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Spleno-adrenal shunt: A feasible alternative to splenorenal shunt in extrahepatic portal hypertension

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Abstract

Extrahepatic portal hypertension (EHPVO) is a common cause of portal hypertension in children. Surgical Porto-systemic shunt operation is often required when they do not respond to medical or endoscopic interventions. Among various types of shunt surgery, the proximal splenorenal shunt, also known as the Linton's shunt is a viable option with good outcome. The modification of the proximal splenorenal shunt is the spleno-adrenal shunt which has been sparsely described in literature. This is a case of EHPVO managed with spleno-adrenal venous anastomosis highlighting the main advantages of using the adrenal vein as a conduit when performing a splenorenal shunt.

Key words: Anastomosis; Child; Portal hypertension; Splenorenal shunt.

INTRODUCTION

Portal hypertension among children in South-East Asian subcontinent is usually secondary to extrahepatic portal vein obstruction (EHPVO).[1,2] One of the hallmarks of EHPVO is portal vein cavernous transformation (PVCT) which is defined as formation of venous channels within or around a previously thrombosed portal vein.[3-5] Splenorenal shunt is an excellent method to decompress the portal system[3] and when adrenal vein is of adequate caliber, use of adrenal vein as viable conduit for splenorenal shunt has been described.[6-8] In this case report, the use of spleno-adrenal shunt for the management of extrahepatic portal vein obstruction is described.

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CASE REPORT

A 17-year-old female presented to the emergency department of Kathmandu Medical College Teaching Hospital with a single episode of vomiting of around 700-800 ml bright red blood with clots. According to her mother, when the girl was nine years old, there was a similar episode for which she had to undergo an endoscopic intervention. On examination in the emergency room, she was pale and tachycardic with normal blood pressure. The abdominal examination revealed massive splenomegaly and laboratory reports showed pancytopenia with normal renal and liver function. An upper gastrointestinal (GI) endoscopy showed oesophageal and fundic varices with red wale sign. Contrast Enhanced Computed Tomography (CECT) abdomen showed cavernous transformation of the portal vein with gross splenomegaly and multiple collaterals around splenic hilum. With above findings, extrahepatic portal vein obstruction (EHPVO) was diagnosed and the patient was planned for a proximal splenorenal shunt with splenectomy.

At operation, cavernoma was noted around the portal vein. Spleen was significantly enlarged and there were prominent retroperitoneal portosystemic collaterals.

During isolation of the left renal vein, thick retroperitoneal tissue was noted covering the renal vein and a large left adrenal vein was encountered. Due to the dense retroperitoneal tissue leading to difficulty in isolation of the left renal vein, the adrenal vein was planned to be used as a conduit for the splenorenal shunt. The left adrenal vein was ligated as far distal as possible from the renal vein to achieve the greatest length. Splenectomy was performed and the splenic vein was transected near the hilum to provide sufficient length to allow tension-free end-to-end anastomosis to the adrenal vein. After adequate backflow of blood was noted from the splenic vein, the splenic vein was anastomosed with the left adrenal vein in an end-to-end fashion using 6-0 prolene sutures (Figure 1 and 2). The postoperative period was uneventful and the patient was discharged on the sixth postoperative day. At two weeks follow-up, the patient was doing well and the doppler ultrasound confirmed shunt patency. An upper GI endoscopy repeated at one month following the operation revealed a significant decrease in the oesophageal and fundic varices.

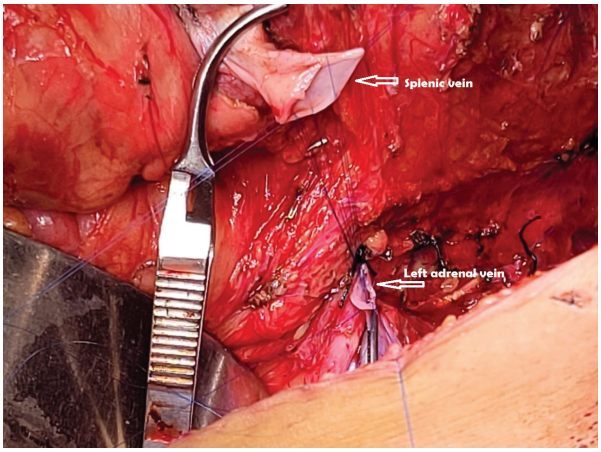

Figure 1: **Splenic vein and left adrenal vein**

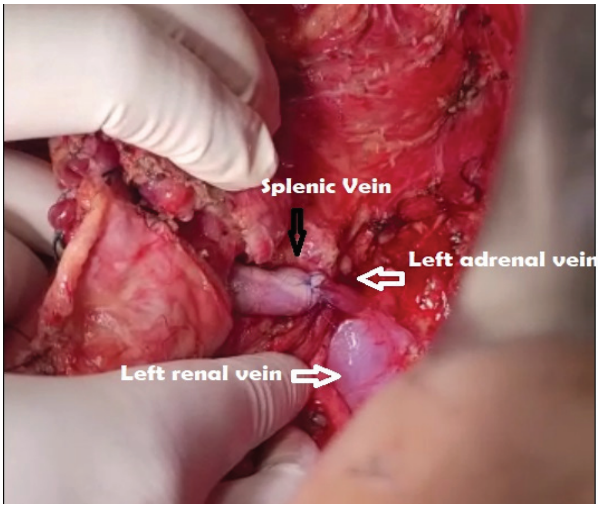

Figure 2: **Splenic vein, left adrenal vein, and left renal vein**

DISCUSSION

The case discussed above presented with life-threatening upper GI bleed with features of hypersplenism. The aim of shunt surgery in these cases is to decompress the portal system and preserve adequate flow through the liver to prevent encephalopathy and ascites.[3] In 1947, Robert Linton first published his work after performing splenectomy and splenorenal venous anastomosis.[9] Other techniques such as selective portocaval shunt with autologous or prosthetic graft and the Rex shunt have been used for portal decompression. However, these procedures are relatively more complex and have been shown to have a higher complication rate.[3] Mazariego and Reyes in Pittsburgh described a modification of the distal splenorenal shunt technique using the adrenal vein as the inflow vessel into the renal vein to accomplish selective portal decompression which had a good perioperative outcome.[6] In 2012, Gu et al. in Shanghai also demonstrated similar results by using a left adrenal vein as a viable conduit for selective portosystemic decompression.[3]

There are a few factors that make the adrenal vein suitable for a conduit for the splenorenal shunt, such as i) the adrenal vein lies in the area of dissection for shunt and is exposed during dissection and mobilisation of the left renal vein, ii) when using the adrenal vein as a conduit, it avoids the need for a vascular anastomosis directly into the renal vein and hence avoids the clamping of the renal vein which has the potential to cause renal vein thrombosis postoperatively, iii) the use of natural vein is superior to that of a prosthetic graft in terms of rate of infections and thrombosis, iv) drainage of the adrenal vein into the left renal vein has an anatomical angle which provides a favourable tension-free anastomosis.[10] This technique is particularly useful in cases where there is difficulty in isolating the left renal vein due to dense fibrosis around it or when there is a presence of a vascular anomaly.

It has been noted that in cases of EHPVO with massive splenomegaly and hypersplenism, the Linton's shunt and spleno-adrenal shunt results in a more clinically significant resolution of hypersplenism compared to distal splenorenal shunt.[9] Splenectomy in these cases also tends to improve the quality of life by addressing the abdominal discomfort associated with massive splenomegaly. While both distal and proximal

splenorenal/adrenal shunts are equally effective in preventing bleeding from gastroesophageal varices, proximal splenorenal/adrenal shunt prevents bleeding from ectopic varices that are commonly observed in patients with noncirrhotic portal hypertension (NCPH).[10] The proximal splenorenal/adrenal shunt also prevents the development of portal biliopathy, a morbid long-term complication in these patients. The theoretical disadvantage of a non-selective shunt is the development of hepatic encephalopathy; however, it is not very common in patients with NCPH as they have a normal liver function.

CONCLUSION

Spleno-adrenal shunt can be a feasible alternative to spleno-renal shunt in extrahepatic portal hypertension when there is difficulty in isolating the left renal vein, provided an appropriately sized left adrenal vein is present.

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