Liver Transplantation following Blunt Liver Trauma

S. Hatipoglu, E. Bulbuloglu, M. Ates, C. Kayaalp, and S. Yilmaz

ABSTRACT

Due to developing medical technology worldwide, an increasing number of liver transplantations are performed for various indications. Liver transplantation has a limited but important role in specific life-threatening liver trauma cases, when initial therapeutic options fail to control the bleeding or when liver failure ensues. Herein we have reported a patient who required liver transplantation at 18 days after blunt liver trauma with acute liver failure. This case report suggested that liver transplantation is a potential treatment modality for a selected group of patients including pedratric cases who experience acute or subacute liver failure secondary to blunt trauma.

LIVER transplantation has had a profound impact on the care of patients with end-stage liver disease seeking to acute or chronic hepatic failure from a variety of causes. The liver is one of the organs most frequently injured by penetrating or blunt abdominal trauma. Liver transplantation for trauma is rare; herewent is the only therapeutic option for posttraumatic patients who display progressive acute liver failure. Herein we have reported a posttraumatic pediatric case with unreconstructable hepatic injuries that was treated with liver transplantation.

CASE REPORT

A 4-year-old boy was admitted to another institution in a neighbouring city following a fall. He displayed a grade IV liver injury; according to the American Association for the Surgery of Trauma Liver Injury Scale, with a hematoma in the right lobe identified radiologically together with a right hemopneumothorax. A chest tube was inserted and because he was hemodynamically stable the patient was managed nonoperatively initially. On the 18th day after the trauma, he suddenly became hemodynamically unstable and displayed melena. After an unsuccessful attempt at angiographic embolization, he was taken to the operating room. Active bleeding was seen from the lacerated liver parenchyma. A right hepatectomy was performed and a catheter was inserted into an office that was believed to be a bile duct and drained externally. Because of clinical and laboratory deterioration in the postoperative period, the patient was referred to our center.

On the 19th posttrauma day the patient was taken to the intensive care unit of the liver transplantation unit. On admission, the laboratory values were as follows: aspartate aminotransferase (AST)-5793 U/L, alanine aminotransferase (ALT) 2587 U/L, (total bilirubin) 6.84 mg/dL (direct bilirubin) 4.34 mg/dL (international normalised ratio) 3.76, ammonia 268 μg/dL, lactate 30 mg/dL, (Pediatric End-Stage Liver Disease) score 25, and Child-Pugh score of C-14. He had grade 3 encephalopathy. Dynamic computed tomography of the liver revealed a necrotic appearance with occlusion of the portal vein immediately after the confluence possibly due to a thrombus and reduction in the diameter of retrohepatic inferior vena cava (Fig 1).

The boy was listed as an urgent case with the diagnosis of acute liver failure, suitable liver presented after 24 hours. During the laparotomy, the liver was ischemic, edemaous and hard. The formerly placed catheter had been inserted into a right biliary branch. During dissection of the hilum we observed that the left branch of the portal vein was sewn to the right branch and the portal vein was thrombosed. After removal of the stitches, we performed a thrombectomy, establishing portal vein flow.

Following the total hepatectomy, a full-size donor liver was implanted orthotopically. The abdomen was closed with a Bogota bag; skin closure was achieved in 2 sessions a 1-week intervals. The immunosuppressive regimen included cyclosporine. He was discharged home after 30 days in the hospital. The patient is alive and well at the fourth postoperative month.

DISCUSSION

Trauma currently remains a leading cause of death worldwide. Among subjects who sustain abdominal trauma, the liver is the most frequently injured organ. Liver jnjury is the main cause of death following major blunt abdominal trauma with mortality rates of I0%–31%. Patients with a severe blunt liver injury show higher reported mortality rates of up to 58%.[1–3]

From the Department of General Surgery and Liver Transplantation Unit, School of Medicine, Inonu University, Malatya, Turkey.

Address reprint requests to Sinan Hatipoglu, MD, Assistant Professor, Department of General Surgery and Liver Transplantation Unit, School of Medicine, Inonu University, Malatya, Turkey. E-mail: hamitsinanh@gmail.com

0041-1345/12/$–see front matter
http://dx.doi.org/10.1016/j.transproceed.2012.04.009

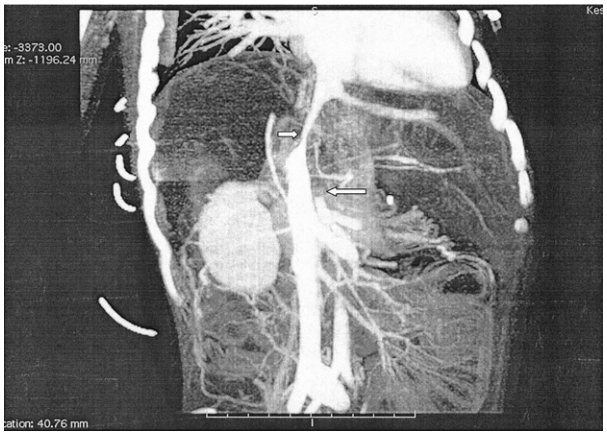

Fig 1. Short arrow, vena cava inferior (reduction in the diameter of retrohepatic inferior vena cava). Long arrow, portal vein (ending of portal vein immediately after confluence possibly due to thrombus).

Previously published studies have reported that 50%–96% of hemodynamicaily stable patients with blunt hepatic trauma can be successfully treated without surgery at appropriately designated trauma centers. Now nonoperative management of blunt hepatic injuries is considered the treatment of choice in about 70% of cases.[1,3]

The nonsurgical interventional techniques, including selective angiographic embolization, biliary endostent placement, and computed tomography (CT)-guided drainage of infected collections or bilomas, treat potential complications of liver tracima as nonsurgical management. There has been an evolution in our understanding of the importance of CT findings and clinical examinations in patients who have undergone hepatic trauma. CT-based criteria can be used to guide the diagnostic management of blunt hepatic trauma in hemodynamicaily stable patients. The criteria, including CT grade of hepatic injury, CT evidence of arterial vascular injury, and presence or absence of hepatic venous involvement within the hepatic injury, help to select patients who should undergo hepatic angiography and possibly embolization.[3,4,5]

Liver transplantation should be considered to be a salvage procedure in severe hepatic trauma, when all other treatment modalities have failed. There have been 19 cases of total hepatectomy and liver transplantation performed in trauma patients in the literature.[6,7] The largest series of 8 patients was reported by Ringe and Pichlmayr.[8]

Liver transplantation is an acceptable surgical method for management of patients with severe traumatic liver injury in the setting of major trauma using indications of uncontrollable hemorrhage (in experienced hands), severe grade IV–V injury, irreversible liver failure after initial treatment, and life-threatening postperfusion injury under life-threatening conditions. Total hepatectomy is a well-described therapeutic strategy in some patients with acute liver failure to "buy time" unit procurement of a suitable donor organ.[4,9] Major resection of the damaged parenchyma after severe liver injury is not recommended for hemodynamically unstable patients.[3,6]

Operative management of patients with severe liver trauma in specialized units is associated with lower mortality and morbidity rates compared with nonspecialist centers. Early communication with a specialist unit, hemostasis with perihepatic packing, and prompt transfer to a tertiary care facility are recommended for further management once the patient is hemodynamicaily stable.

In conclusion, the first step to consider a patient for potential liver transplantation is determining the need for the operation. The second step is to confirm that all other effective treatments have been attempted. Finally, the patient's likelihood of being an appropriate candidate for transplantation must be carefully assessed by a transplantation center.

REFERENCES

1. Christmas AB, Wilson AK, Manning B. et al: Selective management of blunt hepatic injuries including nonoperative management is a safe and effective strategy. Surgery 138:606, 2005

2. Tucker ON, Marriott P, Rela M, et al: Emergency liver transplantation following severe liver trauma. Liver Transpl 14: 1204, 2008

3. Demirbas A. Fragulidis GP, Karatzas T, et al: Role of liver transplantation in the management of liver trauma. Transplant Proc 29:2848, 1997

4. Geenen ILA, Sosef MN, Shun A, et al: Usage and outcomes of deceased donor liver allografts with preprocurement injury from blunt trauma. Liver Transpl 15:321, 2009

5. Poletti PA, Mirvis SE, Shanmuganathan K. et al: CT criteria for management of blunt liver trauma: correlation with angiographic and surgical findings. Radiology 216:418, 2000

6. Honoré C, Deroover A, Gilson N, et al: Liver transplantation for hepatic trauma: discussion about a case and its management. J Emerg Trauma Shock 4:137, 2011

7. Delis SG, Bakoyiannis A, Selvaggi G, et al: Liver transplantation for severe hepatic trauma: experience from a single center. World J Gastroenterol 15:164, 2009

8. Ringe B, Pichlmayr R: Total hepatectomy and liver transplantation: a life saving procedure in patients with severe hepatic trauma. Br J Surg 82:837, 1995

9. Kodakat SK, Ginsburg R. Gopal PB, et al: A case of post-reperlusion syndrome following urgery for liver trauma. Br J Anaesth 96:31, 2006