CASE REPORT

Therapeutic options for bleeding oesophageal varices: cyanoacrylate and balloon-occluded retrograde obliteration (BRTO)

Helena L Frischtak,¹ Jessica P Davis,² Neeral L Shah²¹School of Medicine, University of Virginia, Charlottesville, Virginia, USA²Division of Gastroenterology and Hepatology, Department of Medicine, University of Virginia, Charlottesville, Virginia, USA**Correspondence to**
Professor Neeral L Shah,
ns3zt@virginia.edu

Accepted 1 August 2017

SUMMARY

A 56-year-old male with cirrhosis presented with acute bleeding from cardiofundal gastroesophageal varices (GOV) and was treated with endoscopic cyanoacrylate glue. Glue therapy achieved stabilisation of the patient in the emergent setting. Three months later, the patient suffered rebleeding. At that time, he underwent retreatment with balloon-occluded retrograde obliteration (BRTO), with no recurrence at a follow-up of 14 months.

Available treatments for bleeding GOV include methods to (a) directly obstruct the varices (endoscopic variceal ligation, sclerotherapy and cyanoacrylate glue, BRTO) or to (b) decrease portal pressure (surgical portacaval shunts; transportal intrahepatic portosystemic shunt). No precise guidelines are available regarding when to use which modality, and few centres have experience with all of them. This case report illustrates a setting in which both options of cyanoacrylate glue therapy and BRTO were used for acute gastric variceal bleeding.

BACKGROUND

Up to 60% of patients with portal hypertension from cirrhosis develop varices as a means to compensate for increasing portal venous pressure. Variceal bleeding occurs in 25% of patients at 2 years and is considered an emergency: an initial bleed is associated with a mortality rate of 20%–35%.¹

Both the American College of Gastroenterology (ACG) and the American Association for the Study of Liver Diseases (AASLD) recommend first-line treatment of bleeding oesophageal varices with either endoscopic variceal ligation (EVL) or sclerotherapy.² Tissue adhesives, such as cyanoacrylate glue, are recommended as first-line treatment of gastric fundal bleeding varices, but few centres offer this option. Transportal intrahepatic portosystemic shunt (TIPS) remains a second-line modality when endoscopy fails. Balloon-occluded retrograde obliteration (BRTO) is not recognised by AASLD or ACG, despite its widespread use in Asia and growing popularity around the world.³

There is still large variation in methodology between centres among two principal approaches: cyanoacrylate glue and BRTO.⁴ Not only is there a range of experience with each modality, but particularities that can significantly alter outcomes vary among centres. For example, with cyanoacrylates, the side-chain carbon length of the cyanoacrylate

may affect polymerisation time and the interaction of the cyanoacrylate with the clotting cascade (which modulates embolic risk). With BRTO, the type of angiographically administered sclerosant and the duration of balloon occlusion affect the procedure's efficacy.⁴ In Asia, BRTO is used as second-line therapy in lieu of TIPS, but its availability in Europe and the USA is restricted to specialised centres with interventional radiology departments that have experience in this technique.⁵

We report a case of refractory oesophageal and gastric varices that was controlled with multimodality treatment, highlighting the role for a combination of treatments in difficult refractory bleeding cases.

CASE PRESENTATION

A 56-year-old man with a medical history of chronic hepatitis C infection and previous alcohol abuse with subsequent cirrhosis, presented with an acute gastrointestinal (GI) bleed. He has no other medical history. His father had a history of hypertension, but otherwise there was no significant illnesses reported in his family. The patient is a current, every day smoker, but quit alcohol use 6 months prior to this presentation and denies any recent intravenous drug abuse. For this acute GI bleeding, the patient was admitted and underwent an oesophagogastroduodenoscopy (EGD), which diagnosed a bleeding GOV.

INVESTIGATIONS

The patient underwent multiple EGDs; at the time of presentation, 2 days after the initial therapeutic intervention and at a 3-month follow-up.

TREATMENT

The patient was treated with a 23-gauge endoscopic injection needle and undiluted N-2-butyl-cyanoacrylate (enbucrilate) glue injection during the initial EGD (figure 1A and B). A follow-up EGD 2 days later showed no evidence of active bleeding (figure 1C). The patient was discharged on nadolol with a plan for 3-month outpatient follow-up.

Three months later, a follow-up EGD demonstrated small low-risk oesophageal varices and gastric varices, previously treated with cyanoacrylate (figure 1D). Endoscopic Doppler ultrasound at the time showed persistent variceal blood flow, but the patient was asymptomatic and haemodynamically

CrossMark

To cite: Frischtak HL, Davis JP, Shah NL. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-219615

Figure 1 Endoscopic retroflexion views of gastric cardia varices. (A) The patient's initial endoscopy was notable for large cardiac varices with red marks concerning for a high bleeding risk. (B) These were treated with cyanoacrylate therapy. (C) Repeat endoscopy 2 days after treatment showed improvement of the varices on endoscopy, which was confirmed with reduction of flow on endoscopic ultrasound. (D) Surveillance endoscopy 3 months later continued to show improvement endoscopically but persistent flow was noted on Doppler ultrasound and the patient represented with gastrointestinal bleeding 1 month later. (E) Balloon-occluded retrograde obliteration was performed and subsequent upper endoscopy showed absence of gastric varices with persistence of cyanoacrylate cast of former varices.

stable, so a plan for continued conservative management was made.

One month after the scheduled follow-up, the patient was readmitted to the hospital with a 2-day history of melena. Haemoglobin was 9.1 g/dL. As he had previously received cyanoacrylate therapy, we opted for a new therapeutic approach and the patient underwent a BRTO procedure. A 21-gauge needle

under ultrasound guidance was inserted into the right femoral vein. A 10-French sheath and catheter were used to select the left renal vein. The splenorenal shunt location was verified, and an occlusion balloon was deployed. Finally, embolisation was performed with a 3:2:1 ratio of air:sotradecol:ethiodol foam (figure 2). Endoscopic ultrasound a few days later showed grade 1 oesophageal and gastric varices but no evidence of variceal blood flow, and the patient was safely discharged (figure 1E).

OUTCOME AND FOLLOW-UP

The patient was last seen in follow-up at the outpatient clinic in June 2016, 14 months after his last hospitalisation (and 16 months after the initial presentation). Since BRTO, he has completed hepatitis C therapy and has had no further episodes of variceal bleeding.

DISCUSSION

Due to institutional expertise and physician preference, cyanoacrylate glue and BRTO are frequently performed at the facility where this patient received care for gastric varices. Cyanoacrylate has been the focus of several recent studies. The modality has compared favourably with TIPS in terms of rebleeding, survival rates and long-term complications.^{4 6} It has also proven to be safer and more effective than EVL for bleeding gastric varices.⁷ Severe embolic risk (pulmonary, renal or splenic) remains a drawback of this modality, estimated to be around 2% with some forms of the cyanoacrylate.⁴ Other studies have explored the possibility of using injected coils and cyanoacrylate in combination to reduce the risk of embolisation.⁸

BRTO has been widely used in countries such as Japan and Korea, which have higher rates of isolated gastric varices.³ In a recent meta-analysis evaluating the safety and effectiveness of BRTO, pooled clinical success of BRTO, as defined by no recurrence of gastric varices or complete obliteration of varices seen at a follow-up visit, was 97.3%.⁹

There is no current guideline that incorporates all available treatment modalities. Instead, individual and institutional experience remains important guiding principles. Since there is no established algorithm, patients' anatomy on radiological imaging, endoscopic evaluation and overall stability should be considered when deciding the therapeutic modality. It is important to note

Figure 2 Fluoroscopic view of large gastric cardia varices seen prior to balloon-occluded retrograde obliteration.

Learning points

- Current treatment modalities to treat bleeding gastroesophageal varices (GOV) involve methods to either (a) decrease portal pressure or (b) obliterate the varices directly. There are no precise algorithms that include all available modalities, and treatment decisions are thus deferred to provider and institutional preference.
- Ultrasound evidence of increased variceal blood flow in asymptomatic, haemodynamically stable patients may herald bleeding and warrant further investigation and close follow-up.
- Combining two modalities to treat oesophageal and gastric variceal haemorrhage may be beneficial in refractory cases.
- A more accurate assessment of the role of balloon-occluded retrograde obliteration and cyanoacrylate glue within the armamentarium of treatment options for GOV will become possible as experience with these newer techniques continues to accrue.

that evidence of variceal blood flow after initial treatment with either cyanoacrylate glue or BRTO may be a harbinger of imminent acute bleeding. Our experience indicates that a combination of modalities, even among newer modalities such as BRTO and cyanoacrylate glue, may be successful if follow-up studies demonstrate residual flow.

Acknowledgements Hepatology Group at University of Virginia, Interventional Radiology Group at University of Virginia

Contributors All the authors were responsible for the writing and editing of the manuscript. NLS was responsible for the development of the concept.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

REFERENCES

- 1 Toshikuni N, Takuma Y, Tsutsumi M. Management of gastroesophageal varices in cirrhotic patients: current status and future directions. *Ann Hepatol* 2016;15:314–25.
- 2 Garcia-Tsao G, Sanyal AJ, Grace ND, *et al.* Prevention and management of gastroesophageal varices and variceal hemorrhage in cirrhosis. *Hepatology* 2007;46:922–38.
- 3 McCarty TR, Bakhit M, Rustagi T. Isolated gastric varices and use of balloon-occlusive retrograde transvenous obliteration: a case report and literature review. *J Gastrointestin Liver Dis* 2016;25:115–7.
- 4 Caldwell S. Gastric varices: is there a role for endoscopic cyanoacrylates, or are we entering the BRTO era? *Am J Gastroenterol* 2012;107:1784–90.
- 5 El Sayed G, Tariff S, O'Beirne J, *et al.* Endoscopy management algorithms: role of cyanoacrylate glue injection and self-expanding metal stents in acute variceal haemorrhage. *Frontline Gastroenterol* 2015;6:208–16.
- 6 Kang EJ, Jeong SW, Jang JY, *et al.* Long-term result of endoscopic histoacryl (N-butyl-2-cyanoacrylate) injection for treatment of gastric varices. *World J Gastroenterol* 2011;17:1494–500.
- 7 Lo GH, Lai KH, Cheng JS, *et al.* A prospective, randomized trial of butyl cyanoacrylate injection versus band ligation in the management of bleeding gastric varices. *Hepatology* 2001;33:1060–4.
- 8 Bhat YM, Weillert F, Fredrick RT, *et al.* EUS-guided treatment of gastric fundal varices with combined injection of coils and cyanoacrylate glue: a large U.S. experience over 6 years (with video). *Gastrointest Endosc* 2016;83:1164–72.
- 9 Park JK, Saab S, Kee ST, *et al.* Balloon-occluded retrograde transvenous obliteration (BRTO) for treatment of gastric varices: review and meta-analysis. *Dig Dis Sci* 2015;60:1543–53.

Copyright 2017 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow