

Misericordia University

Misericordia Digital Commons

Medical Imaging Senior Posters

Medical Imaging Department

2022

Balloon-Occluded Retrograde Transvenous Obliteration (BRTO) for Gastric Varices (GV) in Interventional Radiology (IR)

Lauren Wiest

Misericordia University, wiestl@misericordia.edu

Follow this and additional works at: https://digitalcommons.misericordia.edu/medimg_seniorposters



Part of the [Medicine and Health Sciences Commons](#)

Recommended Citation

Wiest, Lauren, "Balloon-Occluded Retrograde Transvenous Obliteration (BRTO) for Gastric Varices (GV) in Interventional Radiology (IR)" (2022). *Medical Imaging Senior Posters*. 25.
https://digitalcommons.misericordia.edu/medimg_seniorposters/25

This Poster is brought to you for free and open access by the Medical Imaging Department at Misericordia Digital Commons. It has been accepted for inclusion in Medical Imaging Senior Posters by an authorized administrator of Misericordia Digital Commons. For more information, please contact mcech@misericordia.edu.

Balloon-Occluded Retrograde Transvenous Obliteration (BRTO) for Gastric Varices (GV) in Interventional Radiology (IR)

Student Researcher: Lauren Wiest

Faculty Advisor: Elaine Halsey, Ed.D., R.T. (R)(QM)

BRTO Procedure

- Minimally invasive procedure that uses an endovascular approach to treat gastric variceal bleeding
- BRTO is an effective treatment performed for portal hypertensive gastric varices (Kim et al., 2018)
- Basic principle of the BRTO procedure is to occlude the gastrosplenic shunt
- Procedure performed via transfemoral or transjugular approach (Kim et al., 2018)
- After access is gained with a micropuncture needle a sheath is placed and the gastrosplenic shunt is catheterized
- Balloon catheter is inserted into a draining vein of the varix
- Guidewire is used to advance the balloon catheter (Long, Rollins, & Smith, 2019)
- Retrograde injection of sclerosing agent through the catheter during balloon occlusion to fill GV (Ahmed et al., 2020)
- Sclerosing agents used can be gelfoam mixed with contrast media or sodium tetradecyl sulfate (STS)
- The purpose of the balloon is to prevent leakage of the sclerosant into systemic circulation (Kim et al., 2018)
- Procedure requires long post-procedural monitoring
- Complications can occur such as balloon rupture or adverse effects from sclerosing agent (Kim et al., 2018)
- Confirmation of obliteration can be seen using CT (Kim et al., 2018)

Gastric Varices (GV)

- Dilated veins that occur as a result of portal hypertension
- Blood flows through GV into systemic circulation
- GV drain directly into large veins resulting in high blood flow and mortality due to greater blood loss when varices rupture (Thapa et al., 2020)
- Can occur in combination with esophageal varices (Kim et al., 2018)
- Less common than esophageal varices (Thapa et al., 2020)
- More difficult to obliterate than esophageal varices (Thapa et al., 2020)

Alternative BRTO Method: Plug Technique

- Modified approach performed the same way as the BRTO procedure that uses a permanent vascular plug rather than the balloon
- Can be used along with occlusion balloon or performed by only using the vascular plug
- Size of the vascular plug is decided based on measurements from CT scans of the narrowest part of the shunt (Gwon, Ko, Kwon, Yoon, & Sung, 2018)
- Usually, a plug is used that is 20-30% larger than the size of the shunt to prevent migration of the sclerosant (Kim et al., 2018)
- Mixture of gelfoam and contrast media is injected to embolize gastric varices and collateral veins
- After vascular plug is deployed the sclerosing agent is injected until the small collateral veins are filled and early filling of gastric varices is seen (Kim et al., 2018)
- No risk of balloon rupture in cases where only the plug is used
- Reduces procedure time (Kim et al., 2018)
- Reduces post-procedure monitoring (Kim et al., 2018)
- Mostly used in practice (Kim et al., 2018)



Image: Vascular plug (white arrow) deployed at gastrosplenic shunt after positioning the catheter (open arrow) in the GV (Kim et al., 2018, p. 840)

Alternative BRTO Method: Coil Technique

- Modified approach performed the same way as the BRTO procedure that uses coils and a gelfoam slurry instead of the balloon
- Catheter is advanced into the narrowest part of the shunt and coils are deployed (Kim et al., 2018)
- Once the coils completely occlude the shunt the sclerosant is injected
- Can be used when the vessel is too tortuous or when the shunt angle is not compatible to use a balloon or plug
- Can be performed in larger shunts whereas the plug technique is limited to the diameter of the available plugs (Kim et al., 2018)
- Can be used along with occlusion balloon or by only using coils and sclerosant
- Coils can be deployed through occlusion balloon
- Once the shunt is completely occluded the occlusion balloon can be removed (Kim et al., 2018)
- Procedure time is longer and can be more costly (Kim et al., 2018)

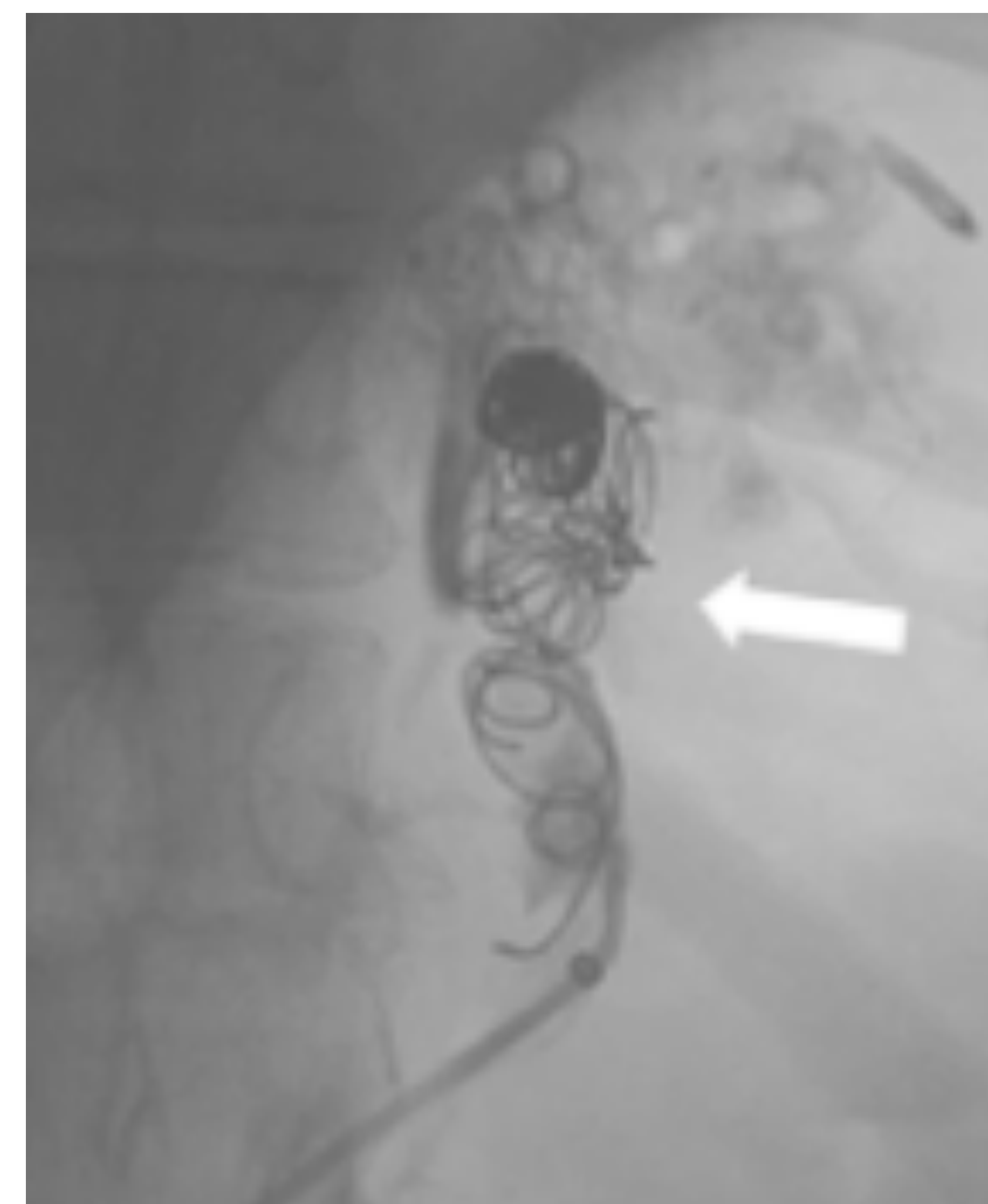


Image: Coil embolization of gastrosplenic shunt after complete occlusion (Kim et al., 2018, p. 843)

Statistics

- Gastric Varices develop in about 20% of patients with portal hypertension (Thapa et al., 2020)
- Recent study of plug technique showed reoccurrence of gastric varices is less common in patients who underwent procedure where sodium tetradecyl sulfate was used (Kim et al., 2018)
- Mortality rate for bleeding of GV is about 55% (Gwon et al., 2018)

Conclusion

- BRTO is:
 - a suitable therapeutic option for controlling GV
 - has a high efficacy for stopping GV bleeding
 - has a significantly lower re-bleeding rate of GV compared to transjugular intrahepatic portosystemic shunts (TIPS) or endoscopic treatments (Gwon et al., 2018)
- Reports show that failure of the BRTO procedure are rare (Thapa et al., 2020)
- Basic principle of procedure is to stop gastric variceal bleeding and preserve hepatic function

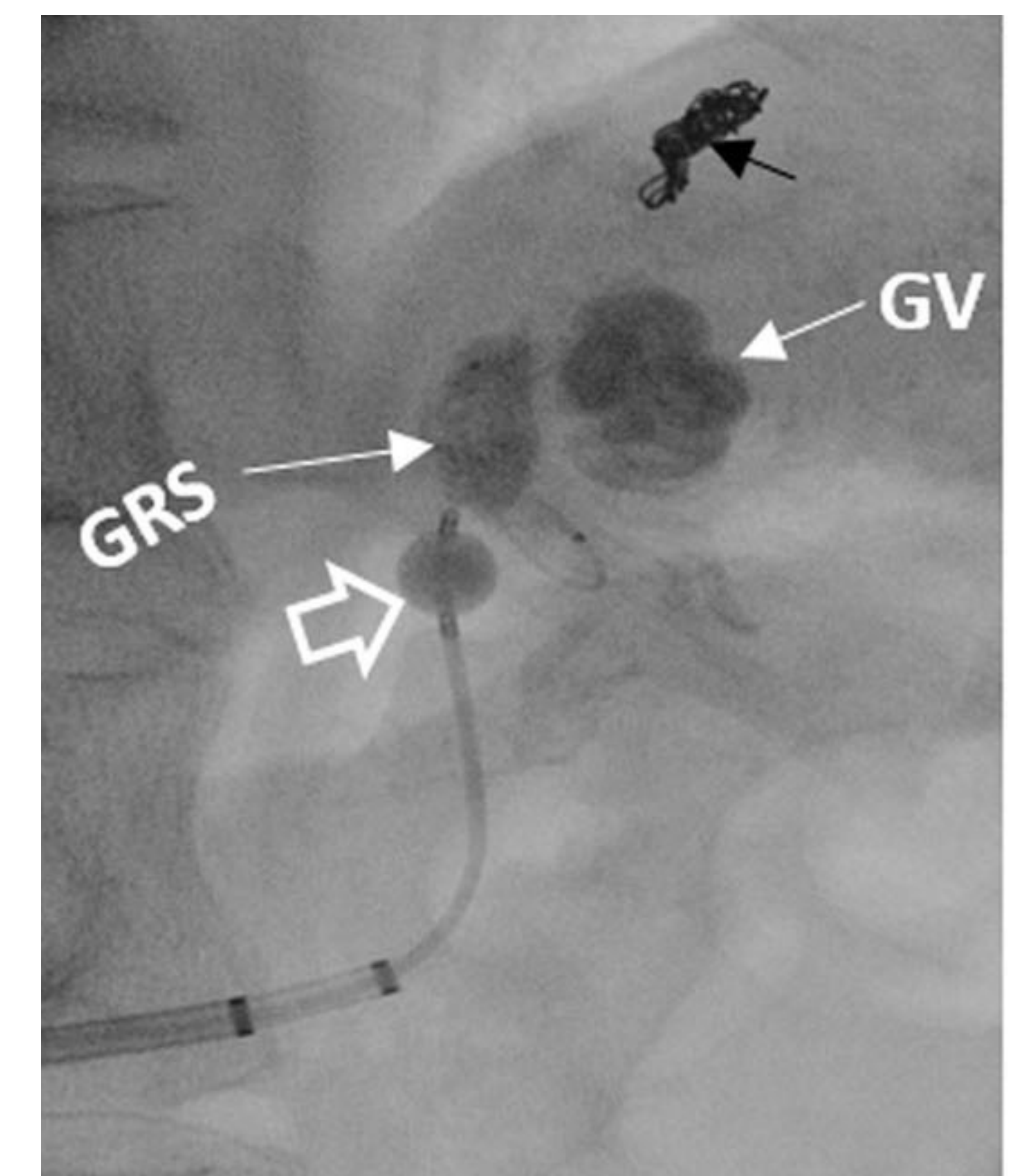


Image: Fluoroscopic image at the end of BRTO showing balloon catheter positioned at gastrosplenic shunt (GRS) and gastric varices (GV) (Ahmed et al., 2020, p. 5)