Hepatic Retransplant

What Have We Learned?

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KEYWORDS

• Liver transplant • Retransplant • Risk prediction models • Hepatitis C virus
• MELD scores

KEY POINTS

- Hepatic retransplant accounts for 5% to 15% of liver transplants in most series.
- Liver retransplants are associated with significantly increased hospital costs and inferior patient survival when compared with primary liver transplants.
- The indications for hepatic retransplant vary depending on the time interval between prior transplant and retransplant. Early retransplants (within the first few days or weeks) are usually due to primary graft nonfunction (PNF) or vascular thrombosis, whereas later retransplants are most commonly necessitated by chronic rejection or recurrent primary liver disease.
- A variety of recipient and donor characteristics predict poor survival after hepatic retransplant, including history of multiple prior liver transplants, need for retransplant 7 to 30 days after prior transplant, high Model for End-stage Liver Disease (MELD) score at the time of retransplant, need for preoperative mechanical ventilation, cold ischemia times greater than 12 hours, advanced donor age, and use of split liver grafts or grafts from donors after cardiac death.
- Several risk prediction models have been developed to characterize high-risk candidates for hepatic retransplant, allowing futile retransplants to be avoided. Better stratification of retransplant candidates has improved the outcomes of retransplant in the contemporary era.

Advances in surgical technique, immunosuppression, and perioperative care have significantly improved the outcomes of liver transplantation over the past 30 years, offering new hope to patients with end-stage liver disease. These clinical innovations have underpinned a dramatic prolongation in graft survival. Indeed, the most recent

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Organ Procurement and Transplantation Network (OPTN) annual report indicated that at the end of 2011, only 2.8% of patients on the liver transplant waiting list had undergone a prior liver transplant and only 6.2% of the actual transplants performed in 2011 were retransplants, a significant decline from the 1980s when retransplants comprised up to one-third of liver transplants.[1–3] For the patients whose grafts do fail, however, retransplant remains the only life-saving option.

Hepatic retransplant remains a formidable technical challenge, and it also raises critical ethical concerns given the current organ shortage. At present, 1 of every 12 donor livers is allocated for a hepatic retransplant, underscoring the role played by retransplant in exacerbating donor organ scarcity.[4] It is well-documented that the outcomes of hepatic retransplant are inferior to those of primary liver transplant (**Fig. 1**).[5–12] For example, in a large series of liver retransplants from University of California Los Angeles (UCLA), the 1-, 5-, and 10-year patient survival rates for liver retransplant recipients (62%, 47%, and 45%, respectively) were significantly worse than those of primary liver transplant recipients (83%, 74%, and 68%, respectively).[7] In addition, hepatic retransplant often consumes far more health care resources than primary liver transplant.[7,13] Indeed, one series demonstrated that hepatic retransplants were associated with almost double the inpatient hospital stay and over twice the immediate hospital cost ($122,358 vs $289,302) when compared with primary liver transplants.[11]

Given the inferior outcomes of hepatic retransplants, some clinicians and ethicists have argued that hepatic retransplant should be abandoned. Back in the early 1990s, for example, Powelson and colleagues[14] used an elegant model of hepatic retransplants in the New England organ procurement region. Given the relatively poor 1-year survival rates of retransplants in their series (48%) compared with the survival rates of primary liver transplants (70%), the investigators found that permitting hepatic retransplant improved the predicted 1-year survival of liver transplant recipients, but at the cost of decreasing the overall survival of patients on the liver transplant waiting list, because organs allocated for repeat transplants obviously deny the opportunity of primary transplant for someone else on the waiting list.

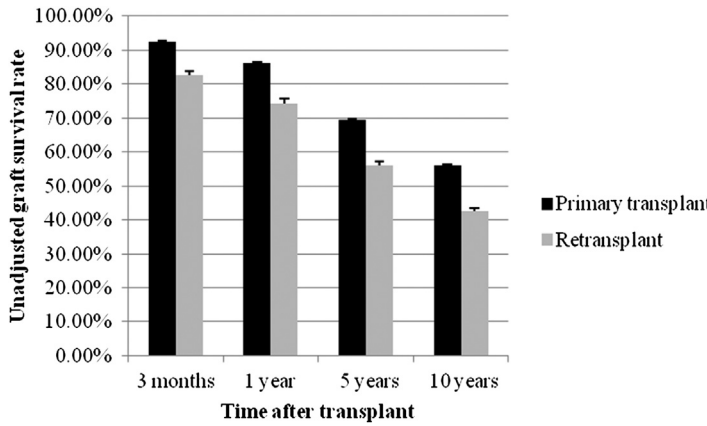

Fig. 1. Hepatic retransplant has inferior graft survival compared with initial primary liver transplants. Error bars show standard error. (*Adapted from* Organ Procurement and Transplantation Network (OPTN) and Scientific Registry of Transplant Recipients (SRTR). OPTN/SRTR 2010 Annual Data Report. Rockville (MD): Department of Health and Human Services HRSA, Healthcare Systems Bureau, Division of Transplantation; 2011.)