



ORIGINAL ARTICLE

Frequency of and factors associated with vascular complications after pediatric liver transplantation^{☆,☆☆}

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KEYWORDS

Thrombosis;
Hepatic artery;
Portal vein;
Morbidity;
Mortality

Abstract

Objective: to evaluate the frequency and factors associated with vascular complications after pediatric liver transplantation.

Method: risk factors were evaluated in 99 patients under 18 years of age with chronic liver disease who underwent deceased donor liver transplantation (DDLT) between March of 1995 and November of 2009 at the Hospital de Clínicas de Porto Alegre, Brazil. The variables analyzed included donor and recipient age, gender, and weight; indication for transplant; PELD/MELD scores; technical aspects; postoperative vascular complications; and survival.

Results: vascular complications occurred in 19 patients (19%). Arterial events were most common, occurred earlier in the postoperative period, and were associated with high graft loss and mortality rates. In the multivariate analysis, the following factors were identified: portal vein diameter ≤ 3 mm, donor-to-recipient body weight ratio (DRWR), prolonged ischemic time, and use of arterial grafts.

Conclusion: the choice of treatment depends on the timing of diagnosis; however, in this study, surgical revision or correction produced worse outcomes than percutaneous angioplasty. The reduction of risk factors and early detection of vascular complications are key elements to a successful transplantation.

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PALAVRAS-CHAVE

Trombose;
 Artéria hepática;
 Veia porta;
 Morbidez;
 Mortalidade

Frequência e fatores relacionados a complicações vasculares após transplante hepático pediátrico

Resumo

Objetivo: Avaliar a frequência e os fatores associados a complicações vasculares após transplante hepático pediátrico.

Método: Os fatores de risco foram avaliados em 99 pacientes com mais de 18 anos de idade com doença hepática crônica submetidos a transplante hepático cadavérico (THC) entre março de 1995 e novembro de 2009 no Hospital de Clínicas de Porto Alegre, Brasil. As variáveis analisadas incluíram: idade, sexo e peso dos doadores e receptores; indicação de transplante; escores PELD/MELD; aspectos técnicos; complicações vasculares pós-operatórias; e sobrevida.

Resultados: Ocorreram complicações vasculares em 19 pacientes (19%). Os eventos arteriais foram mais comuns, tendo ocorrido precocemente no pós-operatório, e foram associados a altas taxas de perda do enxerto e mortalidade. Em uma análise multivariada, foram identificados os seguintes fatores: diâmetro da veia porta ≤ 3 mm, proporção de peso do doador/receptor (DRWR), tempo de isquemia prolongado e uso de enxertos arteriais.

Conclusão: A escolha do tratamento depende do momento do diagnóstico; contudo, nessa série, a cirurgia de revisão, ou correção cirúrgica, produziu resultados piores que a angioplastia percutânea. A redução dos fatores de risco e a detecção precoce de complicações vasculares são fundamentais para um transplante bem-sucedido.

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Introduction

Liver transplantation is an accepted treatment option for children with chronic liver disease, with actuarial survival rates of up to 80% in five and 75% in ten years.¹ Early causes of graft failure and mortality are mostly related to vascular complications, especially hepatic artery thrombosis (HAT) and portal vein thrombosis (PVT).² There are a number of recognized risk factors for the development of these complications in the pediatric population, such as discrepancy between donor and recipient arterial and portal diameter, surgical skills, lower recipient weight,³ and small portal vein diameter.⁴ There are no consistent data regarding these risk factors in the pediatric population of Brazil.

The aim of this study was to assess the frequency of vascular complications in pediatric patients undergoing deceased donor liver transplantation (DDLT) at the Hospital de Clínicas de Porto Alegre, Brazil, and to identify the factors associated with these complications and mortality.

Methods

The charts of 99 first liver transplant recipients under 18 years of age who underwent DDLT at the Hospital de Clínicas de Porto Alegre between March of 1995 and November of 2009 were retrospectively reviewed. The study was approved by the institution's ethics committee.

During this period, 128 liver transplants were performed on 121 children and adolescents (range: 4 months to 18 years). Of these, 29 were excluded from the sample: 13 who underwent emergency liver transplantation due to fulminant hepatitis, six who received living donor grafts, and three because the preservation solution wasn't the University of Wisconsin solution (UW). The exclusion criteria were defined

in order to avoid comparison bias based on immunological or technical factors influencing vascular complications. The patients were split into two groups for comparison: with vascular complications (n=19) and without vascular complications (n=88). These data were used for univariate and multivariate analysis in order to identify the associated factors.

Recipients were assessed for the following variables: age, gender, weight, transplant indication, PELD/MELD scores, type of allograft, type of anastomosis, vascular complications, management of these complications, and survival. Since data regarding graft weight was not available for all patients, the donor weight/recipient weight ratio (DRWR) was assessed.⁵

The diagnosis of vascular complications was established by a minimum of two imaging modalities and/or surgical confirmation. All transplants were performed by the same surgical team, and the piggyback technique with vena cava preservation was the standard procedure. Vascular anastomosis was performed under $3.5 \times$ loupe magnifications. A PDS™ (Ethicon) (7-0 polydioxanone monofilament) thread was used for arterial and portal sutures, and a non-absorbable 5-0 polypropylene monofilament was used on the hepatic veins. Running stitches were used for vessels larger than 3 mm in diameter, and simple interrupted stitches for smaller vessels.

Postoperatively, blood flow in the hepatic artery, portal vein, and suprahepatic vena cava was assessed by Doppler ultrasonography (DUS) of the abdomen once a day during the first postoperative week; every other day on the second week; and once a week subsequently, for a total of 30 days. Outpatient DUS follow-up was provided on the third and sixth postoperative months, and one year after transplantation. DUS was subsequently performed once a year or when patients developed clinical and/or biochemical

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