# Status of Adult Living Donor Liver Transplantation in the United States



# Results from the Adult-To-Adult Living Donor Liver Transplantation Cohort Study

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#### **KEYWORDS**

• Adult living donor liver transplantation • Cohort study • Acute liver failure

#### **KEY POINTS**

- The number of adult-to-adult living donor liver transplants (ALDLT) is consistently increasing.
- Living donor liver transplantation (LDLT) has an important benefit for patients with acute liver failure, without compromising donor safety.
- Lower rates of acute cellular rejection can be found after LDLT in biologically related donor and recipient.

#### INTRODUCTION

The first adult-to-adult living donor liver transplant (ALDLT) in the United States was reported in 1998<sup>1</sup> as a response to the shortage of organ donors. Since then, ALDLT has been performed in more than 4500 patients in 89 centers across the United States. Although it remains a small percentage of total transplants, there has been a steady increase in ALDLT over the past 5 years (Fig. 1). This growth has been slow in coming to the United States. Initial reports were mainly single-center experiences, limiting the applicability of ALDLT. In 2002, the Adult-to-Adult Living Donor Liver Transplant Cohort Study (A2ALL) was launched, with funding mainly by the National Institutes of Health. The A2ALL was the first multicenter consortium aimed at providing accurate information on outcomes for both donors and recipients of ALDLT. Nine North American

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#### Adult LD tx Pediatric LD Tx — Total tx 400 8000 7000 350 300 6000 Number of LD transplants 250 5000 number 200 4000 of transp 150 3000 2000 100 50 1000 0 2013 2014 2011

#### Liver Transplant Volumes – Living Donor and Total Liver Transplants

**Fig. 1.** Annual number of adult-to-adult and adult-to-pediatric living donor liver transplants, and total number of liver transplants in the United States from 2005 to 2016. Adult LD tx, adult-to-adult living donor liver transplant; Pediatric LD Tx, pediatric living donor liver transplant; Total tx, total number of liver transplants.

Transplant year

liver transplant centers comprised the first A2ALL consortium, initiating retrospective and prospective studies with donor and recipient outcomes over a decade (1998–2008). In 2009, the study was continued as 3 new centers joined the renewed study with additional funding from the National Institutes of Health (see Acknowledgments).

### The Adult-to-Adult Living Donor Liver Transplant Cohort Study Database and Publications

The A2ALL study was carried out in 2 phases: A2ALL-1 enrolled potential liver donors and recipients evaluated for ALDLT between January 1, 1998, and August 31, 2009, and A2ALL-2 enrolled ALDLT donors and recipients who received transplant between September 1, 2009, and January 31, 2014, or were previously enrolled in A2ALL-1. Before February 28, 2003, data were collected retrospectively (retrospective cohort), and prospective data collection started thereafter (prospective cohort). In total, data from 2742 donors and 2182 recipients were collected for A2ALL, including the main study and numerous ancillary and substudies. The first publication from the consortium was in 2005. Since then, 41 articles have been published. The entire A2ALL list of publications is shown at this link: https://www.nih-a2all.org/publications.aspx.

Gillespie and colleagues<sup>2</sup> compared Scientific Registry of Transplant Recipients (SRTR) data with data from the A2LL and found that most submitted Organ Procurement and Transplant Network (OPTN)/SRTR data were consistent with the A2ALL, demonstrating the accuracy of the A2ALL database in comparison with the OPTN/SRTR database.

#### Initial Landmark Findings of the Adult-to-Adult Living Donor Liver Transplant Cohort Study

The first publication to come out of the A2ALL retrospective data examined postoperative outcomes of 385 ALDLT recipients. A primary finding was the identification of a

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