



Surgery

PORTOSYSTEMIC SHUNT SURGERY IN A LIMITED FACILITY SETUP: CHALLENGES AND OUTCOMES

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ABSTRACT **Background:** Extrahepatic portal venous obstruction (EHPVO) is the most common cause of paediatric portal hypertension. Cases come from remote background with limited access to health and need proper addressal. We analysed the challenges and outcomes of Porto systemic shunts in a limited facility setup.

Study design: Prospective study

Methods: 29 consecutive children below 18 years operated with a diagnosis of EHPVO formed the study group. All were operated on the basis of clinical findings, presence of hypersplenism and documented portal vein thrombosis on Doppler ultrasound. Results with respect to shunt patency and rebleed were collected. Problem encountered with respect to assistance, blood loss, operating time, vascular anastomosis were recorded based on indigenous scoring system for self-audit.

Results: 29 cases formed the study group and proximal lienorenal shunt (LRS) was performed in 19 cases because of massive splenomegaly with infarcts. Splenectomy with devascularisation was performed in remaining 10 cases. Follow-up ranged from 3 to 12 months. All the cases except one had a patent shunt at last follow up. Mean operating time was 4.30 hours (Range 4.00- 6.00 hours). All the cases were done under 2.5 magnification using instruments from the general surgery department with custom made needle tip cautery as the only energy device. All the cases were kept nil by mouth for 24 hours and discharged at a mean duration of 5 days (Range 4-6 days).

Conclusions: Porto systemic Shunt in children with EHPVO is a viable option. This can be performed even in limited facilities with minimal assistance.

KEYWORDS : Portal hypertension, portosystemic shunts, limited facility setup, Extrahepatic portal venous obstruction

INTRODUCTION:

Portal hypertension is one of the common cause of upper GI bleed. Extra-hepatic portal venous obstruction is one the common cause of portal hypertension. Most of the times the etiological factor responsible for the extra hepatic portal venous obstruction is not clear. The surgical approach for portal hypertension should be considered as a primary management modality especially in Indian scenario because most of the times patient come from the background with remote access to the health care facility. (1) Unfortunately the facility for this surgery is limited to higher setup making the availability of the resources less likely to those who actually require it. Technically the surgery should be feasible even in the setups which have basic facility for laparotomy provided the surgeon is efficient enough in performing the procedures. This article focusses on the feasibility of shunt surgery even in limited set up.

Aim:

To assess the feasibility of Porto systemic shunt surgery in a basic peripheral setup.

MATERIAL AND METHODS:

All the cases of portal hypertension being operated for portal hypertension irrespective of cause between 0- 18 years between June 2014- June 2016 in CM Hospital and associated medical college, from July 2016- June 2017 at AIIMS, Raipur (which is a set up in initial stages) and from June 2017-June 2019 at DKSPGI, Raipur were included in the study. Those refusing consent for participation or who do not had a minimal follow-up of 3 month were excluded. 31 cases were operated during the specified period and 29 were included in the study. The diagnosis of portal hypertension was made on the basis of clinical presentation, presence or absence of hypersplenism and documented portal venous thrombosis on ultrasound Doppler. Upper gastrointestinal endoscopy was done whenever possible and CT portogram was not done due to logistic reasons. Hypersplenism if present was graded as "mild" [platelet count <100,000 and total leukocyte count (TLC) 4000] or "severe" [platelet count <50,000 or TLC <3000]. (1) All the patients were counselled about the option of primary surgery or repeated upper GI endoscopy and sclerotherapy in the presence of the varices and were allowed to decide about the type of management modality. All of them opted for primary surgery owing to

the possibility of one time solution. All the surgeries were done by the first author and the energy source used were only monopolar and bipolar electro cautery. Tip of the electro cautery was custom modified into needle tip for fine dissection by tying 24G needle to the cautery tip (Fig-1).



Figure 1: Custom made needle tip cautery, the basic energy source used.

All the cases with shuntable splenic vein underwent splenectomy with proximal splenorenal shunt (due to huge sizes of the presenting spleen with infarcts) while the remaining cases underwent splenectomy and devascularisation. Vascular anastomosis was done using 6-0 prolene (Fig-2).



Figure 2: Operative collage

Drain was kept in the splenic bed for 2-3 days or till output came. All the patients were kept nil by mouth for 24 hours and kept in the soft oral diet for 1 week. All were started on tab spironolactone if the drain output was above 100 ml after 48 hours at the dose of 1-3 mg/kg/day in two divided doses. (2) Follow-up ultrasound Doppler was done in 3 months for confirming shunt patency. Complete blood count was repeated after 3 months to see the status of hypersplenism. Those with ascites were continued on tab spironolactone at the dose of 1-3 mg/kg/day in two divided doses and were followed up. (2) Results with respect to shunt patency and rebleed were collected. Problem encountered with respect to assistance, blood loss, operating time, vascular anastomosis were recorded based on the indigenously designed scoring system (Table-1) in an attempt of internal audit for further improvement.

Table 1: The Indigenous Scoring System for Self-Audit

Parameter	Criteria's	Score
Assistance	Good	3
	Satisfactory	2
	Poor	1
Blood Loss	< 100ml	3
	100-200 ml	2
	>200ml	1
Operating Time	<3 hour	3
	3-6 hour	2
	>6 hour	1
Vascular Anastomosis	Easy	3
	Manageable	2
	Difficult	1
Total score		12

RESULTS:

A total of 31 cases were operated during the specified period and 29 were included in the study. There were 20 males and 9 females. The average age at surgery was 9 years (Range 6-18 years). Lienorenal shunt (LRS) was performed in 19 because of massive splenomegaly with large infarcts. In the remaining 10 cases splenectomy with devascularisation was performed due to the non-availability of shuntable splenic vein. There were 16 cases of portal hypertension associated with sickle cell disease and rest of the cases were idiopathic portal hypertension. The demographic profiles were as shown in table 2.

Table 2: Demographic profiles and details of the procedures

Parameters	Number
Sex	
Male	20
Females	9
Type of Surgery	
Proximal LR shunt	19
Splenectomy and devascularisation	10
Hypersplenism	
Mild	0
Severe	29
Requirement of Spironolactone	
Yes	19
no	10
Persistent Ascites	
Present	2
Absent	27
Shunt Block	
Present	1
absent	18
Associated Sickle Cell Disease	
Present	16
Absent	13
Internal Audit Score	
0-4	1
5-8	2
9-12	16

Mean operating time was 4.30 hours (Range 4.00- 6.00 hours). Follow-up ranged from 3 to 12 months. All the cases except one had a patent shunt at last follow up. The case presenting with shunt thrombosis was a known case of sickle cell disease with portal hypertension and he developed sickling crisis after 3 months of surgery following which the Doppler showed shunt blockage. This case was kept in follow up on tab

propranolol and endoscopies to grade and manage oesophageal varices. All the cases were done using instruments from the general surgery department with custom made needle tip cautery and bipolar as the only energy device. All the cases were kept nil by mouth for 24 hours and discharged at a mean duration of 5 days (Range 4-6 days). There was no mortality and persistent ascites was seen in two cases which were managed on spironolactone 1-3mg/kg/day in two divided doses. Shunt block was seen in one case.

DISCUSSION:

Portal hypertension is one of the common disease in central India. The exact cause of its endemicity is not clear but it is proposed to be due to associated umbilical sepsis, dehydration and high prevalence of sickle cell disease in these areas. Unfortunately the cases of portal hypertension belong to remote areas with poor access to the health care facilities and general awareness of the disease. These cases thus present late to the health care providers. The disease in them thus is full blown with less possibility of conservative medical management.

Portal hypertension is defined as the elevation of the hepatic venous pressure gradient above 5 mm of HG. It is considered to be clinically significant if the pressure gradient exceeds 10-12 mm of HG because beyond this threshold level the clinical complication of portal hypertension becomes evident (3). The manifestations of portal hypertension can be wide but in paediatric age group they are classified as (4)

1. Bleeding manifestations due to oesophageal varices.
2. Growth retardation due to malabsorption as a result of associated enteropathy and pancreatic syphoning.
3. Manifestations due to hypersplenism.
4. Miscellaneous manifestation like encephalopathy, ascites, etc.

Endoscopic sclerotherapy is generally done to address the complication of portal hypertension like varices, but this is basically the addressal of the tip of the iceberg. This is a continuous process involving the monitoring of the progression with serial endoscopies and sclerotherapy of all the clinically sclerosable varices. For the patient with poor background the cost of therapy and the need of repeated follow up makes this option technically difficult. Shunt surgery may be recommended as the primary treatment in them because it provides one time definite solution to the problem and has an excellent long term result (1).

There are a number of shunt procedures available in the management of portal hypertension with their own pros and cons. Proximal and distal splenorenal shunt are currently the commonest shunts performed. Studies have shown excellent results and even the regression of the infarcts and hypersplenism following successful distal splenorenal shunt (1,5). In our study almost all the patients presented with massive splenomegaly with obvious infarcts with the doubtful follow up and association of sickle cell disease in many of them. Splenectomy with proximal splenorenal shunt was performed and offered to all of them. There was a shunt block in the case with sickle cell disease who needed medical management and sclerotherapy in the follow up. All the remaining sickle cell disease cases were followed closely to avoid such crisis and blockage.

Since long shunt surgeries have been the domain of higher centres. This is possibly due to the availability of surgical expertise and high end energy sources in these centres. For the downtrodden population it is difficult to refer to these centres and afford the cost of treatment. Owing to the endemicity of these cases in the area and authors experience in performing these cases this study was planned to access the feasibility of this surgery and offer definitive surgery. All the procedures were audited using self-designed scoring system after the completion of the procedure to improve the efficiency next time and learn from our own shortcomings. The surgical charges of extremely poor population was waived of by the author personally in an attempt to provide the financial support. The running cost and unnecessary investigations were dropped out. The decision to perform shunt or do a devascularisation procedure was taken on table depending upon the size and availability of the shuntable vein. All the patients were followed free of cost and the cost of the ultrasound Doppler and hemogram (3 month after surgery) were the only expense for the patient during follow-up. Using lessons learned with our own pitfalls discovered in the audit we could significantly improve our technical skill. This was evident with the improvement in the scoring system in the audit (figure 3).



Figure 3: Gradually increasing score with time (Patient's name indicated from A to S)

The difficulty level gradually decreased as the staff got trained in assisting with the span of time. Thus most of the surgeries in the later part could be performed easily with minimal difficulties.

CONCLUSION:

Porto systemic Shunt in children with EHPVO is a viable option. This can be performed even in limited facilities with minimal assistance.

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