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Clinical outcomes of splenorenal shunts in esophageal varices patients: a literature review



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ABSTRACT

The disease known as esophageal varices is usually caused by portal hypertension. Portal hypertension is most commonly caused by extrahepatic portal vein thrombosis and other conditions, such as cardiac problems or hepatic cirrhosis. Clinical manifestations of esophageal varices can include melena, haematemesis, and gastrointestinal bleeding. Effective venous pressure reduction is achieved via the distal splenorenal shunt. We acquired the literature for our review from PubMed and Google Scholar. The search was done in English using terms that indicated a connection between improvements in bone grafting methods and the restoration of alveolar clefts. To expand the search results, we also looked through the papers cited in the literature. Almost all of the five gathered articles demonstrated that the distal splenorenal shunt (DSRS) is a beneficial surgical treatment that effectively avoids postoperative PH issues. Finally, DSRS is presented as a surgical long-term treatment for variceal esophageal reflux disease and portal hypertension. Because DSRS selectively decompresses the venous collaterals around the stomach and lower esophagus, it is a safe and effective therapy choice for decreasing bleeding over nonselective shunting surgeries as a selective shunt.

Keywords: esophageal varices; outcome; splenorenal shunt.

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INTRODUCTION

Esophageal varices connect the portal and systemic circulations and are dilated submucosal distal esophageal veins. This is brought on by resistance to portal blood flow, increased portal venous blood influx, and portal hypertension, which is typically brought on by cirrhosis. In order to decompress portal circulation, portal hypertension leads to the development of portocaval anastomosis.¹ In the event of a portal blockage, the pressure can increase to 15-20 mmHg, although the typical portal pressure is 5–10 mmHg. Any barrier between the splanchnic arteries and the right side of the heart generates retrograde flow and high pressure since the portal venous system lacks valves.² The collaterals, which join the portal venous system to the systemic circulation, progressively enlarge. Over time, this causes convoluted dilated veins in the distal esophagus and

an obstructed submucosal venous plexus. Variceal rupture is the most frequent and deadly side effect of cirrhosis; the likelihood of bleeding and the frequency of varices are correlated with the severity of the liver disease. Clinical manifestations of esophageal varices can include melena, haematemesis, and gastrointestinal bleeding.^{1,3}

Definitive management of esophageal varices depends on the etiology of the disease. While active bleeding can be managed either with medication or surgery for patients who have experienced recurrent bleeding, more invasive therapy is required. Over the past ten years, alternative therapies have supplanted portosystemic shunt surgery as the method of decompressing PH.⁴ The number of transjugular intrahepatic portosystemic shunts (TIPS), endoscopic procedures, sclerotherapy, and medication therapy greatly exceeds that of surgical shunts.⁵

However, if these main treatments fail, many consider distal splenorenal shunt (DSRS) surgery to be the most effective treatment for recurring PH problems.⁶ In this study, we reviewed and analyzed recent research on clinical outcomes of splenorenal shunt in adult and pediatric esophageal varices patients.

METHODS

This study reviews the literature, with searches conducted on Google Scholar, PubMed, the Cochrane Database of Systematic Reviews, and the Directory of Open Access Journals (DOAJ) databases. The search was done in English using terms that indicated a connection between improvements in bone grafting methods and the restoration of alveolar clefts. The keywords used in the literature search were (“esophageal varices” OR “variceal esophagus”) AND “splenorenal

shunt” AND “portosystemic shunt” AND “Warren’s shunt” AND “outcomes” AND “results” AND “complication.” A combination of some or all of these keywords was used in the article’s title and abstract to conduct the search. Only publications published between June 2018 and June 2023 are included in the search.

This study used interrupted time series analysis, prospective and retrospective cohort studies, before-and-after studies with or without controls, and randomized controlled trials as study designs. Included were studies on therapies for patients in both adult and pediatric settings. Letters, notes, case series, conference abstracts, conference publications, and literature reviews were not included. A standardized table containing the authors’ names, the year the study was published, the study design, the study setting,

the number of subjects, the treatment utilized, and the main conclusions of each study were used to extract the data. After searching and sorting articles using search terms, a manual analysis was conducted, considering the titles and abstract’s relevancy. Articles that satisfy the ambiguous inclusion and exclusion criteria will be subjected to additional analysis that involves reading the entire text. We shall compare the outcomes from the included research with those from other literature.

RESULT

Data Extraction

The author (together with the study location and publication year), the study design, the population age (in months, unless otherwise indicated in the table), and a brief description of the findings

comprised the material examined from the papers. The outcomes are displayed in **Table 1**.

DISCUSSION

The distal splenorenal shunt (DSRS) was first described by Warren and associates in 1967 as a long-term surgical treatment for variceal esophageal reflux disease and portal hypertension. The only available treatments for variceal esophageal sclerosis at the time included medical therapies, Sengstaken-Blakemore tube compression, endoscopic variceal sclerosis, and nonselective surgical shunts such as the end-to-side portocaval shunt.^{12,13} As a selective shunt, the DSRS improved nonselective shunting procedures because it limits further bleeding by selectively decompressing the venous collaterals surrounding the stomach and lower

Table 1. Characteristics of the included studies

No	Author	Study Design	Age (years)	Subject	Outcome
1	Praet et al. ⁷ (Belgium, 2020)	Prospective Cohort	15 (4.5-66)	The subject of the research was 14. The children/adults ratio was 9/5	DSRS is a useful surgical treatment for PVT-induced PH that effectively avoids postoperative PH complications. At the most recent follow-up, there had been no re-intervention for variceal hemorrhage (0%), and the survival rate was 100%. There was a higher incidence of preoperative (57%) esophageal variceal bleeding compared to postoperative (0%).
2	Al-Saedi et al. ⁸ (Germany, 2021)	Retrospective Cohort	64 ± 8	The subjects of this research were 10 patients with no pediatric patients.	For patients with pancreatoduodenectomy-related left-sided portal hypertension and compromised stomach venous drainage as a result of portal venous confluence resection, SRS surgery is a safe and efficient therapy option. Patency rates for short- and long-term shunts were 100% and 60%, respectively. There were no postoperative complications. There was no indication of portal hypertension on the left side.
3	Nordman et al. ⁹ (Germany, 2021)	Case Series	27 (16-59)	Thirteen patients with hepatosplenic schistosomiasis were included.	In qualified facilities, TIPS implantation and shunt surgery are safe and effective treatment options for patients with severe HSS and sequelae of portal hypertension; however, patient selection is crucial. TIPS contraindications or technically failed TIPS procedures were treated with splenorenal shunt surgery along with splenectomy.
4	Zhang et al. ¹⁰ (China, 2018)	Case Series	2.7-7.8	Four pediatric patients	A successful laparoscopic distal splenoadrenal shunt was performed on all patients. Portal pressure and splenic size were decreased after surgery. The splenoadrenal shunt showed sufficient flow and shunt patency on postoperative CT and ultrasonography. None of the patients experienced a recurrence of variceal bleeding.
5	Rehman et al. ¹¹ (Pakistan, 2019)	Retrospective Cohort	11 (6-16)	9 pediatric patients. Most were males (n=6)	For children with extrahepatic portal hypertension, DSRS is a safe and useful therapeutic alternative that minimizes bleeding and reduces hypersplenism in resource-constrained situations.

esophagus. Additionally, by maintaining portal blood flow to the liver, the DSRS reduces the risk of postoperative encephalopathy and premature hepatic failure.^{6,11,14} This method has been shown to be successful in selectively decompressing gastroesophageal varices while maintaining hepatic portal perfusion. Systemic and splanchnic hemodynamics are significantly altered due to portal vein occlusion. Other than shunting, several methods have been promoted throughout the years, but none have shown to be as dependable or similar in terms of morbidity and mortality. For many years, the DSRS treatment has been conducted effectively in pediatric patients.¹⁰

The distal splenorenal shunt is a proper surgical technique for PVT-induced PH, with satisfactory postoperative PH issue avoidance, according to a study by Praet et al. The last follow-up showed 100% survival and no need for re-intervention for variceal hemorrhage (0%). This was the result of a distal splenorenal shunt. Both the incidence of ascites (79% versus 0%) and esophageal variceal hemorrhage (57%) were higher prior to surgery than they were.⁷ Similar findings were also demonstrated by Al-Saeedi et al., who found that SRS is a safe and successful treatment for left-sided portal hypertension, with 60% and 100% shunt patency rates, respectively, over the short and long terms.⁸ Endovascular rescue of early postoperative DSRS blockage is viable, with verified long-term clinical success and shunt patency, according to another study by Gandras et al.¹⁵ A distal splenorenal shunt may be the most effective treatment for recurrent variceal bleeding in individuals with well-compensated cirrhosis, according to a previous study by Elwood et al. Moreover, DSRS had no impact on mortality or morbidity following a subsequent liver transplant.¹⁶

When variceal hemorrhage is resistant, a splenorenal shunt is the recommended course of action. A single episode of clinically significant rebleeding from portal hypertensive sources (recurrent melena, hospitalized hematemesis, multiple blood transfusions, and a drop in hemoglobin up to three grams below

normal level) was defined by the Baveno V consensus as refractory variceal bleeding. Rebleeding that occurred after six weeks was classified as secondary prophylaxis failure; bleeding that occurred during the first five days was classified as treatment failure.¹⁷ While splenorenal shunts are unnecessary for every patient after portal confluence resection, Al-Saeedi et al. suggest that they be considered for those who exhibit intraoperative venous congestion. SRS vascular repair is a straightforward procedure with good postoperative results.⁸ At reputable hospitals, TIPS implantation is a safe and useful therapeutic alternative for patients with severe HSS and portal hypertension sequelae in addition to splenorenal shunt, but patient selection is crucial. Variceal hemorrhage due to portal hypertension is treated with a DSRS when a transjugular intrahepatic portosystemic shunt is not an option.^{5,13,18}

Liver fibrosis is one of the most frequent causes of intrahepatic portal hypertension in children. As of right now, there is no reliable treatment for liver fibrosis. Variceal bleeding brought on by portal hypertension is treated with medications, endoscopic variceal ligation (EVL), sclerotherapy, devascularization, and shunting procedures. About 15% of individuals had recurrent bleeding after receiving medication. The rebleeding and esophageal recurrence rates in children with EVL were 27.8% and 44.4%, respectively.^{10,19} By using the distal splenorenal bypass, the Warren shunt is a selective shunt that lowers splenic pressure and alleviates hypersplenism. There is less chance of bleeding since the venous collaterals surrounding the stomach and lower esophagus are decompressed. Moreover, the Warren shunt reduces the risk of postoperative encephalopathy and liver failure by maintaining hepatorenal blood flow. Over 90% of long-term patency rates have been reported. Since this kind of shunt has a lower death rate and rebleeding rate than nonselective shunts, particularly in young patients, it is more advised.^{1,19}

According to a recent study by Zhang et al., all pediatric patients with laparoscopic distal splenorenal shunt surgery succeeded. After surgery, there was a

decrease in both the splenic size and portal pressure.¹⁰ Rehman et al. suggest that DSRS is a safe and efficacious therapeutic alternative for limiting bleeding and lowering hypersplenism in children with extrahepatic portal hypertension in resource-constrained situations.¹¹

One notable shortcoming of this literature review was the absence of large-scale randomized clinical trials. The research considered, however, was also hampered by a paucity of data and large-scale, high-quality investigations. We need a big, multicenter, randomized, prospective investigation to verify our findings.

CONCLUSION

As a long-term surgical treatment for variceal esophageal reflux disease and portal hypertension, DSRS is presented. Because DSRS selectively decompresses the venous collaterals around the stomach and lower esophagus, it is a safe and effective therapy choice for decreasing bleeding over nonselective shunting surgeries as a selective shunt.

CONFLICT OF INTEREST

All authors declare no conflict of interest regarding this study publication.

FUNDING

None.

ETHICAL CLEARANCE

Not applicable.

AUTHOR CONTRIBUTION

All authors contributed equally to this study's writing and publication.

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