Surgical Management of GI Bleeding

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VA Case Presentation

- 79 yo male admitted with several episodes of hematochezia, initial SBP 80s normalized with saline boluses in ED
- PMH – CAD s/p MI and cardiac stent ’87, paroxysmal afib, prostate CA s/p brachytherapy, hypothyroidism
- Meds – Plavix, ASA, Synthroid, Lovastatin, Lisinopril, Terzosin, NTG SL
- PE - unremarkable

0-24 hours

- Admitted to ICU
- Overnight – Hct drop 31.5 to 22.9 with 3 medium-sized bloody BM
- Transfused 4U PRBC, Hct 28.6
- Tagged RBC scan – negative
- GI consult
- EGD – small gastric erosions, no active bleeding
- Golytely prep for planned colonoscopy
- Continues to pass liquid maroon stools
- Hct falls to 22.7
24-48 hours

- Colonoscopy – large amount of blood/clot throughout colon, more red blood in cecum, right-sided diverticulosis
- Transfused 5U PRBC, Hct 27.1
- Surgery consult
- Continues to pass BRBPR
- Hct falls to 19.6
- Transfused 6U PRBC, Hct 20.1
- Repeat tagged RBC – positive RLQ
- Selective visceral angiography – active bleeding from proximal jejunal artery not amenable to embolization

Emergent Laparotomy

- Microcatheter left in place at site of jejunal bleeding
- Methylene blue injected into the microcatheter
- Pan-diverticulosis of the entire small bowel concentrated in proximal jejunum
- Segmental jejunal resection performed

Acute GI Bleeding

- > 300,000 U.S. admissions per year
- Over $1,000,000,000 annually
- Ligament of Trietz determines UGIB vs LGIB
- Hemorrhagic shock - mortality reaches 30%
- Surgery plays adjunctive role
- Surgical intervention in only 3 – 15% cases

GI Bleed “Pearls”

- 10-15% patients presenting with acute severe hematochezia have UGI source
- 5 – 10% of patient with negative NGT lavage w/ duodenal ulcer
- Young patient with hematochezia think Meckel’s diverticulum (Meckel’s scan)
- If surgery required, pre-operative localization is crucial
  - 29% mortality rate with “blind” subtotal colectomy
  - With localization, recurrent bleeding seen in < 4% pts

What’s Changed for Management of GI Bleeds?

- Advances in GI endoscopy
- Discovery of the role of H. pylori
- Better acid suppression drugs
- Liver transplant
- Interventional radiology

Diagnostic & Therapeutic Options for GI Bleeding

"There is nothing wrong with surgery that a course of a million dollars worth of medical care won’t fix."
Small Bowel Series
- Low yield in patients with obscure bleeding
- Dx Crohn's disease and large ulcers

Technetium-labeled RBC Bleeding Scan
- Bleeding beyond ligament of Trietz
- Detect bleeding > 0.1 ml/min
- Intravascular half-life 24 hrs
- Fails to localize bleeding in 85% patients
- Poor localization for surgery

Selective Visceral Angiography
- Detect bleeding 0.5 ml/min
- Massive bleeding, yield only 50-72%
- Bleeding slows or stops, yield drops below 25%
- Very low yield for small bowel angiodysplasias
Capsule Endoscopy
- Diagnostic, not therapeutic
- 8-hr test
- Risk of retained capsule
- False-negative rate

Double Balloon Push Enteroscopy
- Targeted small bowel intervention – biopsy, injection, tattoo, ablation
- Aid surgical planning for obscure GI bleeding

Distribution of Patients Admitted for LGiB
- 65 patients (Lower GI bleed)
- 15 patients (Upper GI bleed)
- 13 patients (continue bleeding)
- 72 patients (laparotomy study stop)
Suspected LGIB Workup

- Exclude upper GI source
- Anoscopy/Proctoscopy
- Colonoscopy
  - Accuracy 70-92%, therapeutic 17-39%
- Radionuclide scintigraphy
  - Diagnostic accuracy 30 – 52%
  - Localizing accuracy 83 – 95%
  - Delayed studies provide little information
- Mesenteric angiography
  - Localization 57 – 72%
  - Reduced operative mortality from 37 – 50% to 9 – 14%

Initial Management

- ABCs (airway, breathing, circulation)
- Bilateral 16-gauge upper extremity peripheral IV
  - Poiseuille law – flow rate proportional to 4th power of radius and inversely related to length
- 3-for-1 rule to restore lost plasma volume
  - 3 ml crystalloid for each ml blood loss
- Foley catheter is mandatory to monitor renal perfusion
- NGT lavage
- Rectal exam with anoscopy

Technique NGT/Gastric Lavage

- Nonbloody, bilious aspirate suggests LGIB source
- Fresh blood or coffee-ground aspirate dx UGIB
- Clear, nonbilious aspirate is NONDIAGNOSTIC
  - Miss duodenal source of bleeding
- Gastric lavage with 500 – 1000 ml saline
  - Duodenal bulb
  - Assess ongoing hemorrhage
- ASGE study* – 16% patients with clear NGT aspirate had active UGI source of bleeding at endoscopy

* Silverstein FE, et al. GI Endosc, 27(2):80, 1981
Lab Studies

- Check and monitor hemoglobin level
- Crossmatch 2 – 6 units PRBC depending on level of active bleeding
- Platelet count < 50k with active bleeding requires transfusions of platelets and FFP to replete lost clotting factors
- PT/INR/LFTs to r/o advanced liver disease
- Electrolytes/renal function – DDAVP, conjugated estrogens

Hemorrhagic Shock Classification

Based on 70-kg adult

<table>
<thead>
<tr>
<th>CLASS</th>
<th>&gt; 100</th>
<th>&gt; 120</th>
<th>&gt; 140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse rate (bpm)</td>
<td>Normal</td>
<td>Decreased</td>
<td>Decreased</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Normal</td>
<td>Normal</td>
<td>Decreased</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>Normal</td>
<td>Normal</td>
<td>Decreased</td>
</tr>
<tr>
<td>Urine output, ml/hr</td>
<td>&gt; 20</td>
<td>10 – 20</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Blood loss, ml</td>
<td>&lt; 100</td>
<td>100 – 200</td>
<td>&gt; 200</td>
</tr>
<tr>
<td>Blood loss, % blood vol</td>
<td>0 – 5</td>
<td>5 – 15</td>
<td>&gt; 20</td>
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</table>

Impact of Transfusion on Surgery and Mortality

<table>
<thead>
<tr>
<th>Number of Units Transfused</th>
<th>Need for surgery</th>
<th>Mortality Rate</th>
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<tbody>
<tr>
<td>1 – 3</td>
<td>6 %</td>
<td>14 %</td>
</tr>
<tr>
<td>4 – 5</td>
<td>17 %</td>
<td>28 %</td>
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<tr>
<td>&gt; 5</td>
<td>57 %</td>
<td>43 %</td>
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Evidence Supports Performing Early Endoscopy

- Early endoscopy within first 24 hrs of acute GIB
  - Decreased hospital stay
  - Decreased rate recurrent bleeding
  - Decreased need for surgery
  - ~ 50% reduction in mortality rates

Cooper GS, et al. GI Endosc, 49(2):145, 1999

Selection of Patients for Early Discharge
After Acute UGIB

- Scoring system for predicting rebleeding and mortality
- UK audit of 2531 pts admitted for UGIB
- Based on endoscopic and clinical criteria


<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>SCORE</th>
<th>REBLEEDING</th>
<th>MORTALITY</th>
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<tbody>
<tr>
<td>9</td>
<td>5 %</td>
<td>0 %</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5 %</td>
<td>1 %</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12 %</td>
<td>2 %</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14 %</td>
<td>4 %</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>17 %</td>
<td>8 %</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>30 %</td>
<td>13 %</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>40 %</td>
<td>20 %</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>46 %</td>
<td>39 %</td>
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Causes of Lower GI Bleed

Diverticulosis
- Rebleeding rate
  - One year: 9%
  - Two-year: 10%
  - Three year: 19%
  - Four-year: 25%

<table>
<thead>
<tr>
<th>Maximum Transfusions/Day</th>
<th>Number of Episodes</th>
<th>Stopped Spontaneously N (%)</th>
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<tbody>
<tr>
<td>1 unit</td>
<td>14</td>
<td>14 (100)</td>
</tr>
<tr>
<td>2 units</td>
<td>44</td>
<td>44 (100)</td>
</tr>
<tr>
<td>3 units</td>
<td>10</td>
<td>7 (70)</td>
</tr>
<tr>
<td>4 units</td>
<td>15</td>
<td>14 (93)</td>
</tr>
<tr>
<td>5 units</td>
<td>1</td>
<td>3 (43)</td>
</tr>
<tr>
<td>6+ units</td>
<td>16</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>82 (76)</td>
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Angiodysplasia
- 2 – 4 % of UGI bleeds (6 % of LGIB)
- Abnormal dilation of mucosal and submucosal vessels
- “Cherry spots” – dilated thin-walled vascular channels, < 5 mm
- Most commonly involve stomach and duodenum
- 15% massive bleed
- Most subacute and 90% stop
- > 25% rebleed
- Endoscopic methods highly successful
- Angiography with catheter-directed vasopressin or selective embolization (angio confirmed vs “blind” embo)
- Combined estrogen-progestagen therapy

Etiology of Angiodysplasia

- Chronic obstruction of submucosal veins
- Ectasias of submucosal vessels
- Dilation of mucosal vessels
- Develop small arteriovenous shunts

Bowel Resection with Intraoperative Enteroscopy and Transillumination

Less Common Causes

- Inflammatory bowel disease
- Neoplasm
- Ischemic colitis
- Radiation proctitis
- Varices
Less Common Causes

- Inflammatory bowel disease
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Less Common Causes

- Inflammatory bowel disease
- Neoplasm
- Ischemic colitis
- Radiation proctitis
- Varices

Indications for Surgery with GI Hemorrhage

- Persistent hypotension
- Failure of medical therapy and endoscopic hemostasis
- Coexisting condition (perforation, obstruction, malignancy)
- Transfusion requirements
  - 4 units blood over initial 24 hrs
  - 10 units blood
- Recurrent hospitalization

Operative Therapies

- Intraoperative localization
  - Colonoscopy
  - EGD
  - Enteroscopy
  - Bowel clamping
  - Mid-transverse colostomy
- Ostomy if hypotensive or unstable
Outcome of Blind vs Directed Resection

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. patients</th>
<th>Rebled</th>
<th>Mortality</th>
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<tbody>
<tr>
<td>Blind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>78</td>
<td>19%</td>
<td>5%</td>
</tr>
<tr>
<td>Left</td>
<td>92</td>
<td>38%</td>
<td>32%</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>2%</td>
<td>16%</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. patients</th>
<th>Rebled</th>
<th>Mortality</th>
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</thead>
<tbody>
<tr>
<td>Directed</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>81</td>
<td>4.9%</td>
<td>10%</td>
</tr>
<tr>
<td>Left</td>
<td>36</td>
<td>0%</td>
<td>11%</td>
</tr>
<tr>
<td>Unspecified</td>
<td>19</td>
<td>5.3%</td>
<td>11%</td>
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Indications for Surgical Consultation for GI Bleeding

- Co-existing surgical condition (eg. perforation, obstruction, cancer)
- Severe abdominal pain and/or tenderness
- Recent GI surgery
- Massive, life-threatening bleed and hemodynamic instability
- Failure to respond to endoscopic tx
- Inability to perform endoscopy (prior surgery, anatomic abnormality)
- High-risk endoscopic criteria for rebleeding
- Esophageal varices
- Mesenteric vasculopathy
- Aorto-enteric fistula

Diminishing Role of Surgery in the Management of GI Bleed Creates Dilemma in Surgical Education