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Should living donor liver transplantation be part of every liver transplant program?

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The critical shortage in donor organs is generally proffered as the main impetus behind the development of living donor liver transplantation (LDLT), and although the procedure has significantly impacted since its initial development approximately 17 years ago on the pediatric waiting list mortality and morbidity, the same cannot be stated with reference to the adult population of potential liver transplant recipients [1,2]. The picture which emerges is complex and is affected by a variety of factors such as geographic variability in the availability of deceased donor (DD) organs, differences in institutional commitments, surgical expertise, the availability of ancillary support services, emerging data on donor and recipient outcomes and complications, anatomic as well as psychosocial limiting factors in both potential donors and recipients,

and ethical considerations as well as conflicting viewpoints within the transplant community. In addressing the question ‘Should LDLT be part of every liver transplant program?’ all of the issues listed need to be discussed. Although the transplant community has been developing a number of guidelines as to who should or should not perform LDLT, the question of level of need for LDLT and donor/recipient risk are constantly being weighed against the required threshold of surgical and institutional expertise. In addition, to further add complexity to this situation, we are concomitantly re-evaluating and extending our accepted indications for liver transplantation within the context of LDLT, with changes in our perceptions of minimal outcome limits in specific oncologic diseases. Ultimately, the question as to who should be performing LDLT should also enter into the realm of ‘Who oversees innovative practice?’ and ‘Do we have a structure to monitor the development and evolution of innovative techniques such as LDLT?’ The dichotomy which has developed with LDLT between our rule as physicians to ‘primum non nocere’: first do no harm, and our desire to help an ever-increasing population of patients with end stage liver disease places us in urgent need of structure and guidelines.

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Abbreviations: ACOT, US Department of Health and Human Services Advisory Committee on Organ Transplantation; DD, deceased donor; ELTR, European Liver Transplant Registry; ESLD, end stage liver disease; LDLT, living donor liver transplantation; MELD, Model for end stage liver disease.

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1. Variability in the need for LDLT

Looking at cadaveric organ donation rates in various countries, there is a recognized diversity in the percentage of organ donors per million population. Geographic variability in the availability of DD and social acceptance of cadaveric organ donation, in conjunction with the stimulus of the growing mortality of patients with end stage liver disease (ESLD) in need of liver transplantation, appear to play a crucial role in the development of LDLT [3–5]. In spite of the 1997 approval in Japan of the law for organ retrieval from brain dead donors, the low popular acceptance of cadaveric donation that has ultimately resulted in an extreme paucity of DD organs, has caused LDLT to remain as the main technique of liver transplantation performed in that country [3]. Trotter et al. found that LDLT centres in the United States had significantly fewer (46% less) DD liver grafts available per listed patient compared to non-LDLT centres [4]. In Latin America, where cadaveric donation rates vary between countries in the range of 4.5 to 11.8 per million population per year, LDLT is performed in most countries for pediatric recipients and in 3 Latin American countries for adult patients [5]. In Switzerland, faced with a non patient based liver allocation system where donor hepatic allografts originating from non transplant centres are distributed into a national pool rotated between liver transplant centres, the University of Zurich initiated their LDLT program in the year 2000 to address their low local donor rates, high waiting list numbers and significant mortality and drop out of patients due to progressive advancement of liver disease [6]. The donation rates from deceased donors are lowest in the German part of Switzerland despite numerous efforts from the Swiss transplant community to change this cultural barrier [7].

In Europe, data relating to LDLT activity can be obtained from the European Liver Transplant Registry (ELTR). Although the number of adult LDLT procedures began to exponentially increase as of 1999 until the present time, LDLT is only performed by 48% of European liver transplant centres ($n=61/126$) and forms only 2.9% of all liver transplantations recorded in the ELTR database ($n=1468/50577$) [8] (Figs. 1 and 2). This same trend can be seen in the USA where LDLT only makes up approximately 5–9% of all liver transplantations performed, even at the time of its peak in 2001 when 506 LDLT were recorded by UNOS [9]. The initial enthusiasm as well as the projected major increase in LDLT procedures has not occurred in countries where cadaveric organ donation is present despite the availability of LDLT for a number of years [4]. Reasons for this are multiple and complex. From the perspective of donor suitability, approximately >50% of potential liver transplant recipients do not have at the outset an identifiable potential donor based on either a lack of family members or other significant person willing to donate, or based on general

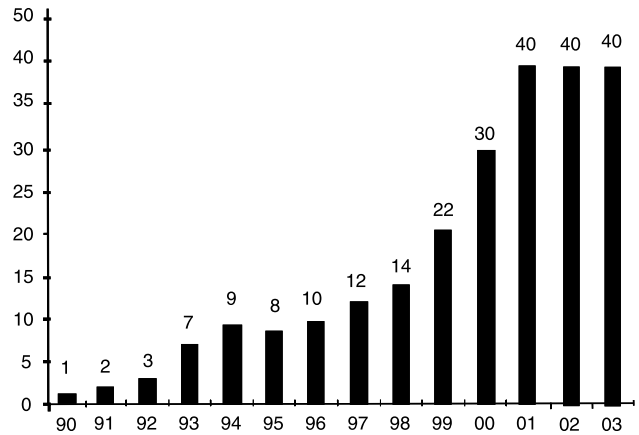


Fig. 1. Evolution of the number of centers performing living donor liver transplantation in Europe, 1990–2003. (European Liver Transplant Registry).

donor medical contra-indications such as cumulative comorbidities, age, obesity and psychosocial reasons [10–12]. After further detailed evaluation of those living donors who appear to be initially suitable, stringent exclusion criteria based on liver anatomy, degree of hepatic steatosis and graft volume size, only 11–45% eventually proceed with liver donation [4,10–13] (see previous article by HP Tan, K Patel-Tom, and A Marcos in this forum). In other examples of how social acceptance of LDLT and availability of DD organs can impact to some extent on the degree to which donor restrictions apply, Morimoto et al. evaluated 135 patients for living donation and only 11% of cases were rejected, whereas Renz et al. describe an acceptance rate of 13% of the 75 potential donors who underwent evaluation in their institution. Other liver transplant centers have published acceptance rates ranging between these two extremes, generally ~30% [4,10–14].

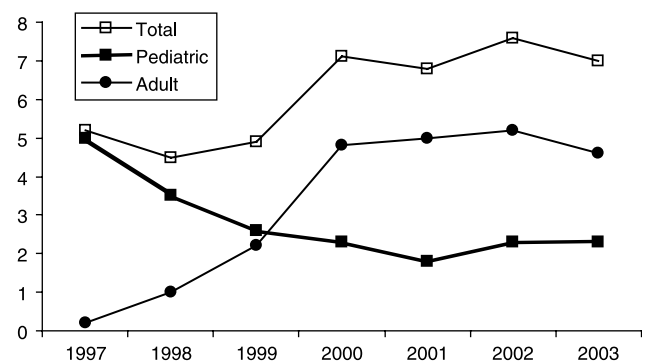


Fig. 2. Average number of LDLT per center in Europe, 1997–2003 (European Liver Transplant Registry). No data available in the UNOS registry website (USA).

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