GI Update:
Small Bowel Obstruction,
Acute Pancreatitis,
Upper GI Bleeding,
Acute Diverticulitis

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University of California, San Francisco

Disclosures: Nothing to disclose
Question 1

- 55 year old woman admitted with 1 day after onset of crampy abd pain, lack of flatus and distention. Vitals are normal and her abd is non tender, but tightly distended. Plain films are consistent with small bowel obstruction. This is the 3rd time this year she has been admitted with the same problem. She has a remote history of a abdominal hysterectomy.
- In addition to IV hydration and NG tube suction, what should you do?
  1. Nothing else, wait at least 72 hours before intervening as long as she does not develop signs and symptoms of bowel ischemia.
  2. Obtain a CT scan with IV and oral contrast to assess bowel viability and determine if contrast will pass to the cecum.
  3. Recommend an operation now. Might as well since this is her 3rd episode in the last year.
  4. Manage conservatively now, but once patient recovers, refer or elective laparoscopic lysis of adhesions.
CT abdomen and pelvis

bowel wall edema, collapsed colon
small bowel feces sign present

What is the cause of the patient’s intestinal obstruction?

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Incidence, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesions</td>
<td>60</td>
</tr>
<tr>
<td>20% within 1 month of surgery</td>
<td></td>
</tr>
<tr>
<td>30% within 1 year of surgery</td>
<td></td>
</tr>
<tr>
<td>25% years 1-5</td>
<td></td>
</tr>
<tr>
<td>25% after 5 years</td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td>20</td>
</tr>
<tr>
<td>Hernia</td>
<td>10</td>
</tr>
<tr>
<td>Inflammatory Bowel Disease</td>
<td>5</td>
</tr>
<tr>
<td>Volvulus</td>
<td>3</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>2</td>
</tr>
</tbody>
</table>
Is the obstruction strangulating or non-strangulating?

The “classic signs” of strangulating obstruction are:
* continuous (rather than colicky) pain
* fever
* tachycardia
* peritoneal signs
* leukocytosis

…but alone, or in combination, sensitivity / specificity low


“The results of this study indicate that the clinical differentiation between simple and strangulating obstruction is often impossible.”
Clinical Study

- Retrospectively reviewed 192 cases operated on for a small bowel obstruction (1996-2006) at UCSF Medical Center.
- A predictor model was created based upon operative findings: strangulated (n=44) or non-strangulated (n=148).
- Independent Predictors of strangulation: WBC > 12K, Rebound/Guarding at PE, Reduced Enhancement of SB at CT.

Is the obstruction strangulating or non-strangulating?

Predicting Strangulated Small Bowel Obstruction: An Old Problem Revisited

Tim Jancelewicz · Lan T. Vu · Alexandra E. Shawo · Benjamin Yeh · Warren J. Gasper · Hobart W. Harris

Table 3  Sensitivity, Specificity, and Likelihood Ratios of Parameters Found in the Multivariate Analysis to be Significant Indicators of Bowel Strangulation

<table>
<thead>
<tr>
<th>Findings</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Likelihood ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT: reduced enhancement only</td>
<td>56%</td>
<td>94%</td>
<td>9.3</td>
</tr>
<tr>
<td>Guarding only</td>
<td>39%</td>
<td>86%</td>
<td>2.8</td>
</tr>
<tr>
<td>WBC &gt;12 only</td>
<td>45%</td>
<td>74%</td>
<td>1.7</td>
</tr>
<tr>
<td>WBC &gt;12 and CT: reduced enhancement</td>
<td>20%</td>
<td>100%</td>
<td>Infinite</td>
</tr>
<tr>
<td>WBC &gt;12 and guarding</td>
<td>18%</td>
<td>97%</td>
<td>6.0</td>
</tr>
<tr>
<td>Guarding and CT: reduced enhancement</td>
<td>16%</td>
<td>100%</td>
<td>Infinite</td>
</tr>
<tr>
<td>WBC &gt;12, guarding, and CT: reduced enhancement</td>
<td>4%</td>
<td>100%</td>
<td>Infinite</td>
</tr>
</tbody>
</table>

The best initial study is a CT abdomen/pelvis with IV contrast and without (positive) oral contrast.
Can any tests differentiate patients whose non-strangulating obstruction will resolve non-operatively?

OLD: CLINICAL PRESENTATION

Complete obstruction = absence of significant flatus or stool for 12 hours and no colonic gas seen on KUB.

Complete obstruction = 20% success rate with non-operative treatment, 20-40% risk of strangulation

Partial obstruction = 80% success rate with non-operative treatment, low risk of strangulation (3-6%)
Can any tests differentiate patients whose non-strangulating obstruction will resolve non-operatively?

NEW: ORAL WATER SOLUBLE CONTRAST ADMINISTRATION

Instill 50-150cc of gastrograffin (water-soluble contrast) orally or via NGT. Obtain abdominal plain films at 4, 8, and/or 24 hours

Presence of gastrograffin in the colon at 8 hours predicts non-operative resolution with 95% sensitivity and 99% specificity. PPV = 99%, NPV = 85%.

At 24 hours, 99% sensitivity, 97% specificity, 99% PPV, 97% NPV

Possible therapeutic role for gastrograffin:

Systematic review and meta-analysis of the diagnostic and therapeutic role of water-soluble contrast agent in adhesive small bowel obstruction

B. C. Bezzio†, G. Bonopane†, B. Schnitzler†, K. Ikeda‡, L. S. Chao* and B. Demetriades†
Division of Trauma, Emergency Surgery and Surgical Critical Care, and Biostatistics and Biometry Associates, University of Southern California, Los Angeles, California, USA

British Journal of Surgery 2010, 97: 470–478

**PROPORTION NEEDING SURGERY**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Proportion needing surgery</th>
<th>WSCA</th>
<th>Control</th>
<th>Weight (%)</th>
<th>Odds ratio (95% CI)</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assale et al.††</td>
<td>7 of 59</td>
<td>10 of 48</td>
<td>11.8</td>
<td>0.01 (0.01, 1.47)</td>
<td>0.01 (0.01, 1.47)</td>
<td></td>
</tr>
<tr>
<td>Feige et al.††</td>
<td>3 of 35</td>
<td>4 of 25</td>
<td>4.0</td>
<td>0.72 (0.04, 9.96)</td>
<td>0.72 (0.04, 9.96)</td>
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</tr>
<tr>
<td>Dirvy et al.††</td>
<td>17 of 49</td>
<td>15 of 60</td>
<td>11.5</td>
<td>1.28 (0.35, 4.46)</td>
<td>1.28 (0.35, 4.46)</td>
<td></td>
</tr>
<tr>
<td>Bianco et al.†</td>
<td>5 of 44</td>
<td>8 of 46</td>
<td>8.4</td>
<td>0.61 (0.16, 2.49)</td>
<td>0.61 (0.16, 2.49)</td>
<td></td>
</tr>
<tr>
<td>Lee et al.††</td>
<td>25 of 75</td>
<td>26 of 75</td>
<td>23.4</td>
<td>0.79 (0.41 - 1.60)</td>
<td>0.79 (0.41 - 1.60)</td>
<td></td>
</tr>
<tr>
<td>Borger et al.†††</td>
<td>4 of 22</td>
<td>4 of 21</td>
<td>4.1</td>
<td>0.94 (0.20, 4.30)</td>
<td>0.94 (0.20, 4.30)</td>
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</tr>
<tr>
<td>Di Russo et al.††</td>
<td>7 of 38</td>
<td>17 of 38</td>
<td>16.8</td>
<td>0.28 (0.10, 0.79)</td>
<td>0.28 (0.10, 0.79)</td>
<td></td>
</tr>
<tr>
<td>Fordyce et al.‡</td>
<td>8 of 55</td>
<td>19 of 65</td>
<td>19.7</td>
<td>0.32 (0.13, 0.82)</td>
<td>0.32 (0.13, 0.82)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75 of 386</td>
<td>105 of 358</td>
<td>100.0</td>
<td>0.62 (0.44, 0.89)</td>
<td>0.62 (0.44, 0.89)</td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: $I^2 = 70.9\%$; $F = 0.86$; $P = 0.12$; $I^2 = 12\%$

Test for overall effect: $Z = -2.68$, $P = 0.007$
“I don't buy it. You just have to use your judgment.”

Madhulika G. Varma, MD, Chief Section of Colon and Rectal Surgery, UCSF

How long should non-operative management be tried?

85-95% of patients with adhesive SBO who are destined to recover without surgery will show marked improvement within 72 hours

- EAST guidelines 2009: 3-5 days
- Bologna guidelines 2010: 3 days
Can adhesiolysis reduce the risk of recurrent SBO, readmission, or reoperation?

Review of 500 patients Norway operated upon for adhesive SBO from 1961-1995. All patients interviewed at median follow-up of 11 years, 85% follow-up rate.

For patients with >2 prior bouts of adhesive SBO,

- Surgery: reduced risk of readmission (RR 0.55)
- ...but did not change risk of future operations (RR 0.79)

**Surgery:**
- Reduced risk of readmission (RR 0.55)
- But did not change risk of future operations (RR 0.79)

Can adhesiolysis reduce the risk of recurrent SBO, readmission, or reoperation?

**Natural history of patients with adhesive small bowel obstruction**

**G. Miller, J. Boman, I. Shrier**, and **P. H. Gordon**

Division of Colorectal Surgery and *Center for Epidemiology and Community Studies, Sir Mortimer B. Davis – Jewish General Hospital and McGill University, Montreal, Canada*

**Fig. 1**: Median time to recurrence for successive hospitalizations and recurrence rate for further episodes of small bowel obstruction. For example, the median time between the first and second admission was 4 years and that between the first and each admission was 4 years. The recurrence rate for individuals with one episode of small bowel obstruction (n=137) was 7 per cent and that for individuals with five episodes (n=10) was 64 per cent.

**Surgery...**
- Had no effect on total readmissions (32% vs 34%) but spaced out readmissions over time (median 0.7 vs 2 years) and had no difference in reoperation rate (14% vs 11%)
Special cases

| virgin abdomen | • confirm diagnosis (no ileus)  
| • exam to rule out hernia  
| • CT abdomen/pelvis to look for intussusception, tumor, Crohn’s, malrotation, etc.  
| • diagnostic laparoscopy and LOA |

| intra-abdominal malignancy | • 1/3 caused from adhesions that can be lysed  
| • 1/3 caused from tumor that can be resected or bypassed  
| • 1/3 nothing can be done surgically  
| • high failure rate / mortality with nonoperative management |

| intussusception | • if <3cm in length, spontaneous resolution expected  
| • operate for obstruction, pain, intransigence |

| hernia | • operate on all hernias causing SBO  
| • relative contraindication for laparoscopy  
| • zebra are: obturator, paraduodenal, transmesenteric, transomental, congenital hernias |

| Crohn’s | • treat medically initially. Surgery for intransigence. |

| tumors | • GIST, adenoma, lipoma, hamartoma, hemangioma, adenocarcinoma, lymphoma, carcinoid, metastasis  
| • Rx is resection |

| early postoperative (within 30 days of surgery) | • risk of strangulation low  
| • success rate of nonoperative management is 85% at 7 days, 90% at 14 days |

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**Question 2**

- 62 year old woman awakes several hours after a large meal with severe epigastric pain radiating to her back. When she comes to the hospital, T 37.9, HR is 114, BP 90/60, RR 25. Labs are notable for a WBC of 22K and AST of 250 and ALT 290, Alk phos of 180 and T. bili of 2.3. Her amylase is 950.

- In addition to admission to the ICU for monitoring and aggressive fluid resuscitation, what diagnostic test would you order next?
  1. Transabdominal ultrasound to look for gallstones in the GB.
  2. Abd/pelvic CT scan to look for pancreatic necrosis.
  3. ERCP to assess if CBD stones and cholangitis are present and drain the CBD urgently if needed.
Severity Assessment

- Ranson criteria of historical interest
- Multiple other scoring systems
- BISAP (Bedside Index for Severity of Acute Pancreatitis) is likely best
- BISAP assessed in first 24 hours
  - BUN > 25 mg/dl
  - Glasgow coma score < 15
  - Age > 60
  - Pleural effusion
  - SIRS present*  

*2 of the following 5 present:
- T < 36, > 38
- RR > 20 or PaCO2 < 32
- HR > 90
- WBC < 4 or > 12 or >10% bands

Incidence
- 2-3% if acute care admissions in the USA
  - Acute pancreatitis 5 to 75 cases per 100,000/year
    - Scotland: 24 cases per 100,000
    - Finland: 73 cases per 100,000
  - Gallstone pancreatitis: 35-75% of all cases
  - Alcohol 35-75% of admissions
  - Other causes: drug, idiopathic, structural, immune, infection, trauma/procedure

Mortality
- Overall for acute pancreatitis: 10%
CT can see fluid collections around pancreas, but also presence & amount of pancreatic necrosis.

More necrosis = worse prognosis.

Degree of necrosis:
- <30%
- 30-50%
- > 50%
Diagnostic Tests

- Transabdominal ultrasound in all
- No gallstones or ETOH history, carefully review drug list and check triglycerides
- CT scan only for those with diagnostic dilemma (atypical presentation, amylase or lipase < 3x normal) or those not doing well after 48-72 hours
- Post recovery testing for those with idiopathic disease might include EUS or ERCP

Management: “Golden Hours”

- Management in the first 24 hours:
  - Aggressive fluid resuscitation is the key
    - 2000 ml bolus in ED
    - 250-300 ml/hr
    - Use lactated Ringer’s
    - UO of at least 0.5 ml/kg/hr
- Under resuscitation
  - Pancreatic hypoperfusion occurs
  - SIRS, Pancreatic Necrosis, Mortality all increase
Early Fluid Resuscitation

- Early resuscitation (use LR)
  - SIRS at 72 hours 10% vs 23%
  - Organ Failure 5% vs 10%
  - ICU care 6% vs 17%
  - Hospital Stay 8 d vs 11 d

Mortality Benefit in other studies as much as 0 versus 20%
Banks PA, Am J Gastroenterol 2006;101:2379-400
Gardner TB, Pancreatology 2009;9:770-6

Nutritional Support

- Total Enteral Nutrition (TEN) for those unable to eat for more than 5-7 d
- Ok to feed by mouth once little or no pain
  Enteral feeds DO NOT need to be post ligament of Treitz
- Advantages:
  - reduced cost
  - no associated risk of catheter line sepsis
  - prevents gut atrophy and bacterial translocation and infection
- Disadvantages:
  - NONE
  - Contraindications are only SEVERE ileus, bowel obstruction
Prophylactic Antibiotics: NO!!!

- Wittau M, Scand J Gastroenterol 2011;46:261-70
- 14 trials with 841 patients
- Infected pancreatic necrosis:
  - RR 0.78 (95% CI, 0.6-1.1)
- Non pancreatic infections:
  - RR 0.70 (95% CI, 0.46-1.1)
- Mortality:
  - RR 0.74 (95% CI, 0.5-1.1)

Bai Y, Am J Gastroenterol 2008;103:104-10

Early Treatment of Acute Biliary Pancreatitis:
NO ERCP unless clear cholangitis

20-50% biliary pancreatitis recurrence within 8 weeks, so prior to discharge or soon after ERCP with sphincterotomy or cholecystectomy is needed
Infected Pancreatic Necrosis

- 7-10 days after admission typical
- CT guided FNA versus empiric antibiotics debated
- Avoid drainage for 4 weeks if at all possible
- Endoscopic drainage preferrable to IR or surgery

Case #3

- 72 year old man with drug eluting stent placed 5 months ago presents with hematemesis and melena. HR 85, BP 90/60. After resuscitation, urgent EGD performed and 1 cm DU seen with spurting vessel. Bleeding stopped with placement of 2 clips.
- When should you resume his aspirin and plavix?
  1. Immediately since his risk of stent thrombosis is significant.
  2. After observing that he has no further bleeding for at least 4-7 days.
  3. After 30 days, and only after making sure he is negative for H pylori and that he is taking a daily PPI.
  4. Never both drugs again.
Definition of Low Risk:
< 5% Rebleeding, < 1% Mortality

**Blatchford**
- Systolic BP > 110
- Pulse < 100
- Hgb ≥ 12 (women), 13 (men)
- BUN < 6.5 mmol/L
- Comorbidities: none

**Clinical Rockall**
- Systolic BP > 100
- Pulse < 100
- Age < 60 years
- Comorbidities: none

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**Early EGD Reduces LOS**
Cooper GS et al. Medical Care 1998:4:462
Cooper GS et al. Gastroinest Endos 1999;49:145

![Bar chart showing LOS reduction with early EGD](chart.png)
Early Endoscopy: Risk Assessment and Therapy

<table>
<thead>
<tr>
<th>Stigmata</th>
<th>Prevalence (%)</th>
<th>Rebleed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial bleed</td>
<td>10</td>
<td>90</td>
</tr>
<tr>
<td>Visible vessel</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Adherent clot</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Clean ulcer base</td>
<td>35</td>
<td>&lt; 5</td>
</tr>
</tbody>
</table>

Endoscopic Treatments for PUD with High-risk Stigmata (active bleeding / visible vessels)

**Injection:**
- Epinephrine (1:10000)
  - Injection alone is inferior Rx

**Thermal:**
- Contact thermocoagulation: MPEC, heater probes

**Mechanical:**
- Endoclips: loops, bands

**Combination:**
- Epi injection + thermal or mechanical

Outcomes: Reduction in rebleed, LOS, Tx, Surgery, Mortality by >/= 50%
Kaplan-Meier estimate of the cumulative percentage of patients with recurrent bleeding within 30 days

### IV PPI Infusion vs Placebo

**Before EGD**

**Endoscopic Tx:**
- Peptic Ulcers: 22.5% (PPI) vs 36.8% (placebo) (p< 0.05)
- Other bleeding sources: no difference
- Hospitalized < 3 d: 61% PPI vs 49% placebo (P< 0.05)
- No effect of PPI on:
  - Urgent endoscopy
  - Transfusions
  - Rebleeding
  - Death

- N = 638 UGIB: 377 PUD (60%)
- Omeprazole 80 mg bolus, 8 mg/hr X 72 hr
Post Endoscopy Care

- Test and treat for H pylori
- Assess need for anti-platelet Rx or anticoagulation or NSAID
  - Risk for bleed with DAT is ~2% at 30 days and 5-15% long term,
  - Risk factors: prior bleed, PUD, age, NSAIDs, anticoags (risk increases 2-5 fold)
  - Risk mitigated by PPI therapy by 50-85%, no benefit to BID dosing
  - After initial hemostasis, resume therapy immediately if need is great, ie, recent stent
Case #4

- What is the indication for colon resection in a patient with sigmoid diverticulitis?
  1. 1st episode with abscess requiring catheter drainage
  2. 3rd episode, all treated with oral antibiotics
  3. 1st episode requiring IV abx in a 35 year old
  4. Ongoing pain and fever after 4 days of IV antibiotics

When Should the Patient be Admitted?

- Nausea/Vomiting
- Pain that requires narcotics
- Bowel obstruction
- Sepsis
- Peritoneal irritation
Antibiotics for acute diverticulitis?

- Multicenter randomized controlled trial in Sweden and Iceland of 623 patients with uncomplicated left-sided diverticulitis (confirmed on CT), excluded if abscess, fistula, free air, high fever, peritonitis, or sepsis
- Randomized to broad-spectrum antibiotics of IV fluids alone

Also no difference in mean hospital stay, complications, or recurrent diverticulitis necessitating re-admission over 1 year

Authors concluded that antibiotics should be used only in cases of complicated diverticulitis

Chabok et al, Br J Surg 2012

Complicated Diverticulitis
Hinchey Classification

![Diagram of Hinchey Classification](image)
When to operate?

- Emergency
- Free Perforation
- Diffuse Peritonitis
- Complete Colonic Obstruction

- Relative emergency
- Fail medical therapy, 72-96 hours
- Recurrence in the same admission
- Partial colonic obstruction
- Immunocompromised patients
- Unable to rule out carcinoma
Diverticular Abscesses (Hinchey I and II)  
- Initial Therapy -

- Small pericolic abscesses – antibiotic therapy
- Large (> 5 cm) pericolic/pelvic abscesses – IR drainage
- Feasible 15-70%
- Effective 93%
- If not feasible/effective - surgery in the same admission


Primary Anastomosis vs Hartmann (Hinchey III & IV)

Current Status  

Literature search - 98 series - Hinchey III & IV  
1957 - 2003

<table>
<thead>
<tr>
<th>Series</th>
<th>#</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hartmann</td>
<td>54</td>
<td>1051</td>
</tr>
<tr>
<td>Primary Anastomosis</td>
<td>50</td>
<td>569</td>
</tr>
</tbody>
</table>

19% (0-100)
10% (0-75)
Why Elective Surgery?

• To prevent the morbidity associated with new episodes of acute diverticulitis

• To reduce the risk of having emergency surgery and requiring a stoma

• To eliminate the symptoms associated with the disease and improve the quality of life of the patient

Do Multiple Recurrences Predict a Less Favorable Outcome?

• Prior episodes 1-2 >2
• # of patients 122 35
• Perforation 17% 0
• Stoma 37% 3%

### Results of Elective Surgery

- **Mortality**: 0-15%
- **Morbidity**: 20-51%
- **Persistent symptoms**: 27-33%
- **Reoperation**: 1-19%

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### Need for elective surgery?

- We have traditionally recommended elective surgery for patients with recurrent diverticulitis based on the assumption that risk of recurrence was 7-62% and that recurrent cases are less likely to respond to medical therapy.

- More recent studies of natural history however suggest that medically managed acute diverticulitis has low recurrence rate and rarely progresses to complications.
  - Retrospective cohort studies estimate recurrence rates 13% over 9 years, 19% over 16 years
  - 2010 study, over ~9 years, 23% with recurrence, most had one recurrence and only 4.7% with more than 2 episodes. Risk of complicated disease was 5% over 8 years.

- **Risk of individual requiring urgent surgery was 1 in 2000 patient-years of follow-up.**

- American Society of Colon and Rectal Surgeons recommend consideration of elective sigmoid colectomy after recovery from acute diverticulitis on a case-by-case basis.

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Elective Surgery for Acute Diverticulitis

Mortality, Morbidity, Colostomy and Costs of Elective Surgery

Risk of Future Attacks

Mortality, Morbidity, Colostomy and Costs of Emergency Surgery

Salem et al, J Am Coll Surg 2004

Two-way sensitivity analysis:

Influence of Mortality

Salem et al, J Am Coll Surg 2004