Endoscopic emergencies—When to get out of bed in the middle of the night

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Disclosures

- I like to sleep
Objectives

- To know which patients will benefit from emergent endoscopy
- To know the recommended timing of emergency endoscopy for patients with:
  - GI bleeding (upper and lower)
  - Foreign bodies
  - Acute cholangitis
- To avoid performing emergent endoscopy on patients who will not benefit and who may be harmed

Upper GI bleeding
Initial assessment and risk stratification of upper GI bleeding

- Assess hemodynamic status immediately
- Insert 2 large bore IVs and begin resuscitation
- Blood transfusions
  - Target hemoglobin ≥ 7 g/dl
    (> 10 g/dl if intravascular volume depletion or CAD)
  - Target INR < 2.5
- Risk stratify into higher- and lower-risk categories
  - Patient triage
  - Timing of endoscopy

Laine L, Jensen D. Am J Gastroenterol 2012;107:345

Survival according to transfusion strategy

Timing of endoscopy

“Early endoscopy (within 24 hours of presentation) is recommended for most patients with acute upper gastrointestinal bleeding”


“Patients with upper GI bleeding should generally undergo endoscopy within 24 hours of admission, following resuscitative efforts to optimize hemodynamic parameters”


Emergent or urgent endoscopy?

- Emergent (<6-8 hours) endoscopy (EE) vs. urgent (8-24 hours) endoscopy (UE)
- Retrospective series (n=860)
- More endoscopic therapy in EE group
- No differences in:
  - Rebleeding rate
  - Length of stay, transfusions, surgery & mortality

Emergent endoscopy (<12 hours)

- Always after hemodynamic resuscitation and stabilization
- Hemodynamically unstable initially
- Hematemesis
- Suspected active bleeding
- Suspected variceal bleeding


Emergent upper endoscopy may improve outcomes in high-risk patients

- Retrospective review of endoscopy timing (< 13 h vs. > 13 h) in 934 patients
- Blatchford risk score calculated
  - Low-risk = score <12
  - High-risk = score ≥12
- Mortality same in low-risk patients
- Mortality greater in high-risk patients with endoscopy >13 hours (44% vs. 0%)

Lim LG et al. Endoscopy 2011;43:300
Mortality and endoscopy timing

- Analysis of 3 national, multi-center prospective databases (PNED 1 & 2 and PROMETIO)
- 3207 patients with non-variceal upper GI bleed
- Timing of endoscopy ≤6 hours, 7-12 hours or 13-24 hours
- Risk categorized as low, intermediate, or high using 10 independent clinical prognosticators
- Endpoint of mortality (overall 4.45%)

Marmo R et al. DDW 2011

“In patients clinically categorized as high risk, the performance of the endoscopy 13-24 hours of the bleeding episode is associated with a significantly lower mortality (p=0.001) compared to endoscopy performed sooner (≤12 hours)”

Marmo R et al. DDW 2011
Reasons for worse outcomes with urgent endoscopy

- Urgent endoscopy may be associated with inadequate resuscitation
- Procedure may be done without usual supports (endoscopy RNs and techs)
- Procedure often done at off hours (i.e. 11 PM to 7 AM) and endoscopist may be fatigued and/or have a decrease in endoscopic performance quality
- Lack of back-up support immediately available (interventional radiology and surgery)

Acute lower GI bleeding (LGIB)
Strategy for acute LGIB

1. Is the patient stable?
   Resuscitate and correct coagulopathies

2. Could it be an upper GI source?
   Consider NG tube vs. upper endoscopy

3. Assessment of severity of LGIB
   - Could patient die from bleeding?
   - Will bleeding continue?
   - Will bleeding recur?

Rule out upper GI bleed

- 10-15% of “LGIB” are found to have UGIB
- In severely bleeding patients:
  - NG tube
    - Sensitivity 42-84%, specificity 55%
    - Can be useful for rapid bowel prep
  - Upper endoscopy best initial test

Luk GD. JAMA 1979;241:576
Laine L. Am J Gastroenterol 2010;105:2636
Risk assessment

Risk Factors for Severity
• Heart rate > 100 bpm
• SBP < 115 mmHg
• Syncope
• Non-tender abdomen
• Rectal bleeding w/in 1st 4 hrs of presentation
• Aspirin use
• > 2 comorbid conditions

Strate Archives 2003
Strate, Saltzman et al. Am J Gastro 2005

Predicting severe bleeding

% Severe Bleeding

Low-Risk

Mod-Risk

High-Risk

Number of Risk Factors

Derivation
Validation
### Predictors of mortality

<table>
<thead>
<tr>
<th>Predictor</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older age (years)</td>
<td></td>
</tr>
<tr>
<td>50-70</td>
<td>3.67</td>
</tr>
<tr>
<td>&gt;70</td>
<td>4.91</td>
</tr>
<tr>
<td>Intestinal ischemia</td>
<td>3.47</td>
</tr>
<tr>
<td>Comorbidity</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.43</td>
</tr>
<tr>
<td>&gt;2</td>
<td>3.00</td>
</tr>
<tr>
<td>Inpatient</td>
<td>2.35</td>
</tr>
<tr>
<td>Coagulopathy</td>
<td>2.34</td>
</tr>
<tr>
<td>Hypovolemia</td>
<td>2.22</td>
</tr>
<tr>
<td>Transfusion PRBC</td>
<td>1.60</td>
</tr>
<tr>
<td>Male gender</td>
<td>1.52</td>
</tr>
</tbody>
</table>

*Strate L. Clin Gastro Hepatol, 2008;6:1004-10*

### Diagnosis and treatment

- Anoscopy
- Flexible Sig
- Colonoscopy
- Radionuclide scan
- Angiography
- MDCT
- Surgery
Urgent colonoscopy: Severe diverticular bleeding

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Medical Rx n=17/73</th>
<th>Endoscopic Rx n=10/48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemostasis</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Recurrent bleeding</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>≤ 2 units prbcs</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>≥ 3 units prbcs</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Surgery</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Length of stay</td>
<td>5 days</td>
<td>2 days</td>
</tr>
</tbody>
</table>


“Emergent” colonoscopy

- Definition: < 12 hrs from presentation
- Preparation: PEG until clear (4 - 8L)
- Pre-medicate with IV metoclopramide 10 mg
- Diagnostic yield 50-90%
- Therapeutic yield 10-40%
- Complications 1-4%
  - Electrolyte disturbance, aspiration
  - Prep does NOT precipitate bleeding

Strate L, Naumann C. Clin Gastro Hepatol 2010;8:333
Emergent colonoscopy vs. radiography

100 patients with acute lower GI bleeding randomized to:
- Colonoscopy within 8 hours or
- Nucleotide scan: if pos → angio; if neg → colonoscopy

<table>
<thead>
<tr>
<th></th>
<th>Colonoscopy</th>
<th>Radiography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitive Source</td>
<td>21</td>
<td>4*</td>
</tr>
<tr>
<td>Therapy</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Transfusions</td>
<td>4.2</td>
<td>5</td>
</tr>
<tr>
<td>Surgery</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Mortality</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>LOS</td>
<td>5.8 days</td>
<td>6.6 days</td>
</tr>
</tbody>
</table>

Green. Am J Gastro 2005;100:2395

Randomized trial of emergent vs. elective colonoscopy

85 patients with severe acute lower GI bleed: 13 UGI bleed
72 patients randomized to:
- Emergent/urgent colonoscopy within 6 hours or
- Elective colonoscopy (36-60 hours)

<table>
<thead>
<tr>
<th></th>
<th>Urgent colonoscopy (N=36)</th>
<th>Elective colonoscopy (N=36)</th>
<th>Difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with further bleeding</td>
<td>8 (22%)</td>
<td>5 (14%)</td>
<td>8% (-9 to 26%)</td>
</tr>
<tr>
<td>Units of blood transfused after randomization</td>
<td>1.3±0.4</td>
<td>1.1±0.2</td>
<td>0.9 (0.02 to 1.70)</td>
</tr>
<tr>
<td>Hospital days</td>
<td>5.2±0.9</td>
<td>4.8±0.5</td>
<td>0.4 (-1.8 to 2.6)</td>
</tr>
<tr>
<td>Patients with subsequent intervention for diagnosis or treatment of bleeding</td>
<td>13 (30%)</td>
<td>12 (33%)</td>
<td>3% (-19 to 22%)</td>
</tr>
<tr>
<td>Hospital charges ($)</td>
<td>27,500±5,503</td>
<td>26,633±3,004</td>
<td>957 (-12,525 to 14,440)</td>
</tr>
</tbody>
</table>

Laine L, Shah A. Am J Gastroenterol 2010;105:2636-41
Colonoscopy timing - Unresolved questions

- Optimal timing
- Optimal preparation
- Stigmata for lower GI bleeding
- Safety
- Long-term effect on recurrence rates
- Effectiveness in routine practice

Management strategy

- **High risk and stable**
  - Exclude upper GI bleed
  - Begin prep immediately
    - (consider NG tube and metoclopramide)
  - Rapid, possibly emergent/urgent colonoscopy

- **High risk and unstable**
  - (not responding to resuscitation)
  - Exclude upper GI bleed
  - Management based on institutional expertise
  - Coordination between services is key

- **Low risk patient**
  - Timely inpatient colonoscopy
  - Consider outpatient exam (young with minor bleed)
Foreign body ingestion

Factors to consider in foreign body ingestion

- Anatomic location  Where?
- Patient specific issues  Who?
- High risk objects  What?
- Timing of endoscopy  When?
- Airway protection  How?
- Choosing accessories  Which?
Ingested foreign bodies

Outcomes
- Pass spontaneously 80-90%
- Endoscopy 10-20%
- Surgery ~1%

Complications:
- Perforation <1%
- Mediastinitis
- Lung abscess
- Fistula
- Aspiration
- Death

Always consider the possibility of more than one foreign body

Timing of endoscopy

Emergent
- Complete obstruction in esophagus
- Disk battery in esophagus
- Sharp object in esophagus
- Rare earth magnets

Urgent
- Blunt objects in esophagus
- Incomplete obstruction of esophagus
- Sharp objects in stomach

Non-Urgent
- Coins in esophagus: observe 12-24 hours
- Blunt objects >2.5 cm in stomach
Indications for emergent endoscopy

- Respiratory distress/compromise
- Complete esophageal obstruction
  - Unable to handle secretions
- Sharp objects below the UES
  - If above UES = ENT
- Lateral image to determine location in esophagus rather than trachea - button batteries within reach of upper endoscope

Button batteries in esophagus

- Hearing aids, calculators, cameras, computers
- Larger batteries (>21 mm in diameter) cause more problems
- Rapid injury via direct corrosion, low-voltage burns or pressure necrosis
- Liquefaction necrosis
  - Leakage of alkaline KOH or NaOH in 26-45%

Endoscopic emergency with high potential for esophagotracheal or esophago-aortic fistulas
Acute esophageal obstruction: *What not to do!*

- **Do not scope if evidence of perforation**
  - Neck crepitus, pharynx red or swollen, peritonitis
  - Biplane x-rays – rule out perforation, localize object
- **No oral contrast**
  - Aspiration risk
  - Barium precludes successful endoscopy
- **No meat tenderizer or other enzymatic attempts to digest impacted food**
- **Do not remove drug containing packets**

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Acute cholangitis
Acute cholangitis

- **Etiology**
  - Stones
  - Strictures
  - Occluded stents
  - (Malignancy)

- **Clinical**
  - *Charcot’s triad* (50-75%): RUQ pain + fever + jaundice
  - *Reynold’s pentad*: Hypotension + confusion
  - Severity varies with degree of obstruction and virulence of the pathogen

Ascending cholangitis

- **Management**
  - IV fluids and resuscitation
  - Broad-spectrum IV antibiotics
  - Endoscopic biliary drainage

- **Timing of ERCP**
  - *Sepsis/unstable* = EMERGENT
  - Stable = not emergent

Endoscopic management of acute cholangitis

82 patients with severe calculous cholangitis

ERCP

30% ventilation (p<0.005) 65%
34% complication 66%
10% mortality (p<0.03) 32%

Surgery


Timing of endoscopic management of acute cholangitis

• “Prospective”, no randomization
• 85 consecutive ES for calculous cholangitis

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 Good abx response</td>
<td>6% 0%</td>
</tr>
<tr>
<td>25 Poor abx response</td>
<td></td>
</tr>
<tr>
<td>• 13 Early drainage (&lt;72Hr)</td>
<td>0% 0%</td>
</tr>
<tr>
<td>• 12 Delayed drainage (&gt;72Hr)</td>
<td>42% 8%</td>
</tr>
</tbody>
</table>

Endoscopic management of cholangitis

**Cholangitis**

Persistent pain

Hiighiighi

Resuscitation/IV antibiotics

improves

Elective ERCP

Urgent ERCP

Drainage

Clearance

Laparoscopic cholecystectomy

Gallstone pancreatitis

- ERCP indications:
  - Removal of biliary stone
    - Presence on imaging (ultrasound, MRCP)
    - Persistently abnormal LFT's
  - Ascending cholangitis
  - Worsening pancreatitis

- Avoid emergent/urgent ERCP:
  - LFT's improving
**Gallstone pancreatitis**

<table>
<thead>
<tr>
<th>Study</th>
<th>ERCP + ES</th>
<th>n</th>
<th>Control</th>
<th>n</th>
<th>Morbidity ERCP vs Control</th>
<th>Mortality ERCP vs Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoptolemos '88</td>
<td>59</td>
<td></td>
<td>62</td>
<td></td>
<td>24% vs 61% * (p&lt; 0.01)</td>
<td>NS</td>
</tr>
<tr>
<td>Fan '93</td>
<td>97</td>
<td>97</td>
<td>98</td>
<td></td>
<td>16% vs 33% * (p = 0.03)</td>
<td>2% vs 8% (p = 0.09)</td>
</tr>
<tr>
<td>Folsch '97</td>
<td>126</td>
<td>112</td>
<td></td>
<td></td>
<td>46% vs 51% (p = 0.10)</td>
<td>11% vs 6% (p = 0.10)</td>
</tr>
<tr>
<td>Nowak '98†</td>
<td>178</td>
<td>102</td>
<td></td>
<td></td>
<td>17% vs 36% (p &lt; 0.001)</td>
<td>2% vs 13% (p &lt; 0.001)</td>
</tr>
</tbody>
</table>

* Predicted severe GP only
† Published in abstract form only

- Urgent ERCP reduces morbidity in predicted severe GS pancreatitis
- One study demonstrates reduction in mortality as well

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**Emergency endoscopy summary**

- Perform endoscopy in upper GI bleeding within 24 hrs
- In variceal bleeding or suspected ongoing active bleeding, perform upper endoscopy within 12 hours
- Consider emergent upper endoscopy and then colonoscopy with rapid prep for lower GI bleeding
- Recognize indications for emergent endoscopy with foreign body ingestion:
  - Complete esophageal obstruction, sharp objects and button batteries in esophagus, and rare earth magnets
- For patients with acute cholangitis, emergent ERCP in those with worsening status despite initial antibiotics