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Article

Plug assisted retrograde transvenous obliteration of gastric varices in failed endoscopic therapy as salvage option

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Case

A 35 year female patient presented to emergency department with abdominal distension, hematemesis and shock. She was known case of vitiligo vulgaris and chronic liver disease secondary to Autoimmune Hepatitis with features of Portal Hypertension. She had history of upper GI bleed in last 6 months and had undergone endoscopic glue and coil injection into gastric varices. On evaluation, her baseline investigations were hemoglobin 5.6 g/dl, serum creatinine of 1.1 mg/dl, serum bilirubin 2.3 mg/dl, INR 2.13 and serum albumin 1.92 g/dl. Endoscopy revealed small esophageal varices, severe portal hypertensive gastropathy and gastric varices with glue cast in situ, with no active bleed. Triple phase CT abdomen revealed shrunken/cirrhotic liver with splenomegaly and varices in region of fundus of stomach and esophagus (GOV2) with gastro-renal shunt measuring 14 mm (Fig. 1) which was draining to retro-aortic left renal vein (Fig.2). Previous coil and glue mass was also seen in gastric varices with contrast opacification of rest of the patent varices. Patient was simultaneously stabilized with vasopressors, blood transfusion and supportive care and also decision was made for retrograde transvenous obliteration of gastric varices.

Both right jugular and right femoral access taken. GRS cannulated via femoral route and 7 Fr long sheath deployed (Fig. 3). C2 catheter was also negotiated into GRS. From femoral route 20 mm diameter AVP II plug deployed (~40% oversizing) and venogram done, which showed single efferent vein with insignificant collaterals (Fig 4). Varices and afferents were not opacified due to high flow. After significant stasis of contrast, sclerosant mixture of sodium tetradecyl sulphate, iodinated contrast and gel foam were injected in ratio 1:2:4 into efferent vein under fluoroscopic guidance. Sclerosant mixture was injected till complete opacification of gastric varices and minimal entry into afferent veins seen (Fig 5). C2 catheter removed and AVP II plug detached from introducer needle. Procedure was uneventful. On Postoperative day 1 NCCT abdomen was done to see the extent of sclerosant mixture deposition (Fig 6). Patient was discharged on postoperative day 2 in stable condition.

At one month follow up patient was ambulatory and had persistent mild ascites. Lab investigations were hemoglobin of 9 g/dl, serum creatinine of 0.49 mg/dl, serum bilirubin-1.01 mg/dl, INR of 1.1 and serum albumin of 3.39 g/dl. Improvement in bilirubin levels, INR and albumin levels were noticed.

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Gastric varices; autoimmune hepatitis; portal hypertension; transvenous obliteration; retrograde shunt

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Discussion

Gastric varices are seen in 17% of patients with liver cirrhosis and show higher prevalence (24%) in bleeders (1). These are the venous channels in the submucosal layer of stomach. They develop due to raised portal pressure causing portosystemic shunting and they can be located anywhere from GEJ to pylorus. Gastric varices can be associated with esophageal varices. Based on these gastric varices are classified by Sarin et al. into 4 types, Gastroesophageal varices type 1 (GOV 1), GOV2, Isolated gastric varices type 1 (IGV1) and IGV 2 (2). Understanding of anatomy and hemodynamics of this complex portosystemic anastomosis plays pivotal role in management of bleeding gastric varices.

Gastric variceal system is a complex venous system of portosystemic anastomosis, which includes an afferent portal venous inflow component, true submucosal varices, perforator veins, extra-gastric varices and efferent systemic venous outflow component. Afferent veins are coronary/left gastric vein, posterior and short gastric veins. These afferents drain to extra-gastric veins, which through the perforator veins drain into submucosal varices. Based on afferents gastric varices are classified into Type 1 which are supplied by single afferent gastric vein, Type 2 which are supplied by multiple afferent gastric veins and Type 3 which are supplied by single or multiple afferent gastric veins with coexistent gastric vein that is directly draining into shunt without contributing to submucosal varices (3). Based on efferent gastric varices are classified into type A which has shunt with single draining vein, type B which has shunt and multiple collateral draining veins, type C has both gastrocaval and gastrorenal shunt and type D has multiple draining veins and no shunt (3).

Management of gastric varices depends on symptoms like bleeding or hepatic encephalopathy, anatomy (shunt and varices size) and hemodynamics of gastric variceal system. Nonselective beta blockers are used for primary prophylaxis to prevent bleeding (4). In bleeding gastric varices endoscopic therapies and antegrade/retrograde transvenous therapies for occlusion of varices should be selected in complementary manner. For any bleeding gastric varices endoscopic banding, glue or coil are considered as initial management option. In case of failed or suboptimal response, endovascular transvenous obliteration of gastric varices should be considered as valid treatment option. Previously BRTO was popular, but due to its complications like balloon rupture, non-availability of large sized balloons, variations of this procedure like plug-assisted retrograde transvenous obliteration of gastric varices (PARTO) and Coil-assisted retrograde transvenous obliteration of gastric varices (CARTO) have gained popularity due to high technical success rate and relatively less complications. Antegrade transvenous obliteration techniques are considered when additional TIPS is needed or when retrograde options are not technically easy/feasible.

Overall PARTO is safe and effective procedure with reliable technical and clinical success rates at short term.

Declarations

Competing interests: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics approval and consent to participate: If your research involves human subject please specify your ethical approval and consent to participate.

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Appendices

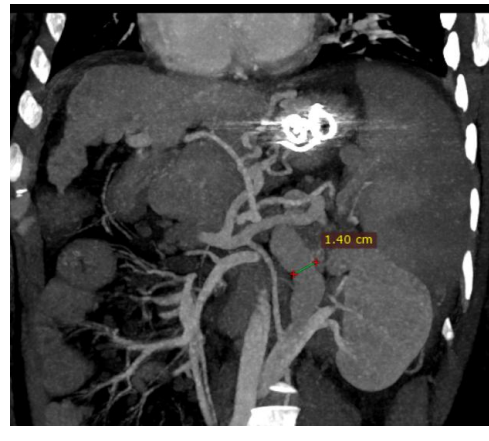

Figure 1. Oblique coronal maximum intensity projection image of portal venous phase of Ct abdomen showing residual gastric varices with coil mass with afferent as medial posterior gastric vein and efferent as gastrorenal shunt measuring 14mm.

Figure 2. Axial CECT image showing retro-aortic left renal vein.

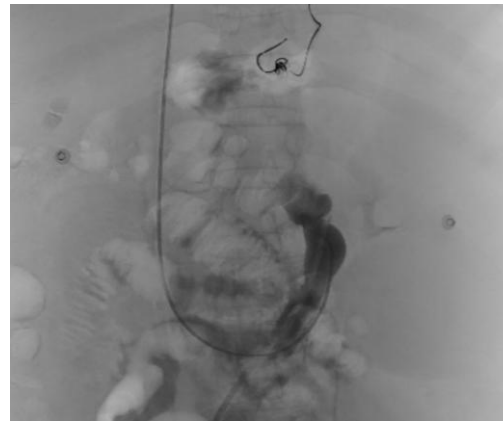

Figure 3. Sheath deployed in GRS from femoral route and jugular route used for second catheter.

Figure 4. Venogram after deployment of plus showing single efferent vein with insignificant collaterals.

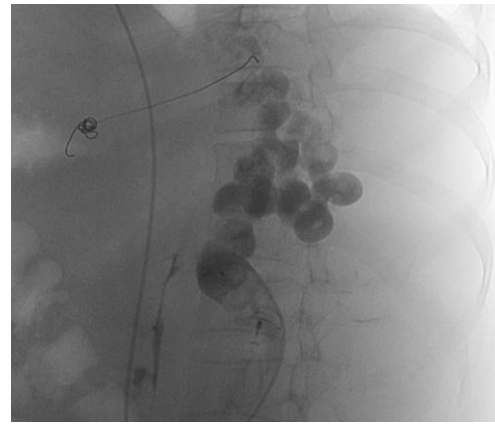

Figure 5. Sclerosant mixture completely filling the efferent shunt, gastric varices with minimal entry into afferents.

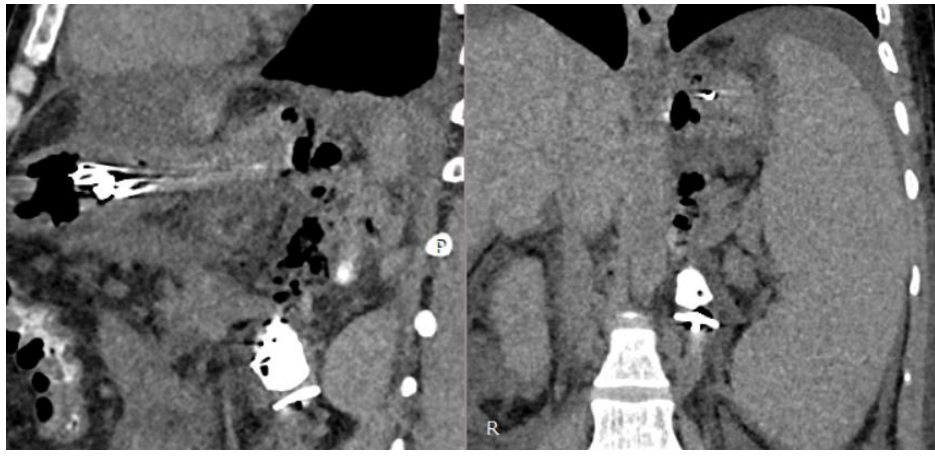

Figure 6. Sagittal and coronal CT images showing complete gelfoam packing in efferent and gastric varices.