CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 10 (2015) 65–68

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Hepatic venous outflow obstruction after living donor liver transplantation managed with ectopic placement of a foley catheter: A case report

Mohamed Abdel Wahab[a], Ahmed Shehta[a,*], Hosam Hamed[a], Mohamed Elshobary[a], Tarek Salah[a], Ahmed Mohamed Sultan[a], Omar Fathy[a], Ahmed Elghawalby[a], Amr Yassen[a], Usama Shiha[b]

[a] Liver Transplantation Unit, Gatroenterology Surgical Center, College of Medicine, Mansoura University, Egypt
[b] Radiology Department, Gatroenterology Surgical Center, Mansoura University, Egypt

ARTICLE INFO

Article history:
Received 6 February 2015
Received in revised form 8 March 2015
Accepted 9 March 2015
Available online 12 March 2015

Keywords:
Liver transplantation
Venous outflow obstruction
Foley catheter

ABSTRACT

INTRODUCTION: The early hepatic venous outflow obstruction (HVOO) is a rare but serious complication after liver transplantation, which may result in graft loss. We report a case of early HVOO after living donor liver transplantation, which was managed by ectopic placement of foley catheter.
PRESENTATION: A 51 years old male patient with end stage liver disease received a right hemi-liver graft. On the first postoperative day the patient developed impairment of the liver functions. Doppler ultrasound (US) showed absence of blood flow in the right hepatic vein without thrombosis. The decision was to re-explore the patient, which showed torsion of the graft upward and to the right side causing HVOO. This was managed by ectopic placement of a foley catheter between the graft and the diaphragm and the chest wall. Gradual deflation of the catheter was gradually done guided by Doppler US and the patient was discharged without complications.
DISCUSSION: Mechanical HVOO results from kinking or twisting of the venous anastomosis due to anatomical mismatch between the graft and the recipient abdomen. It should be managed surgically by repositioning of the graft or redo of venous anastomosis. Several ideas had been suggested for repositioning and fixation of the graft by the use of Sengstaken–Blakemore tubes, tissue expanders, and surgical glove expander.
CONCLUSION: We report the use of foley catheter to temporary fix the graft and correct the HVOO. It is a simple and safe way, and could be easily monitored and removed under Doppler US without any complications.

1. Introduction

Vascular complications after liver transplantation represent a diagnostic challenge and a serious source of morbidities and mortality [1]. The early hepatic venous outflow obstruction (HVOO) is a rare but serious complication causing acute Budd–Chiari syndrome, which may result in graft loss [2].

Early HVOO is mostly caused by technical problems as tight anastomosis, twisting of hepatic veins, intimal flaps, and malpositioning of the graft. The keypoint in management of this form of obstruction is the early diagnosis which allows proper treatment to prevent graft dysfunction or graft loss [3].

We report a case of early HVOO after living donor liver transplantation using right hemi-liver graft, which was managed by ectopic placement of foley catheter to maintain adequate outflow of the graft.

2. Case presentation

A 51 years old male patient with end stage liver disease due to chronic hepatitis C virus infection received a right hemi-liver graft from his brother. Prior to transplantation, the donor was evaluated by hepatic angiography; to outline the anatomy of the portal vein, hepatic artery and hepatic veins, magnetic resonance cholangiopancreatography; to assess of the anatomy of the biliary system, and liver volumetry. In this case, the donor had single hepatic

Abbreviations: HVOO, hepatic venous outflow obstruction; MHV, middle hepatic vein; IVC, inferior vena cava; US, ultrasound; AST, aspartate aminotransferase; ALT, alanine aminotransferase.

* Corresponding author at: Gastroenterology Surgical center, Gehan Street, Postal code: 35516 Mansoura, Egypt. Tel.: +20 50 2254558/103 814 174.
E-mail addresses: ahmedshehta@mans.edu.eg, dr_ahmedshehta@yahoo.com (A. Shehta).

http://dx.doi.org/10.1016/j.ijscr.2015.03.017

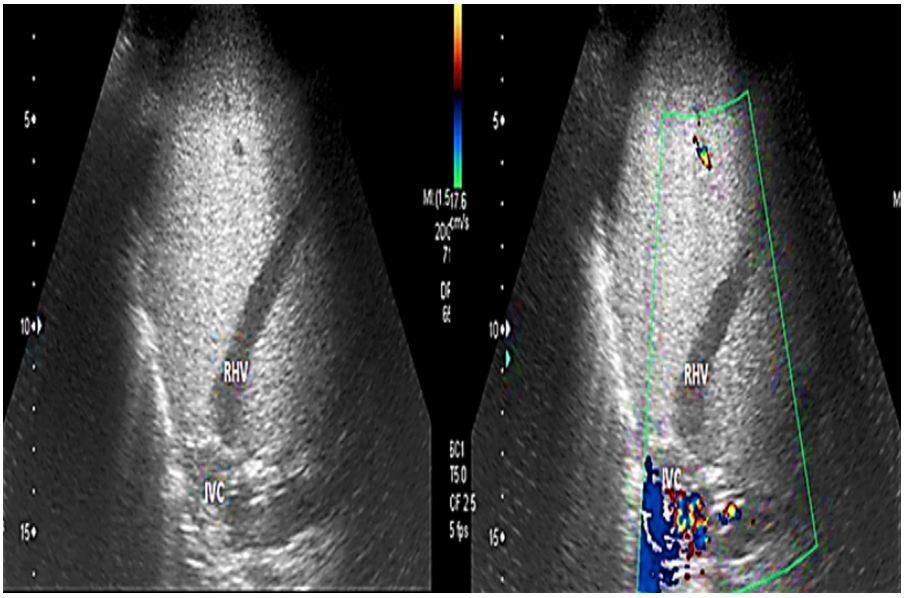

Fig. 1. Doppler ultrasound on the first post-operative day denoting absence of flow in the right hepatic vein (RHV: right hepatic vein, IVC: inferior vena cava).

artery, portal vein, and right hepatic vein and single large tributary from segment VIII to the middle hepatic vein (MHV). The liver graft weight was 900 g, and the graft to recipient weight ratio was 0.8%.

During back table preparation of the graft, we routinely reconstructed the tributaries of the MHV of more than 5 mm in diameter or draining significant liver volume depending on preoperative computed tomography and intraoperative ultrasound. The decision whether to reconstruct or occlude the vein was taken during the recipient surgery depending on the presence of significant graft congestion, the rate of flow in the graft, and occurrence of hemorrhage from the resection surface of the graft after graft reperfusion.

Right hepatic vein reconstruction was done by end-to-side anastomosis between donor right hepatic vein and inferior vena cava (IVC) using continuous 4/0 polypropylene suture with venoplasty. The right hepatic vein stomal diameter was 26 mm. Drainage of segment VIII vein was done to side of IVC using a gortex graft by continuous 4/0 polypropylene suture. Segment VIII vein was 8 mm in diameter. No severe graft congestion or massive bleeding from the transection surface noted at the time of reperfusion.

Doppler ultrasound (US) examination was done after completion of vascular anastomoses and at the end of operation which confirmed patency of all vascular anastomoses.

On the first postoperative day, the patient developed impairment of the liver functions (total serum bilirubin 8.8 mg/dl, serum aspartate aminotransferase (AST) 298 IU/ml, serum alanine aminotransferase (ALT) 223 IU/ml, and serum gamma glutamyl transferase 32 IU/L). Doppler US confirmed absence of blood flow in the right hepatic vein without thrombosis (Fig. 1). The decision was to re-explore the patient. On exploration, this condition was attributed to torsion of the graft upward and to the right side causing kink of the right hepatic vein because of size difference between the graft and the abdominal space.

The management was performed with a foley catheter, inflated by 50 cc normal saline, placed between the graft and the diaphragm and the chest wall. Gradual deflation of the catheter was started one week after insertion, and was gradually applied for another week guided by Doppler US to check adequate hepatic venous outflow (Figs. 2 and 3).

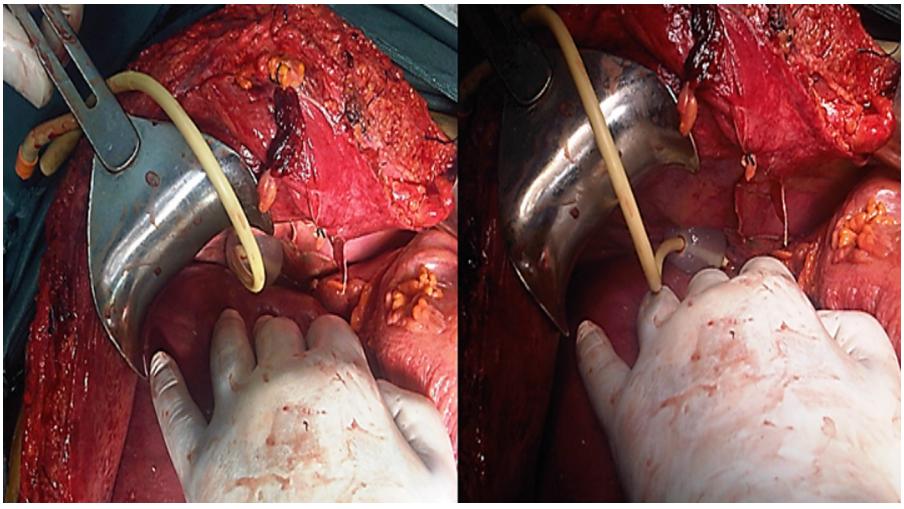

Fig. 2. Intraoperative photograph after inflation of the foley catheter between the graft and the diaphragm and the chest wall.

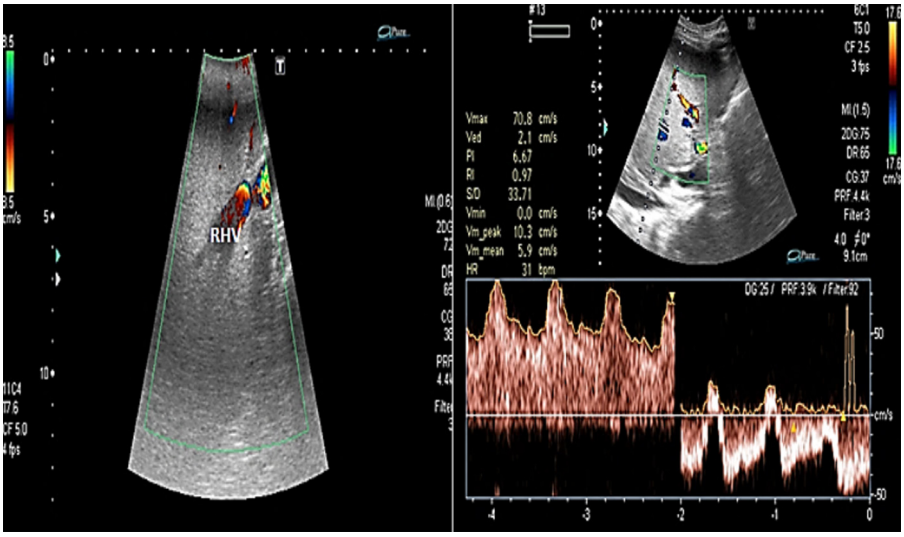

Fig. 3. Intraoperative doppler ultrasound showing improved venous outflow after inflation of the foley catheter (RHV: right hepatic vein).

The patient had adequate postoperative course. Improvement of liver functions was noticed after the exploration (total serum bilirubin 3.1 mg/dl, serum AST 140 IU/ml, serum ALT 155 IU/ml, and serum gamma glutamyl transferase 20 IU/L). Doppler US was performed daily in the first postoperative week, and every other day in the second postoperative week to evaluate patency of vascular anastomoses. The patient was discharged without complications.

3. Discussion

HVOO is classified into early (acute) and late (chronic) types according to its onset after operation. Early HVOO is related to technical problems as tight anastomosis, hepatic veins twisting, and graft malpositioning. Late HVOO or anastomotic stenosis occurs as a result of intimal hyperplasia and perianastomotic fibrosis [3].

Early HVOO after orthotopic liver transplantation is relatively rare with an incidence of less than 2% after the classic technique [4,5] and 3–4% after the piggyback technique [6,7]. Piggyback technique allows greater mobility of the graft along both antero–posterior and latero-lateral directions [6]. The incidence increases to 5–13% in living donor liver transplantation and pediatric split liver transplantation due to greater range of mobility of smaller grafts [8–10]. In our experience, early HVOO accounts for only 0.3%. This low incidence can be explained by that our surgical team had a long experience of shunt operations in management of portal hypertension. In our center, we had performed more than 1000 cases in the era of shunt operations [11].

Mechanical venous outflow obstruction occurs as a result of anatomical mismatch between the liver graft and the recipient abdomen. It may result from the presence of deep and wide subphrenic space with a relatively small sized graft offering a wider range of movement of the graft and allowing kinking of the venous anastomosis [12]. Also, it may result from compression of venous anastomosis by very large graft after abdominal wall closure [3].

Clinically, early HVOO presents manifestations of hypovolemic shock due to decreased systemic venous return. Fluid resuscitation will not correct such hypovolemia [3]. In our case, the patient developed hypotension that was not explained and did not respond to fluid resuscitation.

Early diagnosis of HVOO after liver transplantation is the key point to allow immediate intervention and prevent graft dysfunction or even graft loss. Some surgeons recommend immediate surgical intervention to correct the cause of mechanical obstruction [3,13,14]. However, others recommend percutaneous interventions as balloon angioplasty or stent placement as surgical interventions are dangerous and followed by unfavorable outcomes [8,12,15,16].

We believe that, balloon angioplasty and stent placement is very dangerous during the very early postoperative period for fear of disruption of the newly formed anastomosis. So in our case, we did not offer such modality and preferred surgical exploration during the early post-transplant period. This is supported by other studies [3,8].

Mechanical venous outflow obstruction from kinking or twisting of the venous anastomosis should be managed surgically by repositioning of the graft or redo of venous anastomosis or retransplantation [17]. The use of additional cavo-caval anastomosis or retransplantation is dangerous and associated with a high mortality rate [18,19].

Several ideas had been suggested for repositioning and fixation of the graft to overcome the venous outflow obstruction. Malassagne et al. and Steinbrück et al. used Sengstaken–Blakemore tube to support the graft and correct venous obstruction [13,20]. Wang et al. reported, the use of tissue expander and foley catheter in 7 patients to improve venous obstruction [9]. Donataccio et al. reported, the use of surgical glove expander in 9 patients. There was no device related complications in these 9 patients [3]. Inomata et al. described, the use of tissue expander to stabilize the graft [14]. Others used fixation of the round ligament and placement of small bowel loops to fix the graft in position [17].

We report the use of foley catheter to temporary fix the graft in position and correct the venous outflow obstruction. It is a simple and safe way to save the graft. It can be easily monitored and removed under Doppler US without any device related complications.

Conflict of interest

No conflicts of interest were declared.

Financial support

No external funding resource.

Ethical approval

This case report was accepted by the local ethical comittee.

Author contribution

Conception and design of the study: Wahab M.A.
Collection and assembly of the data: Shehta A., Hamed H.
Data analysis and interpretation: Wahab M.A., Shehta A., Hamed H.
Drafting the manuscript: all authors.
Critical revision of the manuscript for important intellectual content: all authors.
Final approval of the manuscript: all authors.
Study supervision: Wahab M.A.

Consent

We obtained a written informed consent from the patient for the publication of this case report and accompanying images. A copy of this written consent is available for review by the editor-in-chief of the international journal of surgery case reports on request.

Guarantor

Mohamed Abdel Wahab: Professor of Surgery, College of Medicine, Mansoura University, Chair of Liver Transplantation Unit, Gastroenterology Surgical Centre, College of Medicine, Mansoura University, Egypt.
Ahmed Shehta: Assistant lecturer of surgery, Gastroenterology Surgical Centre, College of Medicine, Mansoura University, Egypt.

Acknowledgement

None.

References

[1] J.P. Duffy, J.C. Hong, D.G. Farmer, et al., Vascular complications of orthotopic liver transplantation: experience in more than 4200 patients, J. Am. Coll. Surg. 208 (2009) 896–903.
[2] Y. Tanimoto, H. Tashiro, T. Itamoto, et al., Hepatic venous outflow obstruction after right lateral sector living donor liver transplantation, treated by insertion of an expandable metallic stent, J. Hepatobiliary Pancreat. Surg. 15 (2008) 228–231.
[3] D. Donataccio, S. Grosso, M. Donataccio, A simple and new device to avoid hepatic venous outflow obstruction in adult liver transplantation, Surg. Sci. 2 (2011) 485–487.
[4] J. Lerut, A. Tzakis, K. Bron, et al., Complications of venous reconstruction in human orthotopic liver transplantation, Ann. Surg. 205 (1987) 404–414.
[5] U. Settmacher, N.C. Nussler, M. Glanemann, et al., Venous complications after orthotopic liver transplantation, Clin. Transplant. 14 (2000) 235–241.
[6] P. Parrilla, F. Sanchez-Bueno, J. Figueras, et al., Analysis of the complications of the piggy-back technique in 1112 liver transplants, Transplantation 67 (1999) 1214–1217.
[7] F. Navarro, M.C. Le Moine, J.M. Fabre, et al., Specific vascular complications of orthotopic liver transplantation with preservation of the retrohepatic vena cava: review of 1361 cases, Transplantation 68 (1999) 646–650.
[8] G.Y. Ko, K.B. Sung, H.K. Yoon, et al., Early post-transplant hepatic venous outflow obstruction: long-term efficacy of primary stent placement, Liver Transplant. 14 (2008) 1505–1511.
[9] C.C. Wang, A.M. Concejero, C.C. Yong, et al., Improving hepatic and portal venous flows using tissue expander and foley catheter in liver transplantation, Clin. Transplant. 20 (2005) 81–84.
[10] G.K. Kumar, K. Sharif, D. Mayer, et al., Hepatic venous out-flow obstruction in paediatric liver transplantation, Pediatr. Surg. Int. 26 (4) (2010) 423–435.
[11] F. Ezzat, K. Abo Elmaged, I. Aly, et al., Distal splenorenal shunt in management of variceal bleeding in patients with schistosomal hepatic fibrosis, Ann. Surg. 204 (5) (1986) 566–573.
[12] M.D. Darcy, Management of venous outflow complications after liver transplantation, Tech. Vasc. Interv. Radiol. 10 (2007) 240–245.
[13] K. Steinbrück, R.A. Fernandes, M. Enne, et al., Ectopic placement of Sengstaken–Blakemore device to correct outflow obstruction in liver transplantation: case reports, Transplant. Proc. 42 (2010) 597–598.
[14] Y. Inomata, K. Tanaka, H. Egawa, et al., Application of a tissue expander for stabilizing graft position in liv-ing-related liver transplantation, Clin. Transplant. 11 (1) (1997) 56–59.
[15] U. Settmacher, N.C. Nussler, M. Glanemann, et al., Venous complications after orthotopic liver transplantation, Clin. Transplant. 14 (3) (2000) 235–241.
[16] C. Quintini, C.M. Miller, K. Hashimoto, et al., Side to side cavocavostomy with an endovascular stapler: rescue technique for severe hepatic vein and/or inferior vena cava outflow obstruction after liver transplantation using the piggyback technique, Liver Transplant. 15 (1) (2009) 49–53.
[17] J. Lerut, P. Gertsch, Side-to-side cavo-cavostomy: a useful aid in complicated piggy-back liver transplantation, Transplant. Int. 6 (5) (1993) 299–301.
[18] J. Quintela, C. Fernàndez, J. Aquirrezabalaga, et al., Early venous obstruction after liver transplantation and treatment with cavo-cavostomy, Transplant. Proc. 41 (6) (2009) 2450–2452.
[19] A. Cavallari, M. Vivarelli, R. Bellusci, et al., Treatment of vascular complications following liver transplantation: multidisciplinary approach, Hepatogastroenterology 48 (37) (2001) 179–183.
[20] B. Malassagne, B. Dousset, P.P. Massault, et al., Intra-abdominal Sengstaken-Blakemore tube placement for acute venous outflow obstruction in reduced-size liver transplantation, BJS 83 (8) (1996) 1086.