Evaluation of Peritoneovenous Shunt in Refractory Cirrhotic Ascites in Indian Patients

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Abstract
Ten patients with tense and refractory cirrhotic ascites underwent a modified peritoneovenous shunt procedure. Nine patients responded with complete resolution of ascites, mean weight gain of 5 (range 0-8) Kg, and rise in serum albumin level of 0.6 g/dL. Six patients improved from Child’s class B to A. The longest survival period was 2.5 years.

The main constraint in a developing country is the high cost of the shunt. (Indian J Gastroenterol 1992; 11: 127-138)

Key Words: Cirrhosis of liver.

Introduction
LeVeen popularized the use of peritoneovenous shunts in the management of ascites by designing a valve for the purpose. Since then, the procedure has been used the world over and divergent views have been expressed regarding its usefulness and complications. There are no reports on the use of peritoneovenous shunts from India. The present study was undertaken to define its use in the Indian context.

Material and Methods
Of 1500 patients with cirrhotic ascites attending the Gandhi Memorial & Associated Hospitals, Lucknow, during the period 1982-1990, 20 patients (1.3%) failed to respond to six weeks of bed rest, salt restriction (<0.5 g/day in adults), diuretics (including spironolactone up to 400 mg/day), paracentesis and nutritional correction and were classified as having refractory ascites. All these patients underwent evaluation for hematocrit, coagulation profile, electrolytes, grade of varices, urine and ascitic fluid, and hepatorenal and cardio-respiratory status.

Patients with one or more of the following features were excluded: acute tubular necrosis, prior bleeding from esophageal varices, serum bilirubin above 3 mg/dL, infected ascitic fluid (leukocyte count > 300/mL), acute alcoholic hepatitis, encephalopathy or cardiac failure. Patients who could not afford the cost of LeVeen shunt were also excluded.

Preoperative treatment included correction of electrolyte imbalance, anemia, respiratory infection and coagulopathy. The patients were also trained to breathe against a resistance of 5 cm of water for 5 minutes every waking hour.

The operation was done under local anesthesia and sedation. All the precautions necessary for foreign body implantation were taken and operative steps carefully executed. We used a modified technique, ie cannulation of the subclavian vein via an infraclavicular incision to guide the venous tube into the superior vena cava, instead of the traditional neck incision and cannulation of the internal jugular vein, to reduce the chance of kinking and achieve better cosmetic results.

A tight abdominal binder was applied immediately after the surgery, taking care to avoid pressure over the venous tubing, and was maintained for two to three weeks. Frusemide in a dose of 60-80 mg was given intramuscularly 6 hourly, to achieve diuresis. Breathing exercises and broad spectrum antibiotics (ampicillin and metronidazole orally or parenterally for 5 days) were continued. A careful watch was kept for evidence of pulmonary edema and bleeding diathesis. Body weight, urine output and abdominal girth were measured at regular intervals. Weekly estimation of hematocrit, coagulation profile, and liver and renal functions was done to monitor the progress.

Results
Nine of the ten patients showed a rapid reduction in abdominal girth. These patients had a ‘flat’ abdomen by the 10th day after surgery and remained ascites-free thereafter. Mean duration of postoperative hospital stay was three weeks. Before the operation, patients with massive ascites were mostly confined to home and bed. Within 6 to 8 weeks of successful shunt insertion, all patients were employed in work requiring mild physical exertion. Mean body weight fell from 45 Kg to 40 Kg by the 10th postoperative day. Six months later, 7 patients showed a significant gain in body weight (mean 5 Kg). Mean abdominal girth showed a decline from 92 cm to 77 cm in the postoperative period and further to 75.6 cm six months later. All patients were in Child’s class B pre-operatively, after surgery 6 patients improved to Child’s class A.
One patient with azotemia (blood urea 91 mg/dL) showed significant decline in blood urea and serum creatinine levels postoperatively. Six months later, he had normal renal functions. All the other patients had normal blood urea levels prior to surgery and showed no significant change postoperatively. All patients were hypoproteinemicmic prior to surgery. The serum albumin levels showed a mild increase from 2.60 g/dL to 3.47 g/dL in the immediate postoperative period in successful cases. Six months later, seven patients had normal albumin levels; of the remaining three, one patient had hypertension, one died of an unrelated cause, and one was lost to follow-up. Hypokalemia occurred in the postoperative period in all the patients but could be corrected with intravenous potassium supplementation.

In the immediate postoperative period, mean (range) hemoglobin level fell from a mean of 8.3 (4.6-13) g/dL to 7.2 (6.0-11.0) g/dL. However, six months later, it increased to 9.3 g/dL.

Self-limiting low grade pyrexia occurred in the first postoperative week in 5 patients. Leakage of ascitic fluid around the valve and subcutaneous tube occurred in one patient, which subsided within 6 days.

Ascites reaccumulated in one patient after 8 weeks. The venous tube was lying in the superior vena cava on tubogram and ascitic fluid could be freely withdrawn from it using a 25G needle. A valvar clot was suspected. At re-explosion, the venous end of the tube was reinserted into the axillary vein. The patient showed a marked reduction in ascites postoperatively.

Another patient had gradual reaccumulation of ascites on the 6th postoperative day. On aspiration with a 25G needle, free flow of ascitic fluid was obtained from the venous tube. Tubogram showed that the tube ended in the subclavian vein and did not reach the superior vena cava. The shunt was removed and reoperation was advised, which the patient declined.

Discussion

About 1.3% of our patients with cirrhotic ascites were refractory to medical therapy. Though the disease is common in India and peritoneovenous shunt has been shown to be effective in this group of patients, there are no data on its use from India.

The complications of disseminated intravascular coagulopathy (DIC) and infection are deterrents to frequent use of peritoneovenous shunt in cirrhotic ascites.

Greig and coworkers encountered serious infection in 22% of their patients, half of whom died due to sepsis despite the routine use of antibiotics. Also 9 of 33 patients developed coagulation abnormalities in their series and one patient died of DIC. LeVeen and coworkers also reported infection after peritoneovenous shunt insertion especially in cirrhotics. Serious bleeding diathesis other than alimentary tract bleeding was reported in four of the 94 patients treated. Infection and sepsis occurred due to undetected infection in ascitic fluid. DIC is common in patients with high preoperative levels of serum bilirubin and evidence of hepatocellular failure.

We have evolved strict selection criteria for our patients. Infection or clinically detectable coagulopathy were not encountered in any patient in the present series. After the procedure, there occurred a rapid reduction in ascites and a significant gain in weight. Relief of ascites and abdominal distension relieved anorexia. Moderate relaxation in salt intake added to palatability of diet. Hence, these patients showed a rapid improvement in general health, the period of hospitalization was reduced, employment in sedentary jobs became possible and hematological and biochemical parameters improved.

The use of intravenous injection to guide the venous tube naturally produces a more cosmetic scar not visible in the usual clothing. Instances of kinking and injury to the recurrent laryngeal nerve were reported by LeVeen in 4.2% of patients when using the internal jugular vein. This modification minimizes the chances of both these complications.

Our study reiterates that if cases are carefully selected, the use of peritoneovenous shunt by our modified technique gives a lasting relief in ascites. However, the cost of the shunt is a major constraint and a cheaper indigenous alternative should be developed.

References