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Case Report

Balloon-occluded retrograde transvenous obliteration for treatment of bleeding gastric varices: case report and review of literature

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ABSTRACT

Gastric variceal bleeding is a major complication of portal hypertension and is associated with high morbidity and mortality. While esophageal varices are more common, gastric varices are often more challenging to treat. Balloon-Occluded Retrograde Transvenous Obliteration is an interventional procedure whereby the portosystemic gastrorenal shunt is accessed via the left renal vein and the gastric varix outflow tract obliterated using direct sclerotherapy. Herein, we present a case of a 68-year-old female patient with cirrhosis who presented with bleeding gastric varices and successfully treated. This case highlights the procedural steps and the importance of detailed knowledge of the patient's portosystemic anatomy for determining suitability for balloon-occluded retrograde transvenous obliteration of gastric varices.

Introduction

Gastric varices (GV) develop in approximately 20% of patients with portal hypertension [1]. Most GV are associated with a left-sided spontaneous portosystemic shunt of varying complexity. Although GV bleed less frequently as compared to esophageal varices, GV bleeding is difficult to manage endoscopically due to their size, location, and high-volume blood flow [2]. Furthermore, GV are associated with a higher risk of rebleeding and increased mortality rate [3]. Balloon-occluded retrograde transvenous obliteration (BRTO) is a safe and effective procedure for treating GV and reducing the risk of rebleeding [4]. BRTO involves temporary occlusion of outflow veins of the portosystemic shunt followed by endovascular injection of a sclerosant into the varix. Over the last 2 decades, BRTO has been a common modality used for the prevention and treatment of bleeding GV in Japan and various parts of Asia. However, it has only recently gained wider attention in North America and is still underused for treatment of GV. This case describes the key clinical and anatomic features of GV in a patient who was a suitable candidate and was successfully treated with BRTO.

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Case report

A 68-year-old woman with a history of liver disease was transferred from a regional hospital to a tertiary care hospital for urgent assessment and treatment of large GV along the greater curvature of the stomach with previous bleeding. Before arrival, the bleeding GV had been temporized with endoscopic clip placement. On admission, the patient was alert, oriented, and hemodynamically stable.

Laboratory investigations yielded the following results: Hgb 90 (normal, 120-160) g/L, red blood cell count 3.8 (normal, 3.8-5.8) $\times 10^{12}$/L, white blood cell count 7.8 (normal, 4.5-11) $\times 10^{9}$/L, and platelets 163 (normal, 150-350) $\times 10^{9}$/L. Her cardiovascular and respiratory examinations were unremarkable. Her abdomen was soft and nontender. There was no peripheral edema or any other stigmata of chronic liver disease (Child-Pugh class A). Her medical history was significant for anemia, diabetes, hypertension, dyslipidemia, cholecystectomy, and cirrhosis. Hepatology and interventional radiology services assessed her for possible consideration of BRTO for treatment of the GV.

Triphasic computed tomography (CT) of the abdomen and pelvis was performed with noncontrast, arterial, and portovenous phase multiplanar imaging. Very large GV were found in association with a splenorenal shunt draining into the left renal vein (LRV; Figs. 1 and 2A). There was no evidence of esophageal varices. The portal venous system, hepatic veins, and inferior vena cava were all patent. The liver demonstrated nodular contour and morphologic changes in keeping with cirrhosis. Based on the clinical and imaging findings of large GV with prior bleeding in the setting of a gastrorenal shunt, she was deemed a suitable candidate for BRTO treatment.

The BRTO procedural steps are illustrated in Figures 3A-F. Briefly, needle access to the right common femoral vein was achieved under ultrasound guidance. The vascular sheath and C2-shaped catheter were advanced over the wire, and the LRV was selected. Venography was performed to identify the inferior phrenic vein (Figs 3A and B). A Berenstein catheter was used to select the gastrorenal shunt over a Glide wire (Figs 3C and D). Balloon-occluded venogram was performed through a 10-French sheath with an 11.5-mm occlusion balloon, outlining the entire extent of the GV with reflux into the splenic vein via the posterior gastric vein (Fig. 3E). A C-arm (cone-beam) CT was performed with the occlusion balloon inflated to outline the varices with trapped contrast. A total of 240 mg of 3% sodium tetradecyl sulphate foam was injected (air, sodium tetradecyl sulphate, and lipiodol ratio of 3:2:1; Fig. 3F). A C-arm CT was subsequently performed, which confirmed good filling of the GV with the sclerosing agent. With the occlusion balloon left in place, the patient was transferred to the step down unit and monitored during the sclerosant dwell time. Repeat fluoroscopy and C-arm CT were preformed 6 hours later. The patient had an uncomplicated recovery and was discharged home 4 days later. Follow-up CT performed 3 months later showed complete obliteration of her GV (Fig. 2B). Upper gastroscopy was performed 10 months post-BRTO which revealed the presence of small esophageal varices, but no GV were seen.

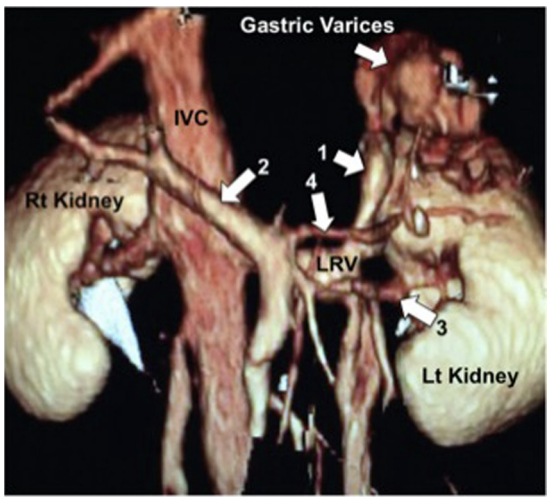

Fig. 1 – Volume-rendered image from a preprocedure CT showing a large gastric varix with a gastrorenal shunt (arrow 1) draining into the left renal vein (LRV). The portal vein (arrow 2), LRV (arrow 3), splenic vein (arrow 4), and inferior vena cava (IVC) are also indicated.

Discussion

GV are submucosal venous saccules in the wall of the stomach, which develop in about 20% of patients with portal hypertension [1]. They are classified according to Sarin et al [1] as either gastroesophageal varices (GOV) or isolated GV (IGV). GOV are further subdivided into two types: GOV1 (varices continuous with esophageal varices, extending down to the cardia, or lesser curve), and GOV2 (varices extending from the esophagus toward the fundus). IGV may be found in the fundus (IGV1) and are often tortuous and complex, or may be located elsewhere in the stomach (IGV2) such as the antrum, corpus, or around the pylorus [1,3]. GOV1 account for most GV (75%), however, according to a prospective study, the incidence of bleeding is significantly higher for IGV1 (78% for IGV1 vs 55% for GOV2, and 10% for GOV1 and IGV2) [1]. In comparison with esophageal varices, GV bleeding occurs less frequently but is associated with a poorer prognosis. GV bleeding results in greater hemorrhage and transfusion requirements, as well as increased risk of rebleeding and higher mortality rate [3]. Endoscopy is required to distinguish between an esophageal and gastric source of bleeding and is the first-line assessment modality for management of GV bleeding. However, a prospective study of patients with cirrhosis and GV hemorrhage and/or high-risk GV found that conventional endoscopic measures such as sclerotherapy may be associated with a higher rebleed rate as compared to BRTO [5].

The vast majority of GV are associated with a spontaneous left-sided portosystemic shunt, which can include gastrorenal, direct gastrocaval, and gastrocaval shunts via the inferior phrenic vein [2]. These shunts form to relieve portal hypertension or to bypass portal venous obstruction. Gastrorenal shunts are the most common, making up 80%-85% of left-sided portosystemic shunts [2]. They create an outflow