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Coronary Renal Shunt with Splenectomy (CRSS) for Selective Variceal Decompression

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Abstract

Background Distal splenorenal shunt and coronary caval shunt are commonly used for selective decompression of esophagogastric varices, but they may not solve severe hypersplenism and their application may be hampered by the presence of splenic venous thrombosis or a left gastric vein (LGV) situated deeply behind the pancreas. On the other hand, some patients have an LGV entering the splenic vein (SV). We tried to work out a new selective shunt for this group of patients.

Methods Sixteen patients with severe hypersplenism and esophagogastric varices received coronary renal shunt using the SV following splenectomy. After splenectomy, the proximal portion of the SV and the LGV was isolated from the pancreas. The isolated SV was divided at a point 3–5 cm left to its junction with the LGV. The proximal orifice was anastomosed to the left renal vein, and the distal orifice was ligated. A clip was applied to the SV for occlusion between the portal vein and LGV. The right gastric and gastroepiploic vessels were divided to block backflow from the portal vein and to reduce the arterial inflow of the varices.

Results No operative mortality or procedure-related complications occurred. Postoperative computed tomography and endoscopy showed that all the shunts were patent and that the varices had been obliterated or markedly alleviated. In the 6–36 months' follow-up period, no recurrent variceal hemorrhage or encephalopathy occurred.

Conclusion Coronary renal shunt combined with splenectomy can achieve the goal of selective decompression of esophagogastric varices. It would become an alternative means of selective variceal decompression for patients whose LGV enters the SV.

Introduction

Although treatment for portal hypertension and its complications has developed into a wide range of options, surgery still plays an important role, and surgical treatment of these conditions is constantly evolving [1]. Selective variceal decompression is an effective surgical treatment for variceal hemorrhage. Distal splenorenal shunt and coronary caval shunt are means of selective variceal decompression that do not divert portal venous blood and are commonly used. However, they do not provide long-term satisfactory relief of hypersplenism in some patients [2], and distal splenorenal shunt may not be possible if

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there is splenic venous thrombosis [3]. Moreover, a left gastric vein (LGV) draining into the splenic vein (SV) rather than the portal vein may hamper the creation of a coronary caval shunt because its main trunk is situated deeply behind the pancreas. In this study, we performed selective variceal decompression by means of coronary renal shunt using the SV following splenectomy to treat 16 patients whose LGV drained into the SV. The study was approved by the ethics committee of the hospital, and all patients signed the informed consent prior to the operation.

Operative technique

After splenectomy, the peritoneum at the inferior border of the pancreas was incised. The pancreas was lifted up by the inferior border, and the proximal portion of the SV was identified on the posterior surface of the pancreas. Isolation of the SV from the pancreas was carried out from its junction with the superior mesenteric vein (SMV) to the left. By incising the overlying adventitia, the inferior wall of the SV was first exposed. The inferior mesenteric vein was divided between ligatures if it was connected to the SV. The SV was encircled with vessel loops and retracted downward to expose its superior wall and the LGV. Pancreatic venous tributaries to the SV were divided between clips and ligatures until the proximal portion of the SV was freed 3–5 cm from its junction with the LGV. In the same way, the LGV was totally isolated from the pancreas (Fig. 1).

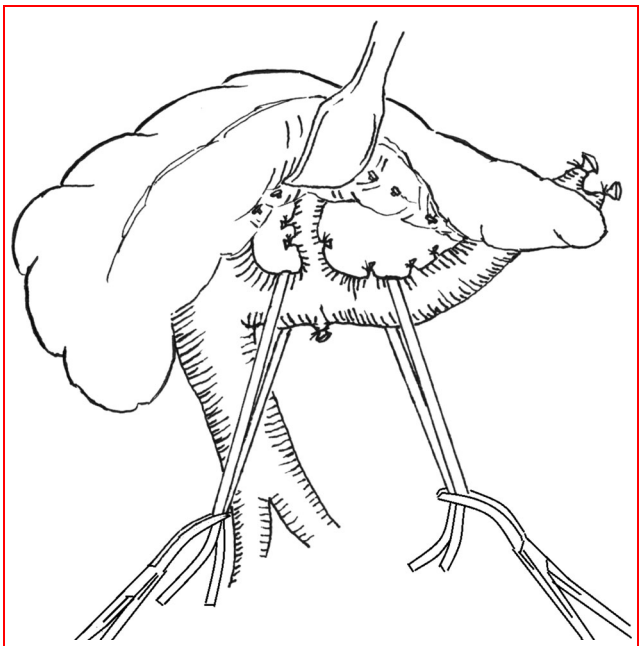

Fig. 1 Proximal portion of the SV and the main LGV has been isolated from the pancreas

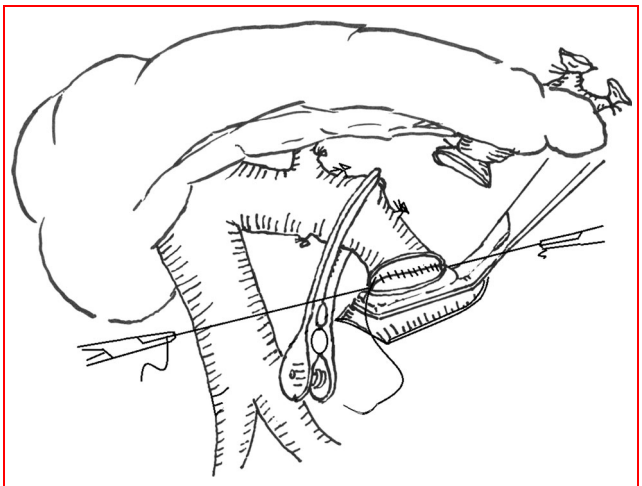

Fig. 2 Proximal end of the divided SV is anastomosed to the left renal vein, and the distal end is ligated

The isolated SV was divided at its upmost left side. The distal end was ligated and the proximal end was trimmed and anastomosed to the left renal vein in an end-to-side style (Fig. 2). A big clip was applied to the SV between its junction with the portal vein and its junction with the LGV so as to obtain a selective shunt (Fig. 3). The SV would be divided between sutures if the distance between the portal vein and the LGV was over 1 cm. The right gastric and gastroepiploic vessels were divided to block backflow from the portal vein and to reduce the arterial inflow of the varices.

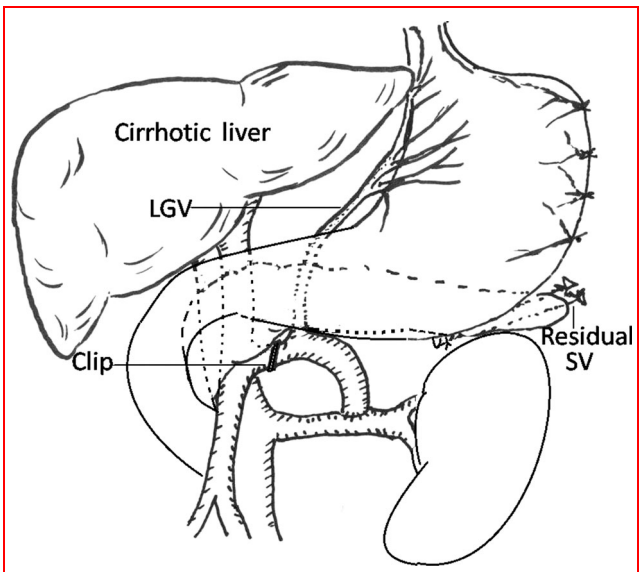

Fig. 3 Coronary renal shunt is completed with clipping occlusion of the SV remnant after splenorenal anastomosis

Results

Sixteen patients with severe hypersplenism and esophagogastric variceal hemorrhage received splenectomy followed by coronary renal shunting using the SV. The operation was completed successfully in all of the patients. The mean operative time was 234 (±121) min, and the mean amount of operative bleeding was 356 (±228) ml. There was no operative mortality. No pancreatitis or portal venous thrombosis or other procedure-related complications occurred. At the sixth month after the operation, computed tomography and endoscopy showed that all the shunts were patent and that the varices had been obliterated or markedly alleviated (Fig. 4). In the 6–36 months' follow-up period, no recurrent variceal hemorrhage or encephalopathy occurred.

Discussion

As early as 1984, Warren et al. [3] reported selective variceal decompression for eight patients with splenic vein thrombosis or a prior splenectomy. The surgeons used a splenic vein remnant, the coronary vein, the gastroepiploic vein or the inferior mesenteric vein to divert variceal blood and obtained good results. In China, where hepatitis is rampant, splenectomy for portal hypertension is common since the patients usually have splenomegaly with compression symptoms and severe hypersplenism due to posthepatitic cirrhosis. For patients who need spleen resection, an option for selective shunt is coronary caval shunt, which often requires a venous autograft [4]. However, if the main trunk of the LGV is deep behind the pancreas, coronary caval shunt may not be possible. In a report by Widrich et al. [5], 30% of the patients with portal hypertension had an LGV entering the SV, and our present study was to work out a variceal blood diversion route for this situation. With the splenic vein remnant anastomosed to the left renal vein and the spleno-portal blood flow cut off, the splenic vein remnant became a draining conduit linking the LGV to the renal vein.

Coronary renal shunt using the SV following splenectomy was successfully performed in our 16 patients, and successful decompression of esophagogastric varices was confirmed in postoperative follow-up. The most difficult and critical part of this procedure is isolation of the SV and the LGV because tributaries from the pancreas are thin and short. When performing this procedure, special attention should be paid to the following three points. (1) An LGV over 5 mm wide is required to prevent stagnant blood flow in the SV, which has a larger bore than the LGV. (2) The length of the isolated SV should always be longer than required because the orifice needs trimming before anastomosis. It is recommended that measurement of the distance between the LGV-SV junction and the left renal vein is taken before the SV is divided. (3) The whole course of the LGV behind the pancreas should be isolated to prevent the pancreatic siphon effect. We found that there were 2–4 tributaries from the pancreas. If left intact, these tributaries would become enlarged, produce the pancreatic siphon effect and even form direct collaterals between the LGV and the portal vein as the distance between them is short.

In conclusion, coronary renal shunt combined with splenectomy can achieve the goal of selective decompression of esophagogastric varices. It would become an alternative to the current means of selective variceal decompression for up to 30% of patients with portal hypertension.

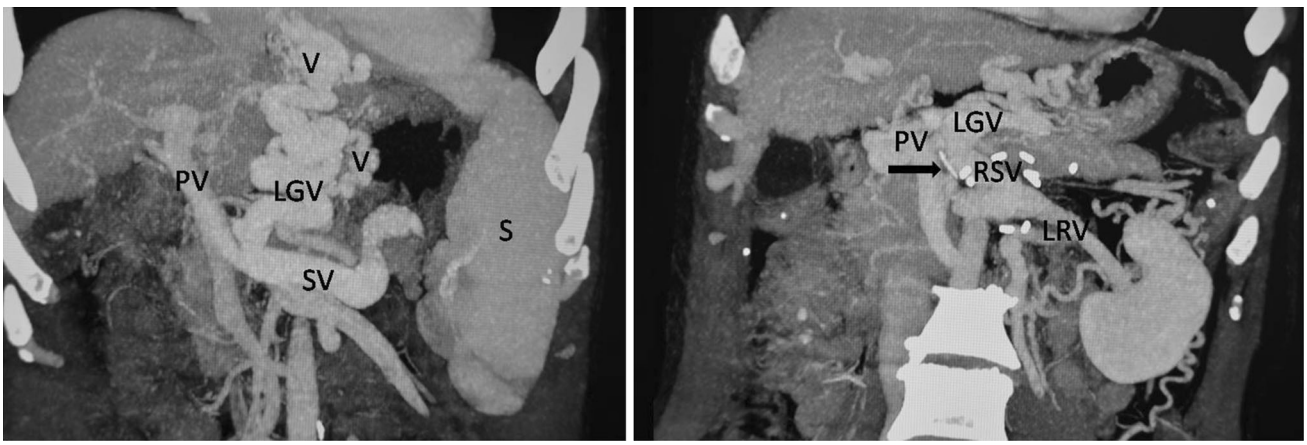

Fig. 4 Comparison of a patient's preoperative (left) and postoperative (right) computed tomographic portal venograms (V, varices; S, spleen; PV, portal vein; LGV, left gastric vein; SV, splenic vein; RSV, remnant splenic vein; LRV, left renal vein. Clip indicated by arrow)

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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