Advances in the Diagnosis of Bowel Obstruction

Famous Surgical Dictum

• “Never let the sun rise and set on a complete small bowel obstruction”.

BOWEL OBSTRUCTION

• Presence
• Location
• Cause
• Classification
• Strangulation
• Complications

SMALL BOWEL OBSTRUCTION: PLAIN FILMS

• Sensitivity: 69%
• Specificity: 57%

Small Bowel Obstruction: Ovarian Carcinomatosis
Contrast Materials

Barium versus Water Soluble

Water Soluble Agents

- For GI Studies – 37% solution
- For CT – 2-3% solution

Gastrograffin: One Hour Later

“Small Bowel Obstruction: CT”
- Sensitivity-80-90%
- Specificity-70-90%
- Strangulation can be predicted in 80-90%

“The times they are A-changing”
Bob Dylan
THE CHALLENGE

Axial images of bowel obstruction are difficult to interpret because dilated and collapsed loops of bowel are constantly moving in and out of the visualized section.

PROTOCOL

• Abdomen and pelvis
• IV contrast
• No oral contrast
• Coronal and sagittal reformats

80 y.o F. With Abdominal Pain

How to Evaluate Bowel Obstruction on CT:
Helpful Signs

• The Closed Loop
• The Swirling Mesentery
• The Small Bowel Feces Sign
• The Triangle Sign
• Mural Enhancement
• Tumor Identification

• 75% Of Patients With Obstruction Secondary To a Femoral Hernia Present With Gangrenous Bowel

• The Closed Loop

30 y.o M. Post Sigmoid Resection for Rectal Prolapse

Closed Loop: Radiating Fold Pattern

• The Swirling Mesentery “Whirl Sign”

40 y.o M. with Abdominal Distention

40 y.o M. with Abdominal Distention: Contrast Enema
“Whirl Sign”

- Whirl sign is more conspicuous when images are viewed rapidly in cine mode on the PACS workstation.
- Not specific
- Most patients with small bowel volvulus had a whirl “sign”, but most whirl signs were not due to volvulus

The Small Bowel Feces Sign

- Feculent matter mingled with gas bubbles in the lumen of dilated small intestines
- Caused by incompletely digested food, bacterial overgrowth, or increased water absorption of the distal small-bowel contents due to obstruction

87 y.o with History of Prostate Cancer

The Small Bowel Feces Sign

Pathophysiology of Obstruction

- Within Several Hours- 10,000 Fold Increase of E.Coli In Ileum
- 60% of Mesenteric Lymph Nodes will Harbor E.Coli [Normal-4%]
- Hypersecretion Secondary To Bacterial Endotoxin

Is The Small Bowel Feces Sign Good for The Early Diagnosis Of Small Bowel Obstruction?
One Year Post Sigmoid Resection For Diverticulitis: 2 days later

Adhesions
- 60-80% of bowel obstructions
- Kinking, fixation, angulation, wall asymmetry, obliteration of fat planes
- Parietal Pain syndromes
  Usually from anterior wall
- Visceral (interloop) Bowel obstruction
- Important differentiation for surgeons in the placement of trocars

- Ischemia
  or
  No Ischemia?

The “Disappearing Wall” Sign
• Are reformatted images always superior for evaluating bowel obstruction?

• Cecal Volvulus versus
  • Cecal Bascule

74 y.o. man with Femur Fracture

Coffee Bean Sign

Cecal Volvulus
Conclusions:

- Coronal And Sagittal Reformations Significantly Ease The Evaluation Of Small Bowel Obstruction And The Presence Of Strangulation
- Mesenteric Swirl, Small Bowel Feces, Closed Loop, Triangle Signs Improve Diagnostic Certainty
- A Correct Diagnosis Depends On A Systematic And Careful Evaluation Of All Three Projections

“Never let the sun rise and set on a complete small bowel obstruction”.

- Thanks to the information that YOU provide us, this famous law is no longer true!

Stanford Resident assuming correct Zen position for evaluating Bowel Obstruction
• The Postoperative Patient

29 y.o F.: Gastric Bypass Two Years Ago

• Tumor Detection

Pseudopneumatosis

CURRENT RECOMMENDATION

• When we suspect bowel obstruction based either on the clinical presentation or on the scout film, we obtain 1.25 mm reconstructions followed routinely by coronal and sagittal reformats.