

Management of Acute GI bleed Emergencies

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Conflicts of Interest: none

Background

- Acute upper GI bleed: bleeding arising proximal to ligament of Trietz
- Variceal or Non Variceal
- Presentation:
 - haematemesis, melaena, haematochezia, shock
 - syncope, fatigue, SOB
 - coffee ground vomiting: non-specific, may be due to obstruction

Background

- 1/2000 adults in UK admitted each yr with UGI bleed
- District Hospitals: 50-80 cases/yr per 100,000 population
- >2/3 aged over 60 years
- Overall mortality 4 -10% ... slight reduction in past 2 decades
- Mortality increases with age
- Several guidelines: SIGN, NICE, BSG, ESGE, Baveno

UGI bleeding - causes

Cause of bleeding	Relative frequency (% of whom any abnormality was identified at OGD)
Peptic Ulcer	44
Oesophagitis	28
Gastritis/Erosions	26
Erosive duodenitis	15
Varices	13
Portal Hypertensive Gastropathy	7
Malignancy	5
Mallory Weiss Tear	5
Vascular Malformation	3
In 20% presenting with apparent UGI bleeding, OGD does not reveal a cause	

Management

1. Pre-endoscopy: resuscitation, risk stratification, drugs
2. Endoscopy: timing, assessment of lesion and treatment
3. Post-endoscopy: drugs, H pylori eradication, follow up

Pre - Endoscopic Management

Pre Endoscopic Management

- Airways and Breathing:

- Prophylactic intubation: does not reduce pneumonia, length of stay or mortality
- ESGE (non variceal bleed): intubation only in severe bleed, agitation or inability to protect airways
- Baveno VII (variceal bleed): intubation in patients with altered consciousness and actively vomiting blood, with extubation as soon as possible after endoscopy

Pre Endoscopic Management

- Circulation:
 - IV access: large bore peripheral IVs best
 - Use crystalloids/ colloid first
 - Anticipate need for blood transfusion
 - Threshold should be based on underlying condition, hemodynamic status, markers of tissue hypoxia
 - Should be administered if $Hb \leq 70$ g/L
 - 1 unit PRBC should raise Hb by 10 (Hct by 3%)
 - Initial Hct can be misleading (Hct remains same with loss of whole blood, until re-equilibration occurs)
 - Correct coagulopathy

Transfusion: NICE 2012

- Transfuse patients with massive bleeding with blood, platelets and clotting factors in line with local protocols for managing massive bleeding.
- Base decisions on blood transfusion on the full clinical picture, recognising that over-transfusion may be as damaging as under-transfusion.

Transfusion: NICE 2012

- Do not offer platelet transfusion if not actively bleeding and haemodynamically stable.
- Offer platelet transfusion if actively bleeding & platelets $<50 \times 10^9/l$
- Offer FFP if Fibrinogen level $<1g/l$ or, PT or APTT $>1.5X$ normal
- Offer prothrombin complex concentrate if on warfarin & actively bleeding
- Do not use recombinant factor VIIa except when all other methods have failed

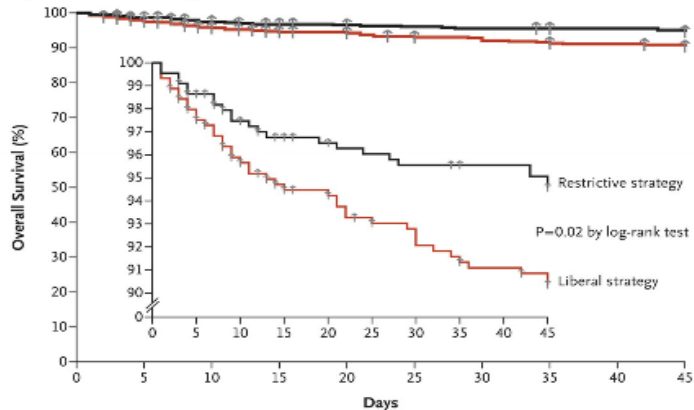
Transfusion Strategy

- Randomized trial:
 - 921 subjects with severe acute UGIB
 - **Restrictive** (tx when Hb<70; target 70-90)
 - vs.
 - **Liberal** (tx when Hb<90; target 90-110)
 - Primary outcome: all cause mortality rate within 45 days

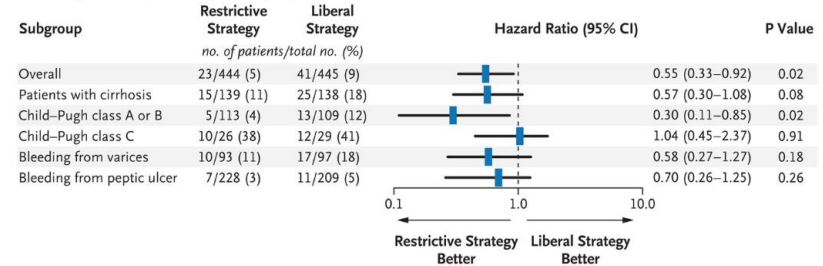
Restrictive Strategy Superior

	Restrictive	Liberal	P value
Mortality rate	5%	9%	0.02
Rate of further bleeding	10%	16%	0.01
Overall complication rate	40%	48%	0.02

A Survival, According to Transfusion Strategy



B Death by 6 Weeks, According to Subgroup



Benefit seen primarily in Child A/B cirrhotics

Risk Stratification

- Identify patients at high risk for adverse outcomes
- Helps determine disposition (ICU vs. med ward vs. outpatient)
- May help guide appropriate timing of endoscopy
- Rockall, Blatchford (Glasgow), Addenbrook , AIM65 etc

Rockall Scoring System

- Validated predictor of mortality in patients with UGIB
- 2 components: clinical + endoscopic

	Score			
Variable	0	1	2	3
Age	<60	60-79	≥80	
Shock	'No shock', systolic BP ≥100 pulse <100	'Tachycardia', systolic BP ≥100 pulse ≥100	'Hypotension', systolic BP <100	
Comorbidity	No major comorbidity		Cardiac failure, ischemic heart disease, any major comorbidity	Renal failure, liver failure, disseminated malignancy
Diagnosis	Mallory-Weiss tear, no lesion identified and no SRH	All other diagnoses	Malignancy of upper GI tract	
Major SRH	None or dark spot only		Blood in upper GI tract, adherent clot, visible or spurting vessel	

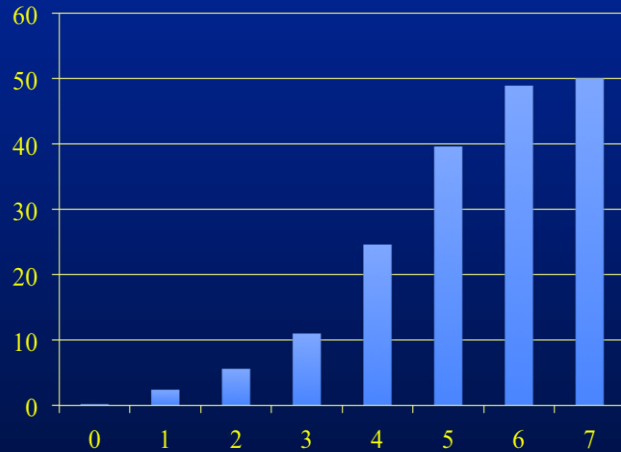
N=3981

PRE ENDOSCOPY MAX: 7 POST ENDOSCOPY MAX: 11

Rockall Score

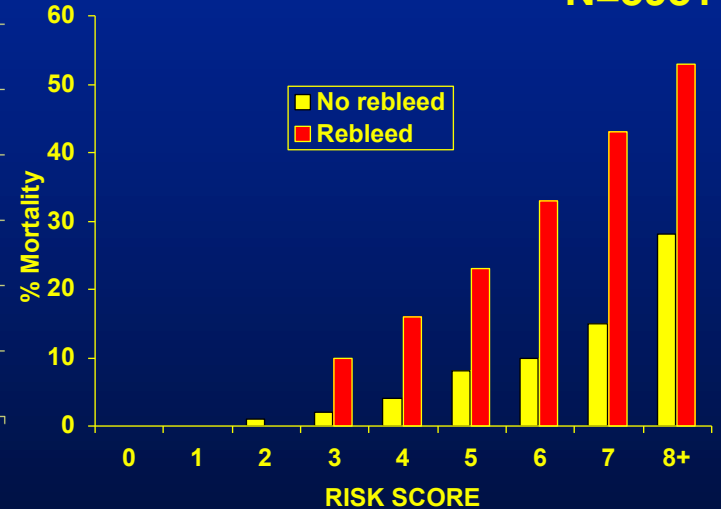
Pre Endoscopy score
0: 0.2% mortality
0.2% rebleed
=> early discharge?

Predicted mortality



Pre endoscopy score

N=3981



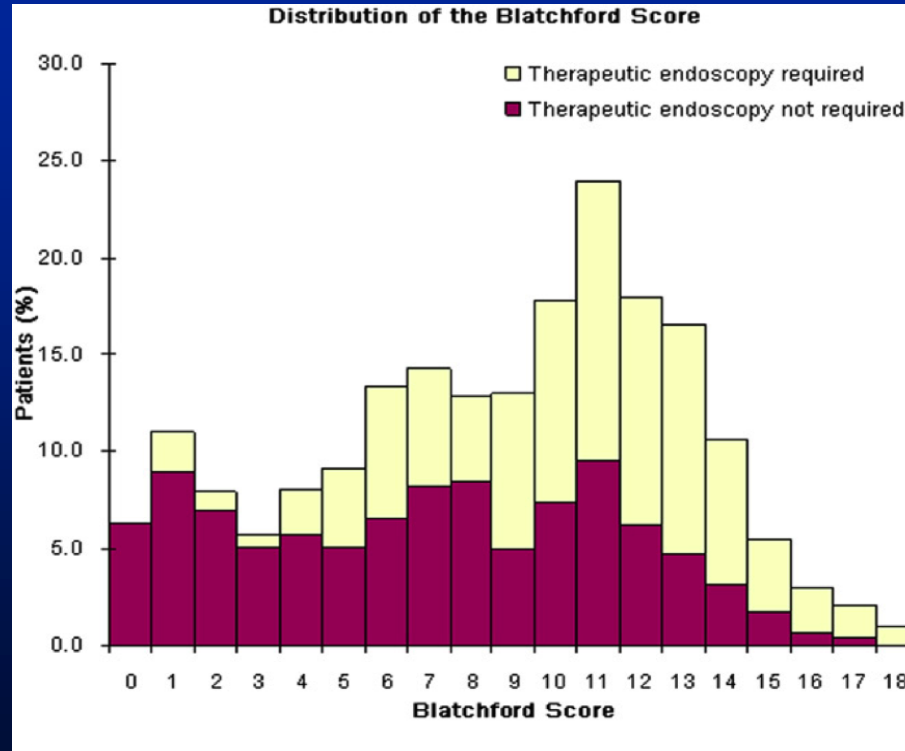
Post Endoscopy Score

Blatchford (aka Glasgow) score

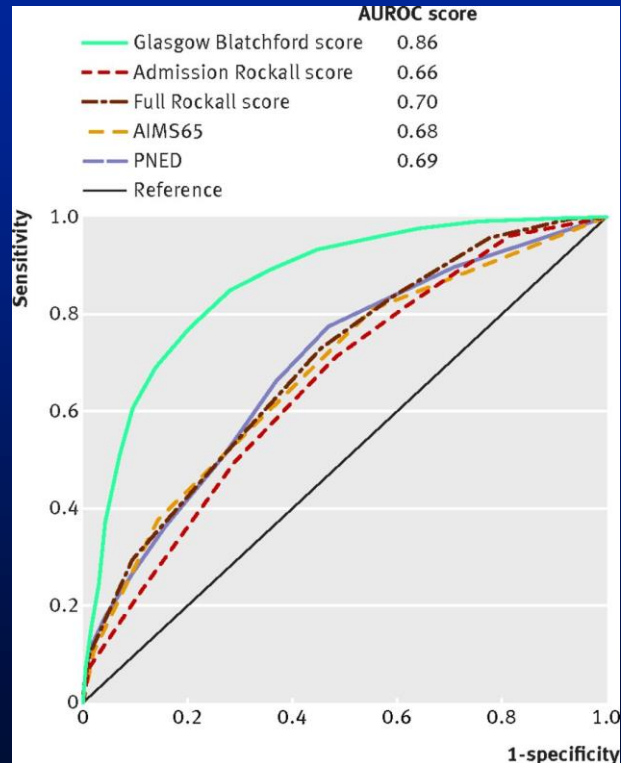
- Based on readily available clinical and lab data
- Predicts need for endoscopic therapy:
- Score > 0 → intervention
- Recommended by NICE 2012, and ESGE 2021

Table 9: The Blatchford score Admission risk marker	Score component value
Blood urea (mmol/L)	
≥6.5 <8.0	2
≥8.0 <10.0	3
≥10.0 <25	4
≥25	6
Haemoglobin (g/L) for men	
≥120 <130	1
≥100 <120	3
<100	6
Haemoglobin (g/L) for woman	
≥100 <120	1
<100	6
Systolic blood pressure (mm Hg)	
100-109	1
90-99	2
<90	3
Other markers	
Pulse ≥100 (per min)	1
Presentation with malaena	1
Presentation with syncope	2
Hepatic disease	2
Cardiac failure	2

Blatchford Score



Comparison of risk scoring systems in upper GI bleed



N = 3012 consecutive patients with UGIB over 12 months

Glasgow Blatchford score:

1. Best (AUROC) 0.86) at predicting intervention or death
2. **Score ≤ 1** was optimum threshold to predict survival without intervention (sensitivity 98.6%, specificity 34.6%).
3. **Score of ≥ 7** was optimum threshold to predict endoscopic treatment (sensitivity 80%, specificity 57%)

NICE 2012 / ESGE 2021

- Use risk assessment scores for all patients with UGIB:
 - Blatchford score at first assessment
- Consider early discharge if:
 - Blatchford score = 0 (NICE 2012)
 - Blatchford score \leq 1 (ESGE 2021)

Pre-endoscopic Pharmacotherapy

- For suspected Non-Variceal UGIB
 - IV PPI: 80 mg bolus, 8 mg/hr drip
 - Rationale: suppress acid, facilitate clot formation and stabilisation
 - Duration: at least until OGD, then based on findings
 - Recommended by ESGE 2015, not by NICE 2012 (after OGD if stigmata)
 - Cochrane meta-analysis of 6 RCTs (n=2223 patients) : PPIs before OGD:
 - Decreases incidence of high risk stigmata of hemorrhage at index endoscopy (37.2% vs. 46.5 %)
 - Decreases need for endoscopic haemostasis (8.6% vs. 11.7 %)
 - Has no effect on rebleeding, need for surgery, or mortality
- For suspected Variceal UGIB:
 - Prophylactic Antibiotics and a Vasoconstrictor (Terlipressin)

Vasoconstrictor therapy for varices

- Goal: reduce splanchnic blood flow
- Terlipressin – only agent shown to improve control of bleeding and survival in RCTs and meta-analysis; give for 5 days (NICE 2012)
- Vasopressin + nitroglycerine – too many adverse effects
- Octreotide (somatostatin analogue)
 - Decreases splanchnic blood flow (variably)
 - Efficacy is controversial; no proven mortality benefit
 - Standard dose: 50 mcg bolus, then 50 mcg/hr drip for 3-5 days

Antibiotics for varices

- Bacterial infection occurs in up to 66% of patients with cirrhosis and variceal bleed
- Negative impact on hemostasis (endogenous heparinoids)
- Prophylactic antibiotics reduces incidence of bacterial infection, significantly reduces early rebleeding
 - Ceftriaxone 1 g IV QD x 5-7 days
 - Alt: Norfloxacin 400 mg po BID

Other Pre-endoscopic Pharmacotherapy

- Tranexamic acid – not recommended (HALT-IT study, 2020)
- Somatostatin – not recommended
- iv Erythromycin (250mg) – recommended by ESGE 2015
improves visibility, reduces need for second look

Antiplatelets and Anticoagulants

- Aspirin
 - Primary prophylaxis => stop
 - Secondary prophylaxis => continue
- Dual APT
 - Coronary stent => continue, if stopped restart within 5 days, liaise with cardiologist
- Anticoagulants
 - Stop, correct coagulopathy: vit K, PCC etc
 - Restart ASAP when safe

Endoscopy: Timing, Assessment and Treatment

Timing of Endoscopy

NICE 2012 / ESGE 2021

- NICE 2012
 - Immediately after resuscitation: patients with severe acute UGIB
 - Within 24 hours of admission: all other patients with acute UGIB
- ESGE 2021
 - OGD should be performed “early” (≤ 24 hours) following hemodynamic resuscitation.
 - “Urgent” (≤ 12 hours) OGD not recommended since patient outcomes are not improved compared to early OGD.

Timing of Endoscopy

N=2944

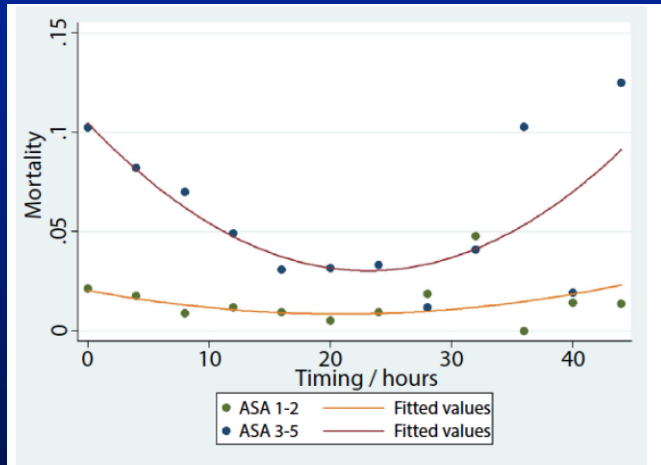


Figure 1. Association between timing of endoscopy and in-hospital mortality in hemodynamically stable patients.

Haemodynamically stable
ASA 3-5: best time 12-36hr

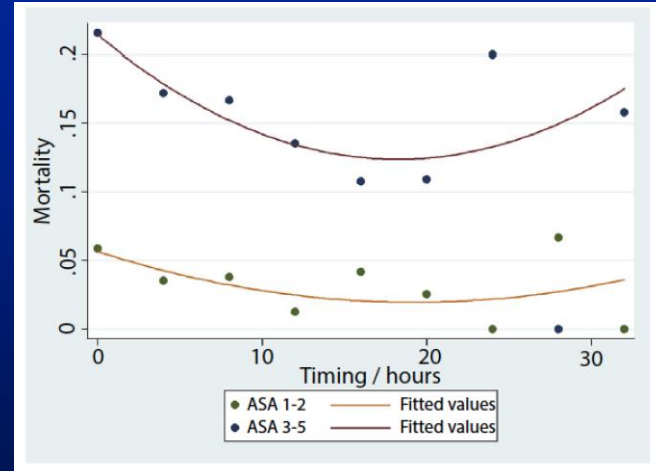
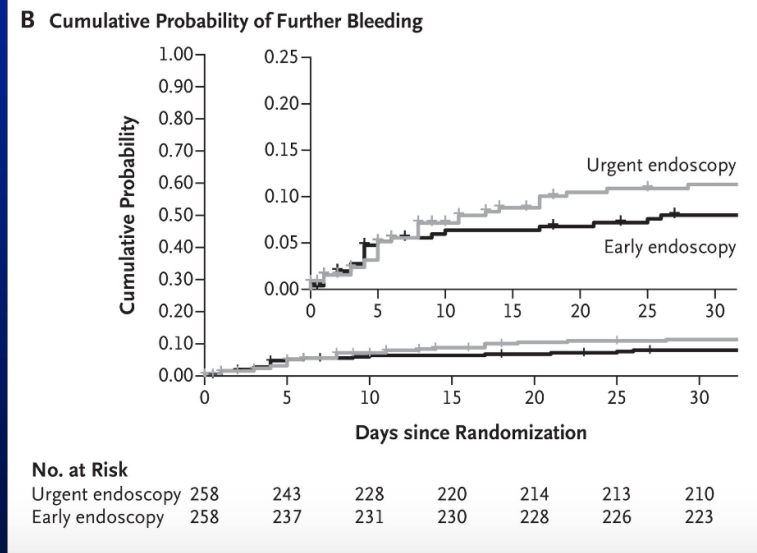
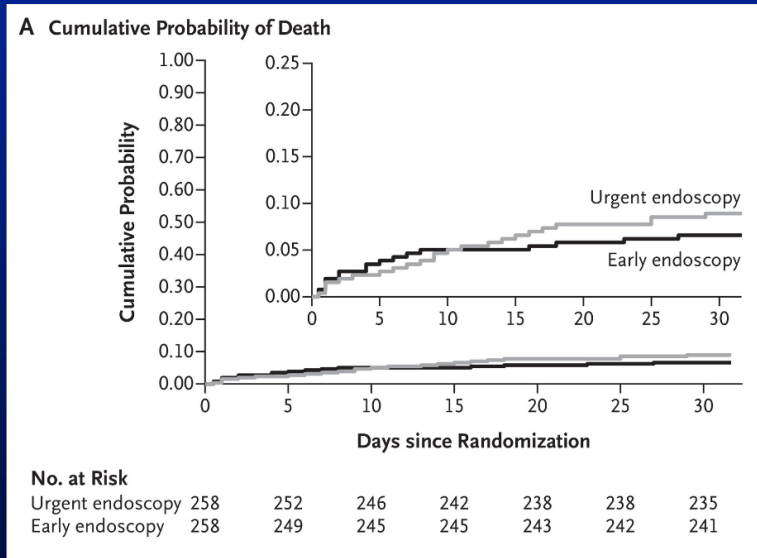


Figure 2. Association between timing of endoscopy and in-hospital mortality in patients with hemodynamic instability.

Haemodynamically unstable
ASA 3-5: best time 6-24hr

Timing of Endoscopy

N=516, Blatchford score >11 => randomised: urgent OGD < 6hr vs early OGD 6-24hrs

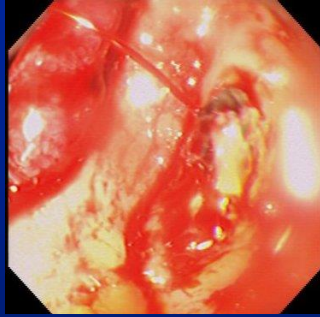


Patients with shock / unstable after initial resus were excluded

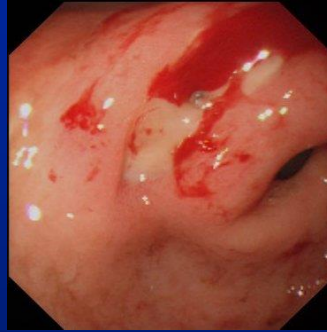
Mort 30 days : 8.9% vs 6.6%, Rebleed 30 days: 10.9% vs 7.8%

Endoscopy: Non Variceal Bleed

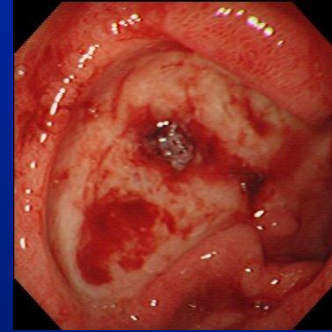
Forrest Classification, 1974



Ia spurter



Ib oozer



IIa visible vessel



IIb: clot

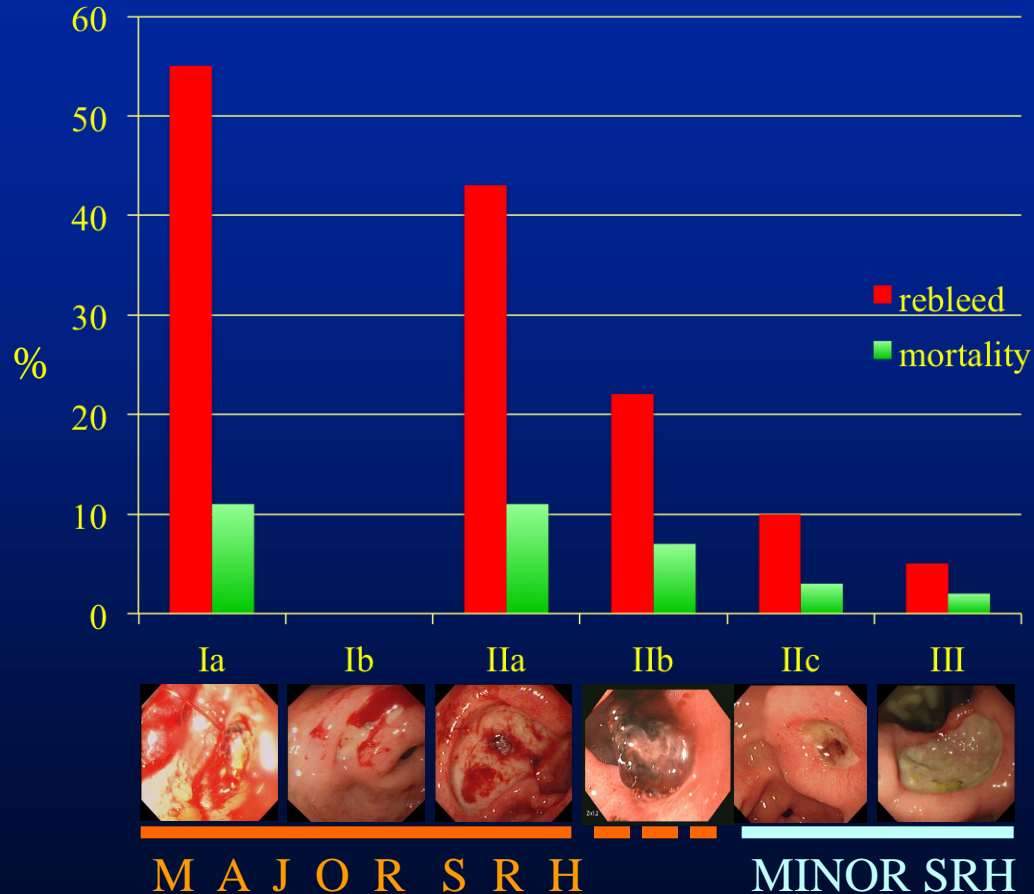


IIc: haematin spot



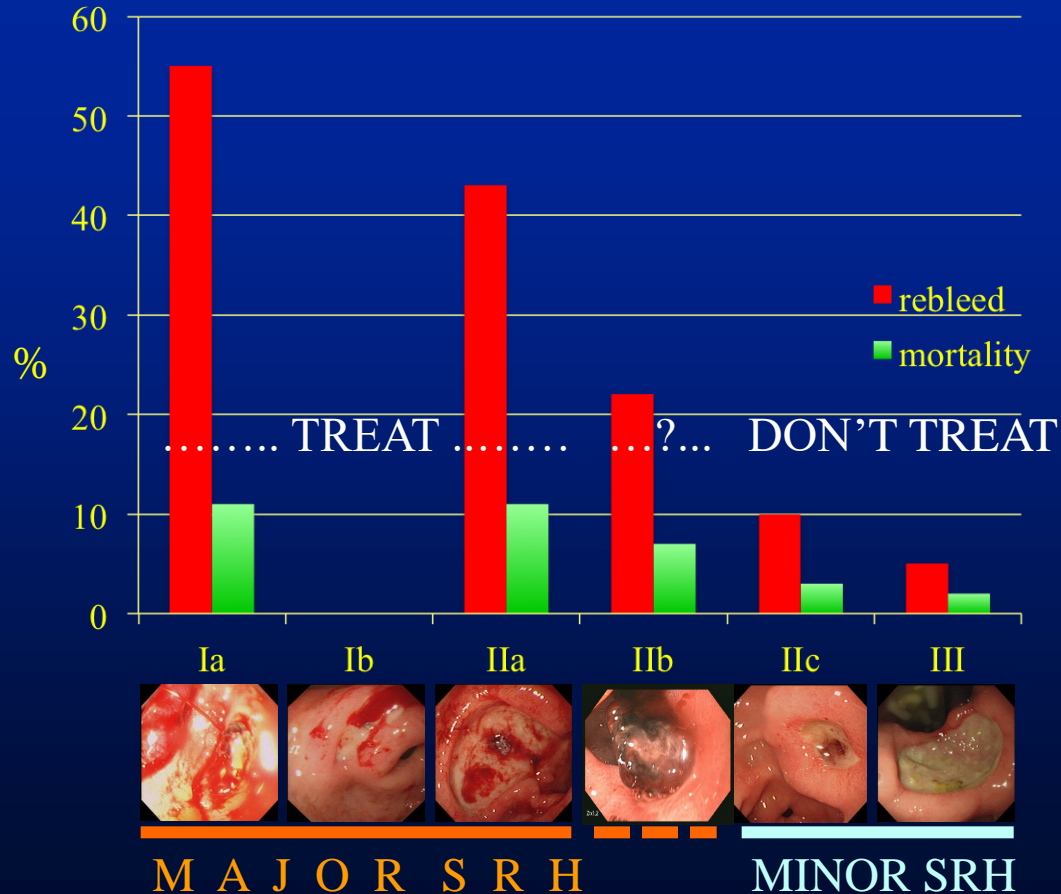
III: clean base

Forrest Classification and rebleed / mortality



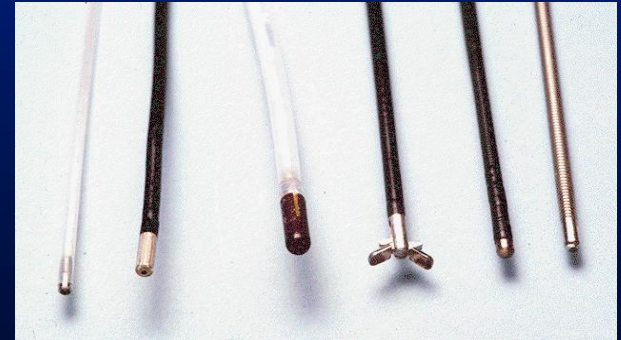
Forrest et al 1974,
Laine and Peterson 1994

Forrest Classification and rebleed / mortality



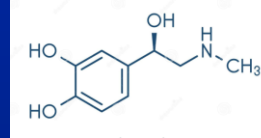
Endotherapy

- **Injection**
 - Adrenaline
 - Sclerosant: absolute ethanol, ethanolamine, STD, polidoconol
 - Histoacryl glue (gastric varices)
 - Thrombin, Fibrin
- **Thermal**
 - Contact: BICAP, Gold probe, Heater Probe
 - Non contact: APC, Laser
- **Mechanical**
 - Clips
 - Banding
- **Haemostatic Powder Spray, Purastat**
- **Others: stents**



Adrenaline

- Usual dilution 1:10,000, 0.5-2ml aliquots
- Causes vasoconstriction + tamponade
- For Non-variceal UGI bleed
- Volumes:
 - Large volume (>13ml) better than low volume (5-10ml) for reducing recurrent bleed in high risk PUD (Lin 2002)
 - 20ml vs 30ml vs 40ml in spurting/ oozing ulcers (Liou 2006)



	20ml	30ml	40ml
Recurrent bleed	20.3%	5.3%	2.8%
Perforation	0	0	5.3%
Epigastric pain	3%	7%	67%
Mortality	ns	ns	ns
Surgery	ns	ns	ns
Transfusion	ns	ns	ns

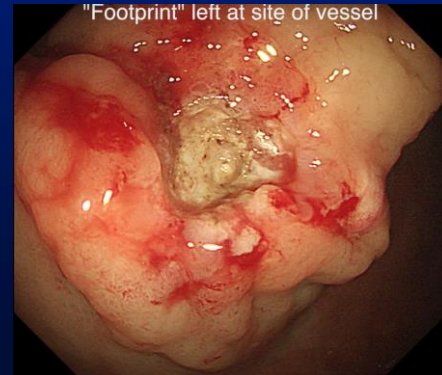
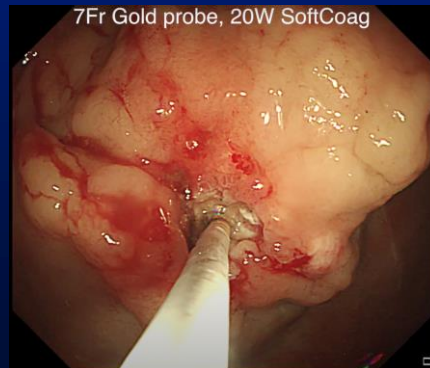
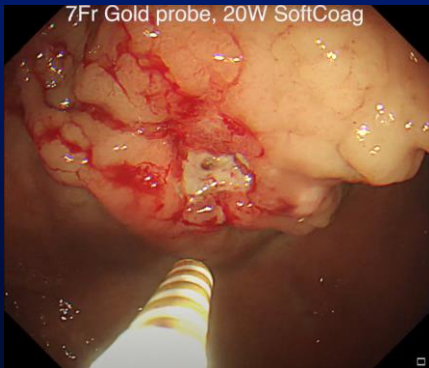
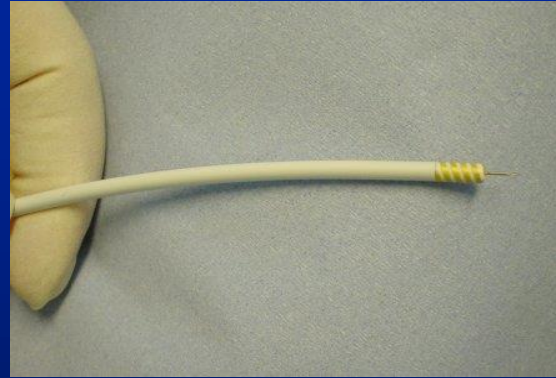


Non variceal GI Bleed

NICE 2012

- Do not use adrenaline as monotherapy
- Use one of the following:
 - a mechanical method (eg clips) +/- adrenaline
 - thermal coagulation with adrenaline
 - fibrin or thrombin with adrenaline

Thermal Treatment: eg Gold Probe for GU

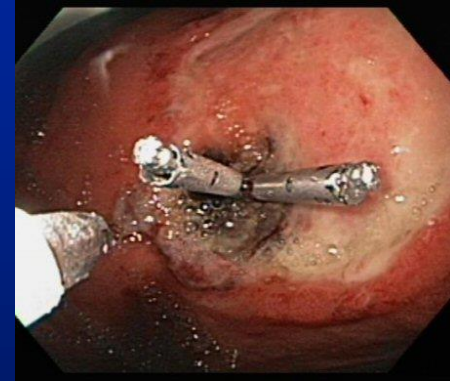


15-20W, 8-10 second application.... footprint

Clips – through the scope (TTS)



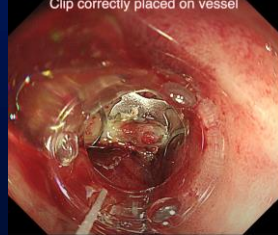
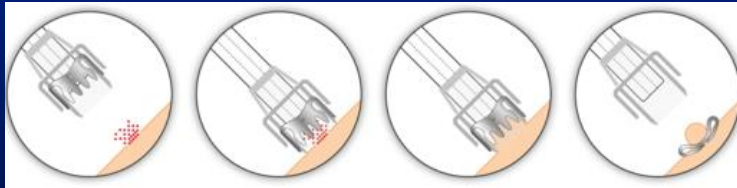
- a: Instinct (Wilson Cook)
- b: QuickClip2 (Olympus)
- c: Resolution (Boston)



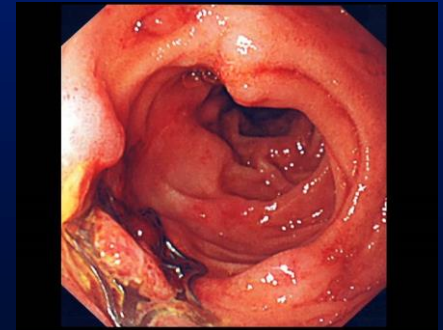
Clip	Jaw Span (mm)	Opening angle	MRI compatibility	Rotatability	Re-opening capability
Resolution (Boston)	11	72	y	y	y
Instinct (Cook)	16	125	y	y	y
Quickclip2 (Olympus)	9	85	n	y	n
QuickClip2 Long (Olympus)	11	85	n	y	n

Clips – over the scope (OTS)



OVESCO



PADLOCK

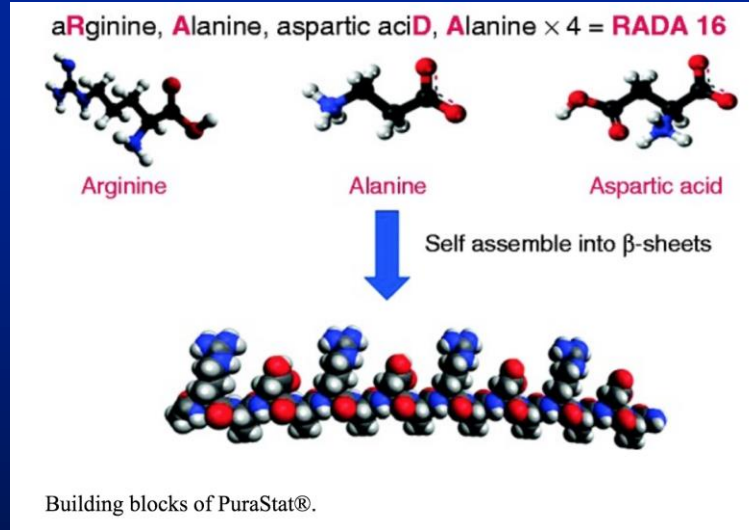


Haemostatic Powder Spray

Endoclot - EPI Premier	Hemospray - Wilson Cook
 A photograph showing the Endoclot - EPI Premier device, a small white and green rectangular unit, connected to a white catheter. A hand is holding the catheter, and the device is placed on a wooden surface.	 A photograph showing the Hemospray - Wilson Cook device, a white and red handheld spray nozzle, resting on a black circular tray. The tray has some red labels and is placed on a dark surface.
<p>Starch derived AMP* particles No human or animal component</p>	<p>Proprietary mineral blend powder = TC-325 No human/ animal proteins or botanicals</p>
<p>Air compressor propels powder through catheter</p>	<p>CO2 canister propels powder through catheter</p>
<p>Absorbs water from bleeding lesion => concentrates platelets, clotting factors and RBC => promotes clot formation + gelled matrix</p>	<p>Absorbs water from bleeding lesion => concentrates platelets, clotting factors and RBC => promotes clot formation + mechanical plug</p>

* Absorbable Modified Polymers

Purastat



3-D Matrix Ltd, Tokyo

Self-assembling synthetic peptide

A slightly viscous liquid that is applied to a bleeding area

Forms a transparent gel matrix which induces haemostasis

If initial endotherapy fails...

- If rebleed .. consider further OGD
- If bleeding not controlled after second OGD:
 - Consider salvage Tx: OTSC or haemostatic spray /gel
 - Interventional radiology / TAE
 - Surgery

Endoscopy: Variceal Bleed

Varices

- Prevalence in portal hypertension
 - Oesophageal varices: up to 85%
 - Gastric varices: 17-25%
- Risk of bleeding
 - Oesophageal varices 64% (within 3yr)
 - Gastric varices 25%
- Gastric varices
 - Bleed more profusely, leading to significant blood loss
 - Increased mortality
 - 35-90% risk of re-bleeding

OESOPHAGEAL VARICEAL (OV) BLEED

ESGE 2020 GUIDELINES

Resuscitation:
iv fluids, restrictive RBC tx
Terlipressin, Abx
Temporarily withhold antiplatelets and anticoagulants
Consider intubation for high risk patients

OGD within 12 hrs
after resuscitation

OV bleed confirmed => risk stratification

Band ligation

OV bleed controlled

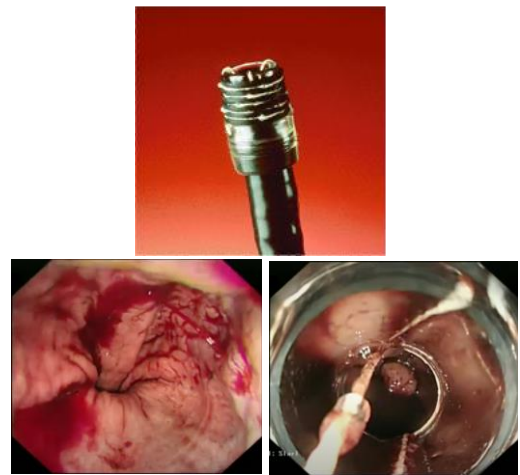
OV bleed persistent

Recurrent OV bleed within 5 days

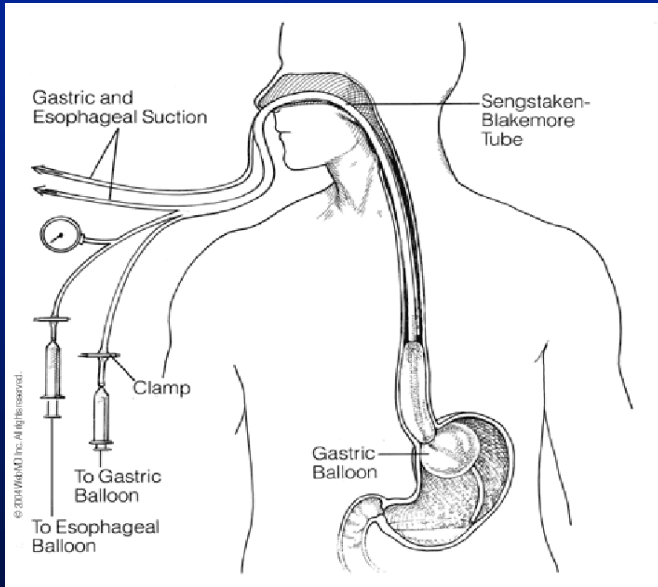
1. Low risk of recurrent bleed
 - Terlipressin for up to 5 days + NSBB
 - OGD within 1-4 wks +/- band ligation
2. High risk of recurrent bleed
 - Consider pre-emptive TIPSS within 72 hrs (pref 24 hrs)

Consider urgent rescue TIPSS
or oesophageal stent => TIPSS
or Sengstaken tube => TIPSS

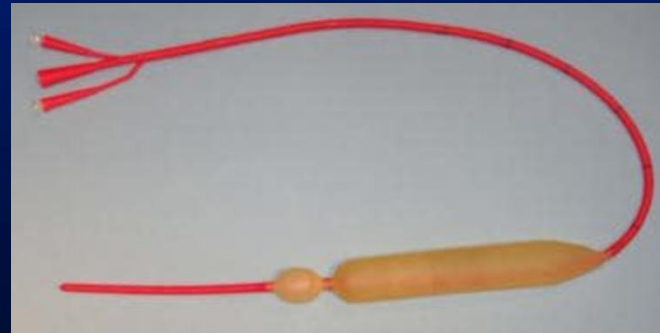
Second attempt at endotherapy
or salvage TIPSS



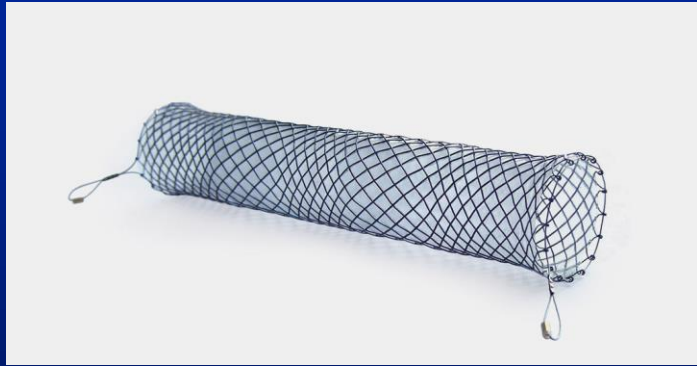
Sengstaken Blakemore Tube



- Very effective for immediate, temporary control
- High complication rate – aspiration, migration, necrosis + perforation of esophagus
- Use as bridge to TIPSS within 24 hours
- Airway protection strongly recommended

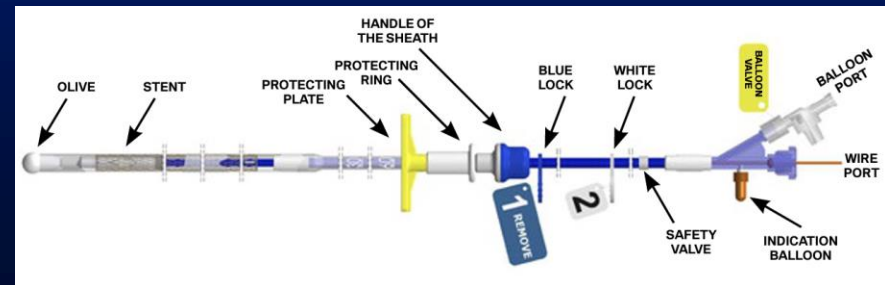


Danis Stent



- Self expanding silicone covered nitinol stent.
- Indication: refractory oesophageal variceal bleed.
- Length: 135 mm.
- Diameter: 25mm (body) / 30mm (ends), 2mm uncovered at ends.
- Balloon assisted deployment system.
- Fluoroscopic or endoscopic guidance not necessary.
- Remove within 7 days (dedicated extractor available)
- Cost: £1495 (stent), £695 (extractor).

REF No.	SX-ELLA Stent Danis			Delivery system	
	Stent flares diameter [mm]	Stent body diameter [mm]	Nominal length [mm]	Active length [cm]	Outer diameter [F]
019-08S-25-135	30	25	135	60	28 / 20
019-08S-25-135-B	30	25	135	60	28 / 20



NICE Recommendations, 31 March 2022

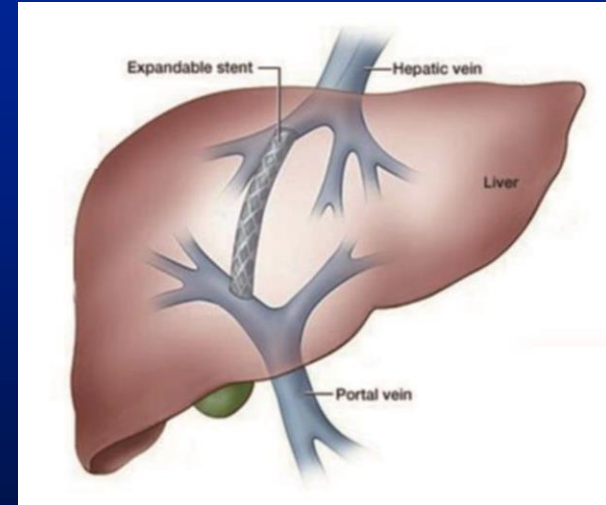
- 1.1 Evidence supports ... adopting Danis stent for **treating acute oesophageal variceal bleeding**. ... improves short-term control of bleeding compared to balloon tamponade and can be left in place for longer, allowing time for stabilisation.
- 1.2 Danis stent should be considered for ...
 - **Refractory acute oesophageal variceal bleeding in patients being considered for definitive treatment.**
 - **Palliation**
- 1.3 Danis stent is **cost saving** compared with balloon tamponade... Danis stent results in a **shorter stay in intensive care**. To be cost saving, Danis stent needs to decrease intensive care stay by approximately **1 day or more**.

TIPSS

A channel created between a branch of hepatic vein and branch of portal vein using an expandable metal stent, which shunts blood away from high resistance portal circulation

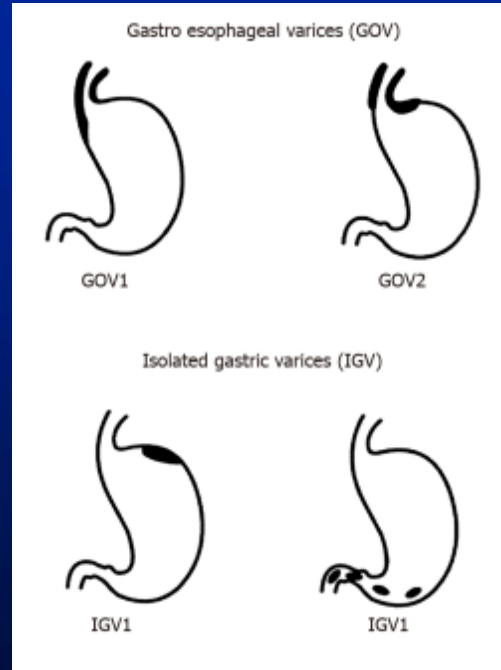
Indications:

- Traditional:
 - Refractory ascites
 - Salvage Tx for refractory AVB* when Child-Pugh ≤ 13
- New:
 - Pre-emptive Tx within 72 hrs in patients with AVB* at high risk of rebleeding (Child-Pugh 8-9 with active bleeding at endoscopy or Child-Pugh 10-13)



*AVB = acute variceal bleeding

Gastric Varices - classification

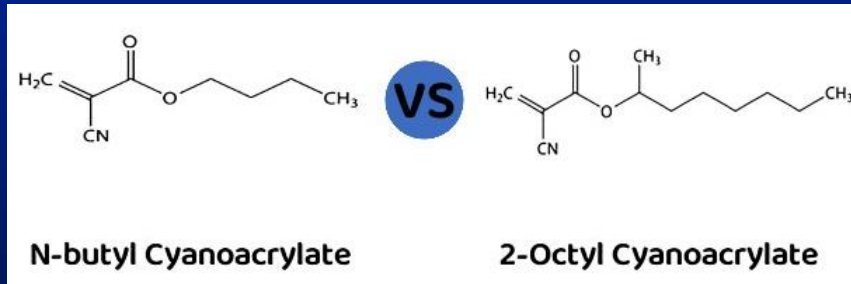


Management of Gastric Varices

- Banding (GOV1 only)
- Cyanoacrylate glue
- Thrombin
- EUS guided placement of coils +/- glue
- Sengstaken tube (cardiofundal varices: GOV1/2, IGV1)
- TIPSS (transjugular intrahepatic portosystemic stent shunt)
- BRTO (balloon-occluded retrograde transvenous obliteration)

Cyanoacrylate Glue

- Glue (monomer) + blood => polymerisation
- 4 carbon (butyl) preparations polymerise much faster than 8 carbon (octyl) preparations



C₈H₁₁NO₂

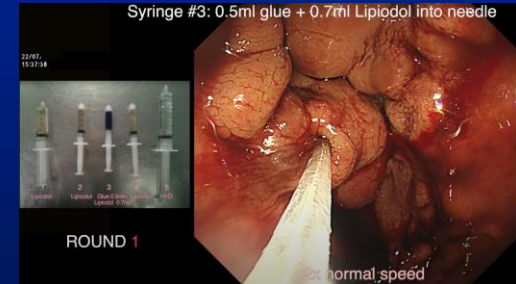


Usually diluted with Lipiodol
Can be used undiluted

C₁₂H₁₉NO₂

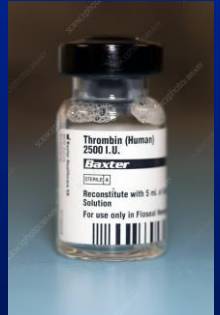


Not diluted



Thrombin

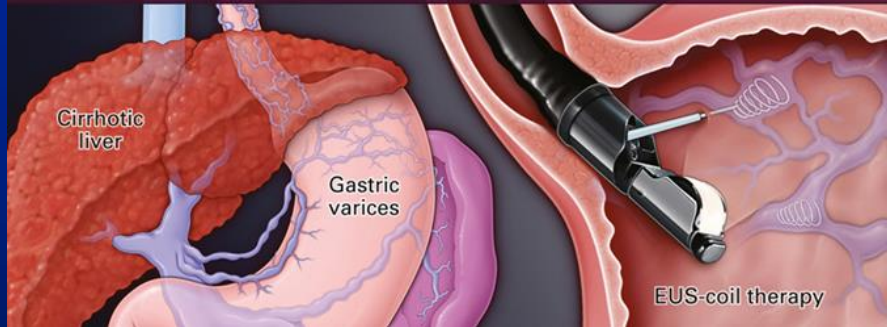
- Acts as a haemostatic agent by converting **fibrinogen to a fibrin clot**.
- First described as a management option for gastric varices in 1947.
- Bovine thrombin used originally, now human recombinant thrombin.
- Indications: gastric and ectopic varices
- Injected using 23GA sclerotherapy needle directly into varix.
- Similar efficacy to glue
- Advantages of glue: ease of use, less embolic complications, less risk of damage to scope.



EUS guided coiling +/- glue or gelatin sponge



Endoscopic Ultrasound-Guided Coil Injection Therapy in the Management of Gastric Varices



Primary outcomes

Technical Success	106/106 (100%)
Clinical Success	94/106 (88.7%)
Adverse Events	
Intraprocedural	2 (1.8%)
Active bleeding from puncture site	1 (0.9%)
Systemic embolization	1 (0.9%)
Post procedure	5 (4.7%)
Transient Fever	3 (2.8%)
Abdominal pain	1 (0.9%)
Systemic embolization	1 (0.9%)

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Bazarbashi et al 2024

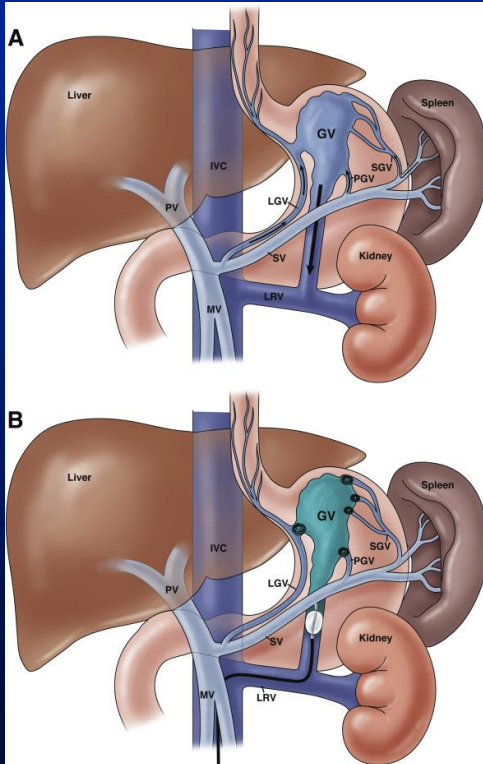
Coil injected into varix via 22G or 19G needle under EUS guidance.

Coil has synthetic fibres attached to it. Fibres slow down blood flow in vessel & promote blood-clot formation, thus occluding vessel.

Glue can be injected after coil => glue attaches to fibres of coil => less risk of embolization.

Gelatin sponge can be injected after coil as alternative to glue.

BRTO for gastric varices



- Minimally invasive technique introduced in 1996 for management of GV-related bleeding (Waguri et al)
- A balloon catheter is inserted into gastro-renal shunt via left renal vein by either the transjugular or transfemoral approach.
- The outflow of the gastro renal shunt is blocked by inflating the balloon, and 5% ethanolamine oleate is injected retrogradely.
- Sclerosant remains stagnant in vessels with overnight balloon occlusion
- Modifications: plug assisted obliteration, coil assisted obliteration
- Less PSE but more aggravation of oes Vx compared to TIPSS

GASTRIC VARICEAL (GV) BLEED
ESGE 2020 GUIDELINES

Resuscitation:
iv fluids, restrictive RBC tx
Terlipressin, Abx
Temporarily withhold antiplatelets and anticoagulants
Consider intubation for high risk patients

OGD within 12 hrs
after resuscitation

GV bleed confirmed => Sarin classification

Cyanoacrylate injection
Cyanoacrylate or band ligation for GOV-1
EUS guided coiling + cyanoacrylate if available

GV bleed controlled

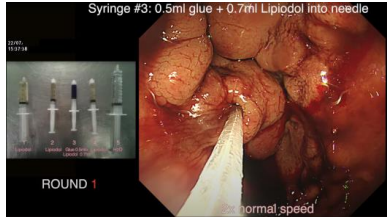
GV bleed persistent

Recurrent GV bleed within 5 days

- Terlipressin for up to 5 days + NSBB
- 2ndry prophylaxis on individualized basis
- High risk of recurrent bleed - consider pre-emptive TIPSS

Consider urgent rescue TIPSS or BRTO
or Sengstaken tube => TIPSS or BRTO

TIPSS or BRTO
or second attempt at endotherapy
(EUS guided coil+ glue)



Post Endoscopy

Post Endoscopy - Drugs

- **Non Variceal UGIB:**
 - High dose PPI for patients receiving endotherapy and untreated FIIb ulcer
 - IV 80mg stat => 8mg/hr for 72 hrs or IV or oral high dose PPI bd can be considered
 - Oral high dose PPI bd for 2 weeks
 - H. Pylori: assess at index OGD – eradicate if +ve; test has poor sensitivity, if –ve retest in 4 weeks
 - Resume oral anticoagulants as soon as bleeding controlled (pref within 7 days)

Post Endoscopy - Drugs

- **Variceal UGIB:**
 - Continue Terlipressin for 2-5 days
 - Continue antibiotics for up to 7 days in cirrhotics
 - NSBB until varices eradicated

UGIB: Summary

- Advances in recent years:
- Restrictive RBC transfusion => improved outcome
- More accurate risk assessment => early decision making re early discharge
- Increased use of Antiplatelet/ Anticoagulants => complex pre and post endoscopy management guidelines
- Endotherapy has rapidly evolved: multiple haemostatic techniques
- If endotherapy fails:
 - Interventional radiology /embolisation (NVUGIB)
 - TIPSS (VUGIB): rescue and ?pre-emptive
- Surgery rarely required

Thank You