The Place of Liver Transplantation in the Treatment of Hemorrhagic Complications of Portal Hypertension

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Orthotopic liver transplantation (OLT) is the only definitive treatment for chronic liver disease. Other available therapeutic modalities (mainly aimed at the treatment of bleeding varices) are palliative, with no influence on long-term survival.

Management of patients with bleeding varices should take into account the etiology of the liver disease, the clinical presentation (acute vs. chronic bleed), and the disease stage, judged by Child-Pugh-classification. Patients with Child's grade C should be transplanted. Those who are not suitable for transplantation should be treated with long-term sclerotherapy. Patients with Child's grade B and a stable liver disease should be treated on an individual basis, sclerotherapy being the first line of treatment.

When a shunt is indicated, the preferred procedure is a distal splenorenal or a H-mesocaval shunt so that a future OLT is not compromised or impossible.

Die Rolle der Lebertransplantation bei der Behandlung von Blutungsunkomplikationen der portalen Hypertonie


Patienten mit Grad C sollen in der Regel transplantiert werden. Bei den Patienten, welche für eine Transplantation nicht in Frage kommen, ist die konsequente durchgeführte Sklerotherapie die Behandlung der Wahl.

Patienten mit Grad B und einer stabilen Lebererkrankung müssen individuell beurteilt werden, wobei die Sklerotherapie in vorderster Linie der Behandlungsmodalitäten steht.

Falls ein Shunt indiziert ist, soll ein distaler splenorenaler oder eventuell auch ein H-mesokavaler Shunt als erstes in Betracht gezogen werden, um eine allfällige spätere OLT nicht zu erschweren oder gar zu verunmöglichen.

The development of esophageal varices in a patient with cirrhosis is a grave sign, heralding a bleeding, which is the most lethal complication of portal hypertension. In these patients, 45% will bleed within 2 years of diagnosis, and up to 50% will die of the first hemorrhage (1).

Theoretically, orthotopic liver transplantation (OLT) is the only definitive treatment for chronic liver disease. None of the available surgical and medical modalities aimed at the management of bleeding esophageal varices reverses the underlying liver disease, and they should therefore be considered palliative, which accounts for their failure to influence long-term survival (2).

With progressive improvement in results, OLT is increasingly advocated for the treatment of bleeding varices. However, it may not be realistic to propose OLT as the only long-term treatment modality for patients with chronic liver disease, portal hypertension and bleeding varices predominantly because of scarcity of organ donors. Patients should be carefully evaluated on an individual basis taking into account the etiology, the natural course of the underlying liver disease, and the clinical presentation expressed by the Child-Pugh grading of hepaticcellular failure which is useful and universally accepted.

Essentially, there are 3 separate clinical scenarios in the management of esophageal varices:

a) Varices which have not yet bled. Management in these patients should be considered as „primary prophylaxis“.
b) Acute variceal hemorrhage.
c) Patients with a history of variceal bleeding. Treatment in these patients is directed to prevent later bleeding episodes ("secondary prophylaxis").

Primary prophylaxis

Prediction of bleeding in these patients is difficult. There is a strong correlation between the varix’s size and the probability of bleeding, but till now, no correlation was found between the level of portal pressure and the likelihood of bleed. Perhaps the most important predictor of bleeding is the Child-Pugh classification and this correlated with variceal size and the presence of red signs (3).

Primary prophylaxis has not been a rewarding endeavor. The evidence from several controlled trials is that though surgery (i.e. porto-systemic or spleen-renal shunting) is capable in preventing bleeding in these patients, survival is not enhanced (2). This kind of surgery therefore does not have a role in primary prophylaxis.

The results of prophylactic sclerotherapy are extremely controversial and in general, there is no place for primary prophylaxis by sclerotherapy in these patients (4).

OLT is considered only according to the stage of the underlying liver disease while the presence of esophageal varices in itself, is not an indication for OLT.

Acute bleeding episode

In acute bleeding, surgery is not primarily indicated. Following the reintroduction of the flexible endoscope in the 1970’s with a claimed control rate of 80 to 90%, it seemed that the management of bleeding esophageal varices would be in the hands of the endoscopists. However, it must be kept in mind that in about two-thirds of patients admitted with an acute hemorrhage, bleeding has stopped at the time of endoscopy, either spontaneously or in response to initial treatment (vasoactive drugs or Sengstaken-Blakemore tube) (2). Nevertheless, emergency sclerotherapy is now the gold standard for treating acute vari-
potential liver transplant candidate results in a situation where future OLT may be complicated by a set of technical and anatomic factors:

1) A shunt may create hemodynamic disturbances and its draining significantly increases the complexity of OLT (11).

2) A patent shunt is associated with a plebo-colic portal vein (12).

3) Selective shunts such as distal splenorenal or H-mesocaval have been implicated in the development of portal vein thrombosis, which may preclude successful transplantation (13).

Although the above mentioned objections may be valid, there are situations where a shunt is clinically indicated or is a life-saving procedure. However, though it has been demonstrated that survival in patients with previous shunt is similar to that obtained in the overall OLT patient population, the type of shunt constructed may significantly affect future transplantation. Several reports analyzed the effect of a previous shunt on technical difficulty, morbidity and survival of liver transplanted patients.

In general, shunt procedures with no liver hilus dissection are safer (12). The portocaval shunt was found to have the most deleterious effects on OLT. Shunt disconnection in these patients results in a significantly greater morbidity and mortality (11). Bismuth, bearing in mind future OLT modified the portocaval shunt and uses an interposition ring graft of 8, 10, or 12 mm in diameter. The postprosthetic anastomosis is low on the inferior vena cava, permitting the shunt to be used as a portal bypass during OLT, while the portal vein is clamped distal to the graft.

With this technique he claims no significant difference in operative mortality between shunted and non-shunted OLT patients (14).

The distal spleno-renal and the H-mesocaval shunts have the advantage of construction away from the porta hepatitis. The splenorenal shunt does not increase the technical difficulty of OLT (11, 12). However, while Starzl advocates shunt closure, either by splenectomy or by direct division and splenectomy (12), others see no special need for shunt disconnection, claiming that a patent shunt usually has no deleterious effects on liver perfusion (11).

The separation and H-mesocaval shunt are advocated by Brem as the best alternative (11). Though known for a high thrombosis rate (13), this complication has not been observed in their series. Since these shunts divert portal blood into the vena cava, caval return alone may be used for venovenous bypass (11).

The shunt may be easily disconnected by a double firing of a TA35 intestinal stapler (12).

The largest experience regarding OLT patients with a previous shunt comes from the Pittsburgh series. In an analysis of 58 patients, the type of shunt was found to have significant impact on survival. Both mesoscalar and distal spleno-renal shunts have a significant positive effect on survival (95% and 87% 5-year survival respectively) when compared to portacaval side-to-side or end-to-side shunts (53% and 30% 5-year survival respectively) (14). The distal spleno-renal and the mesoscalar shunts are therefore the preferred choice in terms of technical ease of OLT as well as graft and patient survival.

Management of rebleeding (secondary prophylaxis)

At one year, 28% of patients in Child’s grade A, about half of patients in Child’s B, and 68% of patients in Child’s grade C will have rebled from varices (16). To date, there are 3 main possibilities to prevent such a bleed: sclerotherapy, shunt surgery (palliative procedures) and liver transplantation (curative procedure). Sclerotherapy is the most widely used long-term treatment to control variceal bleed (17). However, the incidence of rebleeding is quoted to range between 31 to 58% (18, 19), and it does not effect long term survival which is mainly influenced by the underlying liver disease.

It is now apparent that the outcome of patients with bleeding varices largely depends on the functional reserve of the liver and not so much on the portal system (4). Therefore, the perfusion of the hepatocytes must be conserved after any surgery. In this regard, none of the various total portal-systemic shunts (end-to-side, side-to-side, splenorenal, mesocaval) were found to have a particular advantage over the other, and all were shown to have adverse effect on portal perfusion and carry a risk of encephalopathy (20).

The selective spleno-renal shunt, designed to maintain portal blood flow, has recently been evaluated in a multi-center randomized trial. No significant difference was found in mortality at 30-days, rebleeding and late encephalopathy rate in the 30-day survivors between the selective and non-selective shunts (4).

However, the distal shunt gives particularly good results in nonalcoholic patients, and it is useful in the management of patients with noncirrhotic portal hypertension, or patients with gastric varices (21).

Recent reports have demonstrated that OLT is the optimal treatment for patients with advanced liver disease and bleeding varices. In adult Child C Class cirrhotic patients presenting with variceal bleeding, OLT is associated with excellent survival: 70% at 2 years in the Emroy series (22), 73% at 4 years in the Paul-Broussier series (14), and 71% at 5 years in the Pittsburgh series (23).

In addition, there was no significant difference in the survival rate after OLT be-