Mesocaval shunt for portal hypertensive small bowel bleeding documented with intraoperative enteroscopy

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ABSTRACT

INTRODUCTION: Besides upper gastrointestinal tract, small bowel has also been implicated as a potential source of hemorrhage in patients with portal hypertension.

PRESENTATION OF CASE: We report an interesting case of recurrent massive small intestinal bleeding in a patient with portal hypertension secondary to liver cirrhosis treated with a mesocaval shunt. Endoscopic assessment with gastroscopy and colonoscopy failed to identify the source of hemorrhage. An intraoperative enteroscopy was conducted which revealed a diffuse bleeding pattern from the small bowel mucosa.

DISCUSSION: An interposition mesocaval shunt procedure was successfully carried out on an emergency basis that eventually managed to control bleeding.

CONCLUSION: In cases where a diffuse pattern of hemorrhage exist or non-operative measures fail emergency mesocaval shunting seems to be an efficacious alternative treatment approach for portal hypertension related intestinal bleeding.

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1. Introduction

Acute gastrointestinal bleeding is a common clinical manifestation of portal hypertension (PH) and liver cirrhosis (LC). The vast majority of these cases involve ruptured esophagogastric varices. Generally, bleeding from esophageal varices represents the decompensated stage of LC with significant associated mortality.\(^1\) However, besides upper gastrointestinal (GI) tract, small bowel has also been implicated as a potential source of hemorrhage in these patients. Changes in the small bowel mucosa of patients with portal hypertension have been well described. The term “portal enteropathy” has been proposed to include and group all these mucosal abnormalities seen in patients with LC and PH.\(^2,4\)

Generally, the diagnostic work-up of small bowel is problematic especially in cases of acute bleeding. Conventional endoscopy cannot assess this part of the intestine. The need for endoscopic access to improve diagnosis and treatment has led to the development of novel technologies such as video capsule, and double balloon enteroscopy. Single balloon and spiral endoscopy are used in an experimental level and just recently entering clinical use.\(^5,6\)

However, the necessary expertise and the availability of the appropriate equipment are prerequisites for the widespread use of these modalities. Practically, diagnosis in many cases is established by the endoscopic exclusion of upper GI or colonic bleeding. Computed tomography (CT) angiography is an imaging modality that appears in the literature as an accurate and cost-effective tool in the diagnosis of acute GI bleeding.\(^7\) Determining the precise location of bleeding, i.e. small bowel is of paramount importance and can direct appropriately further management especially on the base of portal hypertension.

Enterectomy of the involved area of the small bowel has been described as effective treatment option with the limitation of the accurate bleeding localization.\(^8\) However, when a more diffuse bleeding pattern is the clinical scenario, a more pathophysiological surgical approach, i.e. portosystematic shunt procedure should be adopted. In the present study we present an interesting case of recurrent massive small bowel bleeding in a patient with portal hypertension secondary to liver cirrhosis. An interposition mesocaval shunt procedure was successfully carried out on an emergency basis that eventually managed to control bleeding.

2. Case report

Written informed consent was obtained from this patient for the publication of this case report and any accompanying images.
A 65-year-old, HBV positive, male presented to the emergency room department due to recurrent episodes of per rectum blood loss – hematochezia. Regarding past medical history; the patient was diagnosed with a Hodgkin lymphoma in 1974 treated with a combined chemo – radiation therapy. In 2003 the patient was subjected to an aortic valve replacement requiring concurrent antiplatelet and antithrombotic medication. International normalized ratio level (INR) was the determinant of coumarin dosages aiming in an INR level of 2–2.5 while the minimum prophylactic dosage of acetylsalicylic acid, i.e. 100 mg were prescribed. Despite the fact that the patient was HBV positive, he was not under periodical hepatological guidance and screening either for the possible development of cirrhosis or hepatocellular cancer.

On admission, the patient had a blood Pressure of 110/60 mmHg and 92 beats per minute. However, gross per rectum blood loss was obvious during digital per rectum examination and stool inspection. Routine laboratory tests results included an hematocrit of 27% and hemoglobin level of 8.7 g/dl, a total bilirubin level of 2.7 mg/dl and an international normalized ratio (INR) level of 1.8. The patient was submitted to an emergency endoscopy of the upper GI and the large intestine. However, this endoscopic assessment failed to identify the source of hemorrhage. Significant amounts of fresh blood in the cecum as well as 2nd grade hemorrhoids were the main colonicoscopic evidences. Endoscopic workup of the upper GI revealed 1st grade esophageal varices without though evidences suggestive of a recent bleeding episode.

Abdominal ultrasound revealed a moderate intra peritoneal fluid collection consistent with ascites and splenomegaly. Additional imaging evaluation with abdominal CT did not add any additional information in the diagnostic field. Vitamin K administration as well as multiple units of fresh frozen plasma (FFP) aimed in the normalization of the patient’s clotting profile. However as the hemorrhage did not cease despite supportive measures, a decision was made to perform a real time angiography via the catheterization of the right femoral artery. The results of this interventional radiographic study were inconclusive.

The ongoing bleeding and the continuous needs for blood transfusions and intensive fluid resuscitation were the indications for an emergency laparotomy. A wide midline incision was performed. Evidences of portal hypertension were observed such as increased spleen dimensions, ascites and nodular cirrhotic liver. Although the source of hemorrhage could not be accurately located preoperatively, a small bowel origin was suspected. Thus, an intraoperative endoscopy of the small bowel was decided. A 2–3 cm enterotomy at the ileo–jejunal transition level was performed followed by the insertion of a typical pediatric gastroscope. Besides, mucosal abnormalities with diffuse edema and dilated vessels with red spots scattered extensively to the bowel wall (portal enteropathy) and hemorrhagic content within the lumen, no focal lesion responsible for the acute hemorrhage was observed. The enterotomy was then closed in two layers with 3-0 intermittent absorbable suture material. Thus, the rare cause of a small bowel hemorrhage due to portal hypertension was the actual scenario.

In the setting of intestinal hemorrhage, due to liver cirrhosis related portal hypertension a procedure that could decrease the pressures within the portal vein system was contemplated. A grafted anastomosis of the superior mesenteric vein and inferior vena cava, i.e. mesocaval shunt was finally decided. Regarding the operative technique, a transverse incision at the root of the transverse mesocolon was performed in order to identify the superior mesenteric vein (SMV). After the identification of the dilated vein just to the left of the superior mesenteric artery (SMA) small branches were ligated in order to free and mobilize the vein for a length of about 5 cm. A wide duodenal and right colon mobilization was then performed and the infrarenal inferior vena cava (IVC) was dissected free from the adjacent structures especially along its anterior aspect.

An 8 mm ringed vascular graft (Gore Tex®) was used for the anastomosis. After the partial IVC occlusion with a Satinsky clamp, a small ellipse was removed from its anterior surface. A typical side to end vascular anastomosis with 5–0 non absorbable continuous suture material was performed. Graft length of 8 cm was adequate in order to bridge the distance between the two veins. Between two Cooley clamps placed onto the SMV a small ellipse was removed from the anterior vein wall. The prosthesis was then anastomosed to the SMV with synthetic non-absorbable suture material. The typically described C-shaped configuration of the prosthesis (ICV – third portion of the duodenum – SMV) was the final outcome.

Operative time was 140 min while two units of packed red blood cell and four units of FFP were required during surgery. After the procedure the patient was carefully observed in the intensive care unit for 5 days followed by an additional 5–day period in our department. No signs of further active bleeding were observed. The patient was finally discharged from the hospital with the proper prophylactic medication. At the follow-up which was conducted 6 weeks after the operation the patient remained asymptomatic. The triple study confirmed the patency of the prosthesis.

3. Discussion

Normal portal vein pressures range from 3 to 6 mmHg, with daily circadian variation. Sustained elevations in portal vein pressure to levels higher than 10 mmHg can result in gradual shunting of blood from the portal circulation into the low-pressure systemic circulation via certain collateral vessels such as left gastric and short gastric veins.1 Long-term shunting of high-pressure (>12 mmHg) portal venous blood, results in variceal dilatation and rupture of the involved veins. Although varices can form throughout the entire length of the alimentary canal, the majority of portal hypertensive bleeding is from esophageal varices.3 However, portal hypertension has also been implicated for small bowel changes. Erythema, edema, telangiectasia, varices or areas of mucosa with a reticulate pattern in the small bowel have been described as PH associated endoscopic findings.4,9,10 The clinical correspondence of these findings remains mainly uncertain. The pattern of chronic occult blood loss in PH patients appears the most frequent. However, acute or recurrent massive bleeding has been also reported,2,3,11,12

The management of patients with portal hypertension has changed dramatically over the past years. Acute bleeding from esophageal varices is initially treated with measures directed at the site of hemorrhage, i.e. variceal veins. Sclerotherapy and variceal ligation (banding) represent first line endoscopic treatment options. Vasoactive drugs such as terlipressin are often concurrently used in order to lower the portal pressure and are the only noninvasive treatment for non-esophagogastric variceal sites of bleeding.13 The transjugular intrahepatic portosystemic shunt (TIPS) procedure is constantly gaining points and represents a reasonable alternative to an emergency surgically created shunt for uncontrolled bleeding.14 TIPS and endoscopic treatment show comparable efficiency in acute or recurrent bleeding.13

Therefore in the era of TIPS, redefining the role of emergency portosystemic shunts seems reasonable. Traditionally, emergency shunt surgery either selective or total is reserved for patients failing
the aforementioned approaches.15 However the widespread practice of using surgical procedures mainly as salvage for failure of endoscopic therapy is not currently commonly accepted.16 Shunt procedures are mainly categorized as selective or not selective on the basis of the amount of portal blood that is diverted from the liver. Liver dysfunction and hepatic encephalopathy are the main complications of surgical shunting. Either the not selective such as portocaval and mesocaval shunt or the selective such as distal splenorenal shunt appear efficient in controlling esophageal variceal bleeding.15 However the pathophysiological results of these procedures are dramatically different. For instance distal splenorenal shunt although it decompresses efficiently the vein system responsible for oesophagogastric variceal bleeding it does not have any effect on the mesenteric venous system. Thus by definition would be ineffective for a bleeding initiating from the small intestine.

In the present paper we present the case of 65-year-old male patient with previously undiagnosed cirrhosis and portal hypertension secondary to HBV infection. Acute recurrent gastrointestinal bleeding that did not cease despite the appropriate conservative measures dominated on clinical presentation. The source of bleeding could not be located despite extensive diagnostic work-up in the preoperative setting. In our department small bowel endoscopy with modern modalities is not available thus the assumption of small bowel hemorrhage was done by exclusion. However, intraoperatively we attempted an endoscopic assessment of the small bowel with a conventional endoscope via an enterotomy that provided information valuable for the decision process.

Under these circumstances, a procedure that could decrease the portal-mesenteric vein pressure was the actual challenge. Liver transplantation was not an option due to residual liver synthetic capacity, thus TIPS procedure was ruled out as a valid bridging option. Increased incidence of long-term encephalopathy after TIPS procedure was an additional argument. The nature, location and the emergency status of the hemorrhage excluded the application of a time consuming selective shunt. The small diameter grafted mesocaval shunt fulfilled the conditions for a partially selective shunt in terms of efficiency in reducing mesenteric vein pressures. Although a portocaval shunt would offer comparable – if not better – results regarding the arrest of the bleeding, a hypertrophic caudate lobe discovered intraoperatively rendered planning for a portocaval shunt technically inappropriate. In addition we hypothesized that the magnitude of encephalopathy would be minor after the utilization of a small diameter graft, i.e. 8 mm for the portosystemic anastomosis compared to the encephalopathy provoked after a wide side-to-side portocaval anastomosis.

The effectiveness of the proposed technique for acute small bowel bleeding due to portal hypertension was confirmed by the absence of signs of hemorrhage in the postoperative period. However, drawing definite conclusions based on evidences of one case is not only risky but also inappropriate. We though aim to underline the need for redefining the indications for emergency shunt procedures. In fact these procedures require surgical skills and expertise but they represent an effective alternative for the treatment of portal hypertension related gastrointestinal bleeding especially in cases where other treatment options have failed.

In conclusion, interposition mesocaval shunt can expeditiously lower the portal vein pressure and should be included in the surgical armamentarium as a mean of controlling acute small bowel bleeding. In cases, where a diffuse pattern of hemorrhage exist or non-operative measures fail emergency mesocaval shunting seems to be an efficacious alternative treatment approach for portal hypertension related intestinal bleeding.

Conflict of interest statement
None.

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Ethical approval
Written informed consent was obtained from this patient for the publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions
D. Symeonidis and K. Tepetes contributed equally to this work; D. Symeonidis, G. Christodoulidis, G. Koukoulis, I. Chatzinkolaoi, I. Mamaloudis, K. Tepetes acquired the data, drafted and revised the article and approved the final version to be published; K. Tepetes, D. Symeonidis and G. Christodoulidis performed the surgical operation.

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