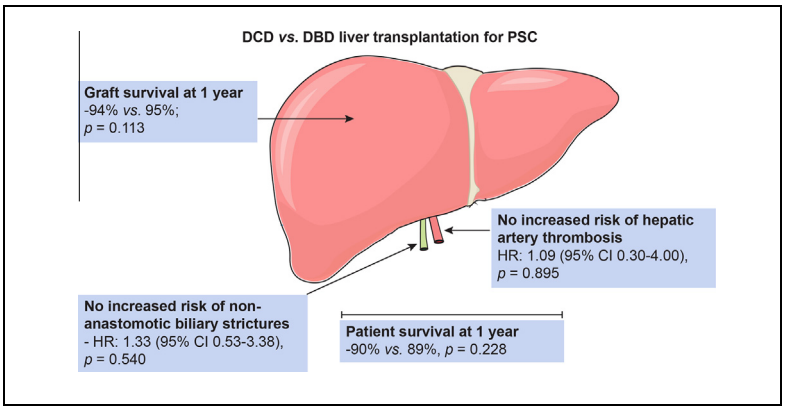
Research Article

EASL JOURNAL OF HEPATOLOGY

Clinical outcomes of donation after circulatory death liver transplantation in primary sclerosing cholangitis

Graphical abstract



Highlights

- Outcomes of DCD *vs.* DBD liver transplantation in PSC are compared.
- Operation times, need for intensive care support, and incidence of renal injury were not increased.
- DCD transplantation in PSC did not increase risk of non-anastomotic biliary strictures overall.
- Incidence of ischaemic-type biliary lesions is heightened in the first year for DCD recipients.
- Overall risk of hepatic artery thrombosis is greatest in patients with inflammatory bowel disease.
- Graft survival is not significantly different for PSC patients receiving a DCD *vs.* DBD liver.

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Lay summary

This study examines the impact of liver transplantation in primary sclerosing cholangitis (PSC) with organs donated after circulatory death (DCD), compared to donation after brainstem death (DBD). We show that in appropriately selected patients, the outcomes for DCD transplantation mirror those using DBD livers, with no significant differences in complication rate, patient survival or transplanted liver survival. In an era of organ shortage and increasing wait-list times, DCD livers represent a potential treatment option for transplantation in PSC.

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Research Article

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Clinical outcomes of donation after circulatory death liver transplantation in primary sclerosing cholangitis

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Background & Aim: Primary sclerosing cholangitis (PSC) is a progressive fibro-inflammatory cholangiopathy for which liver transplantation is the only life-extending intervention. These patients may benefit from accepting liver donation after circulatory death (DCD), however their subsequent outcome is unknown. The aim of this study was to determine the clinical impact of using DCD liver grafts in patients specifically undergoing transplantation for PSC.

Methods: Clinical outcomes were prospectively evaluated in PSC patients undergoing transplantation from 2006 to 2016 stratified by donor type (DCD, n = 35 *vs.* donation after brainstem death [DBD], n = 108).

Results: In liver transplantation for PSC; operating time, days requiring critical care support, total ventilator days, incidence of acute kidney injury, need for renal replacement therapy (RRT) or total days requiring RRT were not significantly different between DCD *vs.* DBD recipients. Although the incidence of ischaemic-type biliary lesions was greater in the DCD group (incidence rate [IR]: 4.4 *vs.* 0 cases/100-patient-years; $p < 0.001$) there was no increased risk of post-transplant biliary strictures overall (hazard ratio [HR]: 1.20, 0.58–2.46; $p = 0.624$), or in sub-analysis specific to anastomotic strictures or recurrent PSC, between donor types. Graft loss and mortality rates were not significantly different following transplantation with DCD *vs.* DBD livers (IR: 3.6 *vs.* 3.1 cases/100-patient-years, $p = 0.34$; and 3.9 *vs.* 4.7, $p = 0.6$; respectively). DCD liver transplantation in PSC did not impart a heightened risk of graft loss (HR: 1.69, 0.58–4.95, $p = 0.341$) or patient mortality (0.75, 0.25–2.21, $p = 0.598$).

Conclusion: Transplantation with DCD (*vs.* DBD) livers in PSC patients does not impact graft loss or patient survival. In an era of organ shortage, DCD grafts represent a viable therapeutic option for liver transplantation in PSC patients.

Lay summary: This study examines the impact of liver transplantation in primary sclerosing cholangitis (PSC) with organs donated after circulatory death (DCD), compared to donation after brainstem death (DBD). We show that in appropriately selected patients, the outcomes for DCD transplantation mirror those using DBD livers, with no significant differences in complication rate, patient survival or transplanted liver survival. In an era of organ shortage and increasing wait-list times, DCD livers represent a potential treatment option for transplantation in PSC.

Introduction

Primary sclerosing cholangitis (PSC) is a progressive fibro-inflammatory cholangiopathy stigmatised by a disproportionate impact on young patients.[1,2] Currently, liver transplantation is the only proven life-extending intervention, and PSC now accounts for 10–15% of all liver transplant activities within Europe.[3–5] In parallel, the overall number of patients with chronic liver disease on an active liver transplant register is increasing globally,[4–6] without an appropriate rise in the donor pool.[7] A challenge more specific to PSC, is that patients may suffer complications inadequately represented by the model for end-stage liver disease (MELD) score; such as intractable pruritus, recurrent ascending cholangitis, and reduced overall quality of life.[8] Consequently, the number of PSC patients who die or are withdrawn from a transplant waiting list due to clinical deterioration is rising, and now approximates 20%.[9] This group of invariably young individuals may have their life saved in the event of timely donor availability.

Donation after brain death (DBD) is the practice of choice in liver transplantation, although the increasing demand for organs has furthered interest in using grafts donated after circulatory death (DCD). Indeed, the advances in graft preservation, immunosuppression and operative techniques have significantly

Keywords: Primary sclerosing cholangitis; Liver transplantation; Ulcerative colitis; Ischaemic-type biliary lesion; Non-anastomotic biliary stricture; Hepatic artery thrombosis; Non-heart beating donor; Risk stratification.
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