Liver transplantation is the ultimate approach for pediatric patients with End-Stage Liver Disease. Transplantation in the pediatric population can present a technical challenge due to vessel size mismatches between donor and recipient vasculature, increasing the risk of vascular complications. Several studies have been conducted discussing potential interventions and mostly describe postoperative management of such complications. This case describes an intraoperative diagnosis of venous size mismatch and thus investigating intraoperative surgical and anesthetic observations of this complication.

The patient was diagnosed in infancy and managed at home with daily L-Valine and L-Sarcosine formulas along with a specific diet. He had been overall healthy with no known allergies. He had a twin brother with MSUD who passed away due to these complications including thrombectomy, balloon dilation, and even eventual retransplantation.

Over 14,000 people in the United States are awaiting liver transplantation according to the USDSHSS National Data. The waiting list for pediatric patients is around 350 patients that are below the age of eight years of age due to the difference in size of typical adult donors to the pediatric recipients, anastomosis mismatch is a common concern. This can lead to anomalies of flow, stenosis and thrombosis of the venous anastomosis. Patients may be required to have repeated interventions due to these complications including thrombectomy, balloon dilation, and even eventual retransplantation.

The case of the intraoperative diagnosis of a vena caval anastomosis mismatch leads to a discussion of simple techniques resulting in early diagnosis of anastomosis mismatch in order to decrease postoperative vascular complications. As an intraoperative diagnostic tool, TEE can aid in differential diagnosis. Table 1 discusses the factors involved in diagnosis of a vena anastomosis mismatch. In this case the patient had hepatic congestion along with low blood pressure and high CVP suggesting some obstruction in allowing adequate cardiac output. This clinical observation led to the need for imaging correlation, which can be conducted through several means including TEE, intraoperative doppler ultrasound and direct visualization of anastomotic site.

A well known method of intraoperative imaging includes doppler ultrasound. Portal vein and other vascular complications can lead to significant morbidity and graft failure. Thus, intraoperative management of these complications are critical. Research has shown that intraoperative doppler ultrasound can improve diagnosis and reduction of vascular complications in the postoperative period as well. Several studies indicate this is an essential test to be conducted intraoperatively. One study goes on to describe the surgical management of venous stenosis beginning with conservative measures (graft re-positioning) followed by invasive measures (angioplasty or endovascular stenting). Another rising alternative to minimize vascular complications of liver transplants in the pediatric population includes segmental grafts. In addition, reconstruction of the site with ultrasound guidance also allows for visualization of flow and waveform throughout the procedure. Although it has been shown that long term consequences of stenosis are not as severe as thrombosis, an immediate diagnosis increases ability to salvage the graft.

Through our case study, we suggest an alternative to intraoperative ultrasonography. Through TEE, we were able to visualize low filling velocities and yet intact contractility along with turbulence in the IVC. These correlations led to the diagnosis of a vena caval mismatch and the intraoperative reconstruction of the site resulting in better hemodynamic stability and cardiac output with decreased CVP. Intraoperative diagnosis through TEE can aid in differential diagnosis of hemodynamic instability as well, including cardiac abnormalities.

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