

Surgical Treatment of Ascites, with Peritoneovenous Shunt

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SUMMARY

At Shaikh Zayed Hospital, during the past one year, Leveen peritoneovenous shunt has been used to palliate three patient with ascites due to portal hypertension refractory to medical measures. Standard procedure of shunt placement was adopted as described by Leveen et al in 1974.

Peritoneovenous shunt functioned well in all the three patients providing good palliation. Two patients were followed upto 14 weeks, the third patient did well upto the 2nd week, when he was lost to follow-up. we have found the procedure simple and very effective. The preliminary report is presented alongwith a brief review of the subject.

Massive ascites resistant to medical management is disabling, when it affects respiration, mobility and nutrition. Medical therapy include bed rest, salt restriction, oral diuretics, but is effective only in some patients. Others require repeated paracentesis, with loss of proteins and electrolytes. A more physiological approach is provided by the continous shunting of ascitic fluid into the circulation[1,2]. Several attempts have been made to construct permanent peritoncvenous shunt. Patency was the main problem in shunts using flow activated valves. In 1974 Leveen et al described the use of a shunt employing a pressure activated valve, with which they achieved prolonged relief of ascites in 28 of 37 cases[2]. since then several reports have established the efficacy and safety of Leveen P.V. shunt in the palliation of resistant ascites[3-9].

PATIENTS AND METHODS

During a one year period three patients were selected for the placement of Leveen peritoncovenous shunt Table 1. Selection criteria included cirrhosis with massive disabling ascites, stable liver disease and failure to respond to medical measures. Two male and one female patient (age range 40-60 years) received Leveen peritoneovenous shunt by the procedure described by Leveen et al[10].

Table 1: Patient details

Case	Age	Sex	Diagnosis	Shunt Function	Survival (Weeks)
1	40-Y	M	Cirrhosis liver with massive ascities.	Good	Lost to Followup after 2nd week.
2	45-Y	F	-do-	Good	Alive at 14 weeks.
3	60-Y	M	-do-	Good	Aliver at 12 weeks.

Procedure

Local anaesthesia with Xylocaine 1% was employed. A single dose of cephradine one gram (veloscf, Squibb pharma) injection given 30 minutes pre-operatively. The shunt is prepared with normal saline and air bubbles expelled. A 6-7 cm long transverse incision is made about 2-3 cm below the right costal margin 2-3 cm medial to the anterior axillary line. The muscles are split in the line of the fibres, to expose the transversus abdominis muscle. Two purse strings are placed in the peritoneum, picking transversal is fascia and the muscle. Through a stab in the peritoneum in the centre of the string, the silicone peritoneal catheter is inserted into the peritoneal cavity (Fig. 1) upto the valve system and the purse string sutures tied. The muscle are tightly closed around the valve to prevent leakage. A collar incision is made in the neck on the right side for the exposure of Int. Jugular vein. An alligator forceps is

passed up from the abdominal incision into the neck and a heavy suture (No. 1 Ethylon) is pulled into the abdominal wound. The suture is tied to the tip of the venous tubing so that it can be drawn into the neck wound (Fig. 2). The Jugular vein is isolated, tied above and through a venotomy, the venous tubing is inserted, so as its lower end lies in the superior vena cava. Another suture ties the vein over the tubing. The wound is closed after irrigating with gentamycin solution. Parentral frusemide is continued post operatively in doses sufficient to induce maximal diureses. Following the placement of the shunt, abdominal binders and respiratory exercise are advised to augment the pressure gradient across the shunt.

Post operative daily record of weight, abdominal girth, 24 hours urine out put, haematocrit (twice a day) BUN, creatinine, and S. electrolytes are maintained for about a week.

RESULTS

All the three patients tolerated the procedure very well. The venous tubing had to be replaced in one patient on the 3rd post-op. day. There was significant reduction in ascites in all the patients. One patient developed hematomas over the neck and the abdominal wounds, which responded to pressure dressing and fresh frozen plasma. Two patients were followed up to 14 weeks post operatively and were doing fine. The 3rd patient was lost to follow-up after two weeks. The post operative course (case 1) as regards BUN/creatinine is shown in Fig. 3. Urine volume and hematocrit of case 2 are shown in Fig. 4.



Fig. 1 The peritoneal catheter is in position through an incision below the Rt. costal margin.



Fig. 2: The venous tubing has been passed up into the neck through subcutaneous tunnel and is to be inserted into the right jugular vein.

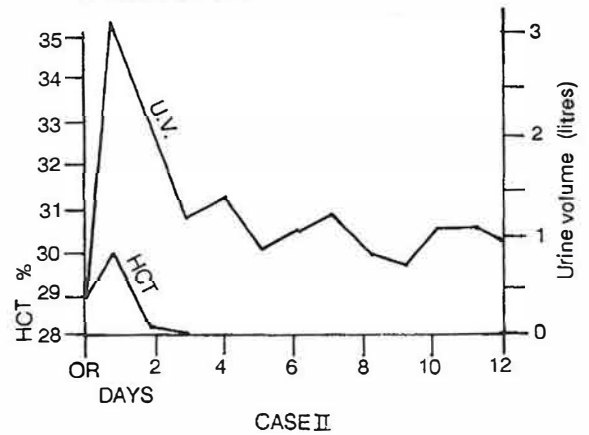


Fig. 3: Post-operative course of case 1.

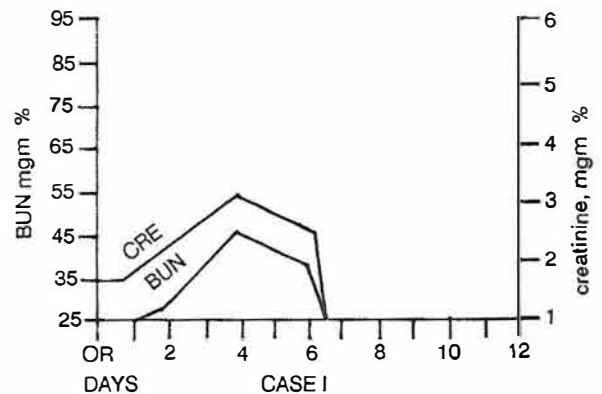


Fig. 4: Urine volume and hematocrit case 2.

DISCUSSION

The word ascites comes from Eskos, the Greek for bag. The development of ascites marks a serious turning

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point in the course of liver disease. Life expectancy is considerably reduced. If the patients are refractory to diuretic therapy, they usually succumb within a year[11].

The treatment of ascites by the physicians of Greco-Roman period included paracentesis. Repeated paracentesis results in loss of proteins and electrolytes as well as predisposes to peritoneal sepsis.

It was Eck in 1877 who first suggested the application of a portacaval shunt for the relief of ascites. The first Eck fistula was made in 1903 by Vidol. This was followed by a variety of other procedures i.e. Omentopexy etc. All these failed due to a very high morbidity and mortality. In 1962 following the introduction of Holter valve for the relief of hydrocephalus. Smith et al used a similar valve to devise a peritoneo-venous shunt in a cirrhotic patient with resistant ascites. Many such earlier shunts had high closure rate. In 1974, the valve design was changed by Leveen to a pressure activated valve with an opening pressure of 3-5 cm water. This formed the basis of Leveen peritoneovenous shunt, which has now been used successfully in thousands of patients with intractable ascites. The second largest group of shunt recipients have been patients with malignant ascites who succumb to the sequelae of progressive ascites rather than the tumor burden. The shunt causes significant reduction in ascites, improves nutrition, and may even extend life[7,12]. Another indication is hepato-renal syndrome defined as the development of renal failure in association with severe liver disease and is associated with very high mortality. Reversal of renal failure is possible with the peritoneovenous shunt if carried out at an early stage [13,5].

Survival after shunt depends upon the status of the liver disease. In patients with alcoholic cirrhosis, prognosis is excellent if alcohol intake is stopped. Liver decompensation induced by jaundice with a serum bilirubin over 5 mg/dl and patients with encephalopathy without azotemia are poor candidates for shunt placement. Patients with P.V. shunts can not have laparotomy without interrupting the shunt, otherwise the air which enters the abdomen at laparotomy would be transported to the venous system and gives rise to fatal air embolism. Complications of peritoneovenous shunt include shunt failure, fluid leakage, fever (unexplained pyrexia), pulmonary edema, and post shunt coagulopathy (similar to DIC). The incidence of such complications is low and the majority can be dealt with successfully[10,14,15].

Denver peritoneovenous shunt designed by an Engineer at the Denver University was introduced in 1979[16]. This differs from the Leveen shunt in that the pressure sensitive self clearing mitre valve is placed in a compressible chamber situated overlying the lower ribs. This has the advantage that the system may be flushed by manipulating the chamber as well as the passage of ascites fluid can be induced by pumping the chamber manually, when the pressure gradient is low [12].

Our limited experience with the peritoneovenous shunt of Leveen type is encouraging. The shunt cost which is prohibitive and the referral pattern of our patients are the main factors responsible for a small percentage of patients benefiting from the surgical treatment of intractable ascites.

We conclude that the peritoneovenous shunting is a simple procedure with little morbidity. The results are gratifying and long lasting.

REFERENCES

1. Grosberg SJ, Wapnick S. A retrospective comparison of functional renal failure in cirrhosis treated by conventional therapy or the peritoneo-venous shunt (LeVeen). *Am J Med Sci* 1978;276:287-91.
2. LeVeen III, et al. Peritoneo-venous shunting for ascites. *Ann Surg* 1974;180:580-91.
3. LeVeen III, et al. Further experience with peritoneo-venous shunt for ascites. *Ann Surg* 1976;184:574-80.
4. Berkowitz ID, et al. Improved renal function and inhibition of renin and aldosterone secretion following peritoneo-venous (LeVeen) shunt. *Surgery* 1978;84:120-6.
5. Wapnick S, et al. Renal failure in ascites secondary to hepatic renal, and pancreatic disease: Treatment with a LeVeen peritoneo-venous shunt. *Arch Surg* 1978;113:581-5.
6. Ansley JD, et al. Effect of peritoneo-venous shunting with the LeVeen valve on ascites, renal function and coagulation in six patients with intractable ascites. *Surgery* 1978;83:181-7.
7. Straus AK, et al. Peritoneo-venous shunting in the management of malignant ascites. *Arch Surg* 1979;114:489-91.
8. Greenlee HB, et al. Intractable ascites treated with peritoneo-venous shunts (LeVeen). *Arch Surg* 1981;116:518-24.
9. Bernhoft RA, et al. Peritoneo-venous shunt for Refractory Ascites. *Arch Surg* 1982;117:631-35.
10. LeVeen III, et al. Ascites: its corrections by peritoneo-venous shunting. *Curr Probl Surg* 1979;16-2.
11. Sherlocks, et al. Complications of diuretic therapy in hepatic cirrhosis. *Lancet* 1966;1079.
12. Millard Fc, Powis SJA. Management of intractable malignant ascites using denver peritoneo-venous shunt. *JR Coll Surg Edin* 1988;33:138-9.
13. Fullen WD. Hepatorenal syndrome: reversal by peritoneo-venous shunt. *Surgery* 1977;82:337-41.
14. Greig PD, Langs B, et al. Complications after peritoneo-venous shunting for ascites. *Am J Surg* 1980;139:125.
15. LeVeen III, Wapnick S. Peritoneo-venous shunt for ascites. *Surg Ann* 1978 10:191-214.
16. Lund LII, New Kirk JB. Peritoneovenous shunt system for surgical management of ascites. *Contemp Surg* 1979;14:31-45.