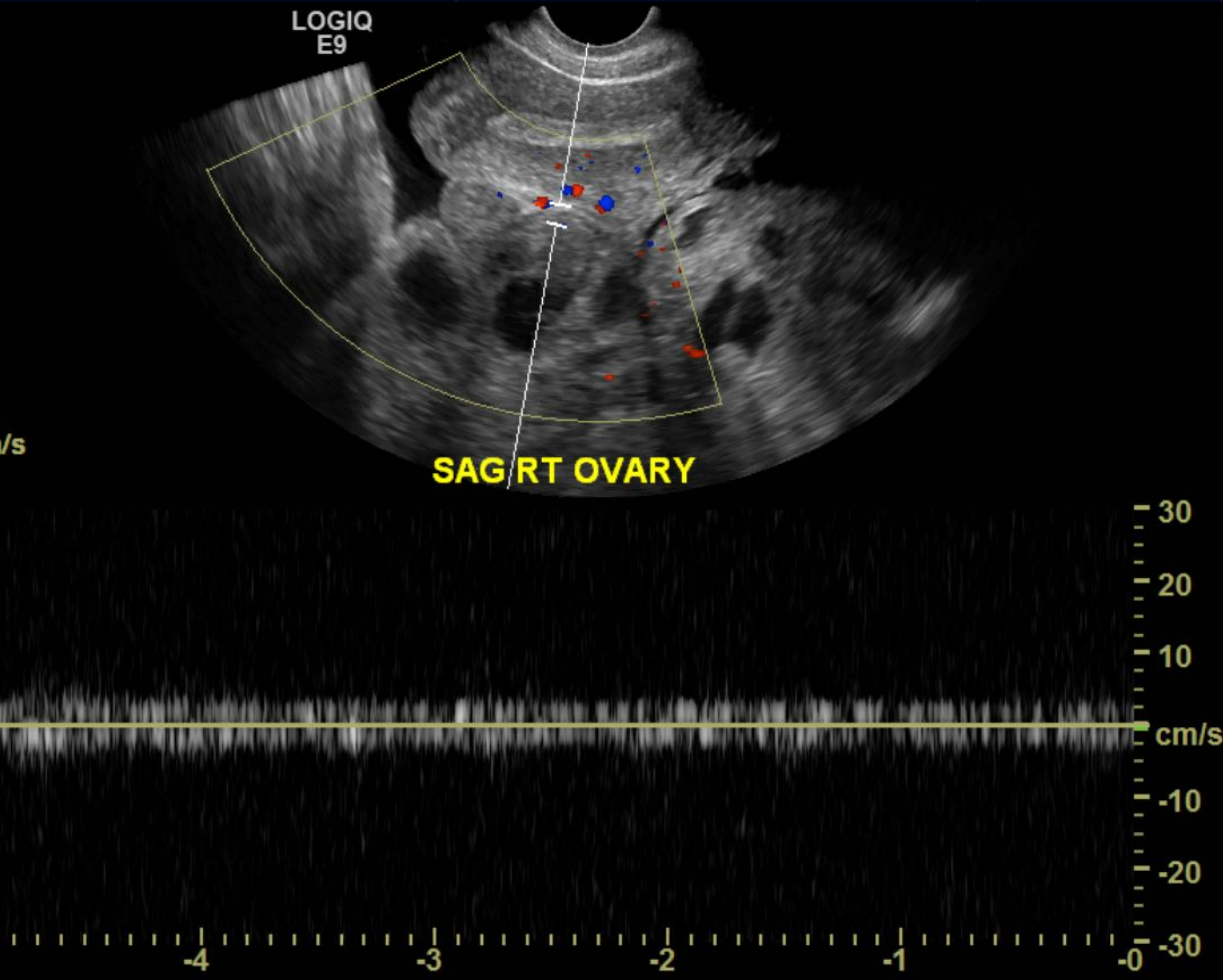


Official US report:

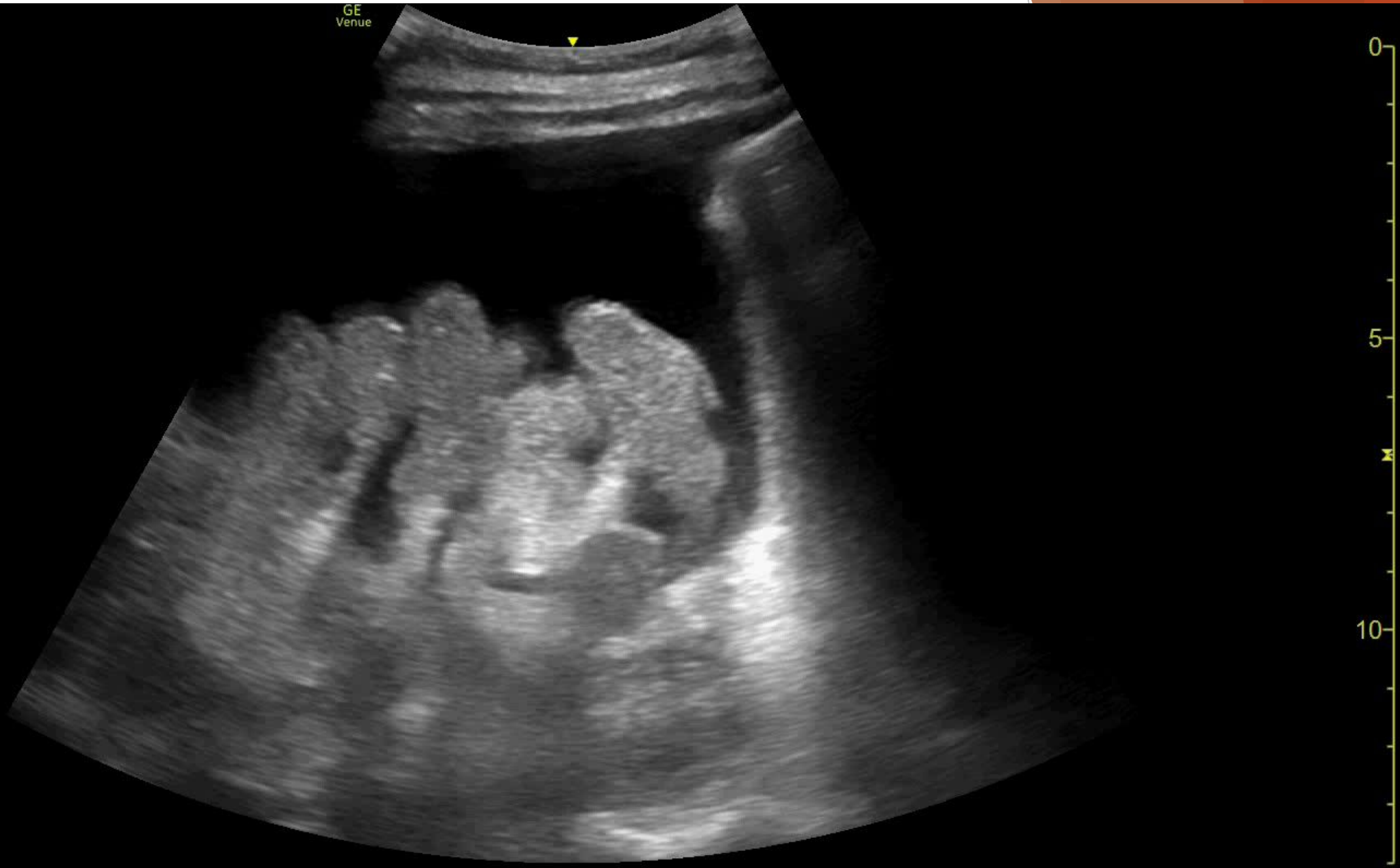
- Enlarged hyperstimulated bilateral ovaries containing multiple cysts. (OHSS)
- Moderate hemorrhagic pelvic ascites

New York Presbyterian Ho:
08/05/19 09:29:12PM MK
MI 0.4 TIs 0.4

 New York Presbyterian Ho:
08/05/19 10:01:17PM MK
MI 1.2 TIs 1.2 C1-6
Gyn



GE
Venue



0

5

10

Ovarian Hyperstimulation Syndrome (OHSS)

- ▶ It is a complication of ovarian stimulation treatment for infertility.
- ▶ It may also occur as spontaneous event in pregnancy.
- ▶ Also well recognized in primary hypothyroidism.

Clinical presentation

- ▶ Vary from abdominal distention to life-threatening capillary leak with fluid sequestration in a third space.
- ▶ Ascites +/- Pleural effusion
- ▶ Intravascular volume depletion
- ▶ AKI
- ▶ LFT's elevation

Pathology

- ▶ Massive cystic ovarian enlargement
- ▶ Fluid shift from the intravascular compartment into the peritoneal, pleural or pericardial cavities due to increased capillary permeability of mesothelial surfaces under the action of several vasoactive ovarian factors.
- ▶ The ascitic fluid can be serosanguinous

Classification

Mild OHSS: Bilateral multicystic ovarian enlargement

Grade 1: Abdominal distention and discomfort

Grade 2: Plus nausea, vomiting and/or diarrhea + ovarian enlargement from 5 to 12 cm

Moderate OHSS: If there is associated ascites and abdominal distention

Grade 3: Features of mild OHSS plus ultrasonographic evidence of ascites

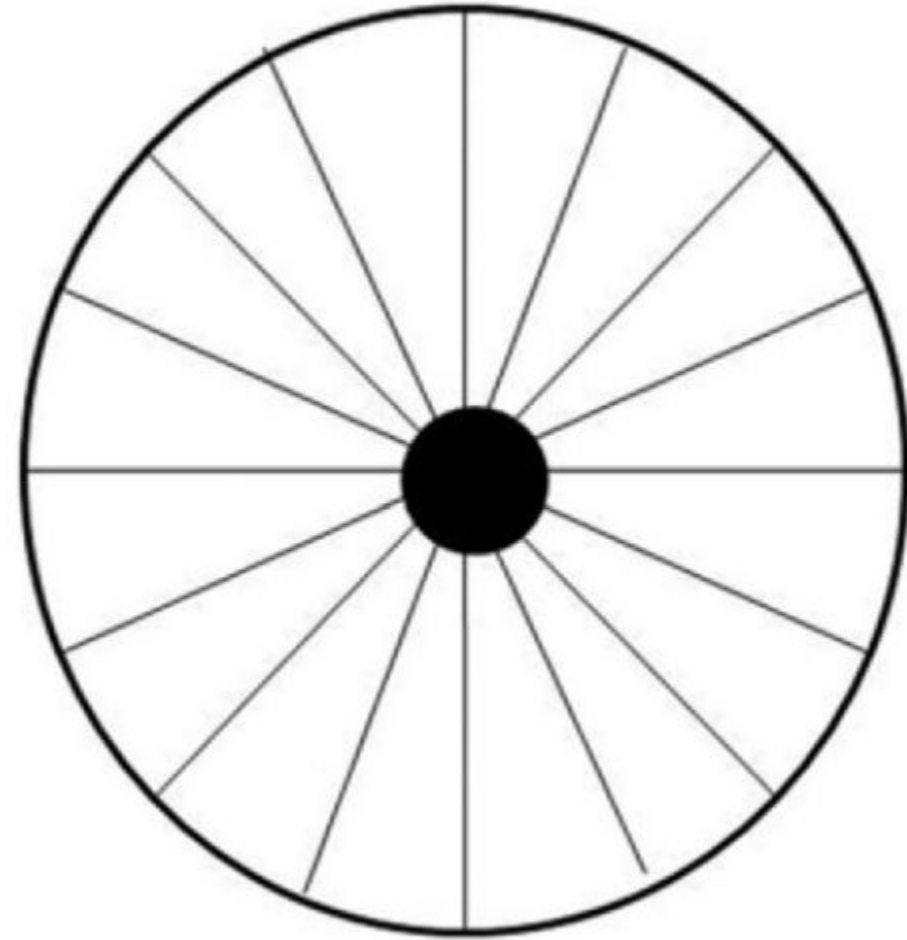
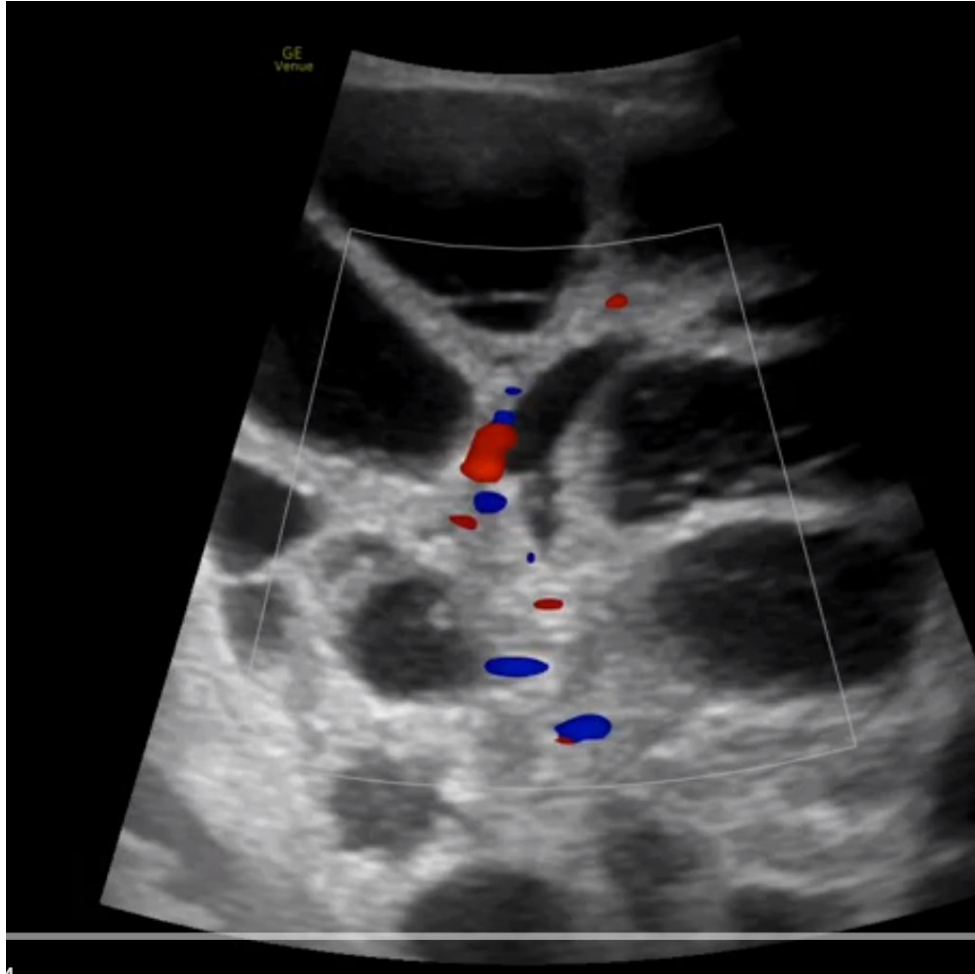
Severe OHSS: Hypovolemia, hemoconcentration, thrombosis, oliguria, pleural and pericardial effusion

Grade 4: Moderate OHSS plus clinical evidence of ascites and/or hydrothorax and dyspnea

Grade 5: Grade 4 plus change in the blood volume, hemoconcentration, coagulation abnormalities and diminished kidney function.

Ultrasound features

- ▶ Typically shows bilateral symmetric enlargement of ovaries (often >12cm in size)
- ▶ Multiple cyst of varying sizes, **spoke-wheel appearance**
- ▶ Associated ascites and pleural +/- pericardial effusion



Treatment

- ▶ Usually self-limiting in most cases and management is mainly supportive.
- ▶ Severe cases usually require hospitalization and close monitoring of hematocrit, liver function, renal function, serum electrolytes and oxygen saturation.

Complications

- ▶ Hypovolemic shock
- ▶ Thromboembolic disease
- ▶ Stroke
- ▶ Increased risk of ovarian torsion



Pseudoascites

- Is the clinical impression of ascites when, in fact, free fluid is not present within the peritoneal cavity.
- Any hollow abdominal viscus may give the **impression of ascites in physical examination** when swells considerably due to the presence of fluid.

Therefore...

- ▶ *Bulging flanks*
- ▶ *Flank dullness*
- ▶ *Shifting dullness*
- ▶ *Fluid wave*

Maybe Pseudoascites?

Can Ultrasound help?

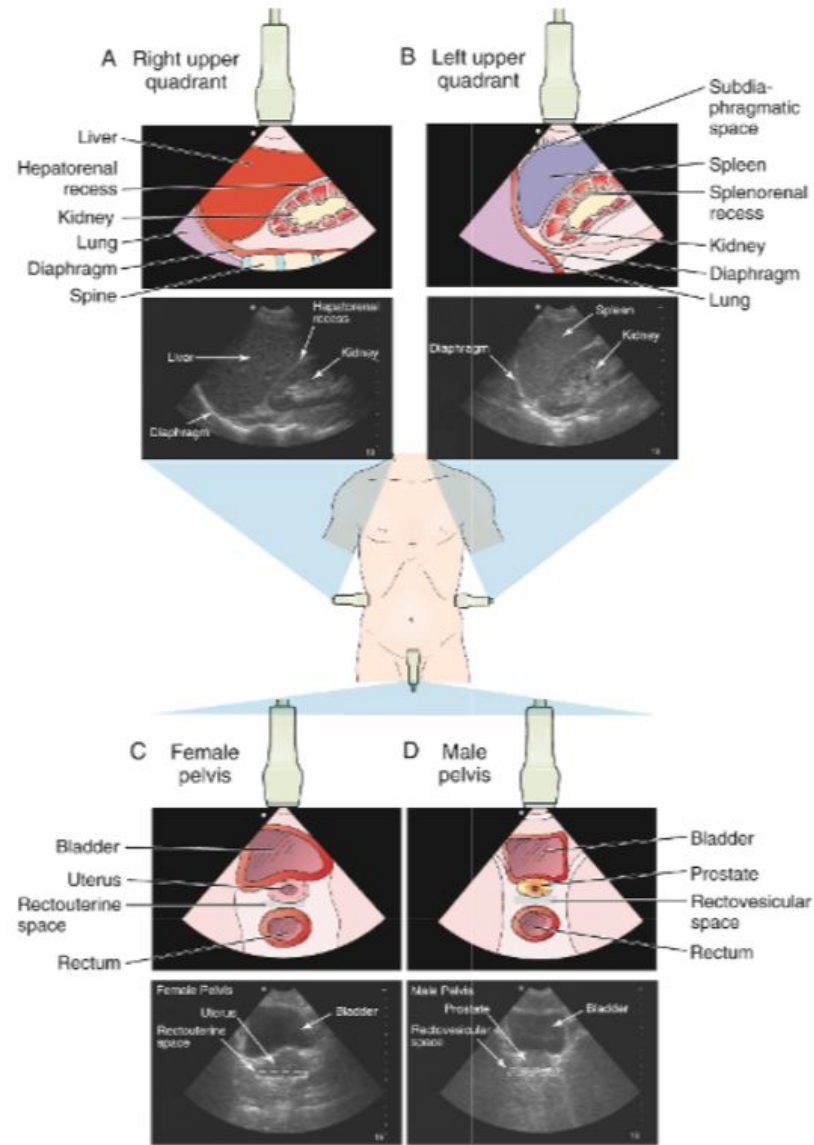
- Abdominal U/S can detect as little as 100 mL of fluid within the peritoneum. It is useful in defining both the presence and the location of the fluid.
- However, cysts of enormous size can be difficult to distinguish from ascites by U/S giving the false impression of free fluid in the peritoneal cavity.

Williams JW Jr, Simel DL. The rational clinical examination. Does this patient have ascites? How to divine fluid in the abdomen. *JAMA*, 1992; 267(19): 2645-8.

Fiedorek SC, Casteel HB, Reddy G, Graham DY. The etiology and clinical significance of pseudoascites. *J Gen Intern Med*, 1991; 6(1): 77-80.

Camilon M, Chilstrom M. Ultrasound distinguishes ascites from a large ovarian fluid-filled cyst. *West J Emerg Med*, 2014; 15(7): 831.

Detection of peritoneal free fluid.



(A) Right upper quadrant. Visualize the right **subdiaphragmatic space**, **hepatorenal space** (Morison's pouch, most important area in the right upper quadrant), and the right inferior pole of the kidney. (B) Left upper quadrant. Visualize the **left subdiaphragmatic space** (most important area in the left upper quadrant), **splenorenal space**, and left inferior pole of the kidney. (C) and (D) Pelvic window. Visualize the **rectouterine space** in females (C) and the **rectovesicular space** in males (D).



PSEUDOASCITES, WHAT WE CAN LEARN FROM PUBLISHED CASE REPORTS AND SERIES

Ioannis Vrettos^{*1}, Panagiota Voukelatou², Apostolos Katsoras³, Despoina Theotoka⁴ and Andreas Kalliakmanis⁵

¹(MD, MSc) 2nd Department of Internal Medicine, General and Oncology Hospital of Kifissia "AgiouAnargyroi", Athens, Greece.

^{2,3,4}(MD) 2nd Department of Internal Medicine, General and Oncology Hospital of Kifissia "AgiouAnargyroi", Athens, Greece.

⁵(MD, PhD) 2nd Department of Internal Medicine, General and Oncology Hospital of Kifissia "AgiouAnargyroi", Athens, Greece.

***Corresponding Author: Ioannis Vrettos**

(MD, MSc) 2nd Department of Internal Medicine, General and Oncology Hospital of Kifissia "AgiouAnargyroi", Athens, Greece.

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ABSTRACT

For patients with abdominal distension but without free peritoneal fluid, that give the false impression of ascites the term pseudoascites is used. The aim of this review is to summarize the published cases of pseudoascites in order to enrich our knowledge about the etiology of this condition and to avoid futile invasive diagnostic procedures. We searched MEDLINE, for any type of giant abdominal cystic lesion mistaken for ascites. We also perused the references of the retrieved articles to identify reports that may have been missed by the electronic searches. Totally we identified 42, relevant to the study topic articles that included 49 cases (29 males) between 15 months -92 years old. The most frequent diagnoses were omental and ovarian cyst. As it seems from the published cases of pseudoascites, the differential diagnosis from ascites cannot be based only on history and clinical examination. All patients should undergo an abdominal ultrasonography and in doubtful cases a computed tomography or a magnetic resonance imaging of the abdomen should be performed. If the imaging studies do not reveal typical signs of free fluid, the patients (which ultimately are few) should undergo an exploratory laparotomy instead of an abdominal paracentesis, which could have disastrous consequences.

KEYWORDS: Pseudoascites, ascites, abdominal cyst.

Methods

- ▶ Publications cited in Pubmed for any type of giant abdominal cystic lesion mistaken for ascites.
- ▶ They searched MEDLINE (last search May 2017) using combinations of terms such as giant abdominal cyst, huge abdominal cyst, enormous abdominal cyst and pseudoascites.

The eligible cases were classified in 4 main groups

1. Cases misdiagnosed and treated as ascites for varied periods of time before reaching the right diagnosis.
2. Cases of giant abdominal cysts mistaken for ascites by physical examination in which patients underwent an abdominal paracentesis.
3. Cases of giant abdominal cysts mistaken for ascites by physical examination and U/S in which patients underwent an abdominal paracentesis.
4. Cases of giant abdominal cysts mistaken for ascites by physical examination, U/S or/and CT which were diagnosed by laparotomy.

Results

- 1. Cases misdiagnosed and treated as ascites for varied periods of time before reaching the right diagnosis.

Total: 24 (8m-5Y)

Table 1: Cases misdiagnosed as ascites for varied periods of time before reaching the right diagnosis.

Author/ year	Patient's age/ Gender	Size of the cyst	Origin of the cyst	Time untilldiagnosis
Karhan[12] 2016	5.5-year old boy	25x30 cm	Omental cyst	3 years
Ragavan 2013 ^[13]	Case 1 3-year old boy	25x22x19 cm	Case 1 Omental cyst	Case 1 2 years
	Case 2 3-year old girl	28x20x20 cm	Case 2 Omental cyst	Case 2 1 year
Chute and Stasaitis 2012 ^[14]	51-year old female	35.5x23x20 cm	Ovarian cyst	4 years
Dulger 2010[15]	25-year Female old	NA	Mesenteric cyst	6 months
Mikos 2009[9]	59-year old female	NA	Ovarian cyst	8 months
Kaya 2009[17]	43-year old male	Anteroposterior diameter of 74 cm	Omental cyst	6 years
	Case 1 43-year old female	Case 1 Contained 14 liters of fluid	Case 1 Ovarian cyst	Case 1 NA
	Case 2 13-year old boy	Case 2 Contained 9 liters of fluid	Case 2 Mesenteric cyst	Case 2 1 years
Debnath 2008 ^[18]	Case 3 22-year old female	Case 3 Contained 10 liters of fluid	Case 3 Ovarian cyst	Case 3 3 years
	Case 1 3.5- year old boy	Case 1 NA	Case 1 Omental cyst	Case 1 several months
Moralioğlu 2007 ^[19]	Case 2 3- year old girl	Case 2 NA	Case 2 Omental cyst	Case 2 2 years
	4- year old girl	30×24×15 cm	Omental cyst	9 months
Menon and Rao 2005[20]	5- year old boy	Contained fluid of 5 liters	Omental cyst	4.5 years
Shilo 2001[21]	92-year old male	Diameter of 25 cm	Renal cyst	3 years

NA= not assessed

Author/ year	Patient's age/ Gender	Size of the cyst	Origin of the cyst	Time untilldiagnosis
Rahman & Johnson 2001	18-month old boy	16.7×17.3× 6.7 cm	Omental cyst	8-9 months
Prasad 2001[23]	Case 2 4-year Old boy	Case 2 20 cm in the maximal diameter	Case 2 Omental cyst	Case 2 2 years
	4-year boy old	NA	Omental cyst	3 years
Fiedorek 1991[7]	Case 2 61-year old male	Case 2 18×16×20 cm	Case 2 Mesenteric cyst	Case 2 14 months
	3-year Male old	Multiple Varying cysts sizes from 0.5 to 8 cm diameter	Congenital Lymphangiomatosis of greater omentum	21 months
Gyves-Ray 1990[26]	26-month old boy	17×11×8 cm	Omental cyst	8 months
Deorari 1985[27]	3.5-year old male	NA	Omental cyst	2 years
Dixon	85-year Male old	60x45 cm	Primary omental leiomyosarcoma	4 years
Grobe 1983[29]	Case 1 35-year Old female	Case 1 NA	Case 1 Ovarian cyst	Case 1 5 years

Table 2: Cases of giant abdominal cysts mistaken for ascites during physical examination in which patients underwent an abdominal paracentesi Total:12

Author/ year	Patient's age/gender	Size of the cyst	Origin of the cyst
Dursun 2009 ^[30]	57-year old female	14x29x22 cm	Mesenteric cyst
Viganò 2007	50-year old male	Diameter of 35 cm	Renal cyst
Oray-Schrom 2002 ^[32]	52-year old female	NA	Intra-abdominal pseudocyst [Its precise origin was unclear]
Chand 2000 ^[33]	46-year old male	44x30x21 cm	Multicystic Intra-abdominal Lymphangioma
Rattan 1996 ^[34]	4-year old boy	Contained over 1.5 liters of fluid.	Omental cyst
Fiedorek 1991 ^[7]	<i>Case 1</i> 4-year old boy	<i>Case 1</i> Contained 1.800 mL of fluid	<i>Case 1</i> Omental cyst
Brophy 1989	34-year old female	55x38 cm	Ovarian cystadenoma
Fiedorek 1986 ^[36]	<i>Case 1</i> 3-year old boy	<i>Case 1</i> Total fluid content of 3.600 ml	<i>Case 1</i> Omental cyst
Adams & Bezuidenhout 1986 ^[37]	60-year old male	NA	Hydatid cyst
Grobe 1983 ^[29]	<i>Case 2</i> 20-year old female	<i>Case 2</i> 10x17 cm	<i>Case 2</i> Ovarian cyst
Liss 1982 ^[38]	63-year old female	18 liters of fluid removed	Ovarian cyst
Bar-Maor & Lernau* 1981 ^[39]	<i>Case 1</i> 31-year-old female	<i>Case 1</i> Diameter of about 35 cm	<i>Case 1</i> Hydatid cyst

*Availability of U/S or CT was not referred in the full text. NA= not assessed.

Table 3: Cases of giant abdominal cysts mistaken for ascites by physical examination and U/S in which patients underwent an abdominal paracentesis. Total: 6

Author/ year	Patient's age/ gender	Size of the cyst	Origin of the cyst
Riyach 2014 ^[42]	75-year old male	35x32x22	Renal cyst
Pathak & Karki 2012 ^[43]	13-year old girl	NA	Ovarian cyst
Parakh 2009 ^[44]	4-year old boy	30 cm lengthwise	Cystic lymphangiomatous hamartoma
Borovec 2009 ^[45]	77-year old male	Diameter of 27 cm	Renal cyst
Rani 2006 ^[46]	3-year old boy	NA	Retroperitoneal lymphangioma
Menahem & Shvartzman 1994 ^[47]	60-year-old female	22 kg	Ovarian cyst

Table 4: Cases of giant abdominal cysts mistaken for ascites by physical examination, U/S or/and CT which were diagnosed by laparotomy or laparoscopy. Total: 4

Author/ year	Patient's age/ gender	Size of the cyst	Origin of the cyst
Shafi 2009 ^[48]	8-year old girl	25x22 cm weighed 4.3 kg	Omental cyst
De Matos 2005	2-year old girl	20×16×1.8 cm	Omental cyst
Narchi 2000	15-month-old boy	NA	Omental cyst
Lombardo & Babando* 1986 ^[51]	89-year-old female	NA	Ovarian cyst

The Etiology and Clinical Significance of Pseudoascites

STEPHEN C. FIEDOREK, MD, HELEN B. CASTEEL, MD,
GURUNATH REDDY, MD, DAVID Y. GRAHAM, MD

ASCITES is an abnormal collection of fluid within the peritoneal cavity. The clinical presence of ascites is suggested by physical signs, including abdominal distention with bulging flanks, a palpable fluid wave, and shifting dullness to percussion. Small amounts of ascitic fluid often are difficult to detect by physical findings, and ultrasonography (US) has become the best procedure to confirm or disprove the presence of ascites in patients who have mild abdominal distention.¹ Massive ascites, in contrast, is documented readily by physical examination, and usually the etiology is apparent after a complete history and thorough physical examination.²

During the evaluation of patients who have obvious ascites, those conditions that produce the physical signs of ascites without actual peritoneal fluid accumulation may not be considered. The term pseudoascites denotes the clinical impression of ascites when, in fact, free fluid is not present within the peritoneal cavity. Our experience with pseudoascites and a literature review prompted us to summarize the reported conditions that may produce pseudoascites. Proper management of these conditions underscores the need to consider imaging studies before invasive diagnostic procedures are performed, especially if the cause of the "ascites" is unclear.

shimmering "gold paint" appearance at the air-fluid interface. Microscopic examination of the fluid revealed abundant cholesterol crystals with 500,000/mm³ crenated red blood cells and 1,460/mm³ white blood cells, of which 6% were polymorphonuclear leukocytes and 94% were mononuclear cells. No malignant cell was seen. Fluid amylase was 18 IU/L; protein, 4,784 mg/dL; triglyceride, 17 mg/dL.

Abdominal US demonstrated a large collection of sonolucent fluid with a lobulated superior border and the conspicuous absence of fluid in the dependent peritoneal recesses. Computed tomography (CT) of the abdomen revealed a large, loculated fluid collection compressing loops of bowel posteriorly. Septa were present within the fluid, and no fluid was seen surrounding the liver, suggesting a giant omental cyst. At operation, a cyst containing 1,800 mL of fluid was found involving the mesentery of the colon and omentum of the stomach. Histologically, a fibrin lining was present generally throughout the cyst, with isolated foci of reactive mesothelial cells. The cyst was removed and the postoperative course was uncomplicated. The child subsequently did well; his bowel habits and appetite returned to normal.³

Case 2

Causes of Pseudoascites

- Omental cyst
- Mesenteric cyst
- Ovarian cyst
- Cerebrospinal fluid pseudocysts
- Hydronephrosis
- Gastrointestinal dilatation (pyloric obstruction, celiac disease, megacolon)
- Primary omental malignancy
- Retroperitoneal cyst
- Echinococcal cyst
- Enteric duplication
- Properitoneal hematoma (anticoagulant therapy)
- Mesenteric and retroperitoneal fat deposition (steroid administration, endogenous obesity)
- **Pancreatic Pseudocyst**

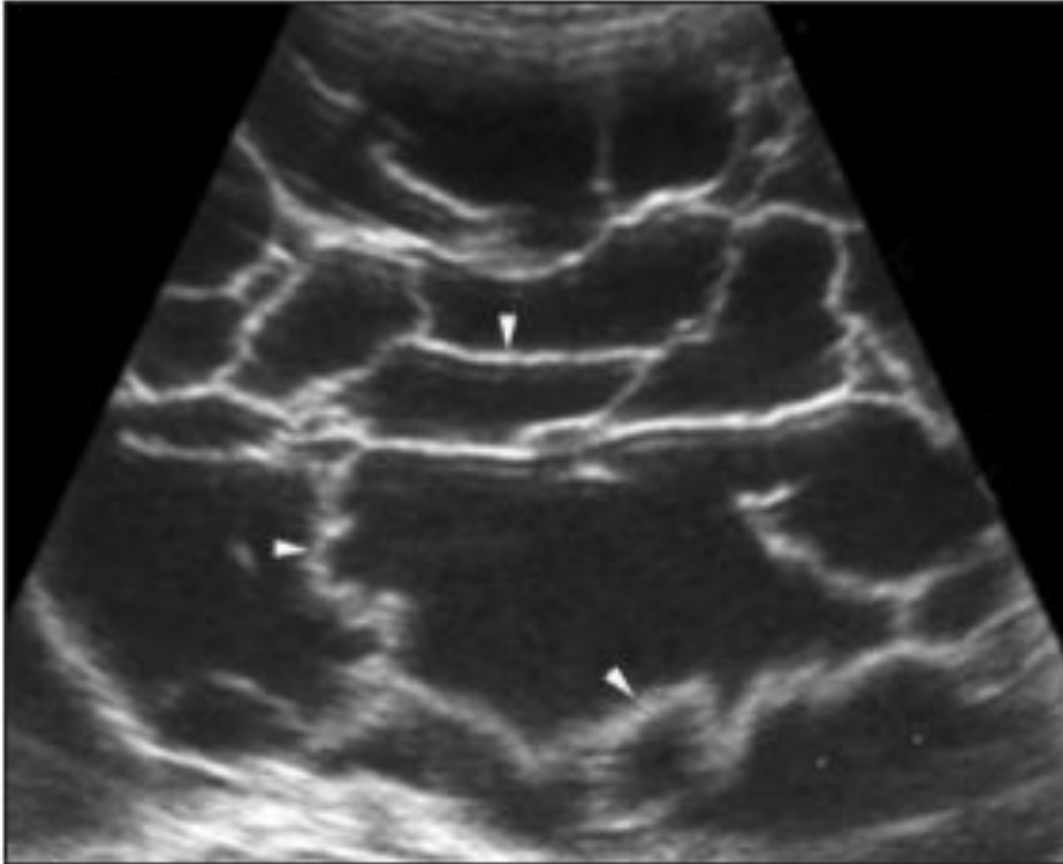
Journal of General internal Medicine, January 1991 volume 6, Issue 1, pp 77-80

Ascites and Pseudoascites

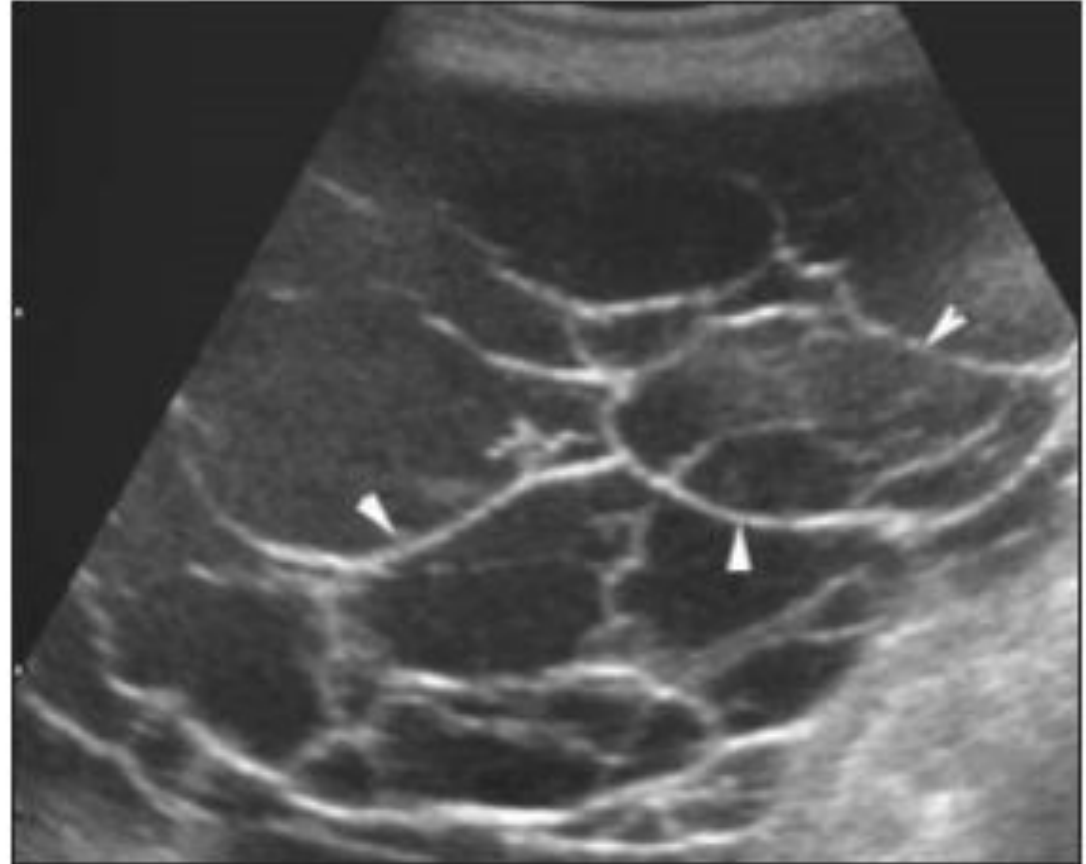
Tuberculous peritonitis

Figure 4. **A**, Transabdominal cross-sectional scan shows an extensive lattice network of fibrin bands (arrowheads) in ascites. **B**, Transabdominal cross-sectional scan of the lower abdomen shows ascites with a latticelike appearance formed by organized fibrin bands (arrowheads).

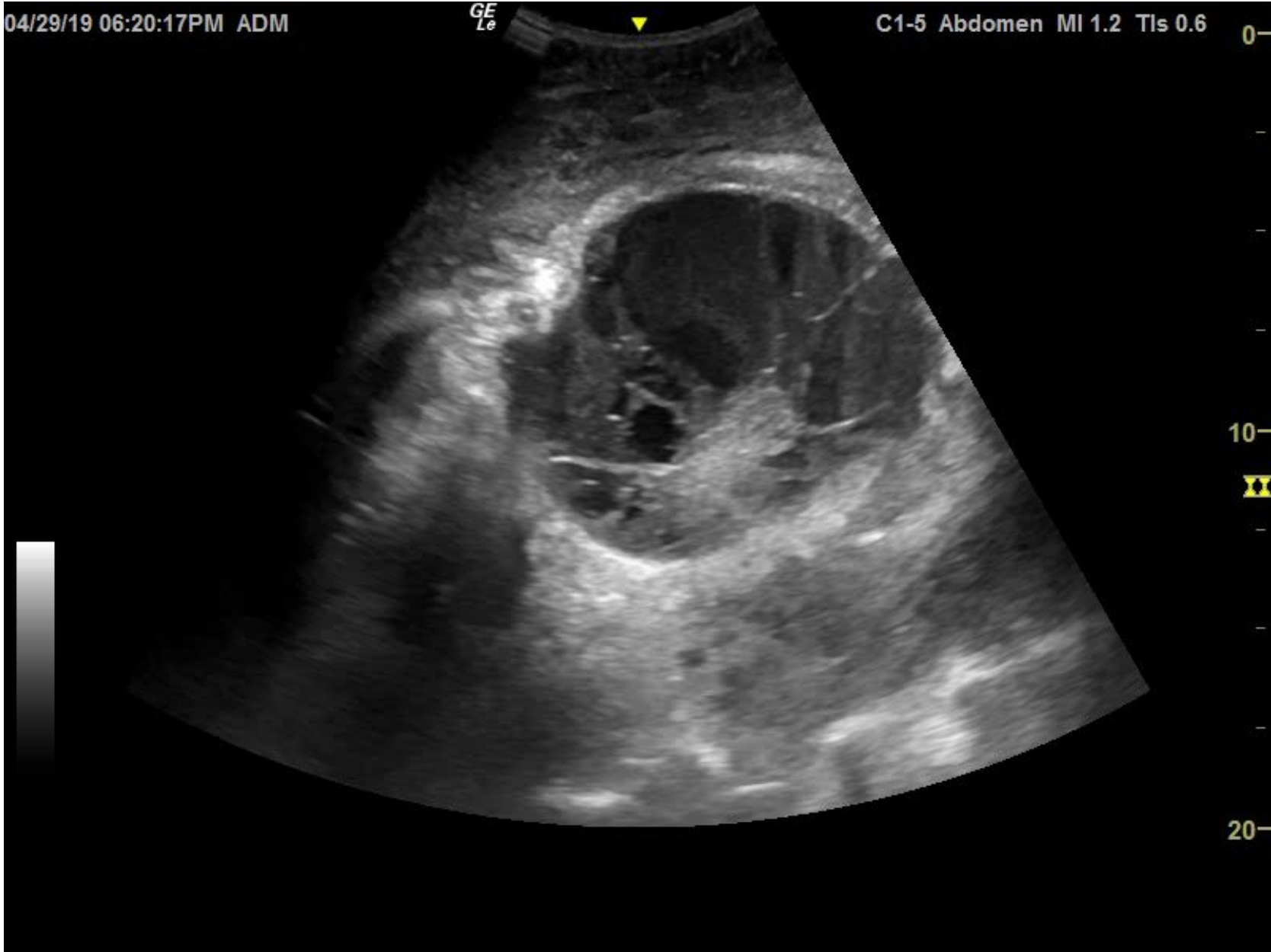
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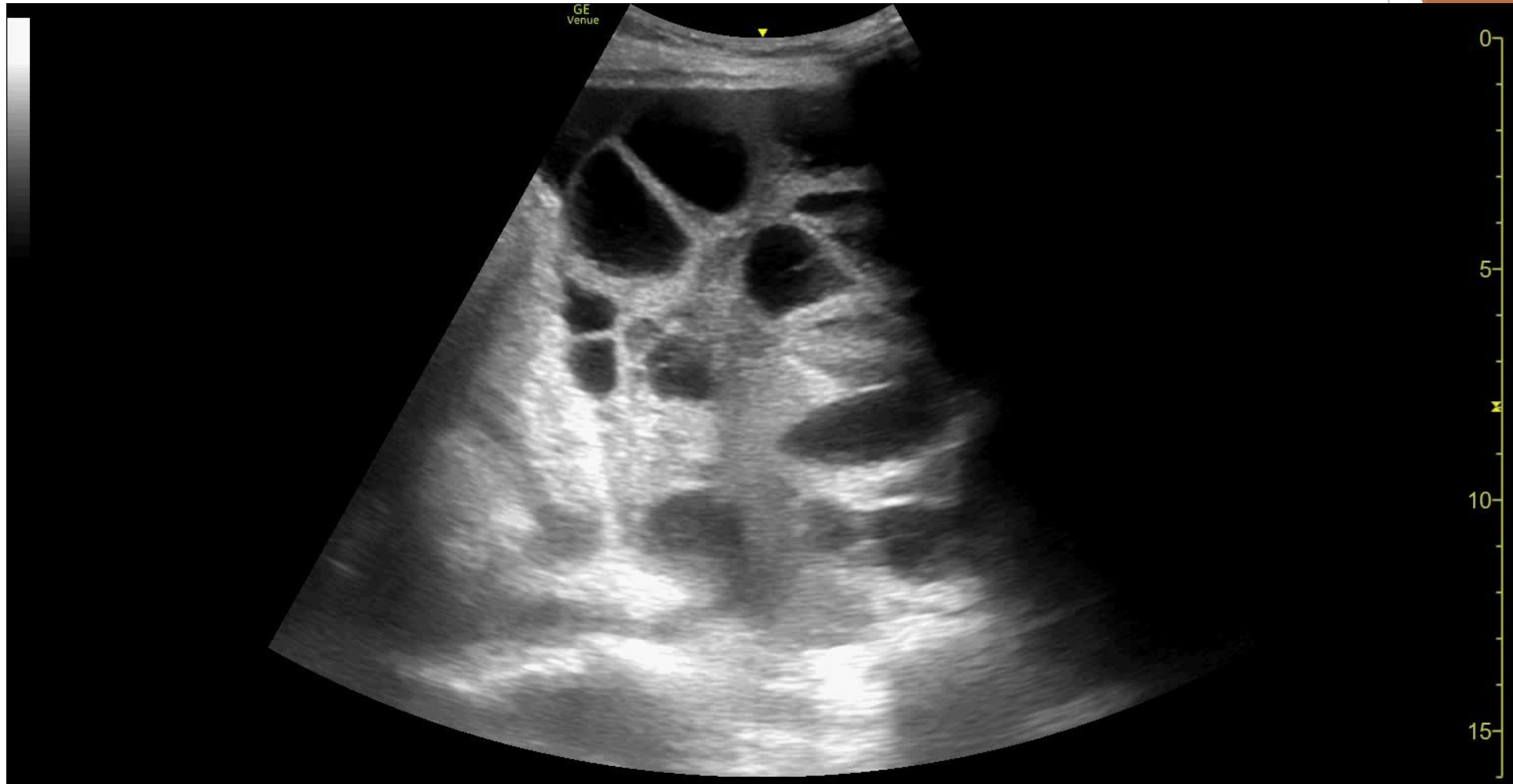
B



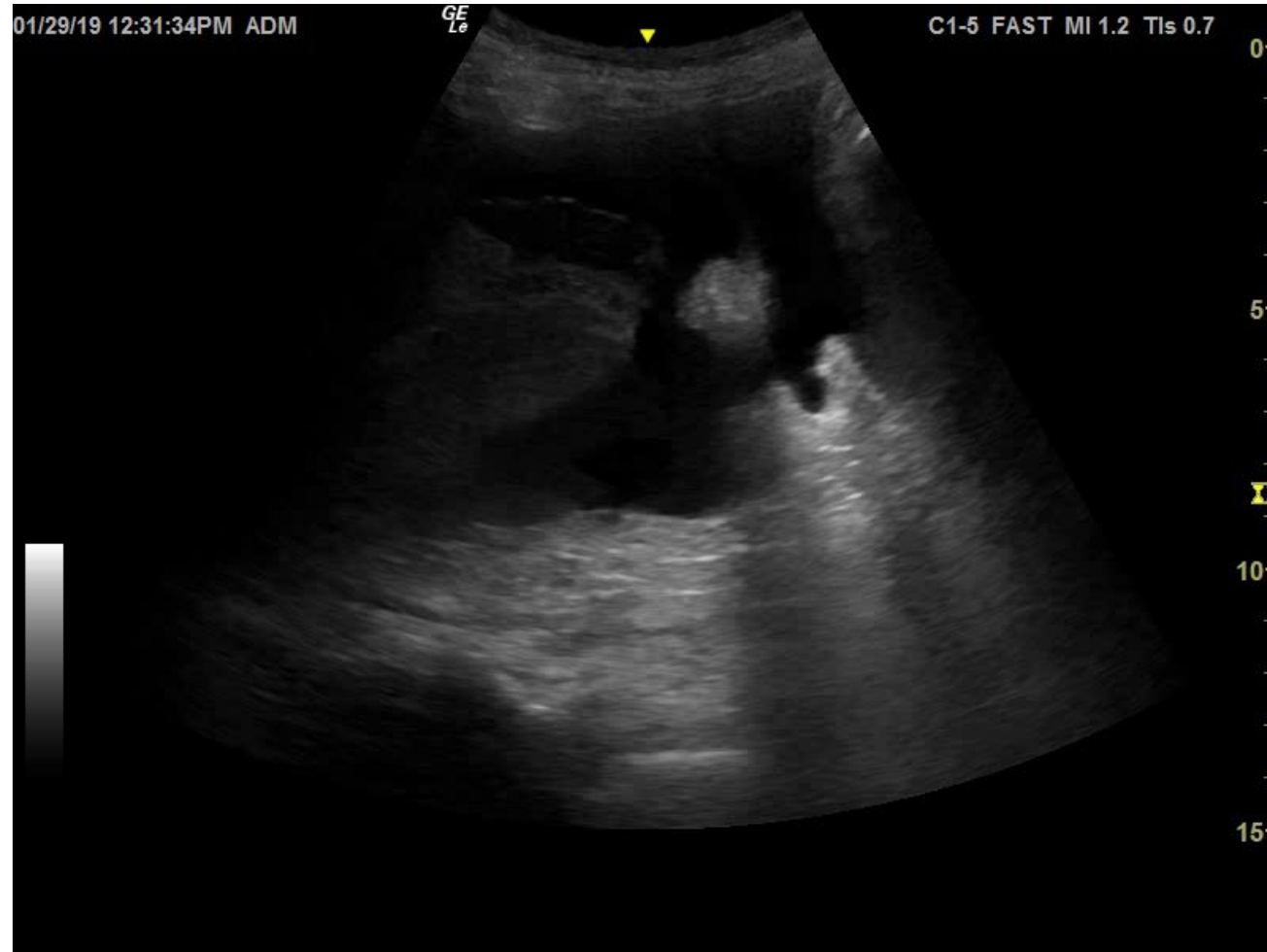
Septated ascites



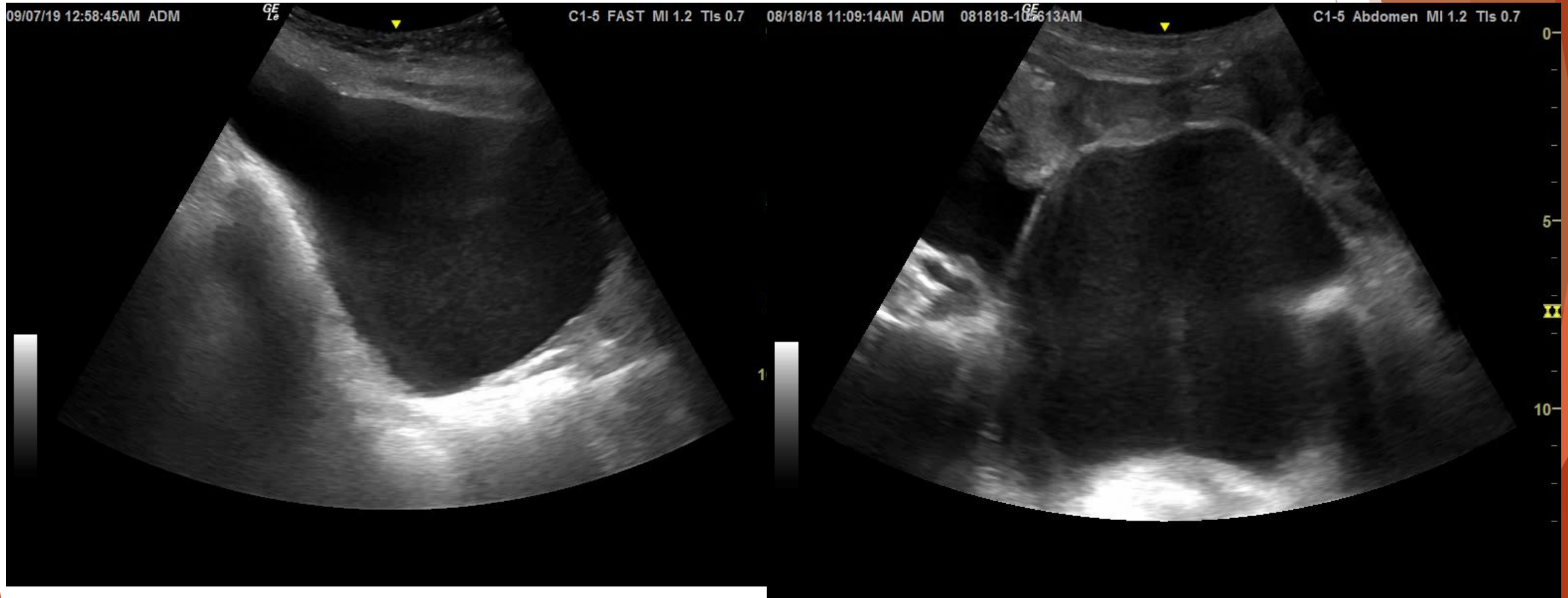
OHSS



Large gallbladder



Urinary retention

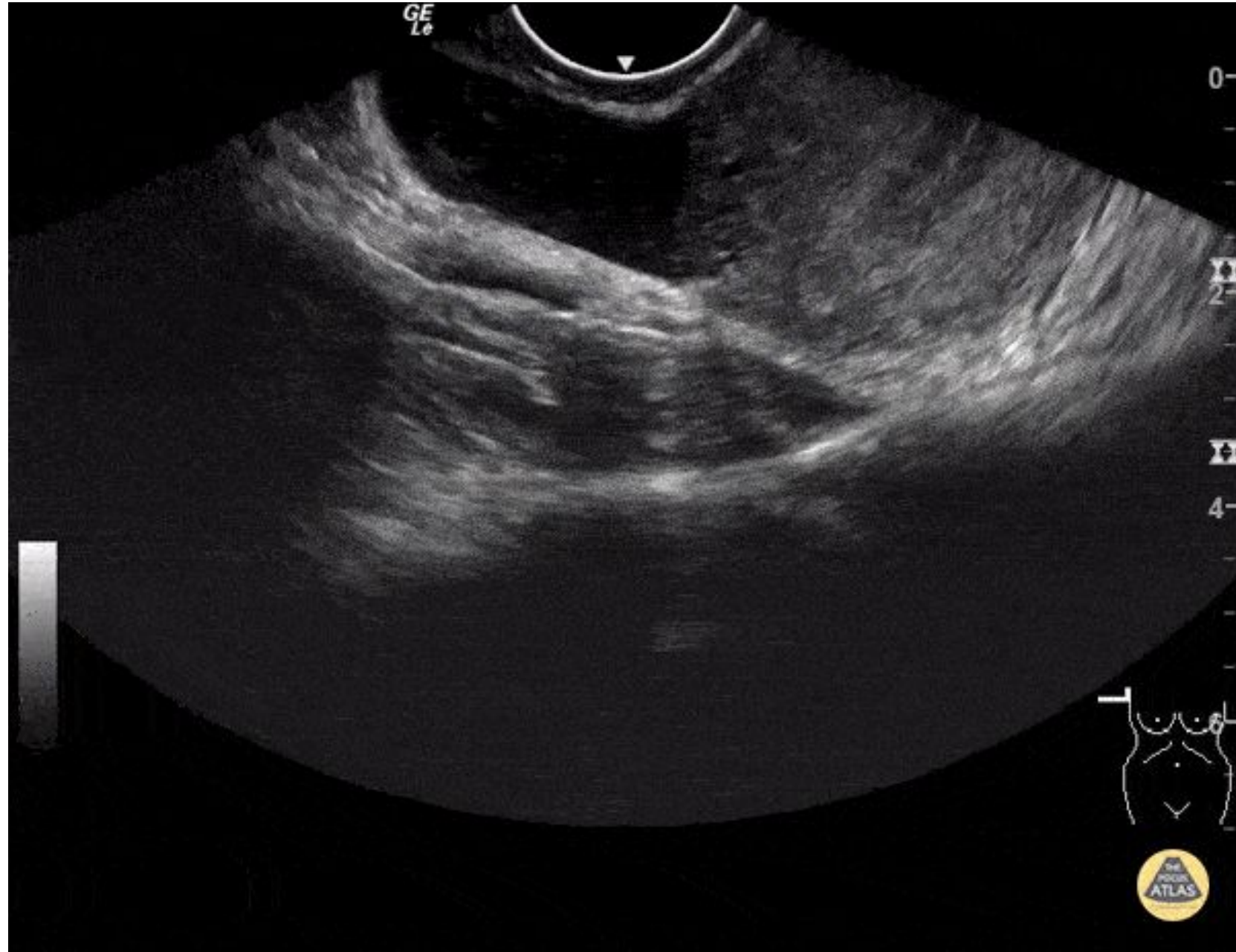


Pancreatic Pseudocyst





Ovarian Cyst



Ovarian Teratoma



PDK



Mesenteric cyst



Take home points

- ▶ **The physical signs of ascites are neither sensitive nor specific. All patients should undergo an abdominal U/S.**
- ▶ **Sonographic features of pseudoascites:**
 - ▶ **Absence of fluid in Morison's pouch and left upper quadrant.**
 - ▶ **Absence of floating bowel loops within the abdomen.**
 - ▶ **Absence of free fluid in the perihepatic region.**
- ▶ **Complications of draining pseudoascites:**
 - ▶ **Ascitic fluid leak, bleeding, bowel perforation and infections.**
 - ▶ **Death (rare).**

Thank you