Stick It with Glue

Roy Soetikno, MD

7 liters in 50 minutes
(≈ 2 gallons per hour)
- Cyanoacrylate injection, if available, is preferred for the treatment of bleeding gastric fundal varices. Otherwise, EVL is an option (Class I, Level B).

- TIPS is for bleeding fundal varices cannot be controlled or recurs despite combined pharmacological and endoscopic therapy (Class I, Level B).

Objectives

- Good Practice of Techniques of Cyanoacrylate Glue injection and Band Ligation.
- Risks, benefits and alternatives of endoscopic treatment of gastric and esophageal varices.
- Understand anatomy and pathophysiology of gastric and esophageal varices.
Which Endoscope do you routinely use for UGIB?

A. Diagnostic endoscope with working channel of 2.8mm
B. Therapeutic endoscope with working channel of 3.7mm
C. Double channel endoscope with working channels of 2.8/3.7mm
D. Extratherapeutic endoscope with working channel of 6mm
ENDOSCOPE SELECTION

Maximum fluid suctioned, in mL/min

<table>
<thead>
<tr>
<th>Model</th>
<th>Ability for evacuation of bleeding gastric varices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Scope</td>
<td>Inadequate</td>
</tr>
<tr>
<td>1 Channel Therapeutic</td>
<td>Potentially inadequate</td>
</tr>
<tr>
<td>2 Channels Therapeutic</td>
<td>Also potentially inadequate as no advantage compared to 1 channel</td>
</tr>
</tbody>
</table>

6mm CHANNEL IS PREFERRED

RAPID

LARGE SIZE of CLOTS
Storing the Cyanoacrylate Glue

At the bedside preparation

Goggles

Glue

Water

Always one spare

Which Technique to Retroflex

A. Two-hands technique

B. One-hand technique
FULL RETROFLEXION CAPABLE

Small dial: fully right
Large dial: fully up

One-hand retroflexion technique

CRITICAL

STOP

Two Hands Technique
Appearance of Gastric Varices

<table>
<thead>
<tr>
<th>Radiology based of Afferent Vein Classification</th>
<th>Endoscopic Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Red Spot Location Form/Shape</td>
</tr>
<tr>
<td>Type 2</td>
<td>Sarin Classification</td>
</tr>
<tr>
<td>Type 3</td>
<td></td>
</tr>
</tbody>
</table>

Sarin Classification

Endoscopic Classification

- Red Spot
- Location
- Form/Shape

Endoscopic Classification

- Tortuous
- Nodular
- Tumor-like
- Red-spot

Fibrin Clot

RR=2.5

RR=1.9
What would you do?

A. Wash the circled area
B. Prepare banding or looping
C. Call IR for TIPS
D. Glue injection

DON’TS

Water-jet
Banding Patient was referred after banding
Looping Before and A few days after
Injecting and Minimizing Embolization

- Not all cyanoacrylate is the same
- Use standardize glue injection technique for gastric varices (Seewald, Soehendar, GIE 2008)
- Use straight n-butyl-2-cyanoacrylate

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Setting time</th>
<th>Glue Injection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histoacryl, Indermil, Glubran 2, Liquiband, Skin Link</td>
<td>Fast</td>
<td>n-Butyl-2-cyanoacrylate Mixed with Lipiodol</td>
</tr>
<tr>
<td>Dermabond, SurgiSeal</td>
<td>Slower</td>
<td>2-Ocyl cyanoacrylate</td>
</tr>
</tbody>
</table>

Where to Inject

- Not into the Fibrin Clot
- It may dislodge it.
- A few mm away from clot
- INTRAvariceal
- Submucosal injection causes ulcer formation
**DON’TS**

- **Inject at the Fibrin Clot**
  (Wall is thinnest, fragile, and may be removed when pulling the needle)

- **Hesitate**
  Also, test trajectory and account for expirations

- **Stick needle into varix**

**How Fast?**

- Straight n-Butyl-2-Cyanoacrylate
Wear protection including goggles

Use distilled water; not saline

Ensure intravariceal; submucosal injection causes ulceration

Do not suction glue into endoscope

Lubricate tip of the endoscope and end of channel
STANDARDIZED GLUE INJECTION FOR GASTRIC VARICES

Seewald S, Ang TL, ...., Soehendra N. GIE 2008
Repeat glue injections of 1mL until hemostasis is achieved.

1mL at a time!!!

Data Supporting the Use of Straight n-butyl-2-cyanoacrylate injection

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Cyanocrylate Group I (n = 30)</th>
<th>Beta-blocker Group II (n = 20)</th>
<th>No treatment Group III (n = 30)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GV Blood</td>
<td>3/30 (10%)</td>
<td>11/29 (38%)</td>
<td>16/30 (53%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Bled from GOV2</td>
<td>2/26 (4%)</td>
<td>11/25 (47%)</td>
<td>13/25 (52%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Bled from IGV1</td>
<td>1/4 (33%)</td>
<td>0/4</td>
<td>3/5 (60%)</td>
<td>0.197</td>
</tr>
<tr>
<td>Increase in GV size</td>
<td>0</td>
<td>11/29 (33%)</td>
<td>13/30 (43%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Decrease in GV size</td>
<td>25/25 (100%)</td>
<td>0</td>
<td>0</td>
<td>0.002</td>
</tr>
<tr>
<td>Appearance of esophageal varix</td>
<td>7/30 (23%)</td>
<td>3/29 (10%)</td>
<td>3/30 (10%)</td>
<td>0.216</td>
</tr>
<tr>
<td>Aggravation/appearance of PHG</td>
<td>7/30 (23%)</td>
<td>2/29 (7%)</td>
<td>3/30 (10%)</td>
<td>0.154</td>
</tr>
<tr>
<td>Bled related mortality</td>
<td>0/30</td>
<td>3/29 (10%)</td>
<td>5/30 (24%)</td>
<td>0.034</td>
</tr>
<tr>
<td>GOV2</td>
<td>0/26</td>
<td>3/25 (12%)</td>
<td>5/25 (20%)</td>
<td>0.025</td>
</tr>
<tr>
<td>IGV1</td>
<td>0/4</td>
<td>0/4</td>
<td>1/5 (20%)</td>
<td>1</td>
</tr>
<tr>
<td>Overall mortality</td>
<td>2/30 (7%)</td>
<td>5/29 (17%)</td>
<td>8/30 (26%)</td>
<td>0.113</td>
</tr>
<tr>
<td>GOV2</td>
<td>2/26 (8%)</td>
<td>5/25 (20%)</td>
<td>6/25 (24%)</td>
<td>0.122</td>
</tr>
<tr>
<td>IGV1</td>
<td>0/4</td>
<td>0/4</td>
<td>2/5 (40%)</td>
<td>0.464</td>
</tr>
<tr>
<td>Complications</td>
<td>1 (3%)</td>
<td>1 (3%)</td>
<td>2 (7%)</td>
<td>1</td>
</tr>
</tbody>
</table>

GV, gastric varix; SD, standard deviation; GOV2, gastroesophageal varix type 2; IGV1, isolated gastric varix type 1; PHG, portal hypertensive gastropathy.

Sarin – Personal communication 1/2012
Reddy – Personal communication 1/2012
Complications of Cyanoacrylate for GV

763 patients (73% male, 70% HBV cirrhosis)
51 patients (6.8%) had complications:

Causes of embolization:
1. Large amount of glue/injection
2. Fast injection
3. Slow polymerization
4. Glue is flushed out from varix

Embolization

Note: Risks of death during admission of GV bleeding is up to 30%

F/U Regimen

4 days later
2 months later
Yearly
7 days of antibiotics

11/2007
5/2011
12/2011
**Glue to Treat Esophageal Varices**
- Complex varix
- Massive bleeding
- Failed therapy
- Contraindication to TIPS

Life flighted due to massive variceal bleeding.
Did not stop with banding (fibrosis) or sclerotherapy.
Clip to temporize while glue was drawn

INTRAvariceal
No further bleeding.

CONCLUSIONS

- Glue injection can be performed using a standardized protocol.
- Well-studied and described; can be performed with favorable benefits/risks ratio.