Nonvariceal Gastrointestinal Hemorrhage: Definitive Surgical Treatment When Endoscopy Fails

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Non-Variceal Upper GI Bleeding

- Incidence of 50 – 150 cases per 100,000

- In the US this translates to 300,000 admissions annually

  - Peptic ulcer disease (gastric and duodenal) remains the most common cause accounting for > 50% of cases

Kazanjian et al. Techniques in Gastrointestinal Endoscopy 2005
Non-Variceal Upper GI Bleeding

Other etiologies:

- Gastro duodenal Erosions
- Mallory-Weiss tears
- Angioectasias, AVM’s
- Neoplasms
- Trauma
- Aortoenteric fistulas
- Hemosuccus pancreaticus
- Iatrogenic

- Dieulafoy lesion
- Gastritis
- Visceral Artery Aneurysms
- Hemobilia

Kim et al. Techniques in Gastrointestinal Endoscopy 2005
Non-Variceal Upper GI Bleeding

- Approximately 80% of patients presenting with UGI bleeding will resolve spontaneously.

- Thus 20% will require intervention.
  - Of these, 90% can initially be controlled with endoscopic intervention
  - Rebleed rate after initial endoscopy of 10 – 30%

Non-Variceal Upper GI Bleeding

- Of the 10% initially not controlled and the 10% – 30% who rebleed what next?
  - Has the bleeding been localized?
  - Is the patient hemodynamically unstable? i.e., life threatening hemorrhage.
  - Resuscitative efforts initiated?
Non-Variceal Upper GI Bleeding

Pre-operative localization:
- Radionuclide Scintigraphy
  - ($^{99}$Tc-labeled red blood cells)
  - Sensitivity 80 – 98%
  - Detect bleeding rates as slow as 0.1 ml/min
- Diagnostic Angiography
  - Sensitivity 61% acute UGIB, 50% in acute LGIB
  - Bleeding rate at least 1 ml/min
  - Potential therapeutic intervention

Arterial Embolotherapy for Upper GI Hemorrhage: Outcome Assessment

- Non-randomized, Retrospective Study
  - 75 patients between 1988 – 1998 underwent arterial embolization for non-variceal UGIB

- 61% embolized based on angiographic evidence of bleed
- 39% underwent “blind embolization” based on endoscopic findings

Aina et al: J Vasc Inter Radiol 2001
Arterial Embolotherapy for Upper GI Hemorrhage: Outcome Assessment

- Technical Success 98.8% (74 of 75)
  - Primary clinical success rate 76% (57 of 74)
    18 primary failures (24% rebleed rate)

- 8 patients underwent repeat embolization
- 10 patients underwent surgical treatment

- Secondary clinical success rate 82.7% (5 of 8)
  - Of the three failures 1 patient died, 2 went to the OR

Aina et al: J Vasc Inter Radiol 2001
Arterial Embolotherapy for Upper GI Hemorrhage: Outcome Assessment

- Surgical Intervention was required in 16%
- 30 day mortality 34.6%
- Complication rate 5%
  - 2 duodenal ischemia
  - 1 liver infarction
  - 1 inguinal hematoma necessitating operation

Aina et al: J Vasc Inter Radiol 2001
Arterial Embolotherapy for Upper GI Hemorrhage: Outcome Assessment

- Morris et al, BMJ 1984
  - 7% mortality in 142
    - No deaths in 42 patients under 60yoa
    - 10% overall mortality in 100 patients over 60

  - 21% overall mortality in 137 patients

- Ripoll et al, J Vasc Interv Radiology 2004
  - 20.5% mortality in 39 patients undergoing surgery

“In summary, embolization of UGI hemorrhage resistant to conservative therapy is safe, effective and durable”

- Is it? 34.6% mortality, 16% requirement for surgery, 5% complication rate

Aina et al: J Vasc Inter Radiol 2001
Comparison of Transcatheter Arterial Embolization and Surgery for Treatment of Bleeding Peptic Ulcer after Endoscopic Treatment Failure

- Retrospective analysis of 70 patients, from 1986 – 2001, refractory to endoscopic therapy
  - Referral for surgery (39) or embolotherapy (31) was at the discretion of the treating physicians

- Patients in the embolotherapy group
  - Older 75 vs 63 (p < .001)
  - More CV disease 67% vs 20% (p < .001)
  - Higher incidence of previous anticoagulation 26% vs 5% (p = 0.18)

Ripoll et al; J Vasc Interv Radiol 2004
Comparison of Transcatheter Arterial Embolization and Surgery for Treatment of Bleeding Peptic Ulcer after Endoscopic Treatment Failure

No differences in outcomes was found.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Posttreatment Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Embolotherapy (n = 31)</td>
</tr>
<tr>
<td>Outcome</td>
<td></td>
</tr>
<tr>
<td>Mean transfusion requirements ± SD (packed red cell units)</td>
<td>4.2 ± 4.6</td>
</tr>
<tr>
<td>Mean days of hospitalization ± SD</td>
<td>30.1 ± 24.6</td>
</tr>
<tr>
<td>Recurrence of bleeding</td>
<td>9 (29)</td>
</tr>
<tr>
<td>Surgery</td>
<td>5 (16.1)</td>
</tr>
<tr>
<td>Death</td>
<td>8 (25.8)*</td>
</tr>
</tbody>
</table>

Note.—Values in parentheses are percentages.
* Four related to a bleeding episode and four related to underlying conditions.
† One related to a bleeding episode and eight related to underlying conditions.

Ripoll et al; J Vasc Interv Radiol 2004
Comparison of Transcatheter Arterial Embolization and Surgery for Treatment of Bleeding Peptic Ulcer after Endoscopic Treatment Failure

“The results of the present study, in which no difference was shown between embolotherapy and surgery despite older age and greater prevalence of heart disease in patients receiving the former, provide support for future prospective randomized studies.”

Ripoll et al; J Vasc Interv Radiol 2004
Trends in Peptic Ulcer bleeding and Surgical Treatment

“There are no proven alternatives to emergency operation for massive bleeding uncontrollable by endoscopic procedures.”

“In many of the medically oriented randomized trials surgery is considered a major outcome rather than a treatment option.”

Trends in Peptic Ulcer bleeding and Surgical Treatment

- “The possibility of a trend to a negative selected population for surgery must be taken into consideration”

- “neither rebleeding nor emergency surgery is the most important clinical endpoint; mortality is”

What operation should be done?

Randomized, Prospective trials
Type of Operative Procedure

- 137 patients randomized to
  - Conservative: under-running the vessel or ulcer excision
  - Conventional surgery: under-running, truncal vagotomy, pyloroplasty or partial gastrectomy
- No statistical difference in rebleeding (11% vs 6%) or mortality (26% vs 19%)

Randomized, Prospective trials
Type of Operative Procedure

Millat et al; World J Surg. 1993
- Patients with massive, persistent, or recurrent hemorrhage were randomized to oversewing plus vagotomy vs gastrectomy
  - Rebleeding was more common in conservative group
    - 17% vs 3% (p < 0.05)
  - Mortality was similar (22% vs 23%)

## Recommendations

Table 4. Choice of emergency operative procedure for peptic ulcer bleeding.

<table>
<thead>
<tr>
<th>Study and year</th>
<th>Study type</th>
<th>Population investigated</th>
<th>Sample size (no.)</th>
<th>Operative treatment</th>
<th>Recurrent bleeding (%)</th>
<th>Mortality (%)</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millat [4], 1993</td>
<td>Randomized&lt;sup&gt;a&lt;/sup&gt;</td>
<td>DU bleeding</td>
<td>60</td>
<td>Gastric resection, BI + ulcer excision</td>
<td>24</td>
<td>3</td>
<td>23</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gastric resection, BII + ulcer excision</td>
<td>36</td>
<td>17</td>
<td>22</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Partial gastrectomy</td>
<td>58</td>
<td>17</td>
<td>22</td>
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<tr>
<td>Poxon [5], 1991</td>
<td>Randomized&lt;sup&gt;a&lt;/sup&gt;</td>
<td>PU bleeding</td>
<td>67</td>
<td>Oversewing + vagotomy</td>
<td>35</td>
<td>0&lt;sup&gt;c&lt;/sup&gt;</td>
<td>19</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Ulcer excision + vagotomy</td>
<td>3</td>
<td>10&lt;sup&gt;c&lt;/sup&gt;</td>
<td>26</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Underrunning + vagotomy</td>
<td>59</td>
<td>10&lt;sup&gt;c&lt;/sup&gt;</td>
<td>26</td>
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<tr>
<td>Kubba [33], 1966</td>
<td>Uncontrolled&lt;sup&gt;b&lt;/sup&gt;</td>
<td>PU bleeding</td>
<td>36</td>
<td>Underrunning + vagotomy + pyloroplasty</td>
<td>24</td>
<td>3</td>
<td>14</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ulcer excision + vagotomy + pyloroplasty</td>
<td>3</td>
<td>3</td>
<td>14</td>
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<td>Partial gastrectomy/antrectomy</td>
<td>9</td>
<td>3</td>
<td>14</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Underrunning</td>
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<td>23</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ulcer excision</td>
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<td>23</td>
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<td>Hunt [43], 1990</td>
<td>Uncontrolled&lt;sup&gt;b&lt;/sup&gt;</td>
<td>DU bleeding</td>
<td>81</td>
<td>Partial gastrectomy, BII</td>
<td>81</td>
<td>10</td>
<td>12</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Partial gastrectomy</td>
<td>101</td>
<td>17</td>
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<td>Partial gastrectomy + vagotomy</td>
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<td>Dousset [45], 1995</td>
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<td>Oversewing/ulcer excision</td>
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</tr>
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</table>

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Recommendations

- Regarding vagotomy: No longer recommended due to effective prevention of ulcer recurrence by H. pylori eradication and acid neutralization
  - The value of studies involving vagotomy is limited from today’s viewpoint

- Gastric ulcer: Ulcer excision is the procedure of choice (except large >2cm, chronic, penetrating ulcers where gastrectomy is preferable)

- Duodenal ulcer: under-running/oversewing, vasoligation

Recommendations

38 yo male with PMHx EtoH abuse, frequent UGIB is admitted to MICU of local hospital for 2 large episodes of melena. Reports of pill endoscopy from OSH are concerning for “distal small bowel ulceration”

After initiation of IV nexium and volume resuscitation he is found to have a Hct of 18

Further resuscitation with PRBC is initiated and he undergoes EGD, colonoscopy.
Denver CO 2007, application to clinical practice
An area in the duodenum concerning for a Dieulafoy’s lesion is identified in D2 and endoscopically clipped.

Marked gastritis is noted, despite Hx of esophageal varices – no evidence of bleeding.

Colonoscopy shows bright blood coming from the T.I.
Pt then returns to MICU where over following 48 hours he receives a total of approx 25 units PRBC and additional blood products. Remaining marginally stable, intubated with intermittent pressor requirements.

- Repeat endoscopy is unrevealing.
- Tagged red cell scan and angiography are performed.
Angiography is unable to localize bleeding
Denver CO 2007, application to clinical practice
The patient remains marginally stable requiring intermittent transfusion prior to having another massive bleed (Hct 30 to 20) despite transfusion. Surgery consulted

Repeat Angiography was unable to identify source of active bleeding.

Repeat TRBCS as follows
Denver CO 2007, application to clinical practice

ANTERIOR_SS
Se: /5
ID:
Im: 1/1

Acc: 4572942
2007 Jan 23
Acq Tm: 17:33:25

GI BLEED STUDY
62.0mCi Tc99m tagged RBC's via IV

RadioPhm:
Energy Wnd:
Counts:
Duration:
Id: DCM / Lin: DCM / Id: ID
W: 234  L: 152
Denver CO 2007, application to clinical practice

- OR: Exlap, push enteroscopy
Large arteriovenous malformation vs varix identified 4cm distal to the ligament of treitz was suture ligated with mid-portion excised.

Pt recovered from operation, was extubated and discharged home within 2 weeks.
Conclusions

- "There are no proven alternatives to emergency operation for massive bleeding uncontrollable by endoscopic procedures."

- In light of the changing management of non-variceal UGIB many residents graduating from programs have limited experience with the techniques involved in UGIB formerly common to a surgical practice.

- Are we becoming too dependent on technologically driven interventions as of yet untested in randomized trials against surgical intervention?