

## Case

60 year old male with a past medical history of non-Hodgkin's lymphoma, presented to the ED with severe abdominal pain that started the night prior and had been progressively worsening. There was associated nausea and two nonbloody, nonbilious episodes of emesis. The patient reported his last bowel movement was normal the day prior, but has not been able to pass flatus since. He denied any surgical history.

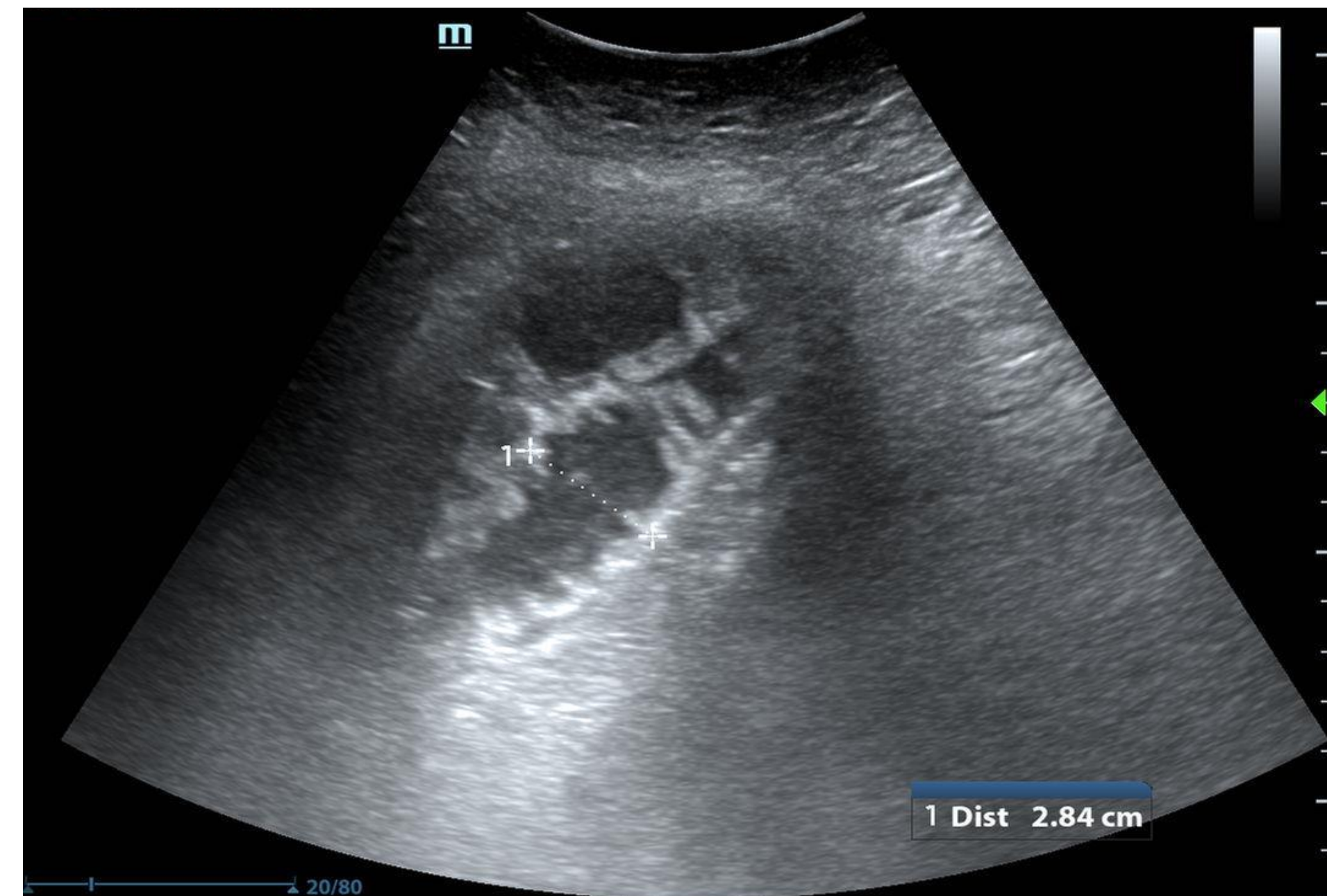
## Physical Exam

Vitals: Temp: 96.1, BP: 108/58, Pulse: 55, RR: 10, SpO2: 100% on RA  
 General: distress secondary to pain  
 HEENT: NCAT, PERRL  
 Chest: No chest wall tenderness  
 Respiratory: CTA, symmetric chest expansion, good effort, no w/r/r  
 CV: RRR, no m/r/g  
 Abdomen: Mildly distended with generalized diffuse tenderness with guarding, rebound and peritoneal signs  
 Skin: Pale, and diaphoretic  
 Neuro: AAOx3, moving all extremities purposefully

## Labs

H/H: 15.3/46.3  
 Lactic acid: 3.3  
 POCUS: dilated loops of small bowel, visible plicae circulares

## Questions



1. What are the criteria for diagnosing this etiology on point of care ultrasound?
2. What is the definitive management of this pathology?

## Answers

1. This patient presented with a closed loop small bowel obstruction (SBO), as depicted in the ultrasound image. Point of care ultrasound showing fluid-filled small bowel lumen measuring >2.5 cm is diagnostic for small bowel obstruction. Medical literature lists varied criteria, but this diameter with fluid seen on the outside of the dilated bowel loops confers a diagnosis of SBO. Bidirectional peristalsis can also be seen and is often coined the "poop waterfall" sign.
2. The initial management of small bowel obstruction is placement of a nasogastric tube on suction to decompress upstream pressure on the point of obstruction. If this conservative therapy fails or there is concern for bowel necrosis, definitive management is surgical intervention.

## Discussion

On patient arrival, bedside POCUS of the abdomen revealed dilated loops of small bowel measuring >2.5 cm, with visible plicae circulares, also known as the keyboard sign. The ultrasound probe was placed in several positions on the abdomen, revealing similar findings. General surgery was called and updated on the findings, in order to prepare an OR for definitive operative management. The patient underwent subsequent CT imaging of the abdomen and pelvis that revealed a high-grade small bowel obstruction with marked bowel wall thickening, mesenteric edema and engorgement of the mesenteric vasculature; findings concerning for a closed loop obstruction.

Given concern for early or impending necrosis, the patient was expeditiously taken to the OR where he had 150 cm of hemorrhagic/hyperemic jejunum, and a small vein mesenteric venous thrombosis. On abdominal re-exploration one day later, the patient's intestines were noted to be viable, improving, with active peristalsis.

Given the presentation and exam of acute abdomen, there was high concern on initial presentation for a small bowel obstruction, a perforated viscus, or other acute intra-abdominal surgical emergencies. Small bowel obstructions are very common in the emergency room, and most of the time, these obstructions are managed outside of the operating room. Approximately 25% of these cases are managed operatively. Indications for operative intervention are increasing pain, distention, persistent high NG output, bowel necrosis, closed loop obstruction, and peritonitis. POCUS of the abdomen is a diagnostic tool that can and should be utilized for expedited diagnostic accuracy. The sensitivity and specificity of POCUS to detect SBO are 97.7% and 92.7% respectively.

A delay in the diagnosis and management of SBO can be associated with a higher risk of bowel resection. The need for rapid imaging and treatment becomes clear when considering the complications associated with delays in definitive treatment. CT imaging is the gold standard for making the diagnosis and can add additional benefits like evaluating for necrosis, lead points, or masses that are usually the catalysts to the SBO. However, POCUS can assist in rapid diagnosis and prompt the emergency physician to have an early conversation with surgical colleagues. Ultrasound should be used by emergency physicians to accurately diagnose SBO. It is reliable, quick, and safe.

## Pearls

1. NG tube placement is the first line of treatment for small bowel obstructions. A quarter of SBOs will need surgical intervention.
2. Small bowel measuring over 2.5 cm on POCUS is diagnostic for a small bowel obstruction.
3. Know your POCUS signs:
  1. Keyboard sign: visualization of the plicae circulares
  2. Poop waterfall: bidirectional peristalsis of stool