Management of Lower GI bleed

Sara Kim, PGY 5
Downstate Medical Center
Case Presentation

- 81 M who presented with syncope and multiple large bloody bowel movements.
- PMHx: HTN, DM, asthma
- PSHx: non-contributory
- Vitals: afebrile, BP 122/83, P110
- Labs: 9.48, 32, 32
  - PT 12.5, PTT 28.9
Case Presentation

- HD 2
  - 2U pRBC transfused

- HD 3
  - C-scope performed: pan diverticulosis with old blood seen, no active hemorrhage; 3mm polyp in sigmoid colon (tubular adenoma)
Case Presentation

- HD 5
  - Had another syncopal episode
  - Transfused 2U pRBC for Hg/hct of 6.1/18.1
  - Tagged RBC scan: neg

- HD 7
  - Tagged RBC scan repeated: extravasation noted in hepatic flexure (after 1 hr 40 min into imaging)
  - Underwent a mesenteric angiogram: no active bleeding, hypervascularity in right colon suggestive of angiodysplasia
  - Transfused 4 U pRBC
Imaging

- Nuclear scan and angiograms
- Tram track sign -- where the feeding artery and draining vein fill simultaneously
Tagged RBC scintigraphy
Case Presentation

- HD 9
  - Underwent exploratory laparotomy, right hemicolecetomy, ileocolic anastomosis
  - Transfused 2U pRBC intra-op

- HD 12-15/POD 3-6
  - Febrile, developed ileus, fever workup negative
  - CTA/P: large fluid collection around the anastomosis suggestive of leak with abscess formation

- HD 16
  - IR guided drainage of abscess - 90cc of purulent fluid evacuated
  - Broad spectrum antibiotics started
Case Presentation

- HD 16-20
  - Improved abdominal pain, bowel function returned
  - Intermittent fevers
  - Continued leukocytosis

- HD 27-28
  - IR drain removed
  - Repeat CTA/P showed persistence of intra-abdominal abscesses

- HD 29
  - Underwent exploratory laparotomy, drainage of multiple abscesses
  - Creation of loop ileostomy

- HD 30-34
  - Ileostomy functioning, tolerating diet
  - Normalization of leukocytosis and afebrile
  - Awaiting rehab placement
Questions??
Management of lower GI bleeds

- Resuscitation
- Localization
- Non-surgical management
- Surgical management
- Summary
## Etiology
- Bleeding distal to ligament of Treitz
  - Acute
  - Chronic
  - obscure

- 20-30/100,000 patients/year
- Spontaneous resolution in 75-85%
- Age specific causes of lower GI bleed

<table>
<thead>
<tr>
<th>Age group</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents/Young Adults</td>
<td>Meckels</td>
</tr>
<tr>
<td></td>
<td>IBD</td>
</tr>
<tr>
<td></td>
<td>Polyps</td>
</tr>
<tr>
<td>Adults up to 60 y/o</td>
<td>Diverticular disease</td>
</tr>
<tr>
<td></td>
<td>Cancer</td>
</tr>
<tr>
<td></td>
<td>IBD</td>
</tr>
<tr>
<td>Age &gt;60 y/o</td>
<td>AV malformations</td>
</tr>
<tr>
<td></td>
<td>Diverticular disease (41%)</td>
</tr>
<tr>
<td></td>
<td>Cancer (9%)</td>
</tr>
<tr>
<td></td>
<td>Colitis (14%)</td>
</tr>
</tbody>
</table>
Diverticular bleed

- 3-5% of patients with diverticulosis present with bleeding
- Bleeding localized to Right colon -- 50%
- 70-80% of bleeding resolves spontaneously
- 38% rebleed
- After second occurrence, 50% of these pts rebleed
AVM

- Pathogenesis:
  - Lifetime of peristaltic contraction of muscular wall → chronic venous congestion → capillary dilation → ectatic vessels
  - 90% resolve spontaneously
  - 25% rebleed
  - Can be asso. with CREST syndrome and portal HTN
  - Most commonly in right colon
  - For recurrent bleeding, can give estrogens to reduce transfusion requirements
Other causes

- Upper GI bleed with rapid transit
- 11-15% of UGI bleeds have a neg NGT lavage
- Small bowel tumors
- Anorectal source
  - Hemorrhoids
  - Solitary rectal ulcer
- Iatrogenic

- Colitis
  - Diversion colitis
- Radiation colitis
- Infectious colitis
- Ischemic colitis
- NSAIDS
- Post polypectomy bleeding
- Stercoral ulcers
- Aortoenteric fistula (previous AAA repair)
Resuscitation

- ABC
- +/- ICU evaluation
- Type and screen, transfusion, reversal of coagulopathies
- NGT lavage
  - 11-15% are falsely negative
  - Unstable pt: consider EGD
- Anoscopy/rigid sigmoidoscopy
Localization

- Diagnostic colonoscopy
- Tagged red blood cell scan
- CT angiogram
- Selective mesenteric angiogram
Diagnostic colonoscopy

- Success in localizing bleeding
  - 42-76% diagnostic yield

- Pros
  - Can be diagnostic as well as therapeutic

- Cons
  - Unprepped bowel making more difficult visualization
  - Inability to evaluate small bowel
  - Risks of perforation
Therapeutic colonoscopy

- Methods used for hemostasis
  - Cautery
  - Argon beam coagulator
  - Laser coagulation
  - Epi injection
  - Endoscopic clips
Predictors of utilization of early colonoscopy vs. radiography for severe lower intestinal bleeding


- Retrospective review of pts with severe bleeding (>2U pRBC) AND underwent colonoscopy and radiography within 24 hrs

- N=118 pts met criteria for severe bleeding
  - 33 pts underwent initial early scope
    - Factors related to early c-scope
      - Post-polypectomy bleeds
      - Weekday admission
      - Late evening admission
  - 20 pts underwent initial radiologic procedure
    - 17 pts had a bleeding scan
    - 3 pts underwent angiogram
    - Factors related to early radiography
      - Tachycardia
      - Syncope
      - Bleeding during 1st 4 hrs of admission
Predictors of utilization of early colonoscopy vs. radiography for severe lower intestinal bleeding

Strate LL1, Syngal S.

- Colonoscopy vs. early rads, c-scope had:
  - Shorter hospital stay
  - Increased diagnostic yield
  - Fewer red blood cell transfusion

- NO difference in:
  - Rates of therapeutic intervention
  - Rates of surgery
  - Mortality rate
For acute lower GI bleeding:
- If hemodynamically stable: Urgent colonoscopy
- Rapid bowel prep with isotonic colonic lavage or GO-Lytely with 4-6 L until pink in color
- If hemodynamically unstable: angiography
Bleeding scan

- **Procedure**
  - Ex-vivo or in vivo labeling of pt’s RBC
  - Injection back into pt
  - Serial scans
    - Can re-scan up to 12-24 hrs for detection of intermittent bleeding (for $^{99m}$Tc Pertechnetate)

- Detection as low as 0.05-0.1 cc/min

- Diagnostic yield: 41-94%

- Should be immediately followed with angio/embolization or c-scope, possibly surgery

- **Pros**: most sensitive test for bleeding

- **Cons**: poor anatomic localization
5 yr retrospective study, N=224

115 scans were positive (51.3%)
- 96/115 (42.9%) localized the bleeding site

Bleeding location was determined in 48/50 pts requiring surgery pre-operatively
- 36/37 pts (97%) with positive bleeding scan accurately determined location
For active bleeding,
- Sensitivity: 79-97%
- Specificity: 70-100%

Positive tagged RBC scan – shown to be 5x more likely to require surgery

Techniques used to improve diagnostic accuracy
- Continuous dynamic imaging
  - Min sampling of 1 frame/min
  - Accurate localization depends on 1st site of bleeding → further imaging revealing antegrade and retrograde flow
- Delayed imaging → continuous dynamic imaging
- Glucagon administration (0.25-2mg IV) -- provoking
  - Slows transit time (b receptor mediated)
  - Increases in BP and cardiac contractility and vasodilation
  - Can potentiate effects of oral anticoagulation
- Subtraction scintigraphy
  - Looking at the changes in the images during the time interval
  - Decreases false neg (from overlying vascular structures)
  - Decreases false pos (from background tagged RBC concentrate)
CT Angiography

- Can detect 0.5 cc/min (in swine model)
- If active bleeding is present, 90% sensitivity
- If intermittent bleeding, 45-47% sensitive
- Pros: widely available, minimally invasive
- Cons: contrast induced nephropathy, contrast allergy, nontherapeutic

Procedure:
- CT without and with IV contrast, no PO contrast
CT angiography

- Positive: extravasation of contrast into bowel lumen
  Area of high attenuation on arterial phase which increases on venous phase

- A,B: arterial phase
- C,D: venous phase
Detection of Active Gastrointestinal Hemorrhage with CT Angiography: A 4½-year Retrospective Review

Daniel W. Kennedy, MD, Christopher J. Laing, MD, Lee H. Tseng, MD, David I. Rosenblum, DO, Stephen W. Tamarkin, MD.

- 86 pts CT
- 26% + for active bleed
- 74% neg for bleed
- 86% confirmed
- 92% did NOT require intervention

- No cases that had a neg CT had a positive angio within 24 hrs
- Authors support use of CT prior to angio for pts with bleeding of Unknown origin
Selective mesenteric angiogram

- Diagnostic yield: 40-86%
- +/- provocative testing
  - Heparin
  - Thrombolytics
  - Vasodilators
  - Improves diagnostic yield to 29-100%
- Pros: diagnostic and therapeutic
- Cons: intermittent bleeding, vascular calcifications, small vessel or venous bleeding
- Complications: hematoma, bowel ischemia, arterial dissection or spasm
- Indications: hemodynamically unstable, recurrent GI bleeding, contraindication for endoscopy, neg upper and lower endoscopy
- Detects 1-1.5cc/min in practice
Angiographic evaluation and management of acute gastrointestinal hemorrhage

Selective Mesenteric Embolization

- Therapeutic angio
  - Vasopressin infusion
    - Cessation of bleeding in 50-90% of pts
    - Rebleeds in 35-50% of pts
- Embolization
  - Cessation of bleeding in 80-100%
  - 14-29% recurrence

- Methods used for hemostasis:
  - Gelfoam
  - Microcoils
  - Liquid embolic agents
    - Polyvinyl alcohol
Localization and Definitive Control of Lower GI Bleeding with Angiography and embolization

Am Surg April 2013
Yi WS, Garg G, Sara J A

159 angiograms performed

Localization
• successful in 23.7%

50% had definitive control of bleeding

1 pt had post-embolization ischemia requiring laparotomy
Noninvasive evaluation of active lower gastrointestinal bleeding: comparison between contrast-enhanced MDCT and 99mTc-labeled RBC scintigraphy.


55 pts underwent contrast enhanced MDCT
- 41 of these pts also underwent RBC scintigraphy

<table>
<thead>
<tr>
<th></th>
<th>CT</th>
<th>RBC scan</th>
<th>Angio</th>
<th>surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 pts</td>
<td>neg</td>
<td>neg</td>
<td>Sx not required</td>
<td></td>
</tr>
<tr>
<td>11 pts</td>
<td>neg</td>
<td>pos</td>
<td>2 pos</td>
<td>3+</td>
</tr>
<tr>
<td>2 pts</td>
<td>pos</td>
<td>neg</td>
<td>1 neg</td>
<td>1 pos</td>
</tr>
<tr>
<td>8 pts</td>
<td>Pos</td>
<td>Pos</td>
<td>4 neg angios, 1 had sx, 1+ angio</td>
<td>2 pts pos, but sx only 1 pt pos (neg angio)</td>
</tr>
</tbody>
</table>

www.downstatesurgery.org
Noninvasive evaluation of active lower gastrointestinal bleeding: comparison between contrast-enhanced MDCT and 99mTc-labeled RBC scintigraphy.


- 19 pts did NOT undergo RBC scintigraphy
  - 5 pts underwent CT \( \rightarrow \) angiography (unstable)
    - 3 had positive angios
    - 2 had negative angios
      - 1 had pos CT
      - 1 had neg CT
Conclusions of the study:

- MDCT had a 31.7% detection rate for active bleeding
  - About 50% required further intervention
- Tagged RBC scintigraphy is BEST test for intermittent bleeding
- No one study is perfect with sensitivity and specificity dependent on timing of test and nature of the bleed
- Advantages of MDCT for first screening test:
  - Readily available 24 hrs/day
  - Ancillary findings can be detected
- Statistically significant disagreement between MDCT and tagged RBC scintigraphy is present
Small bowel bleeding

- Meckel's scan (age appropriate)
- Double balloon enteroscopy
  - Diagnostic yield: 40 - 80%
  - Can evaluate 60-80 cm of jejunum
- Capsule endoscopy
  - Diagnostic yield: 55-92%
  - Required UGI series with small bowel follow through to rule out a mass
  - Failure of retrieval: 5%
Diagnosis of gastrointestinal bleeding: A practical guide for clinicians

Bong Sik Matthew Kim, Bob T Li, Alexander Engel, Jaswinder S Samra, Stephen Clarke, Ian D Norton, Angela E Li
Surgical management

- Indications for surgical intervention
  - Transfusion requirement >4-6U of pRBC in 24 hrs
  - Persistent bleeding (after 72 hrs)
  - Recurrent bleeding within a week
  - Morbidity and mortality increase significantly for pts transfused >10U pRBC

- "blind" Subtotal colectomy, mortality 25-33%
  - Associated with a high rebleeding rate up to 42%
  - If unable to localize the site of bleeding
  - +/- on table endoscopy

- Segmental colectomy
  - If able to localize the site of bleeding, mortality: 7%
  - If unable to localize the site of bleeding, mortality: 57%
Surgical treatment concepts for acute lower gastrointestinal bleeding.

Czymek R1, Kempf A, Roblick UJ, Bader FG, Habermann J, Kujath P, Bruch HP, Fischer F.


Retrospective review of pts requiring surgical intervention for GI bleed

N=63 pts
Localized in 61 pts
- Endoscopy - 41 pts
- Angiography - 12 pts
- Tagged RBC scan - 8 pts
Surgical treatment concepts for acute lower gastrointestinal bleeding.

Czymek R1, Kempf A, Roblick UJ, Bader FG, Habermann J, Kujath P, Bruch HP, Fischer F.

- Indication for surgery: acute, uncontrollable and recurrent bleeding
- Segmental resection is recommended if bleeding is localized
- If bleeding not localized, subtotal resection is treatment of choice
- For small bowel hemorrhage, regular re-evaluation required
Acute Lower GI Bleeding for the Acute Care Surgeon: Current Diagnosis And management

J. lee, t. W. costantini, R. coimbra
Division of Trauma, Surgical Critical Care, and Burns, Department of Surgery, University of California-San Diego School of Medicine, San Diego, California, U.S.A.

Acute Lower GI Bleeding for the Acute Care Surgeon: Current Diagnosis And management

J. lee, t. W. costantini, R. coimbra
Division of Trauma, Surgical Critical Care, and Burns, Department of Surgery, University of California-San Diego School of Medicine, San Diego, California, U.S.A.

<table>
<thead>
<tr>
<th>Modality</th>
<th>Localization Rate</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Complication rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonoscopy</td>
<td>60–97%</td>
<td>Potentially therapeutic</td>
<td>Operator dependent</td>
<td>&lt;5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low recurrence rate (&lt;10%)</td>
<td>Requires adequate bowel preparation</td>
<td></td>
</tr>
<tr>
<td>Scintigraphy</td>
<td>50% (37)</td>
<td>Can be repeated</td>
<td>Low accuracy rate for localization</td>
<td>&lt;1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low risk to patient</td>
<td>Not therapeutic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can detect low rates of bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angiography</td>
<td>47%</td>
<td>Potentially therapeutic</td>
<td>Operator dependent</td>
<td>5–10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low recurrence rate (&lt;10%) (51)</td>
<td>Risk of contrast-induced nephropathy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low risk to patient</td>
<td>Not widely available</td>
<td></td>
</tr>
<tr>
<td>MDCT</td>
<td>50–86%</td>
<td>Low risk to patient</td>
<td>Risk of contrast induced nephropathy</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does not require bowel preparation Quick</td>
<td>Not therapeutic</td>
<td></td>
</tr>
</tbody>
</table>
Questions??
References

- **Diagnosis of gastrointestinal bleeding: A practical guide for clinicians** Bong Sik Matthew Kim, Bob T Li, Alexander Engel, Jaswinder S Samra, Stephen Clarke, Ian D Norton, Angela E Li. World J Gastrointest Pathophysiol 2014 November 15; 5(4): 467-478


References


- **Localization and Definitive Control of Lower GI Bleeding with Angiography and embolization.** Yi WS, Garg G, Sara J A. *Am Surg* April 2013


References

