Extended Donors in Liver Transplantation

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KEYWORDS

• Extended criteria donor • Marginal donor • Liver transplant
• Deceased after cardiac death • Advanced age • Steatosis

The use of extended donors has been studied extensively by the transplant community over the past years. As the waiting list expands for orthotopic liver transplant (OLT), transplant teams are searching for new ways to increase the donor pool. According to the United Network of Organ Sharing/Organ Procurement and Transplantation Network (UNOS/OPTN) database, there are 16,141 patients on the liver transplant list.[1] In 2010, 6124 OLTs were performed.[1] In the same year, 1445 patients died while on the waiting list and 1221 patients were removed because they were too sick to transplant.[1] Less than 40% of the patients of the waiting list eventually receive a liver, and almost 10% die while waiting. It is obvious from these figures that there is a paucity of organs compared with the need for transplantation. One of the ways to augment the donor pool is through use of allografts previously believed to be untransplantable. Although the definition of extended donor has not been thoroughly established, most agree that it conveys either a higher risk of physiologic dysfunction or a higher risk of transmission of disease.

Extended donors can be separated into 2 groups: donor-related and surgical technique-related issues. Donor-related issues include deceased after cardiac death (DCD), advanced donor age, increased cold ischemia time (CIT), ABO incompatibility, steatosis, previous malignancy in the donor, hepatitis C virus (HCV) infection, human T-cell lymphotrophic virus type I/II (HTLV-I/II) infection, other active infections, and Centers for Disease Control and Prevention (CDC) high-risk donors. These extended criteria can generally be accepted or denied by the transplant team during evaluation of the allograft. Surgical technique-related issues of extended donors include split liver transplantation and living donor liver transplantation (LDLT). Both of these methods provide the recipient with an allograft when a whole cadaveric organ is unavailable.

The authors have nothing to disclose.

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DONOR-RELATED ISSUES

DCD

One source of potential liver donors is DCD donors, previously known as nonheart-beating donors. These donors present specific challenges because they have the potential to significantly increase the risk of ischemia to the allograft. One option that has been developed and used by the transplantation community is the idea of controlled DCD procurement in which life support is withdrawn in the operating room to minimize additional ischemic time. The use of DCD donors has increased steadily and now accounts for 5% of OLT.[2] Moreover, the number of liver transplant centers using DCD allografts has also increased.[2] By incorporating DCD donors into the transplantation program, some have seen increased numbers of transplants by 8% and have expected increases up to 25%.[3]

Multiple articles have been written in the medical literature examining the feasibility of these donors compared with traditional deceased after brain death (DBD) donors. Several single-center studies have been documented with large differences in survivals between DCD and DBD allografts (**Table 1**). Some studies report favorable results with use of DCD allografts, with patient and allograft survivals up to 100% and 100% at 1 year, 89.5% and 68.4% at 3 years, and 89.5% and 63.2% at 5 years, respectively[4–7]; although others report significantly reduced patient and allograft survival, down to 68% and 70% patient survival at 3 and 5 years, respectively, and down to 56% allograft survival at 3 and 5 years.[3,6] According to studies examining national data from UNOS/OPTN or Scientific Registry of Transplant Recipient (SRTR) databases, DCD allograft recipients have overall worse patient and allograft survival, down to 60% allograft survival at 3 years[2,8–10]; however, it seems they do not fare significantly worse when compared with DBD donors less than 60 years of age or split liver allografts.[10]

The most common complications with the use of DCD allografts seem to be caused by the threat of prolonged ischemia. Higher incidences of primary nonfunction up to 12%, and biliary complications as high as 60%, including significantly increased

Table 1
DCD allografts transplanted: series reported in the medical literature

Author	Foley et al[3]	Nguyen et al[4]	Detry et al[5]	de Vera et al[6]	Mateo et al[8]	Merion et al[9]	Doshi and Hunsicker[10]
Number of transplants	36	19	13	141	367[a]	472[b]	345[a]
Patient survival (%)							
1 y	80	89.5	100	79	–	–	–
3 y	68	89.5	–	–	–	–	77
5 y	–	89.5	–	70	–	–	–
Allograft survival (%)							
1 y	67	73.7	100	69	71	70.1	–
3 y	56	68.4	–	–	60	60.5	65
5 y	–	63.2	–	56	–	–	–

[a] Authors used UNOS/OPTN database.
[b] Authors used SRTR database.