Objectives

• Role of MDCT in evaluation of bowel obstruction
• CT technique
• Complications:
  ✓ Closed loop obstruction
  ✓ Strangulation / ischemia
• Specific causes of SBO
Introduction

• 20 % of patients admitted with signs and symptoms of acute abdomen
• Causes: - Adhesions 60 %  
  - Hernias  
  - Crohn’s disease  
  - Neoplasms 15 %  
  - Others: Intussusception Gallston ileus

Classification

• Simple: “partial” vs. “high grade” or “complete”  
• Closed loop obstruction: two sites of obstruction affecting same loop  
• Strangulation: ischemia leading to wall necrosis, difficult to ≠ reliably from simple obstruction (clinically and with labs)
Triaging in the ER: when is CT indicated?

- Clinical evaluation usually followed by KUB
- Clinical findings may warrant need for CT:
  - conservative therapy planned
  - confirm findings that may mandate operation, even if not best candidate
  - equivocal cases
  - determine specific cause in some cases

Triaging in the ER: factors that favor early operative management

- Unequivocal clinical signs of vascular compromise, strangulation
- No prior history of abdominal surgery
- Incarcerated hernia
- Complete obstruction ("obstipation")

Maglinte, et al. Abdominal Imaging 2005
When to obtain CT?

- Detection of high grade obstruction: Sensitivity 90-96% / Specificity 91-96%
- Performance decreases substantially in low grade obstruction
- Suspected low grade obstruction, consider:
  - CT enterography
  - Enteroclysis (fluoroscopy or CT)

Clinical utility of CT

- Confirm or exclude diagnosis
- Determine: site, cause and severity of obstruction (high grade vs. low grade)
- Signs of complications: bowel ischemia, necrosis, strangulation
- Closed loop obstruction: CT diagnosis

Scaglione M et al. Euro Rad 2003; 50: 15-22
CT Protocol

- IV contrast: 100 mL @ 3-4 mL/sec, 30-40 mL saline chaser
- Delay: ~ 45 / 70 sec
- No oral contrast
- MDCT (16, 64+): 1.25 mm, reconstruct at 3.75 mm
- Routine orthogonal (coronal, sagittal) reconstructions, all sent to PACS and archived

CT Protocol

- Oral contrast not necessary:
  ✓ Oral contrast frequently has not reached site of obstruction at time of image acquisition
  ✓ Limits evaluation of bowel wall thickening and enhancement
  ✓ May delay examination unnecessarily
CT Signs of Bowel Obstruction

• Transition “zone” or “point”
• “Small bowel feces” sign
• “Collar of pearls” sign

Coronal reformations in the evaluation of SBO

• Coronal reformations: enhance level of certainty to confirm or exclude diagnosis
• Study interpretation using exclusively coronal images: high diagnostic precision

“Small bowel feces” sign

- ↓ sensitivity/specificity than transition point
- may help localize site
- > frequency in moderate to severe obstruction
- may coexist with ischemia?

2. Lazarus DE, et al. AJR 2004
4. Sheedy, SP. Radiology 2006

“Collar of pearls” sign

- line of air-fluid levels (bubbles) with a horizontal orientation
- gas trapped between valvulae conniventes
- highly specific in right clinical setting

Nevitt P. Radiology 2000
CT signs of closed loop obstruction

1) Dilated loops with a “C” or “U” configuration
2) Radial obstruction of dilated loops converging at point of obstruction
3) “Beak” sign
4) “Swirl” sign

“Swirl” Sign

- Low attenuation bands surrounded by edematous mesentery
- Highly suggestive of intestinal volvulus
- Should increase suspicion for closed loop obstruction

2. Gollub. JCAT 2006
CT Signs Suggestive of Ischemia

1. Bowel wall thickening with submucosal edema: “target sign”
2. Mesenteric congestion/edema (venous outflow obstruction)
3. Ascitis
4. Abnormal enhancement of bowel wall (decreased or increased)

CT detection rate of strangulation:
Sens: 15-83% / Spec 92-94% / NPV 93-95%

Identifying Cause of Obstruction with CT

Neoplasiam causing SBO: Carcinoid tumor

Cortesia Jorge Soto Boston Medical Center
Summary

1. CT is important tool in diagnosis and management of patients with acute bowel obstruction

2. Specific cause often identified (but not always)

3. CT helps detect complications of acute bowel obstruction such as closed loop obstruction, volvulus and ischemia

UNKNOWN CASE