



Gastric Varices Novel Management

Vikash G Lala



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL



Wits University
**Donald Gordon
Medical Centre**



SAGES
South African
Gastroenterology Society



INTRODUCTION

- Prevalence = 17% - 25%
- More common - prehepatic PHT
- Splenic vein thrombosis with left-sided PHT
- Gastric varices = CSPH
- Bleed at lower portal pressures vs esophageal varices
- Bleeding from cardiofundal varices = 16%-45% at 3 years.
- Predictors of bleeding:
 - Size (>10 mm),
 - Red wale/nipple
 - Liver disease severity

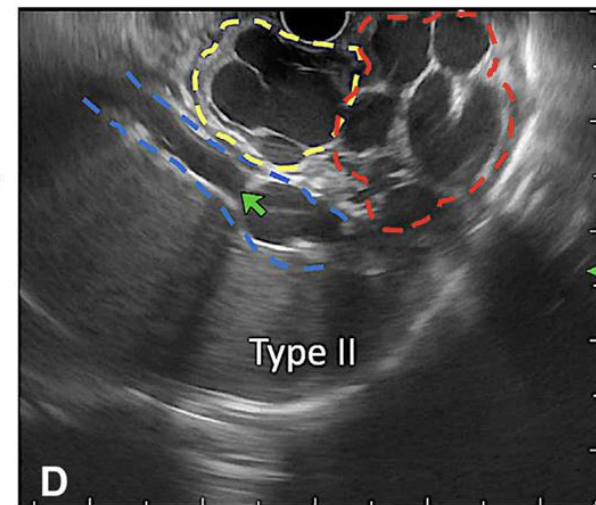
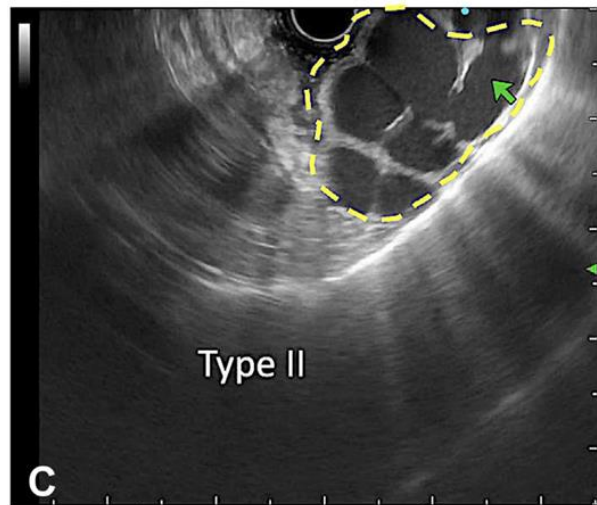
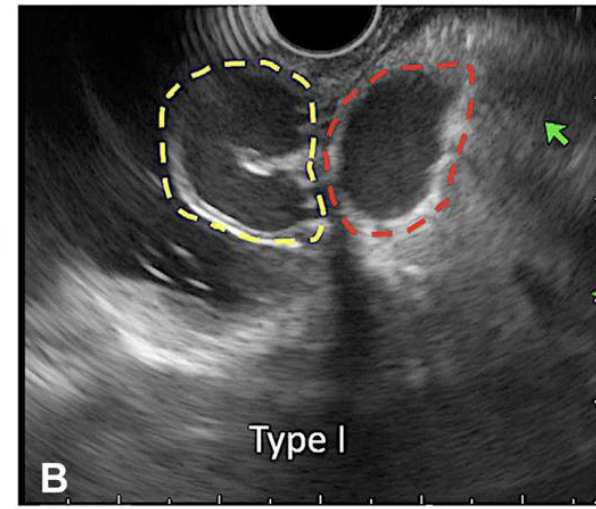
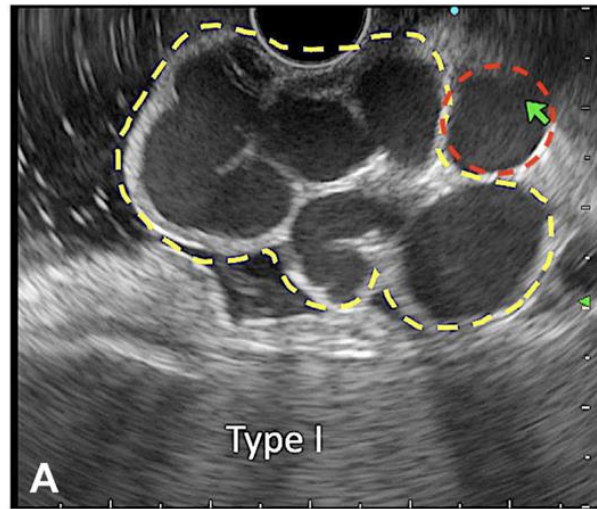
Table1 Classification systems for gastric varices

A. Sarin's classification of gastric varices ¹	
Gastroesophageal varices GOV1 GOV2	Varices in continuity with esophageal varices Along the lesser curvature Along the greater curvature extending toward the gastric fundus
Isolated gastric varices IGV1 IGV2	Isolated cluster of gastric varices in the gastric fundus Isolated gastric varices in the other parts of the stomach
B. Hashizume classification of gastric varices ²	
Form	F1 (tortuous), F2 (nodular) and F3 (tumorous)
Location	La (anterior), Lp (posterior), Ll (lesser curvature), Lg (greater curvature), Lf (fundus)
Color	Cw (white), Cr (red)
RCS	Glossy, thin-walled focal redness on the varix
C. Hoskins and Johnson's classification of gastric varices ³	
Type 1	Inferior extension of esophageal varices across the squamo-columnar junction
Type 2	Gastric varices located in fundus, which appear to converge to cardia with esophageal varices
Type 3	Gastric varices in fundus or body in the absence of esophageal varices
D. Arkawa classification of gastric varices ⁴	
Type I Ia Ib	A single supplying vessel forms a fundic varix Plural supplying vessels join and form a varix that drains into a single vessel
Type II	Gastric varices with multiple communications with vessels in stomach wall
E. Mathur's classification of gastric varices ⁵	
Type 1	Esophageal varices with lesser curvature varices
Type 2	Esophageal varices with fundal varices (2a—subcardiac and 2b—diffuse fundal)
Type 3	Isolated fundal varix (3a—due to splenic vein thrombosis, 3b—due to generalized portal hypertension)
Type 4	Lesser curvature gastric varices with esophageal varices with fundal varices
Type 5	Antral varices

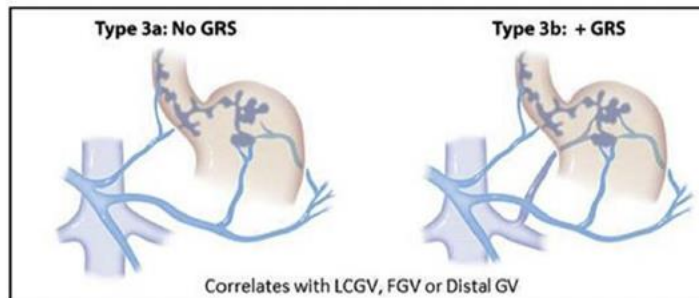
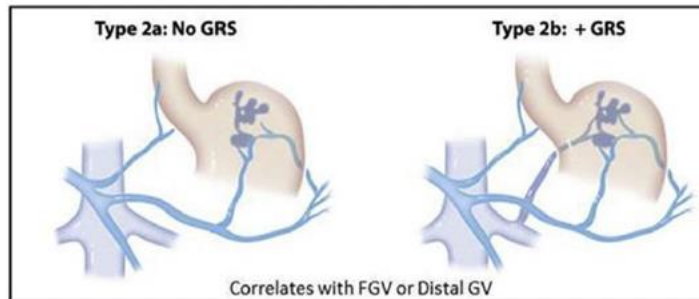
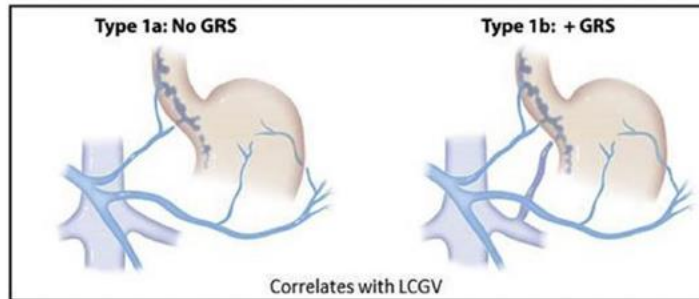
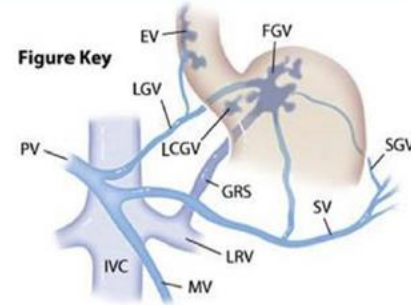
Abbreviations: GOV, gastroesophageal varices; IGV, isolated gastric varices; RCS, red color spot.

D. Arkawa classification of gastric varices⁴

Type I	
la	A single supplying vessel forms a fundic varix
lb	Plural supplying vessels join and form a varix that drains into a single vessel
Type II	Gastric varices with multiple communications with vessels in stomach wall



Saad-Caldwell Classification



- Describes variations in afferent flow into the gastric varix and efferent flow through the portosystemic shunt
- Type 1 – dominant portal venous feeder is LGV
- Type 2 – dominant portal venous feeder is PGV's or SGV's
- Type 3 – All venous feeders are involved w/ variable dominance
- Further defined by the absence (a) or presence of a GRS (b)
- Subtype implies therapeutic management

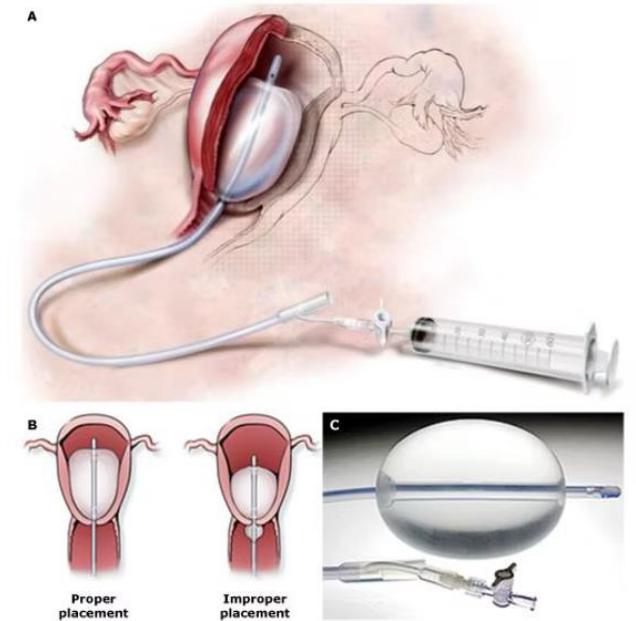
LEGEND

BRTO: Balloon-occluded Retrograde Transvenous Obliteration
 FGV: Fundal Gastric Varices
 GRS: Gastro Renal Shunt
 ECI: Endoscopic Cyanoacrylate Injection
 LGV: Left Gastric Vein
 LCGV: Lesser Curvature Gastric Varices
 LRV: Left Renal Vein
 PGV: Posterior Gastric Vein
 PSS: Portosystemic Shunts
 SGV: Short Gastric Vein
 SV: Splenic Vein
 TIPS: Transjugular intrahepatic portosystemic shunt

AGA Clinical Practice Update on Management of Bleeding Gastric Varices: Expert Review Henry Z., Patel K., Patton H., Saad W. (2021) *Clinical Gastroenterology and Hepatology*, 19 (6), pp. 1098-1107.e1.

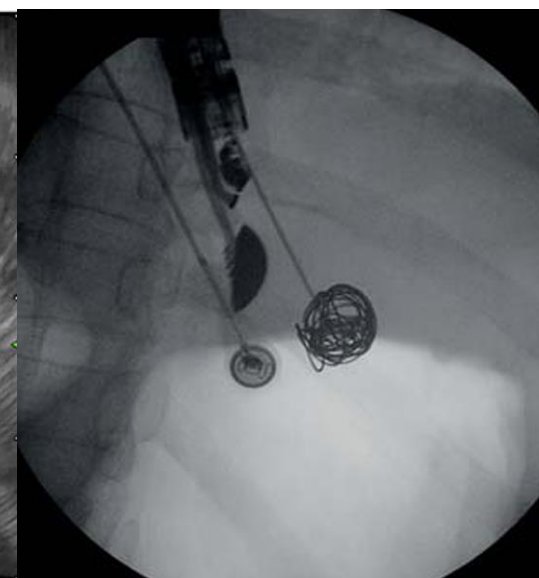
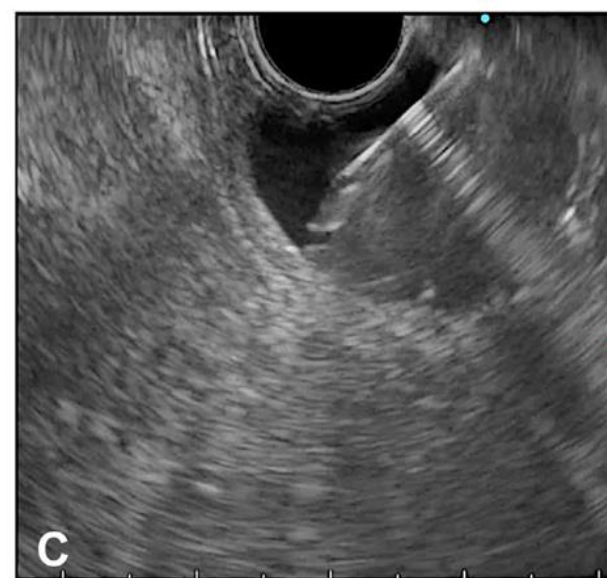
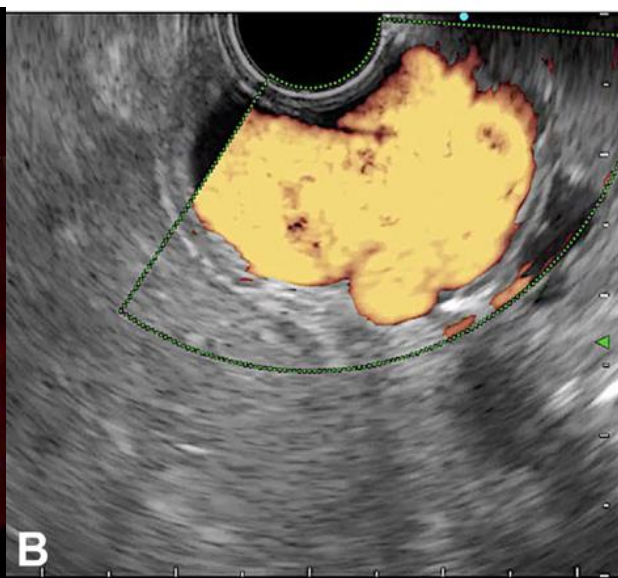
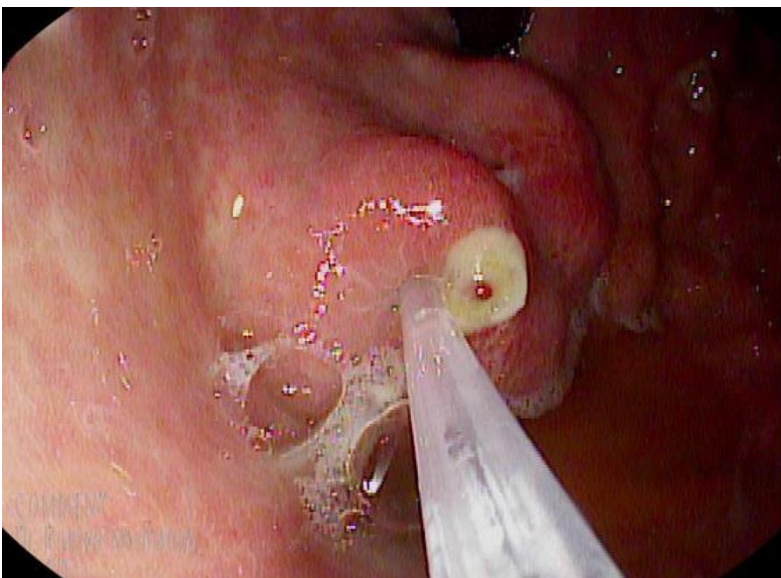
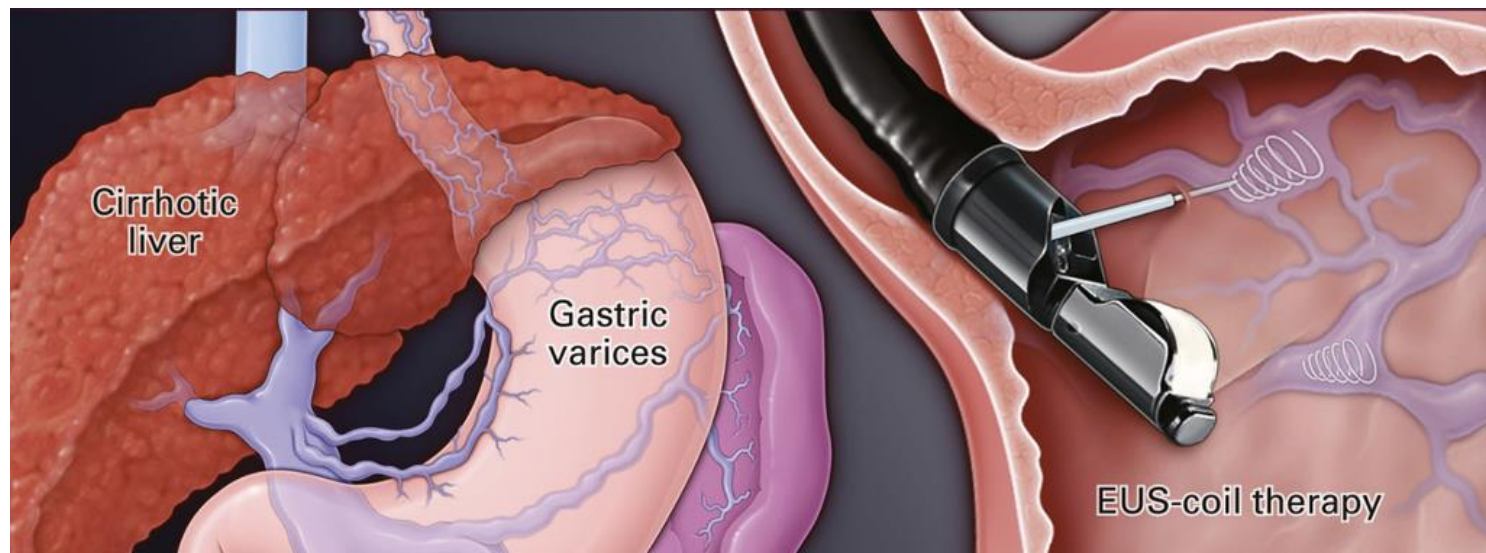
TREATMENT

- Endoscopic
 - EVL – GOV1
 - Low/moderate rates of bleeding control (45%–93%)
 - Higher rebleeding rates
 - No readily available options and varix can be completely suctioned cap
 - Gastroscopy - Glue injection - cyanoacrylate
 - Success rates > 87%–100%
 - Bakri Balloon
 - EUS – Glue ± coils



TREATMENT

- IR
 - Occlusive – BRTO, BATO, CARTO
 - Increased incidence – ascites, bleeding from esophageal varices
 - Improved liver function and reduce encephalopathy -redirecting portal flow toward the liver
 - Shunts - TIPSS
 - Large esophageal varices, significant ascites, PVT, absence of HE
 - Better for lesser curvature > cardiofundal



INDICATIONS

- Active bleeding
- Prophylaxis - high-risk fundal varices (GOV2/IGV1)
- Failed standard therapy
- Expert centre – IR availability

RECOMMENDATION

ESGE recommends endoscopic cyanoacrylate injection or EBL in patients with GOV1-specific bleeding.

Strong recommendations, moderate quality evidence.

RECOMMENDATION

ESGE recommends endoscopic cyanoacrylate injection for acute gastric (cardiofundal) variceal (GOV2, IGV1) hemorrhage.

Strong recommendation, high quality evidence.

RECOMMENDATION

ESGE suggests that, in those patients unable to receive NSBB therapy with a screening upper GI endoscopy that demonstrates gastric varices (Sarin GOV-2 or IGV-1; cardiofundal varices), no treatment, cyanoacrylate injection alone, or endoscopic ultrasound (EUS)-guided coil plus cyanoacrylate injection can be considered. EUS-guided injection therapy should be decided on a case-by-case basis and limited to centers with expertise in this endoscopic technique.

Weak recommendation, low quality evidence.

41. Patients with high-risk cardiofundal (GOV2 or IGV1) varices (≥ 10 mm, red wale signs, CTP class B/C) who have contraindications or intolerance to NSBBs may be considered for primary prophylaxis with endoscopic cyanoacrylate injection (ECI).
42. Neither TIPS nor BRTO (or related oblitative techniques) are recommended to prevent first hemorrhage in patients with fundal varices that have not bled.
45. In patients with acute hemorrhage from gastric (GOV2/IGV1) or ectopic varices, either endoscopic cyanoacrylate therapy, TIPS, or retrograde transvenous variceal embolization/obliteration can be considered first-line options. Retrograde obliteration is preferred when TIPS is contraindicated.

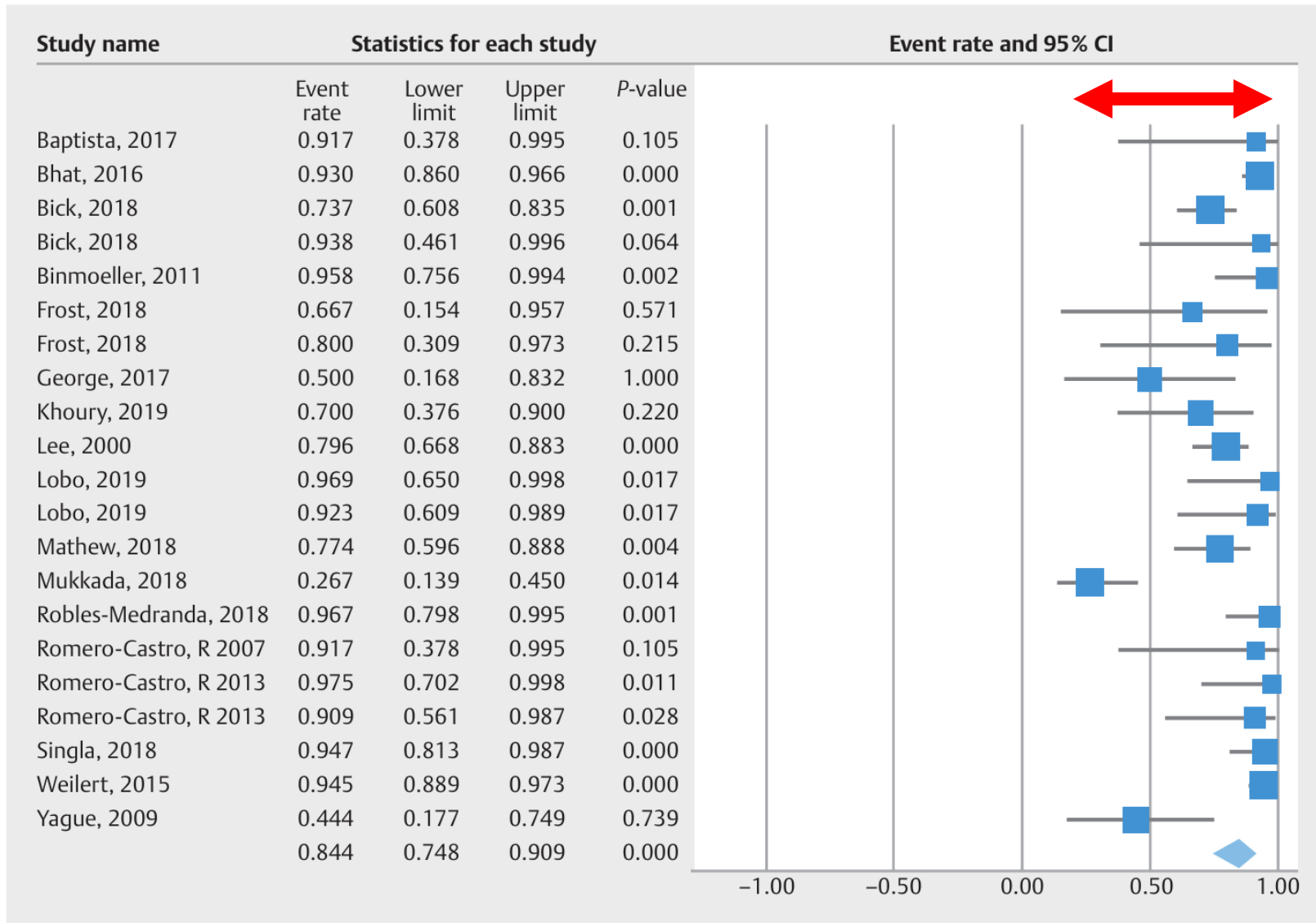
► **Table 2** Comparison of variceal and procedural characteristics and primary outcomes of the study.

	Coils + CYA (n = 30)	Coils alone (n = 30)	<i>P</i> value
Variceal and procedural characteristics			
Type, n (%)			
▪ GOV II	19 (63.3)	12 (40.0)	0.07 ¹
▪ IGV I	11 (36.7)	18 (60.0)	
Diameter, median (range), mm	21 (10 – 32)	25 (10 – 38)	0.15 ²
Number of coils placed, median (range)	2 (1 – 3)	3 (1 – 7)	0.006 ¹
Primary outcomes			
Technical success, n (%)	30 (100.0)	30 (100.0)	n/a
Complete obliteration, n (%)	30 (100.0)	27 (90.0)	0.12 ³
Immediate varix disappearance, n (%)	26 (86.7)	4 (13.3)	<0.001 ³
Adverse events, n (%)	2 (6.7)	1 (3.3)	0.50 ³

► **Table 3** Comparison of the secondary outcomes of the study.

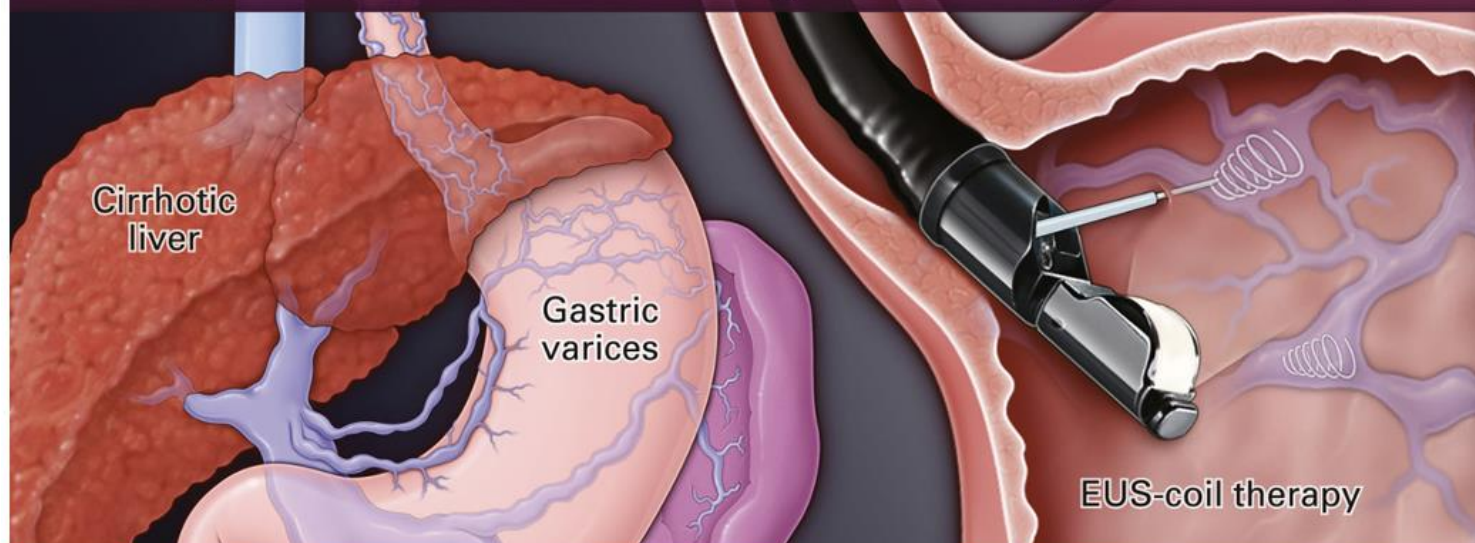
	Coils + CYA (n = 30)	Coils alone (n = 30)	<i>P</i> value
Survival time, median (range), months	16.4 (0.6 – 31.2)	14.2 (0.8 – 28.2)	0.90 ¹
Mortality rate, n (%)	9/30 (30.0%)	8/30 (26.7)	0.84 ²
Rebleeding, n (%)	1 (3.3)	6 (20.0)	0.04 ²
Varix reappearance, n (%)	4 (13.3)	14 (46.7)	<0.001 ²
Reintervention-free time, median (range)	15.8 (0.3 – 31.2)	12.5 (0.1 – 20.2)	0.01 ³
Reintervention, n (%)	5 (16.7)	12 (40.0)	0.045 ²

Intervention/outcomes, pooled rate, % (95 %CI, I ²)	All EUS modalities	EUS-glue	EUS-coil	EUS-coil/glue	END-glue (comparator group)
Treatment efficacy	93.7 (89.5 – 96.3, 53.7) 29 cohorts	91 (80 – 96.2, 40) 9 cohorts	84.2 (54.5 – 96, 6.5) 3 cohorts	96.7 (93 – 98.5, 55) 14 cohorts	91.4 (82.8 – 95.9, 97) 28 cohorts; <i>P</i> = 0.4
Obliteration of gastric varices	84.4 (74.8 – 90.9, 77) 21 cohorts	90 (71.3 – 97, 0) 5 cohorts	N/C	86.2 (75.5 – 92.7, 74) 12 cohorts	62.6 (42.6 – 79.1, 97); 13 cohorts; <i>P</i> = 0.02
Recurrence of gastric varices	9.1 (5.2 – 15.7, 32) 16 cohorts	15 (8.8 – 24.5, 0) 5 cohorts	N/C	5.2 (2.6 – 9.8, 0) 6 cohorts. <i>P</i> = 0.01	18 (11.4 – 27.2, 89) 8 cohorts; <i>P</i> = 0.06
Early rebleeding	7 (4.6 – 10.7, 0) 20 cohorts	6 (3.1 – 11.1, 0) 8 cohorts	N/C	7.7 (3.9 – 14.9, 46) 7 cohorts	5 (3.3 – 7.4, 72) 23 cohorts; <i>P</i> = 0.7
Late rebleeding	11.6 (8.8 – 15.1, 22) 26 cohorts	16.3 (9.7 – 26.1, 65) 8 cohorts	16.8 (7.3 – 34.1, 0) 3 cohorts)	9.2 (6.4 – 13, 0) 12 cohorts	17 (12.3 – 22.9, 92) 27 cohorts; <i>P</i> = 0.1



► **Fig. 4** Forest plot – gastric varices obliteration in endoscopic ultrasound-guided therapy. CI, confidence interval.

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%)

© ASGE / GIE

Intervention/outcomes, pooled rate, % (95 %CI, I ²)	All EUS modalities	EUS-glue	EUS-coil	EUS-coil/glue	END-glue (comparator group)
Adverse events					
Embolism	5.6 (3.1 – 9.8, 56) 28 cohorts	8.4 (3 – 21.3, 66) 9 cohorts	4 (0.5 – 25.7, 0) 3 cohorts	4.3 (1.8 – 9.8, 59) 13 cohorts; <i>P</i> =0.33	–
Mild adverse events	5.9 (4.1 – 8.3, 0) 28 cohorts	4.7 (2.1 – 10.6, 0) 9 cohorts	3.9 (0.8 – 18.1, 0) 3 cohorts	5.3 (3.2 – 8.6, 35) 13 cohorts	–
Moderate adverse events	5.7 (3.2 – 9.8, 53) 28 cohorts	9 (3.5 – 21.6, 66) 9 cohorts	4 (0.5 – 25.1, 0) 3 cohorts	4 (1.7 – 9.2, 57) 13 cohorts	
Mortality (all-cause)	13.1 (8.3 – 20.2, 68); 19 cohorts	27.9 (16.3 – 43.5, 75); 5 cohorts	N/C	9 (5.1 – 15.2, 0); 9 cohorts; <i>P</i> =0.003	
Mortality due to gastric varices rebleed	7.7 (4.9 – 11.9, 29) 18 cohorts	12 (5.2 – 25.6, 58) 5 cohorts	N/C	4.5 (2 – 9.8, 21) 8 cohorts; <i>P</i> =0.09	

ADVANTAGES

- Direct visualization – endoscopic + U/S
- EUS – visibility in bloody field
- Puncture varix under direct vision
- Identify feeder vessels
- 19G – injection of coils
- Confirm placement
- Confirm obliteration - doppler

TABLE 1. Instruments and accessories required for EUS-guided vascular therapy

1	Curvilinear echoendoscope
2	Nineteen- or 22-gauge FNA needle
3	Five- or 2-mL syringes filled with distilled water (5-6 syringes)
4	Coils (0.035 or 0.018 inches; straight lengths of 50-150 mm; coiled diameter of 8-20 mm; 3.2-5.6 configuration loops)*
5	Glue (n-octyl-cyanoacrylate or n-butyl-cyanoacrylate)
6	Lipiodol†

*Specification of Nester coils (COOK Medical, Bloomington, Ind, USA).

†Lipiodol can be used at the discretion of the endoscopist. Alternatively, 5% or 50% dextrose can also be used to flush the glue out of the needle.

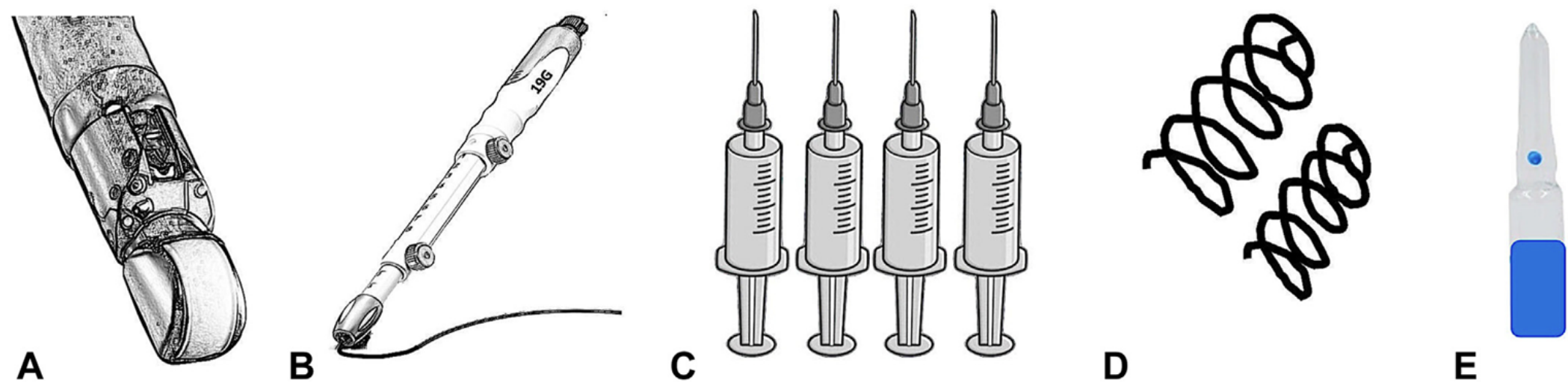
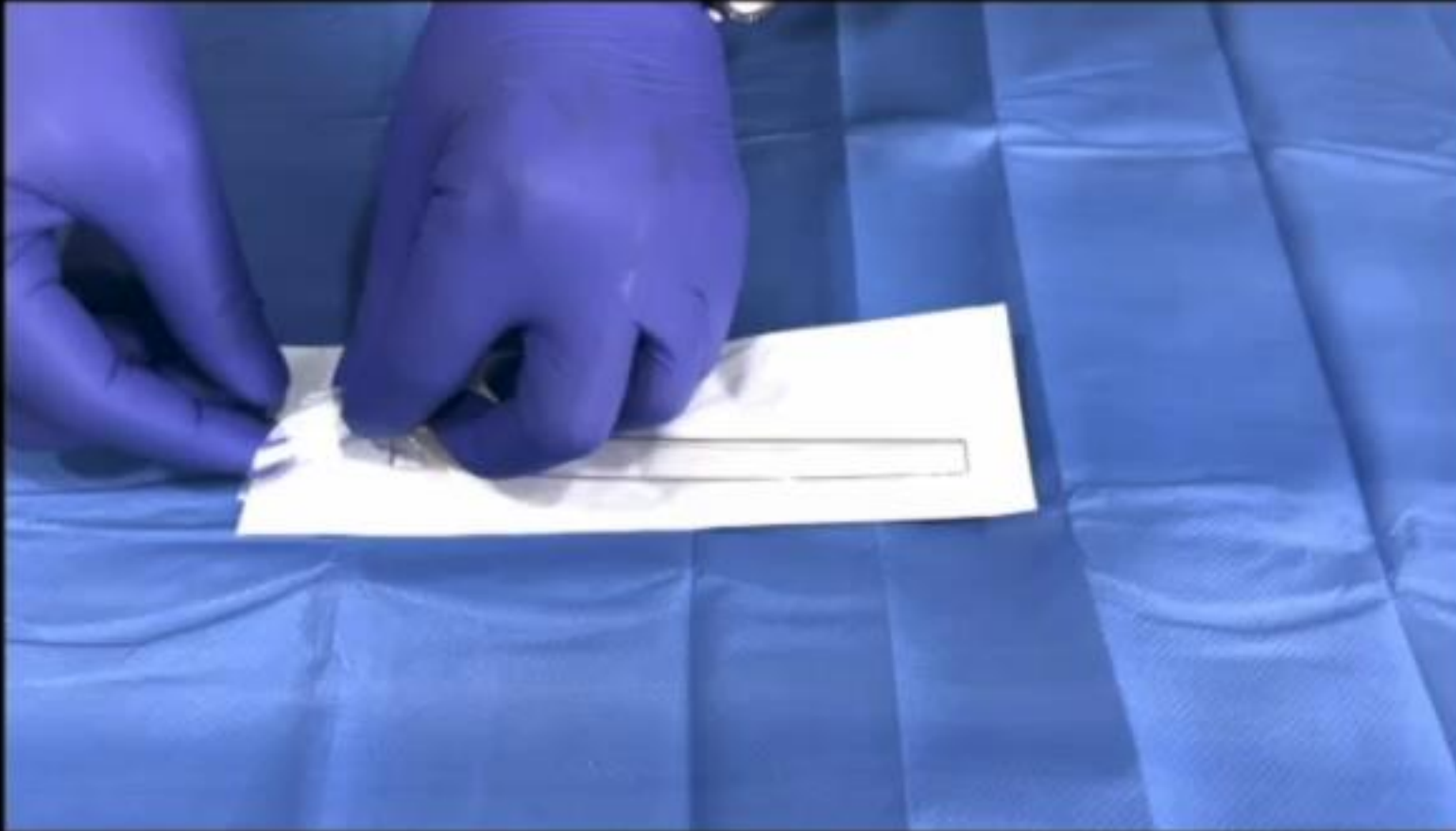


Figure 2. Instruments and accessories required for EUS-guided vascular therapy. **A**, Curvilinear echoendoscope. **B**, Nineteen-gauge FNA needle. **C**, Five to six 2- or 5-mL syringes filled with distilled water. **D**, Coils (0.035 or 0.018 inches). **E**, Glue (n-octyl-cyanoacrylate or n-butyl-cyanoacrylate).

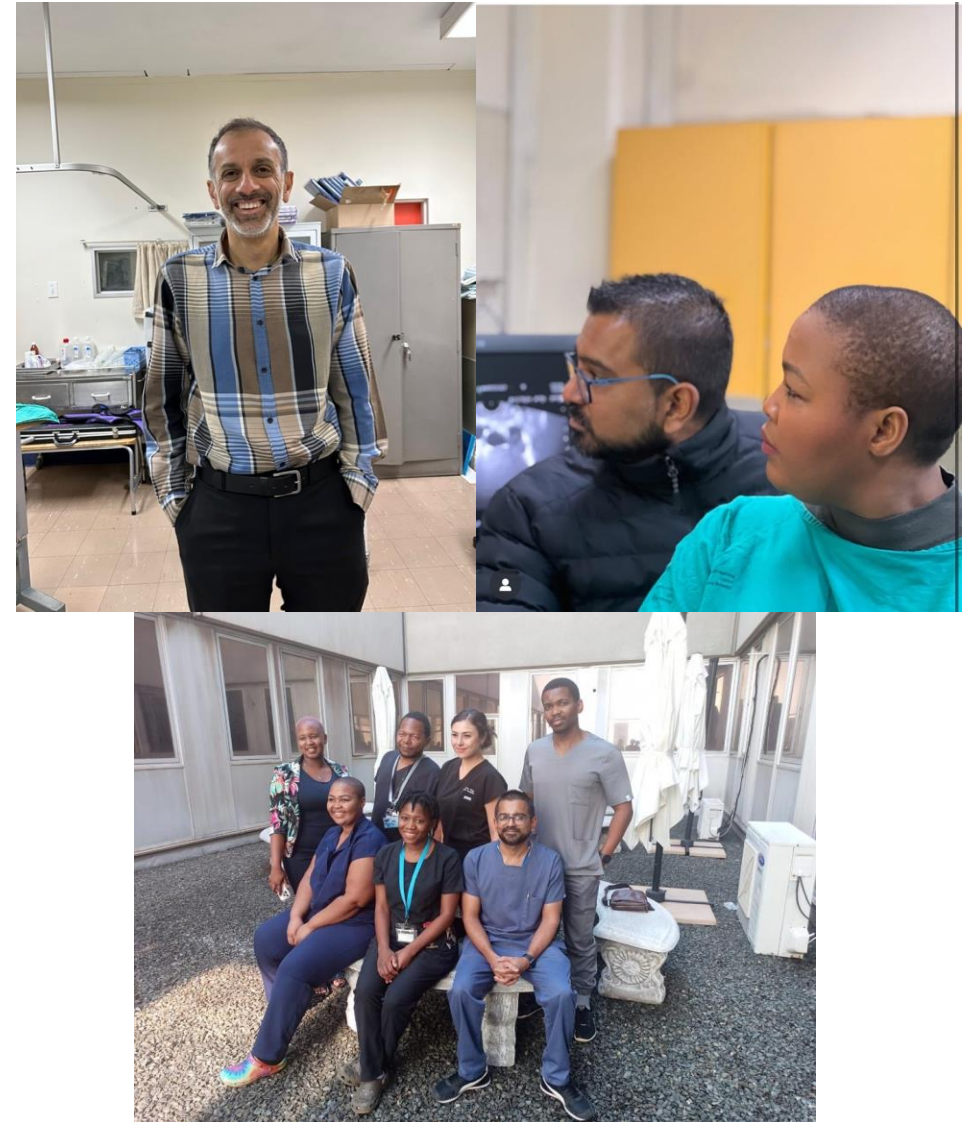
TECHNIQUE

- Feeder vs Direct
- Needle size (depending on coils)
- Number of coils = size of varix
- Avoid deployment through prox and distal wall
- Flush – avoid blood clots + repeat
- Injection of glue + lipiodol /gelatin sponge/thrombin
- Promptly re-sheath needle, withdraw scope catheter protruding
- Assess doppler flow



OUR EXPERIENCE

- \pm 2 years
- Learning curve!!!
- Preparation = key
- Team approach
- Identify feeder
- Loading coils into needle
 - Straight/stable scope
 - Avoid deployment
 - Avoid clots
- Mixing thrombin



- Adverse events
 - No puncture site bleeding
 - No embolism
 - Coils - extrusion

