

MESOCAVAL 'C' SHUNT FOR PORTAL DECOMPRESSION IN PATIENTS WITH POSTNECROTIC CIRRHOSIS

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Bleeding from esophageal varices is a common problem in patients with portal hypertension and different treatment modalities have been advocated by various authors to cope with this difficult and often fatal complication (1,13,17,18,20). The interposition mesocaval shunt described by Drapanas was reported to achieve a satisfactory drop in portal pressure and control of bleeding with a lower incidence of encephalopathy (5). These findings were later challenged with high occlusion and rebleeding rates and an unchanging postoperative encephalopathy incidence being the most common objections to the widespread use of this procedure (11,16). Cameron et al modified the classic mesocaval 'H' shunt and developed a 'C' chunt with the aim of coping with these problems and eliminating graft failure (2,3).

While controversy exists regarding the most satisfactory approach in these patients and various prospective randomized studies have been carried out to compare them, most studies have similar patient populations where alcoholic cirrhotics make up the majority of the cases. Even in studies on nonalcoholic patients, postnecrotic cirrhosis plays a limited role in the etiology of portal hypertension and related esophageal bleeding.

In our country, perhaps due to a developing infrastructure and prevalant hepatitis B infection, postnecrotic cirrhosis is the causative factor of portal hypertension in an overwhelming majority of cases.

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The carrier percentage in Turkey is 8 %, and in south-eastern Anatolia, where most of our cases come from, hepatitis B has been implicated in up to 87 % of the patients with cirrhosis (4).

The purpose of this study is to evaluate the effectiveness of interposition mesocaval 'C' shunt for portal decompression when employed in a patient group consisting wholly of cases with postnecrotic cirrhosis. In order to overcome the difficulties experienced with this procedure by various authors, mainly high encephalopathy rates or graft occlusion, we used small diameter, ringed expanded PTFE (GORE-TEX) grafts and constructed mesocaval 'C' shunts.

MATERIALS and METHODS

The study population consisted of 14 consecutive unselected patients with portal hypertension due to posthepatic cirrhosis, admitted to the surgical department of the Dicle University Hospital during a four year period. All patients had endoscopically proven esophageal varices and been referred to our department after multiple episodes of variceal bleeding.

There were 9 male and 5 female patients with a mean age of 42.5, ranging from 32 to 59 years. All had multiple instances of variceal bleeding; four patients had bled twice and 10 had 3 or more episodes.

After admission routine biochemical studies were performed and each patient's clinical status was evaluated. The severity of the liver disease according to the child classification was class A in 4, class B in 7, and class C in 3 patients. Twelve patients were operated on under elective conditions and the remaining two on an emergency basis. Medication to lower the portal pressure was not used.

Preoperative diuretic therapy was required in 7 patients with excessive ascites. Prophylactic perioperative antibiotics were employed in all patients.

The operations were performed by two surgeons (11 by B.A. and 3 by M.G.). Liver biopsies were obtained following laparotomy in all patients even if the liver was typically cirrhotic. Externally supported (ringed) expanded PTFE Gore-Tex grafts (Gore-Tex, W.L. Gore and Co. GmbH, Haar) and ePTFE atraumatic suture material were used in constructing the shunt.

The graft diameter was determined by preoperative ultrasonographic and operative evaluation of the superior mesenteric vein (SMV) diameter, and 14 mm. grafts were used in 3, 12 mm. in 8 and 10 mm. in the remaining 3 patients (Fig. 1).

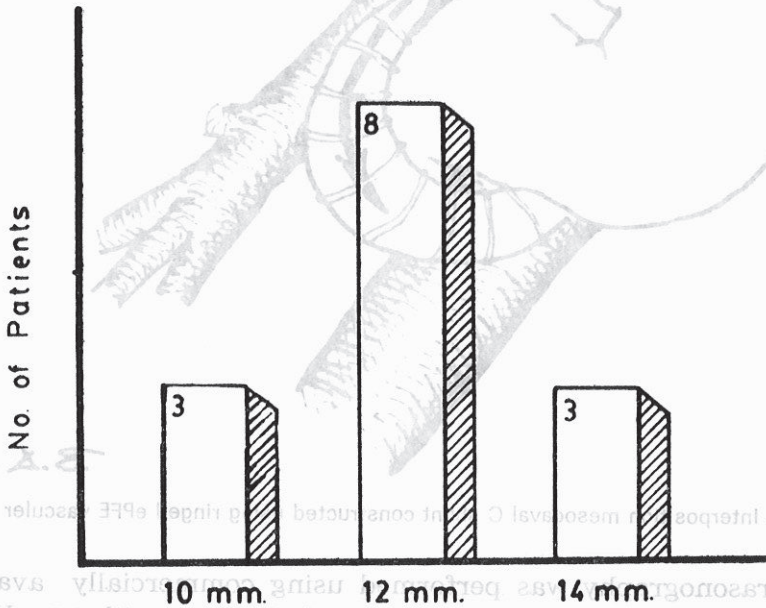


Fig. 1 - e PTFE graft diameters used in interposition mesocaval C Shunts.

Intraoperative portal pressure measurements were obtained before and immediately after the shunt was constructed, by puncture of the SMV. The technique of constructing the mesocaval 'C' shunt was performed as previously described by Cameron et al (9,10) (Fig. 2).

Heparin solution (1 %) was instilled in the graft and used to wash-out the SMV, but systemic heparinization was not employed. During the postoperative period low molecular weight Dextran (Dextran 40) was given for three days and H₂ receptor blockers (Ranitidine) continued intravenously.

The patency of the shunt was evaluated in the postoperative period by ultrasonography. In one patient, where ultrasonography was unable to conclusively demonstrate a patent shunt, splenoportography was employed.

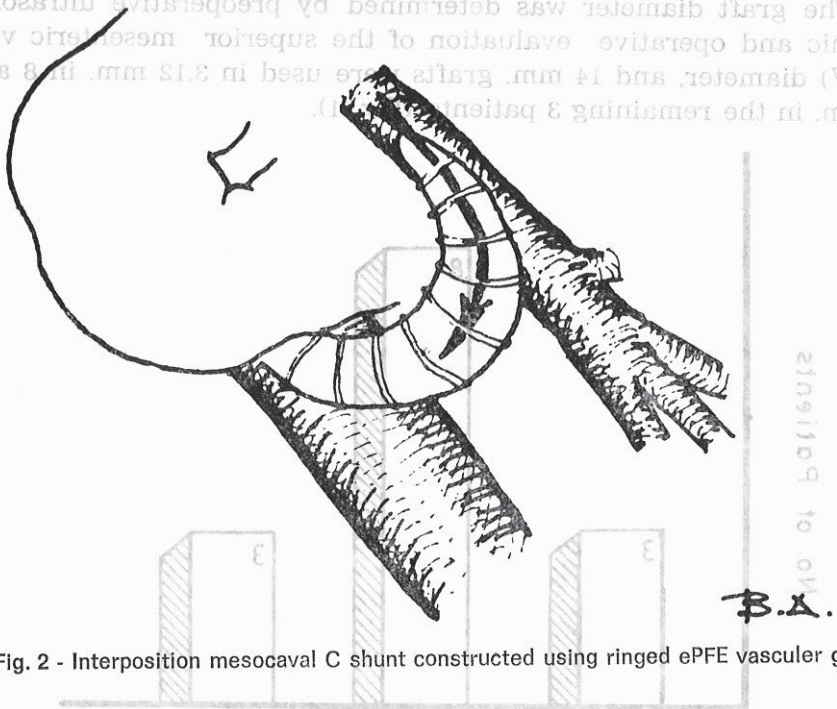


Fig. 2 - Interposition mesocaval C shunt constructed using ringed ePFE vasculer graft.

Ultrasonography was performed using commercially available equipment of the linear array digital real time type with 3.5 MHz probe (Hitachi EUB 26 or Toshiba SAT 30).

RESULTS

Operative Findings : Free portal pressure (FPP) in the superior mesenteric vein decreased from 386 ± 40 mm. H₂O to 207 ± 60 mm. after the mesocaval shunt was constructed. The decrease in FPP was approximately 50 % (Fig. 3).

Early Mortality : There were three deaths within the first 30 postoperative days (21.4 % operative mortality rate). Two died of hepatic failure and one patient died of intraoperative bleeding from the venous puncture site, despite reoperation and control of hemorrhage. Analysis of mortality by Child's classification was 0/4 in class A, 1/7 class B and 2/3 class C (Fig. 4).

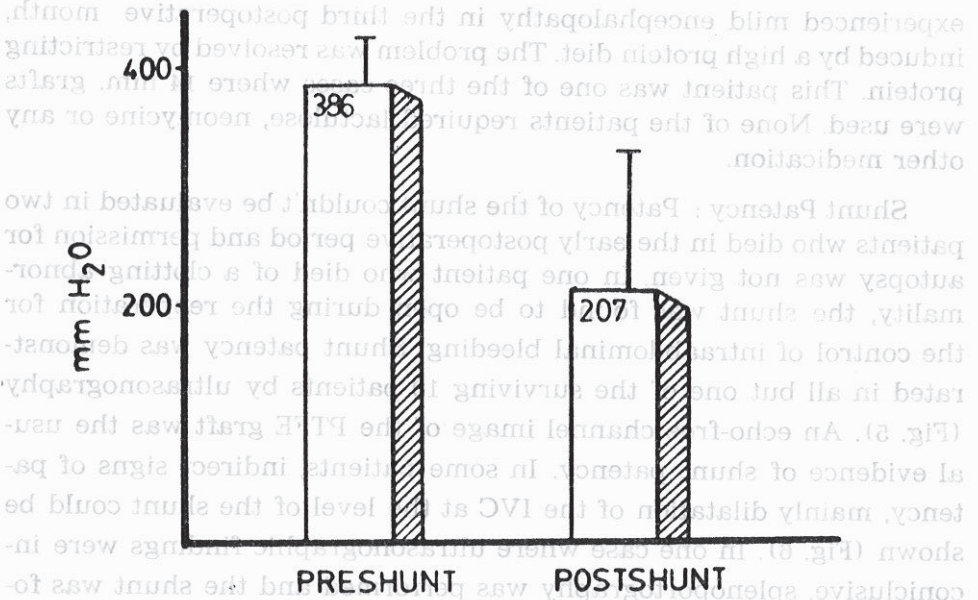


Fig. 3 - Intraoperative portal pressure measurements obtained before and after the shunt.

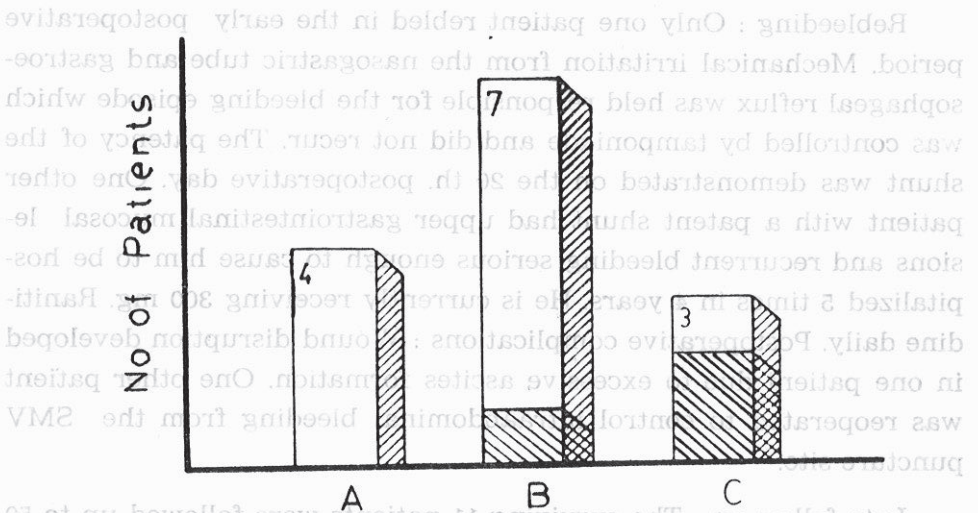


Fig. 4 - Relation between Child's classification and early mortality, number of patients that died within 30 days after the operation.

Encephalopathy: None of the surviving patients developed clinical encephalopathy during their hospitalization period. One patient

experienced mild encephalopathy in the third postoperative month, induced by a high protein diet. The problem was resolved by restricting protein. This patient was one of the three cases where 14 mm. grafts were used. None of the patients required lactulose, neomycine or any other medication.

Shunt Patency : Patency of the shunt couldn't be evaluated in two patients who died in the early postoperative period and permission for autopsy was not given. In one patient who died of a clotting abnormality, the shunt was found to be open during the reoperation for the control of intraabdominal bleeding. Shunt patency was demonstrated in all but one of the surviving 10 patients by ultrasonography (Fig. 5). An echo-free channel image of the PTFE graft was the usual evidence of shunt patency. In some patients, indirect signs of patency, mainly dilatation of the IVC at the level of the shunt could be shown (Fig. 6). In one case where ultrasonographic findings were inconclusive, splenoportography was performed and the shunt was found patent.

Rebleeding : Only one patient rebled in the early postoperative period. Mechanical irritation from the nasogastric tube and gastroesophageal reflux was held responsible for the bleeding episode which was controlled by tamponiade and did not recur. The patency of the shunt was demonstrated on the 20 th. postoperative day. One other patient with a patent shunt had upper gastrointestinal mucosal lesions and recurrent bleeding serious enough to cause him to be hospitalized 5 times in 4 years. He is currently receiving 300 mg. Ranitidine daily. **Postoperative complications :** Wound disruption developed in one patient due to excessive ascites formation. One other patient was reoperated to control intraabdominal bleeding from the SMV puncture site.

Late follow-up : The surviving 11 patients were followed up to 50 months. Medically uncontrollable ascites was seen in two cases and these died of hepatic failure 2.5 and 8 months postoperatively.

Mild encephalopathy due to high protein intake was observed in one patient and was managed easily with a low protein diet.



Fig. 5 - Ultrasonography of a patient meso-caval shunt illustrating the communication between the SMV and IVC.

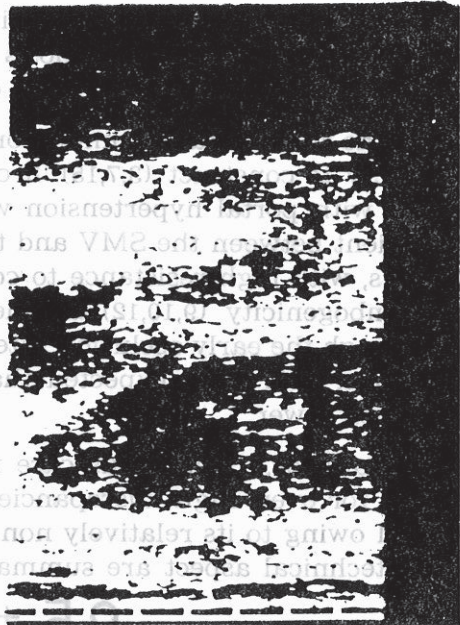


Fig. 6 - Dilatation of the IVC at the level of the shunt demonstrated by ultrasonography.

DISCUSSION

Distal splenoreal shunt (DSRS) has been suggested by some authors to be the optimal surgical therapy in nonalcoholic cirrhotic patients (6,19) Despite the popularity DSRS has achieved, there are many situations where it is technically impossible. Among these are excessive ascites, previous upper abdominal surgery extensive venous collateral formation and thrombosis of the splenic vein (3,15,16) We have employed ePTFE interposition mesocaval 'C' shunts in 13 consecutive, unselected cases of postnecrotic cirrhosis presenting with variceal bleeding and for reasons outlined below, found it to be a comparable procedure for portal decompression in the patients.

All of our patients were non-alcoholic cirrhotics. These differed from alcoholic cirrhotics in various aspects. The mean FFP is lower in these patients than in alcoholic cirrhotics. Decreased total serum

protein levels and excessive ascites formation are more common risk factors in postnecrotic cirrhosis than hyperbilirubinemia. The meso-caval 'C' shunt may be a better choice in this clinical setting.

The shunt is fairly simple for a surgeon acquainted with vascular surgery to construct (3,7,15). It can be employed in almost every patient with portal hypertension where there is a sufficient pressure gradient between the SMV and the inferior vena cava. Ringed ePTFE grafts, with high resistance to compression or kinking (7,13) and low thrombogenicity (9,10,12) are ideally suited for a shunt of this type. Although the early occlusion rates reported with other graft materials are low, it is to be expected that the rate seen with ePTFE should be even lower.

However, meticulous care must be employed in trimming the graft for even slight discrepancies in length or angle will not be tolerated owing to its relatively non-elastic nature. Our experiences with this technical aspect are summarized in figure 7 (Fig. 7). A racquet

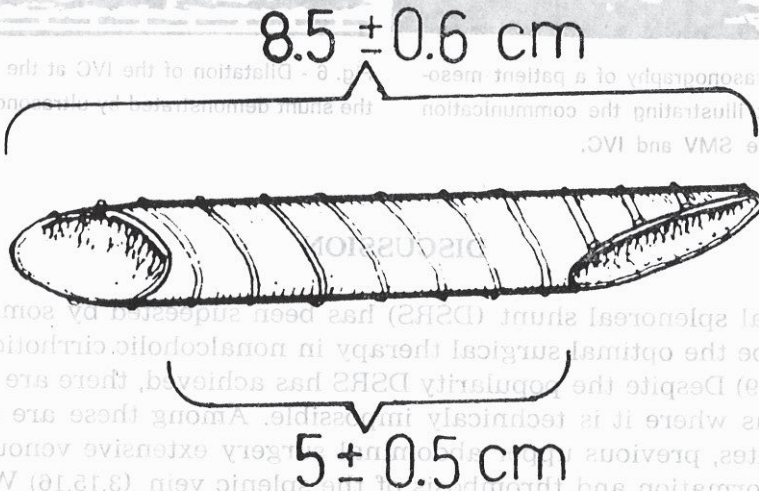


Fig. 7 - The ePTFE graft should be prepared with the transvers axes of the beveled ends at an angle of approximately 45°. The mean length of the graft is shown.

shaped piece rather than an elliptic one should be excised from the IVC in order to increase the cross sectional anastomatic area. The SMV is longitudinally incised as the rigidity of the graft will suffice to maintain patency and excision may result in stenosis. Wetting the graft with heparin will enhance early patency as it has been shown

to decrease platelet deposition (10). Extensive venous collateral formation frequently encountered in the upper abdomen will not result in excessive intra-abdominal bleeding and require massive transfusion as the surgical procedure does not involve manipulation of these structures (e.g. spleen, pancreas, diaphragm) and the venous collateral channels on the posterior peritoneum are often less prominent than those above the transversocolon (8).

We believe that sufficient prograde portal flow is maintained when a graft with 10 or 12 mm. diameter is selected. The postoperative encephalopathy rate was extremely low in these patients.

As a further refinement sutures of the same material as the graft should be preferred to provide a more reliable anastomosis. Systemic heparinization should not be employed but Dextran 40 infusions given for 3 days postoperatively will reduce early graft occlusion.

The nasogastric tube should be removed as early as possible in the postoperative period. We believe that both the direct mechanical irritation of the catheter and the gastroesophageal reflux that it may cause poses a potential threat in regard to variceal bleeding. H₂ receptor blockers were given prophylactically in the early postoperative period and we strongly recommend their use, as gastrointestinal bleeding from other sources may pose a troublesome problem.

In our series there is a significant correlation between the severity of the liver disease and the operative mortality rate.

We have found ultrasonography to be an important noninvasive tool in the evaluation and follow-up patients in whom mesocaval 'C' shunts were constructed.

CONCLUSION

It is concluded that the interposition mesocaval 'D' shunt constructed with ringed ePTFE vascular grafts appears to be an effective procedure for portal decompression in class A and B patients with macronodular cirrhosis and bleeding esophageal varices. Low morbidity and mortality rates (9.1 % excluding class C patients), effectiveness in preventing rebleeding and low incidence of hepatic encephalopathy suggest that this procedure is a satisfactory method of treatment in these patients.

As with other shunts, the interposition mesocaval shunt is associated with a high mortality rate in patients with severe liver disease (class C) and should be used with reservation.

ÖZET

Postnekrotik Siroz da Portal Dekomprimen için Mezokaval C Shunt

Postnekrotik makronedüler siroza bağlı özofagus varis kanamalarında 14 vakada mezokaval C Shunt sonuçları bildirilmiştir. Interpozisyon için dışardan desteklenen PTFE vasküler protez kullanılmıştır.

Postoperatif dönem de greftin açık olduğu bütün hastalarda ultrasonografi ile gösterilmiştir. Hastanın mortalite oranı % 21,4 dür. İzlenen hastalarda tekrarlayan kanama görülmemiştir. Gref okluzyonu olmayan tek hastada orta derecede ensefalopati gözlenmiştir.

SUMMARY

The results of mesocaval «C» shunt in 14 patients with bleeding esophageal varices secondary to postnecrotic macronodular cirrhosis are presented. Four cases were evaluated as class A, 7, class B, and 3 class C according to Child's risk classification. Two of these were operated on an emergency basis and the remainder electively. Externally supported e PTFE (Gore-Tex W.L. Gore and Co. HmbH, Haar) vascular prosthesis was used for interposition. Graft diameter, based upon preoperative ultrasonographic of operative visual assessment of the SMV diameter, was 14 mm. in 3, 12 mm. in 8 and 10 mm. in 3 cases. Preshunt and postshunt pressures (FPP, HOPP) were measured intraoperatively. Mean FPP was 386 ± 22 mm. saline preshunt and 207 ± 60 mm. following the establishment of the shunt. The reduction in FPP was approximately 50 %.

Graft patency was verified in all patients except 2 by ultrasonography in the early and late postoperative periods and by additional splenoportography in a doubtful case. Hospital mortality rate was 21.4 %. The mortality rate was 66 % in clas C, there were no deaths in class A and only one death in class B.

The maximum follow ve period was 50 months. There was no rebleeding from varices in the surviving patients. Only one patient developed mild encephalopathy and documented graft occlusion was not observed.

SHORT SUMMARY

The results of mesocaval «C» shunt in 14 patients with bleeding esophageal varices secondary to postnecrotic macronodular cirrhosis are presented. Externally supported ePTFE vascular prosthesis was used for interposition.

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