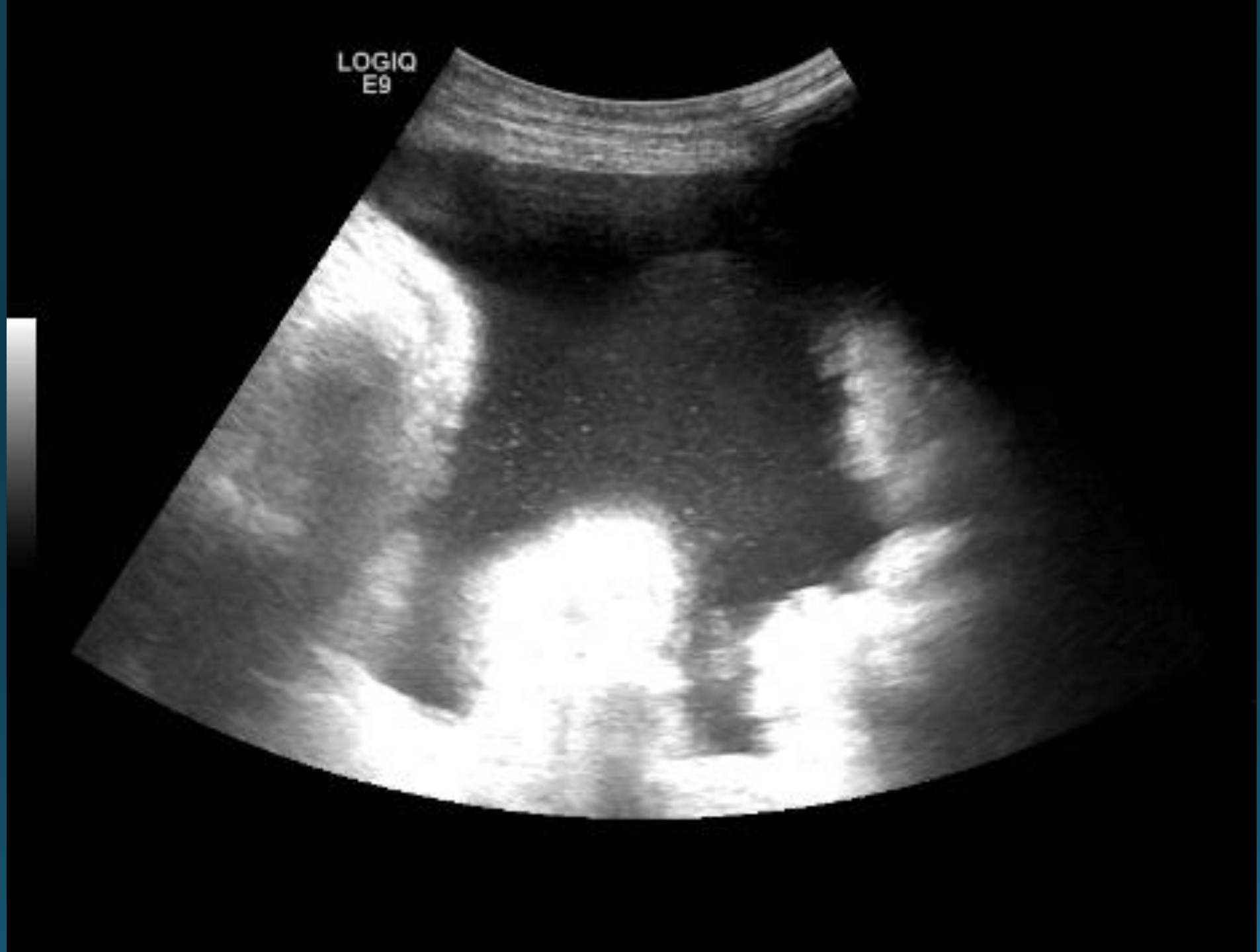
# Case

- 67 yo woman with pancreatic cancer with metastasis to liver, bowel and peritoneum
- h/o malignant ascites w/ outpatient therapeutic paracentesis by IR
- Admitted with N, V, abdominal distension/pain
- s/p 2.5L ascitic fluid removed on admission with plans for Tenckhoff, which was delayed secondary to complications of PE/DVT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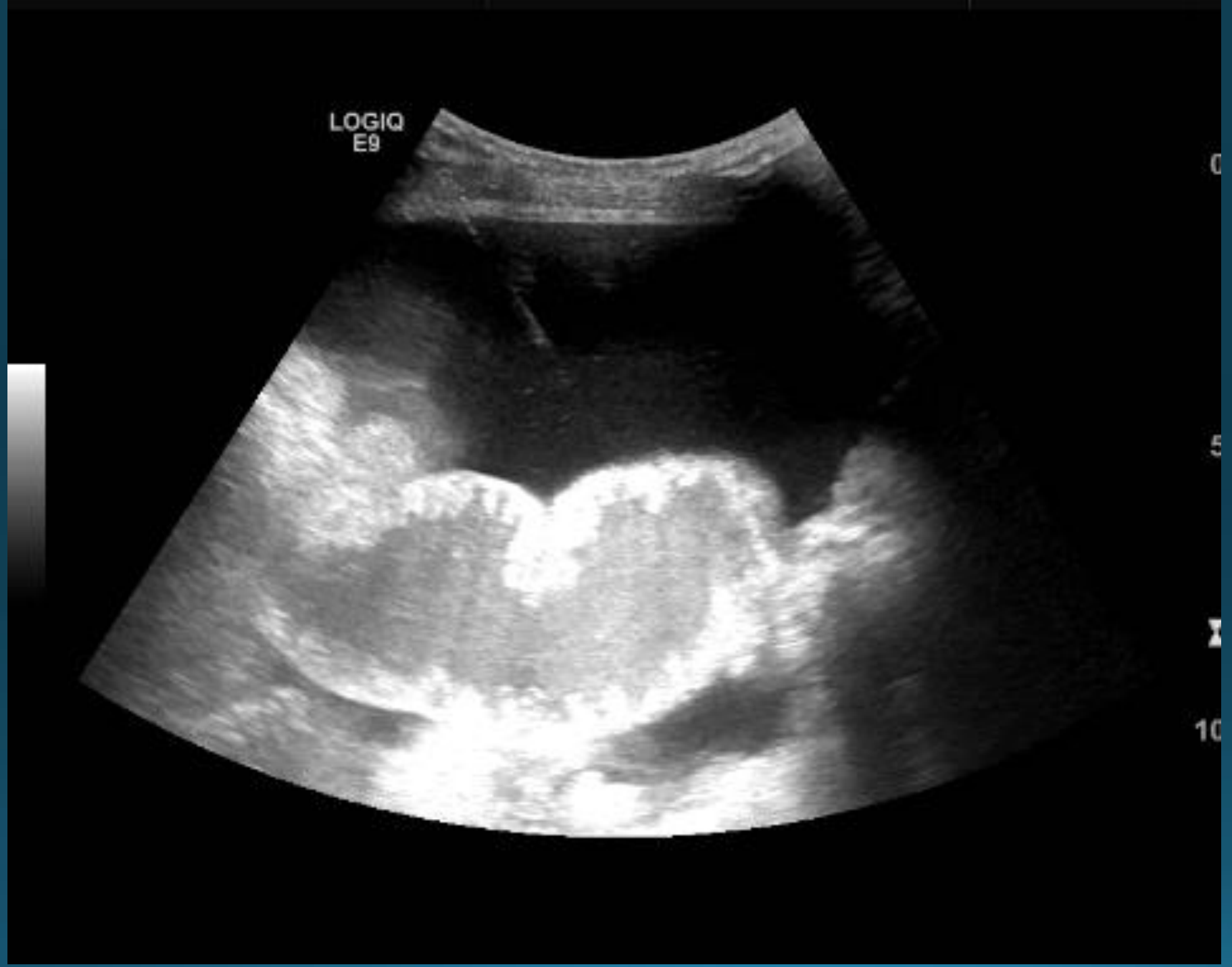
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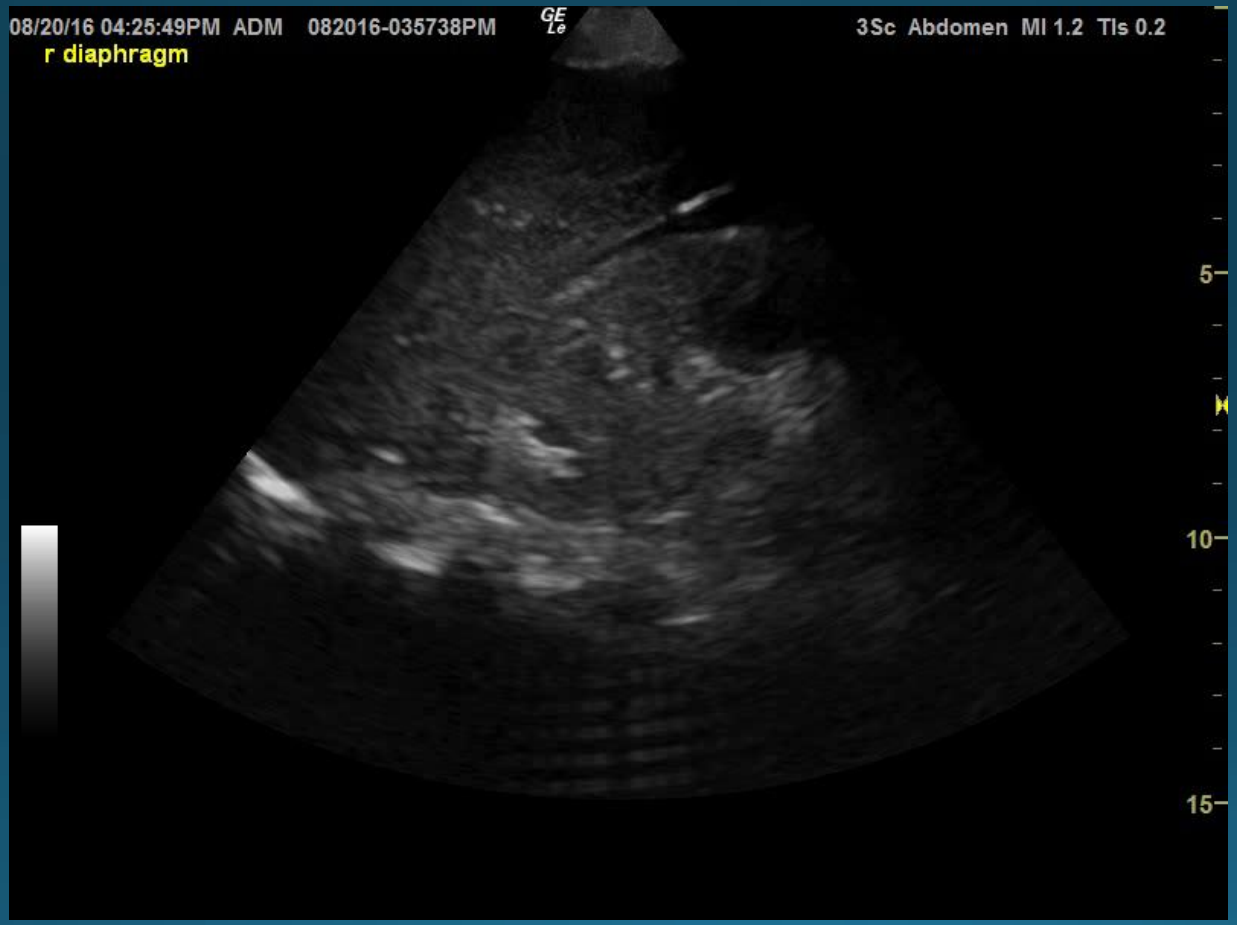
# 1 week after admission:

- Increase abdominal girth and pain, asking for repeat paracentesis
- Continues to have intermittent N/V
- Physical exam:
  - Distended abdomen in thin cachetic woman
  - Tympanic on percussion
  - +Fluid wave noted

  - Bedside US done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r diaphragm
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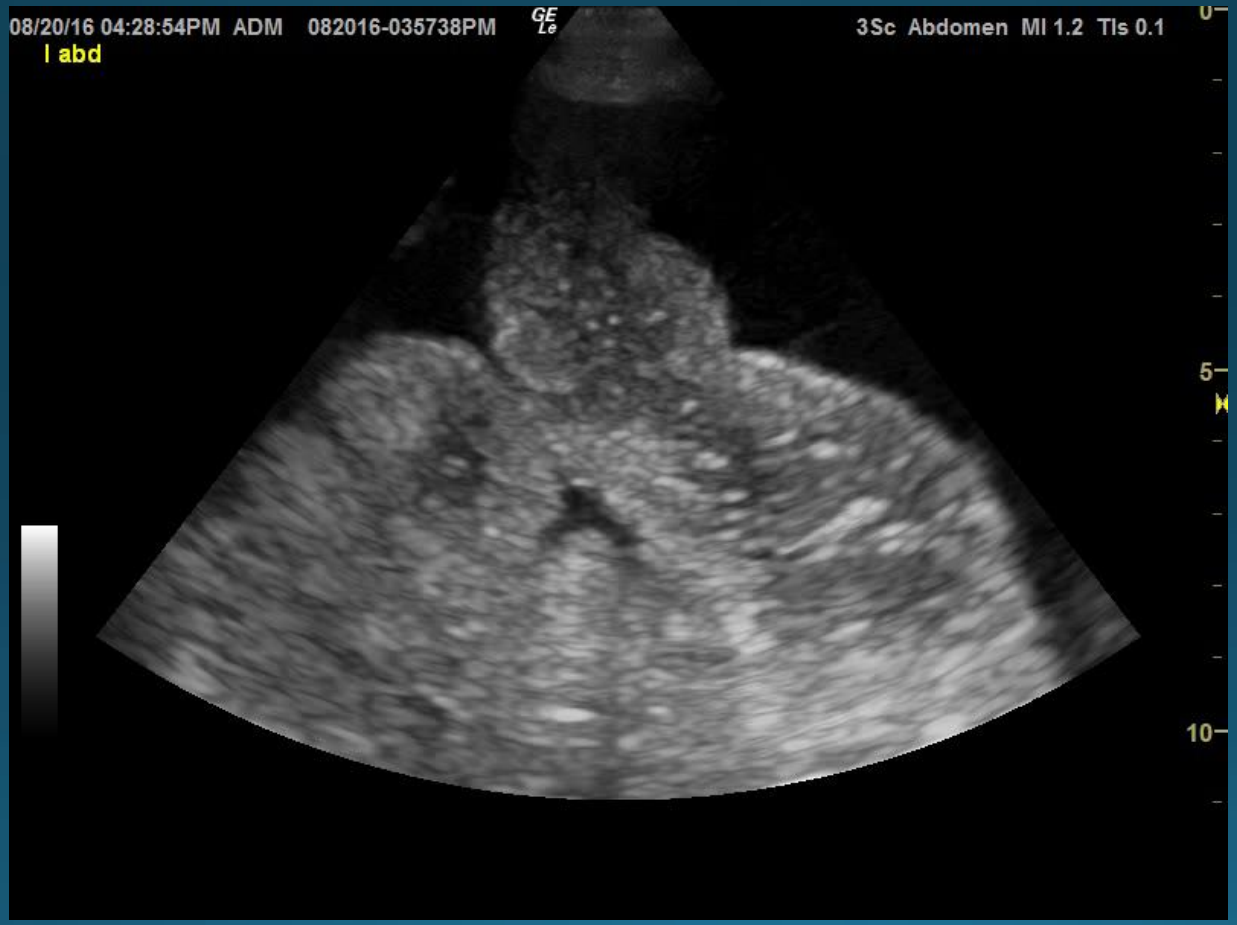
5
10
15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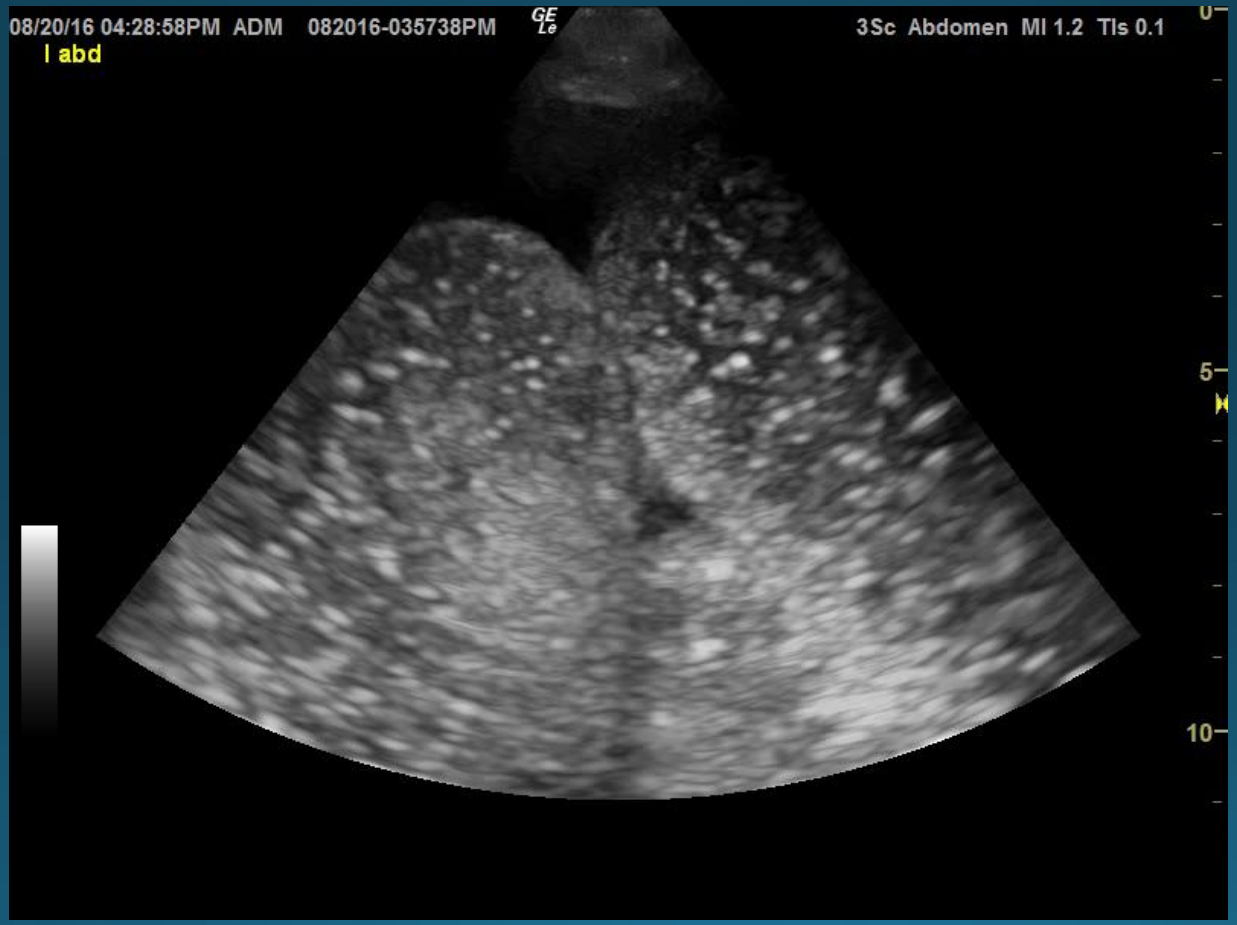
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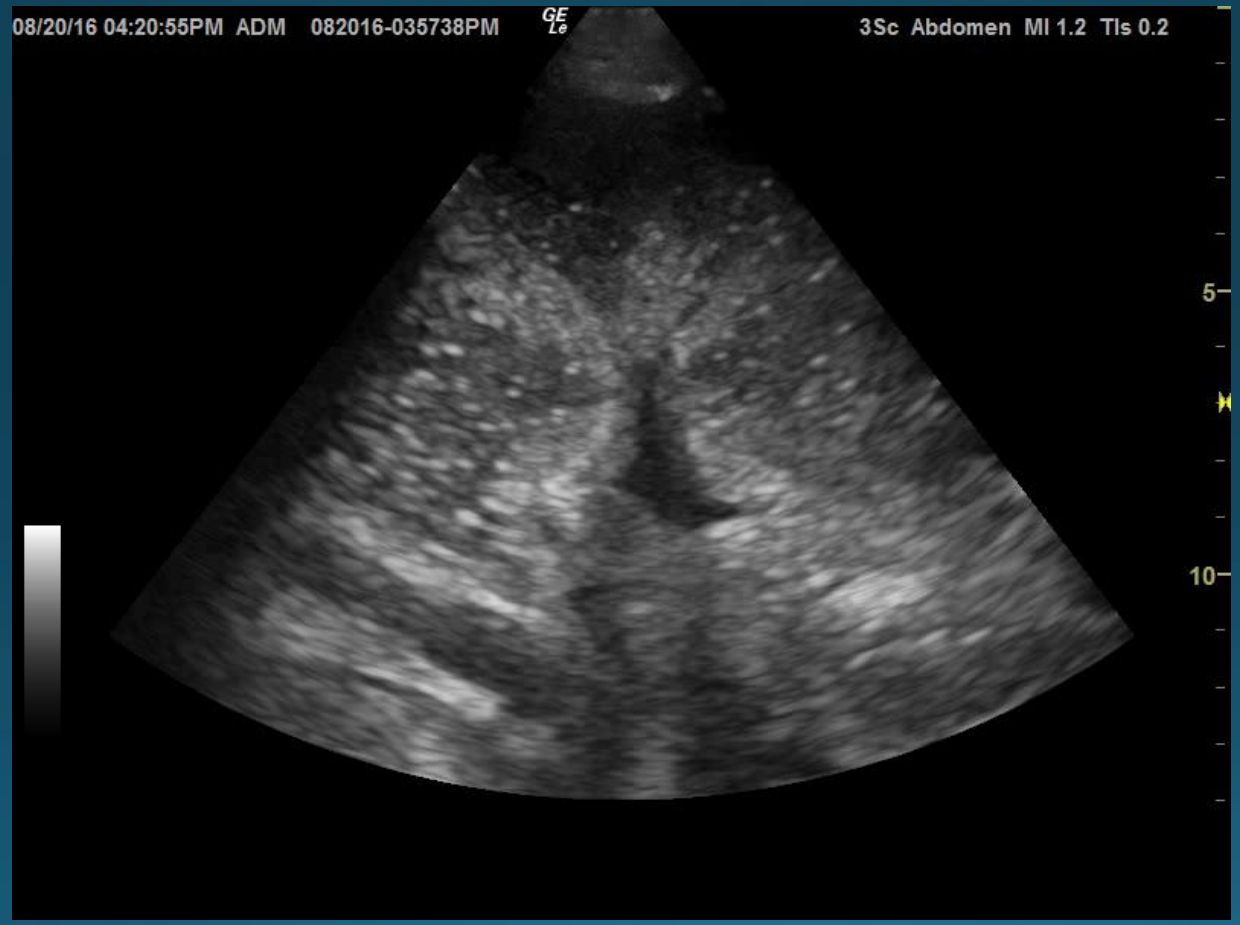
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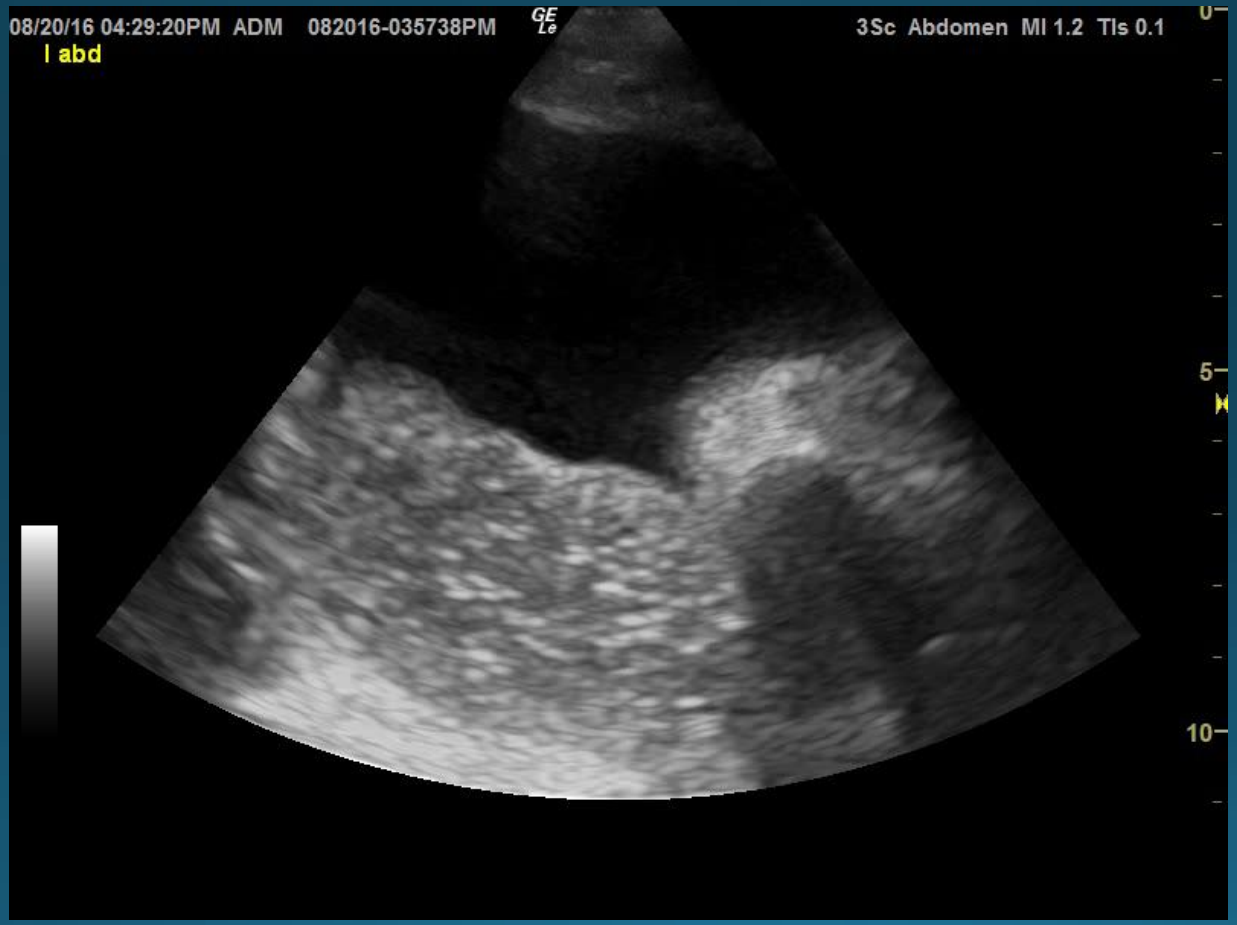
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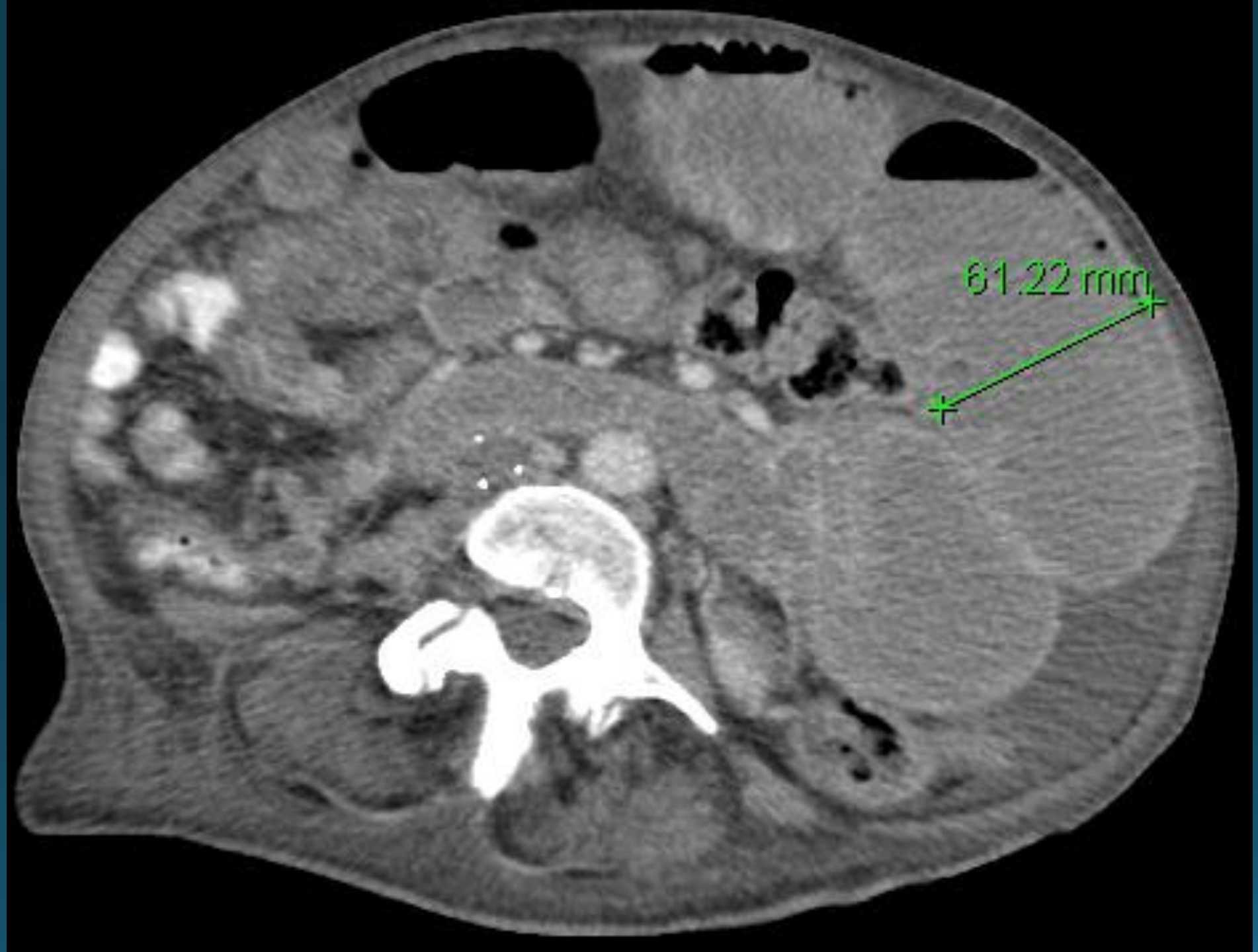

61.22 mm

# Clinical Question:

- What are the findings of SBO on POCUS
- What is the accuracy of POCUS in the diagnosis of SBO

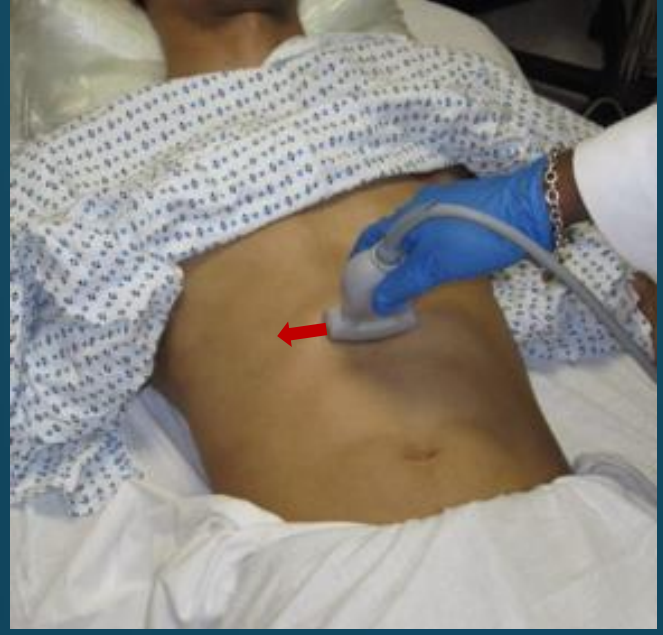
EMJ

# Bedside ultrasonography for the detection o small bowel obstruction in the emergency department

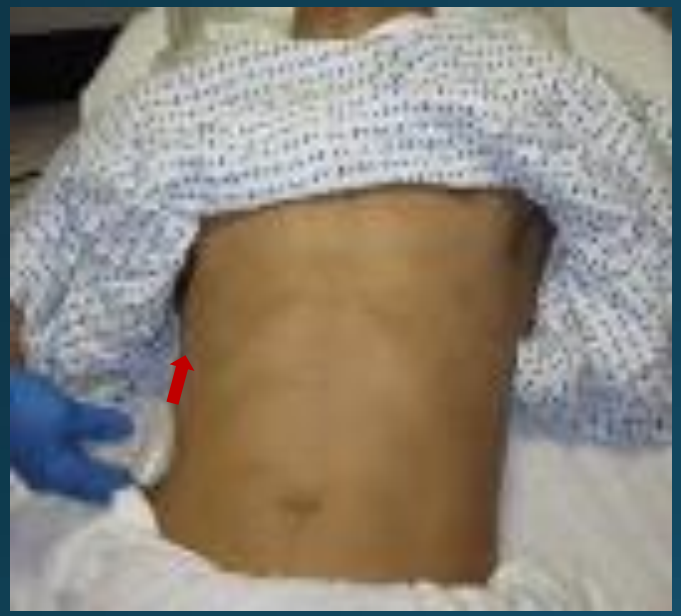
Timothy B Jang, Danielle Schindler and Amy H Kaji

*Emerg Med J* 2011 28: 676-678 originally published online August 22, 2010

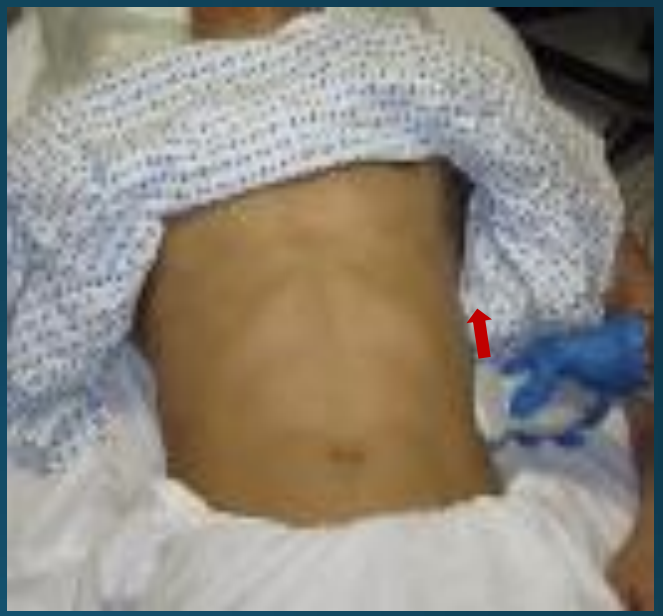
- UCLA  Olive View Medical School, ER & IM residents (10 minutes/5 practice sessions of training)
- ER patients with suspected SBO
- All patients got POCUS, AXR and CT
- Blinded
- CT as gold standard
- Positive POCUS defined as:
    - Fluid-filled, dilated bowel loops of >25mm
    - Lack of peristalsis



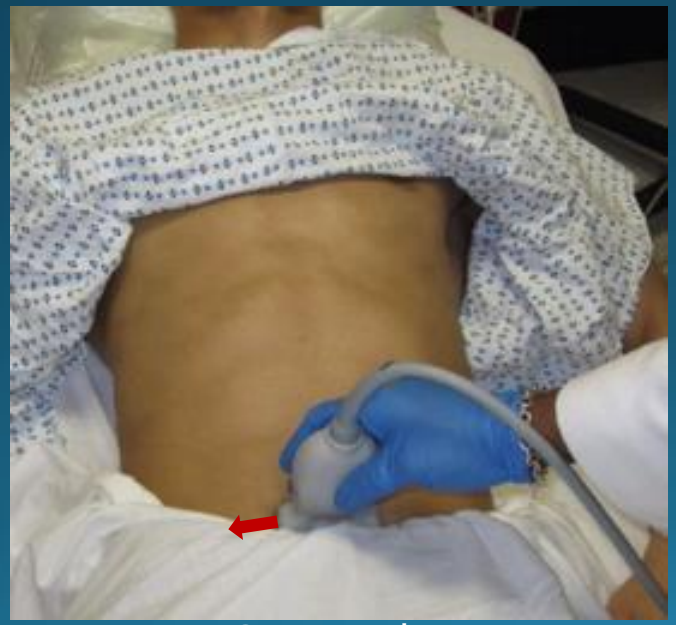
Epigastric



Right pericolic gutter



Left pericolic gutter



Suprapubic

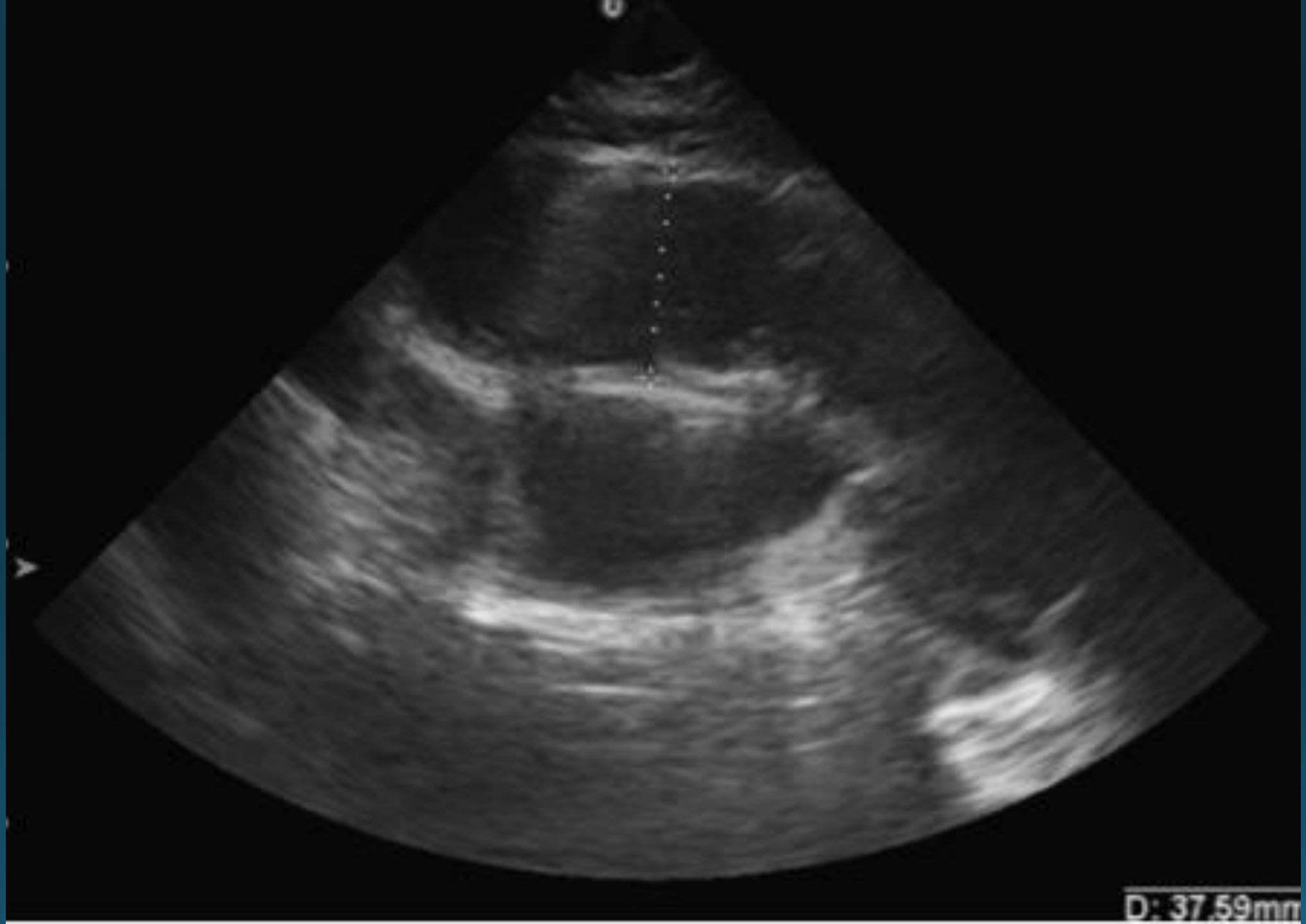

D: 37.59mm

**Table 1** Clinical characteristics of patients

| Characteristics | No. of patients | Percentage of total |
|---|---|---|
| Prior SBO | 9 | 12 |
| Prior abdominal surgery | 74 | 97 |
| Constipation | 16 | 21 |
| Diffuse abdominal pain | 67 | 88 |
| Nausea | 65 | 86 |
| Vomiting | 53 | 70 |
| Absent bowel sounds on exam | 0 | 0 |
| Decreased bowel sounds on exam | 35 | 46 |
| Diffuse tenderness on exam | 56 | 74 |
| Distended abdomen on exam | 53 | 70 |
| Focal point of maximal tenderness on exam | 17 | 22 |
| Guarding on exam | 28 | 37 |
| Rebound tenderness on exam | 0 | 0 |

| POCUS criteria | Sens | Spec | LR(+) | LR(-) |
|---|---|---|---|---|
| Decrease peristalsis | 27% | 98% | 12 (1.6 to 88) | 0.7 (0.6 to 0.9) |
| Dilated bowel | 91% | 84% | 5.6 (2.8 to 11.1) | 0.1 (0.04 to 0.3) |
| ↓peristalsis *or* dilated SB | 94% | 81% | 5 (2.7 to 9.5) | 0.07 (0.02 to 0.29) |
| AXR series | 46% | 67% | 1.4 (0.7 to 2.9) | 0.8 (0.5 to 1.4) |

# Ultrasonography by emergency medicine and radiology residents for the diagnosis of small bowel obstruction

Unleur et al. European Journal of Emergency Medicine 2010, 17:260

- McGill University EM residents with 3 hrs of didactic and 3 hrs of hands on training
- Patient presenting with suspected SBO
- All patients had POCUS, Radiology US and AXR
- Blinded
- Gold Standard: pathology, CT, and 1 month follow up
- Positive POCUS defined as:
    - Dilated small bowel in 3 segments
    - Increased peristalsis
    - Collapsed colonic lumen

**Table 1 Symptoms and signs in 174 patients with suspected mechanical small bowel obstruction**

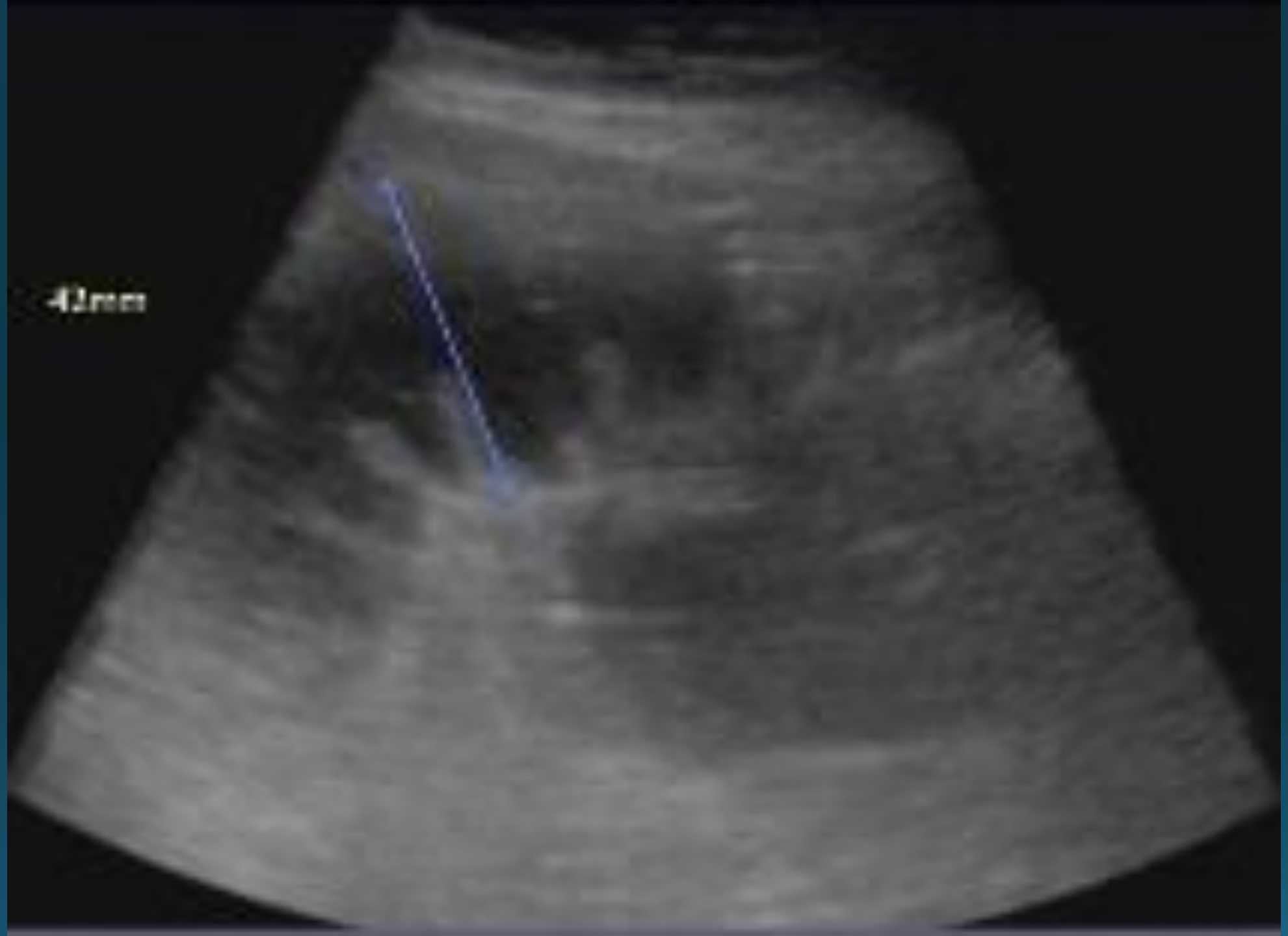
| Variable | % (number) |
|---|---|
| Earlier abdominal surgery | 54 (94) |
| Nausea | 62 (108) |
| Vomiting | 3 (110) |
| Abdominal pain | 73 (127) |
| Constipation | 20 (34) |
| Diarrhea | 20 (35) |
| Abdominal tenderness | 22 (38) |
| Rebound tenderness | 8 (14) |
| Abdominal distention | 48 (84) |

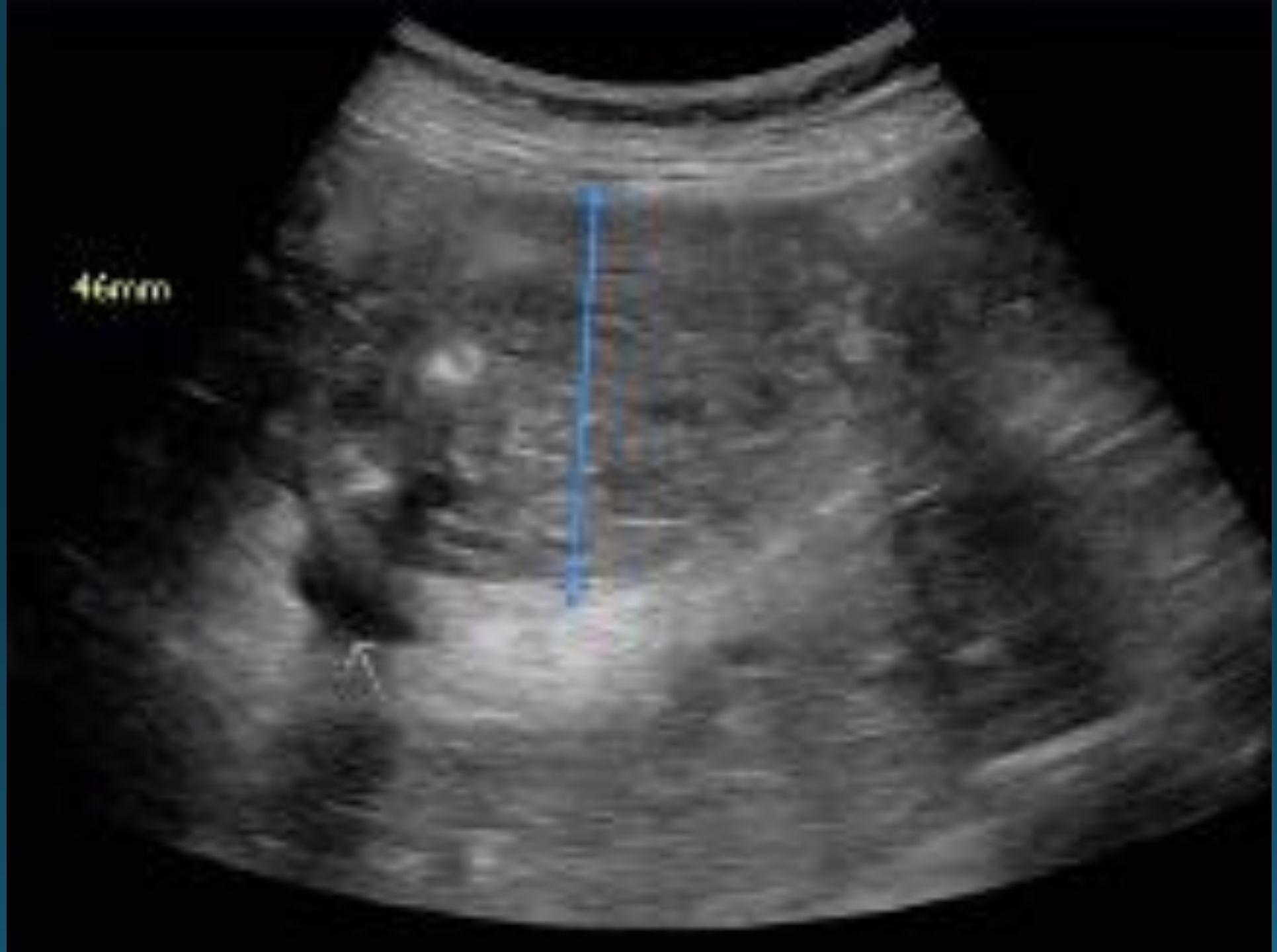
| | Sens | Spec | LR (+) | LR (-) |
|---|---|---|---|---|
| POCUS | 98% | 93% | 13 (6.2 to 28.9) | 0.02 |
| Radiology US | 88% | 100% | INF | 0.12 |
| AXR | 88% | 56% | 2 (1.6 to 2.7) | 0.21 |

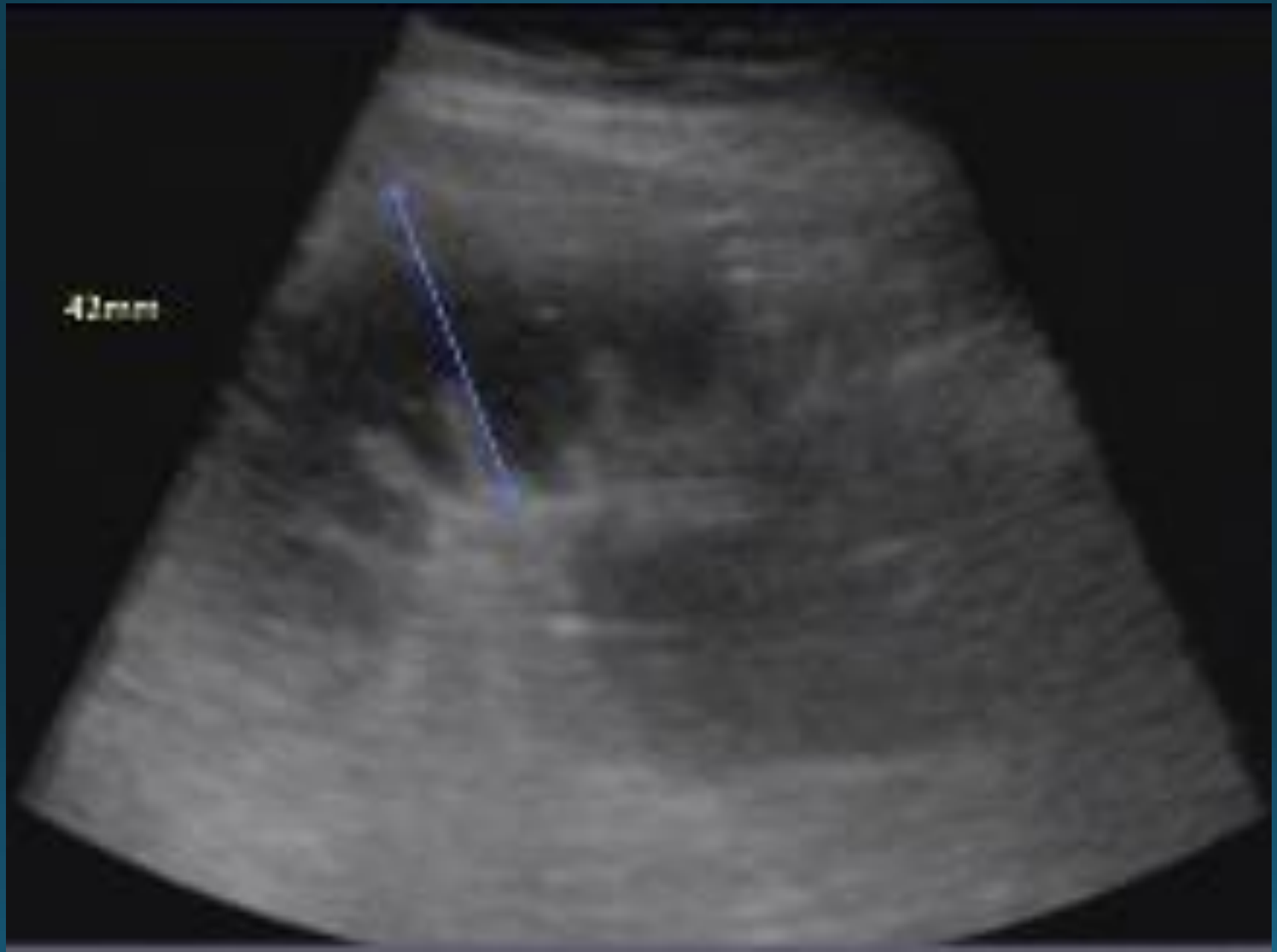
| | Sens | Spec | +LR | -LR |
|---|---|---|---|---|
| Jejunum ∅ >25mm *or* Ileum ∅ >15mm | 94% | 94% | 15 (6.44 - 35.3) | 0.06 |
| Increased Peristalsis | 72% | 36% | 1.1 | 0.7 |
| Collapsed colonic lumen | 85% | 71% | 2.9 (2.1 - 4.2) | 0.2 |

# Signs of small bowel obstruction

- Dilated loops of bowel >25mm
- Increased intraluminal fluid
- Characteristic alternating peristalsis " To and Fro"
- Plicae circulares "keyboard sign"
- Possibly circumscribed free fluid "Tanga sign"
- Late SBO:  hyperechoic content within dilated bowel




46mm


42mm

# SBO vs ILEUS

- Suspect Ileus if:
  - Recently post op patient with hypoactive/absent bowel sounds
  - Dilated bowel <25mm
  - Bowel filled with gas rather than fluid
  - Both small and large bowel are dilated
  - Lack of peristalsis

# Limitations of POCUS in SBO

- Skills
- Obesity
- Bowel gas
- Operator dependent
- AXR for free air

# Future Directions

- Ongoing study at UC Irvine looking at the accuracy of POCUS in diagnosing SBO (compared to CT, operative report and discharge diagnosis)
- Looking at the LRs for >25mm, “to and fro” peristalsis, small bowel wall edema, intra-abdominal free fluid, sonographic transition point