INTRODUCTION

Organ scarcity remains one of the chief concerns for patients waiting for a liver transplant (LT).1 By the end of 2018, 11.8% of the adults listed for LT in 2015 had died, and 10.1% were still waiting for a transplant at the end of the year.2 In the pediatric population, 4.7% of the

Anonymous Living Liver Donation: Literature Review and Case Series Report

Sarah Shan, BA,1 Paola Vargas, MD,2 Jakob Durden, BA,1 Tara Seay, RN, RN,2 Tessa Williams, RN,2 Emily Lyster, SW,2 AnitaSites, NP,2 Patrick Northup, MD,3 Shawn Pelletier, MD,2 Jose Oberholzer, MD,2 Curtis Argo, MD,3 and Nicolas Goldaracena, MD2

Background. Anonymous living liver donations (ALLDs) raise ethical concerns regarding the donors’ motivations. Thus, ALLDs are not as widely accepted as directed donations from friends and family. Literature on ALLDs is limited. Understanding this particular group of individuals is crucial, as they could further help mitigate the shortage of liver grafts worldwide. Methods. A literature review was performed to identify current definitions, ethical considerations, different approaches, and barriers to ALLD worldwide. Furthermore, we present our current experience after the establishment of a protocol to enable an ALLD program in our center and surveyed potential donors to better understand their motives throughout the process. Results. Literature regarding ALLD is scarce. Canada leads the experience with the majority of case reports published to date. Survey-based evaluation of this unique group of individuals reflects the selflessness nature of anonymous living donors and shows that most of them experience the donation as a positive and life-changing event. In our experience, 41 individuals initiated the process of ALLD during the study period. Most were lost to follow-up or deemed ineligible. Five candidates fully completed the donation process and successfully underwent living liver donation. Given that 2 candidates have a follow-up period <3 mo from donation, we have only included data on the first 3 donors in this analysis. Eight individuals (19.5%) responded to the survey with respondents sharing similar reasons for initiating ALLD but varied and multifactorial reasons for terminating. Conclusions. Different institutional protocols can be used to accomplish ALLD, including the one utilized by our institution. Adopting policies to allow for ALLDs and reducing modifiable factors that contribute to ending donation has the potential to increase grafts and decrease wait times.

Supplemental Visual Abstract: http://links.lww.com/TP/C251

(Transplantation Direct 2021;7: e726; doi: 10.1097/TXD.0000000000001181. Published online 16 July, 2021.)
children listed in 2015 had died by the end of 2018, and 7.3% of the children were still waiting for an LT. Living liver donations (LLD) from friends and family have marginally compensated for the gap between the number of people waiting for a liver and the number of available livers from deceased donors.

As of February 28, 2021, national LT data from the Organ Procurement and Transplantation Network show that the number of anonymous living liver donations (ALLDs) has also been increasing in recent years. Since the initial identification of living donors as nondirected (nonbiological, unrelated: Anonymous donation) in 2002, >80% of the total reported 184 anonymous living liver donors have been performed in the last decade. This growing number of ALLDs—defined as directed or nondirected donations from a member of the community whose identity is unknown to the recipient at the time of donation—could further help mitigate the shortage of liver grafts in the United States and around the world. However, the motivations behind these donors’ decisions to accept the surgical and psychological risks associated with LLD for complete strangers have raised ethical concerns.

To avoid the ethical concerns associated with ALLDs, many centers require a biologic or emotional connection to the recipient. Others have established thorough protocols for handling these concerns, although the protocols differ greatly among institutions. In this article, we will provide a literature review on the various institutional protocols used in ALLDs and barriers to this approach. In addition, we present the University of Virginia’s own experience with our ALLD program and report survey results on the experiences of all potential anonymous donors throughout the donation process.

**Literature Review**

A literature review was performed using PubMed database to identify relevant English- and Spanish-language articles published up to September 30, 2020. Search words included anonymous living liver donation, altruistic liver donation, and Good Samaritan liver donation in both languages. The review of the available literature for centers with ALLD protocols and experiences yielded publications from only 3 institutions: University of Toronto, Washington University Medical Center (WUMC), and Hôpital Saint-Luc in Brussels, Belgium. The compiled data revealed a total of 53 reported cases, with a similar distribution in the gender of ALLDs (26 males and 27 females), more pediatric recipients (30, 56.6%) than adult recipients (23, 43.3%), and more male recipients (32, 60.3%) than female recipients (21, 39.6%). A summary of the available literature regarding experiences with ALLD can be found in Table S1, SDC, http://links.lww.com/TXD/A342.

**Anonymous Living Liver Donor Types and Definitions**

As previously reported, an ALLD is a member of the community who volunteers to donate a portion of their liver to a recipient with whom they had no biologic connection or prior relationship. In the published literature, several terms have been used to refer to these donors. Among those are the following: “nondirected,” “Good Samaritan,” “altruistic,” “unspecified,” and “community donors.” The Organ Procurement and Transplantation Network/UNOS Ethics Board Report indicate that the terms “anonymous,” “unspecified,” and “community donors” alternate with “nondirected” and are found to be neutral terms. On the contrary, the terms “Good Samaritan” and “altruistic donors” imply some sort of moral value as compared to directed donation, in which the recipient is an individual specified by the donor.

Despite these definitions, the terms “anonymous” and “altruistic” have been used interchangeably in the context of living organ donors who pledge to maintain anonymity before transplant. However, all living donors exhibit altruism by risking their own health to donate their organs. Consequently, at our program, we—like others who have previously described—choose to use the term “anonymous” because we feel it more accurately reflects the distinction between donors whose identities are known to their recipients versus those whose identities are unknown.

It is important to highlight that anonymous donors can be directed and nondirected, considering that for anonymity to take place one or both parties need to be unaware of the identity of the other. Some programs do not include directed donations in their definition of anonymous donation. We include directed donations in our definition as long as the donor is biologically unrelated to the recipient and the donor identity is unknown to the recipient at the time of donation.

**Ethical Considerations**

Ethical considerations in living donor transplantation have been vastly explored in the past, predominantly for living kidney donation. However, data on ethical considerations around living liver donation are scarce. The risk/benefit ratio as the main concern in living donor transplantations remains true for ALLDs. However, narratives from ALLDs have shown that the anonymous donation process could be as rewarding as if directed to a relative.

Diversity in religions, policies, and legislations among countries makes it difficult to develop international guidelines to better evaluate the ethical challenges with ALLDs. Therefore, providing a standardized approach for ALLD is difficult. Application of moral theories such as the Smith’s theory of Moral Sentiments to understand the ethics among these individuals could represent a helpful tool for the evaluation process to better identify potential ethical misconducts and minimize the risk of unethical practices, as proposed by Khetpal et al. The Smith’s theory proposes that individuals sympathize with others on a constant basis, seeking approval. Assessing ALLDs within their spectrum of sympathy and determining the degree of altruism expressed by the individual, ranging from altruism to egoism, could help to better select these donors and minimize the ethical burden to the transplant team implicit in the process.

**Donor’s Motivations**

Among the centers performing ALLD worldwide, donors’ motivations appear to be similar. The University of Toronto transplant program has been performing ALLDs since 2005 when an individual in the community was motivated by a relative’s positive transplant experience to anonymously donate his liver. The program then went on to complete 50 ALLDs between the first donation in 2005 and May 2017—the largest reported dataset on ALLDs available in the literature to date. During that period, the program received more than 600 anonymous donor candidate applications, with 84% of those submitted in response to media appeals of various scales. Among the 50 candidates who completed donation, 34 (68%)
had a history of altruistic acts before the liver donation. Positive personal encounters with transplant recipients, a personal loss or just the willingness to help somebody in need are among the reported reasons to donate within this cohort. Similarity, in Belgium, the program at the Hôpital Saint-Luc initiated when they were approached by an individual who was motivated to donate after a relative died while awaiting a transplant.

Based on the Smithian approach, the motives why some individuals might pursue ALLD could be explained by an emotional response to an initial exposure (ie, loss of a relative on the transplant waiting list, social media advertising for someone needing a transplant), which results in incorporation of feelings of sorrow and social duty. In this approach, the individual contemplates these feelings as an “impartial spectator” and evaluates the risks and benefits of undergoing such a vast procedure. Ultimately, the deliberation between those emotions and the sense of social duty to ease that burden translates into the decision of becoming a living donor.

### Standard Evaluation

An exhaustive donor evaluation is needed when faced with ALLDs. The University of Toronto transplant program developed a donor-centric, expertise-based, and multidisciplinary approach. With this method, when evaluating a candidate, the transplant team follows a collaborative decision that complies with national regulations as well as expert opinion on overall clinical risks. A thorough medical and surgical assessment, as well as a detailed evaluation by social work and psychiatry are performed to ensure the candidate’s mental health, motivation, social independence, willingness to comply with the center’s ethics policies and support system.

In 2006, Jendrisak et al reported the protocol used at WUMC. The program, named Second Chance at St. Louis, was developed within their regional organ procurement organization to allow evaluation of individuals interested in ALLD or anonymous living kidney donation (ALKD).

The donor evaluation, similarly to the University of Toronto protocol, consisted on a comprehensive, multidisciplinary evaluation of each candidate. The 6-phase protocol included complete medical and social history evaluation, psychometric testing, and the possibility to choose the transplant center for care, or to be directed to the center with greatest need if no preference was given. Their protocol ensured that a complete evaluation was performed, and in case of failure to complete any phase, the program assumed that the candidate was no longer interested in pursuing donation and no further contact was made. In a 30-mo period between 2002 and 2004, the program had 731 inquiries for ALLD or ALKD. One ALLD was performed during this time from a male donor to a female pediatric recipient. Three ALLD candidates were declined by the transplant centers due to a lack of need but were reevaluated for ALKD.

Like the other 2 programs, Hôpital Saint-Luc required a thorough psychological evaluation for their anonymous donor. Their protocol highly pursues the donor well-being by implementing policies such as graft restriction, provision of university-contracted, free life insurance, and assistance with health insurance. The approaches they used can help alleviate some of the financial burdens that may arise from the generous act of ALLD.

Differences and similarities in the evaluation process and protocols among centers are summarized in Table 1.

### Contraindications

To date, there is no consensus regarding potential contraindications related specifically to ALLD. However, it is clear that donor safety is the main priority, and therefore, contraindications for ALLDs should follow all established selection criteria for living liver donation regardless of donor anonymity. Local policies from designated transplant organizations apply for each particular center and country.

### Selection of Graft Type to Donate and Recipients

Selection of the graft type to donate and the donor’s ability to choose which graft to donate is a topic of debate among centers performing ALLDs. The University of Toronto follows a very versatile approach. When evaluating anonymous directed donors, allocation to their intended recipients was done if suitability for the specific recipient was met. If they were not suitable, the center offered the possibility to donate to another recipient. For the nondirected anonymous donors, the protocol permits donors to choose whether they would like to donate to a child or an adult. However, they recommended donating the left lateral segment (LLS) as the first option due to the lower risks when compared with donation of a full left or right lobe graft. If the donor informed preference to donate to an adult, the center respected the donor’s autonomy. Recipient selection was made by the transplant hepatology team based on priority of medical need. Given this choice, 28 (56%) donors donated to pediatric recipients and 22 (44%) to adult recipients. Out of the 50 donors, 24 (48%) donated the LLS, 21 (42%) donated the right lobe, and 5 (10%) donated the left lobe.

In this regards, the protocol at Hôpital Saint-Luc in Brussels limited the procurement to the LLS to a small size recipient to achieve graft weight/recipient weight ratio >1% and a graft volume/standard volume ratio >40%. Similarly, the WUMC in their case series report including 1 ALLD, described the donation of the LLS from a 35-y-old male to a 11-mo-old girl.

Although no consensus is available considering recipient selection of a graft from an ALLD, the preferred allocation is for a pediatric recipient fulfilling standardized criteria for living donation, such as blood group compatibility, waitlist priority, and anatomic compatibility. In addition, the transplant centers must provide documentation on how the graft is placed and the rationale behind it.

### Follow-up and Donor–Recipient Contact

Follow-up of ALLDs must be strict and carefully performed in a multidisciplinary fashion to ensure overall well-being following donation as established for directed living donors. Decision to facilitate a meeting between donor and recipients varies among the available literature. From the donors’ perspective, it has been reported that meeting their recipients brings overall positive feeling to the donor, as well as creation of long-lasting relationships between the donor and the recipients and their families. However, detrimental impact to donors and recipients, when faced with negative outcomes, has also been reported.

At the University of Toronto, to maintain equivalence with Canada’s legal requirements for anonymity with deceased
donations and given reported concerns from donors, anonymity on both parties was maintained during the entire donation process. The donors were informed about the immediate posttransplant condition of the recipient. The program does not engage in donor–recipient disclosure, and as an alternative, offered to facilitate contact through a brief card or letter without identifying information. Although the center no longer facilitates meetings between the donor and recipient, as reported at the initial experience, some have done so by their own initiatives using social media.3,15

Likewise, the WUMC maintain anonymity during the preoperative, inpatient, and postoperative period. At 3-mo postdonation, the program provides the donor and recipient the option for meeting with each other if both parties agreed. At their kidney-liver series, 3/7 recipients met their donors, reporting it as a needed and positive experience. The remaining donors–recipients elected to remain anonymous but asked for feedback on the well-being of the counterpart.12

Public Acceptance of Anonymous Living Donation

Published studies derived from the International Collaborative Project about Living Liver Donation developed by Rios et al provide a good insight in regards to attitudes toward living donation among nonmedical personnel as well as medical professionals in Spanish and Latin American hospitals.19–21 Among 2618 nonmedical professionals participants, 31% (n = 804) were in favor of unrelated living donation, being the majority from Latin America.19 Their results show higher acceptance rates when compared with other publications (31% versus 13%) also evaluating hospital personnel. In their survey, Liu et al found a positive relation between being involved in voluntary prosocial activities and positive related attitudes toward living liver donation.22

When evaluating the attitudes toward organ donation among resident physicians, Rios et al found that only 19% of the surveyed residents (n = 171) were in favor of anonymous living liver donation; however, when donation was from related individuals, acceptance levels were up to 85%.21 A favorable position from healthcare workers (medical and nonmedical) is vital to create an environment of information, avoid confusion and misinformation among those who may want to be part of the ALLD process. It is common for people to look up to hospital personnel for advice and credibility, and it is our duty to respond to those questions with knowledge and evidence-based points of view.

From this review of the literature, it is clear that different approaches to ALLD can be used to achieve successful donation. Some protocols give the donors more choice in deciding which section of their liver they would like to donate, whereas others limit it to the LLS. Methods of coordination and rules for postdonation, donor-and-recipient meetings also differ. The major commonality between the programs is the use of psychological evaluation to assess donor motives. Despite the difference in methods, these ALLD programs have created systems to increase the number of liver grafts and help reduce the strain on the LT waiting list. Table S1, SDC, http://links.lww.com/TXD/A342, depicts the available literature regarding experiences with ALLD.

University of Virginia, Program Development and Case Reports

Standard Evaluation

The anonymous donor selection process at the University of Virginia is similar to that of other institutions.3 Our ALLD screening follows the same protocol we use for screening directed liver donation candidates with one exception: ALLDs must be evaluated by a neuropsychologist after the standard psychosocial prescreening by a Licensed Clinical Social Worker. To briefly outline the selection process, potential donors that initiate contact with our LLD transplant coordinator are first provided with an information packet, agreement form, and increased risk behavior screening worksheet. Those that complete and return the necessary forms are then
referred for medical and psychosocial evaluations carried out by a team consisting of a family medicine physician and hepatologist, transplant surgeon, LLD transplant coordinator, living donor advocate, social worker, nutritionist, and pharmacist. Appropriate laboratory tests and imaging (ie, MRI and CT scans) are performed during the evaluation. The team also provides comprehensive education on medical and psychosocial risks associated with the surgery. At this time, if the donor has been approved by the team, the team selects a potential living donor recipient for nondirected anonymous donations. All LDs are then given a minimum of 10 d for an “inactivity” period before surgery to provide the donor space to reflect, reinforce, or reconsider their decision to donate by their own means.

During the study period, 41 individuals were referred to the University of Virginia LDLT program to initiate the process of ALLD. Of these, 15 (37.5%) individuals were ineligible at the time of the call (Table 2). Twelve (29.2%) individuals returned the agreement of understanding after the initial referral process, of which 9 (22.0%) completed the necessary medical and psychosocial assessments. The transplant team declined 3 potential candidates due to surgical incompatibility of their liver anatomies and one due to psychosocial reasons. One candidate was lost to follow-up after clinic evaluation, and another was deferred due to a lack of compatible recipients at our institution.

Selection of Graft Type to Donation and Recipient Selection
At our institution, the donor may undergo a right lobe hepatectomy, left lobe hepatectomy, or LLS hepatectomy depending on the suitability of the donor anatomy and needs of the intended recipient.

Potential liver recipients are selected based on medical need, blood type compatibility and size match with the donor, lack of surgical contraindications for LD transplantation, and lack of other LD options. If multiple recipients meet these criteria, the recipient listed highest on the transplant list is given priority.

Donation Process, Follow-up
A total of 5 candidates fully completed the donation process and have successfully undergone LLD at our center. Given that 2 candidates have a follow-up period <3 mo from donation, we have only included data on the first 3 donors in this analysis. In addition, 2 others have been approved for donation, but because they have not donated yet, we have also not included them in this report.

Among the donors with >3 mo since donation, the 3 were females. Two of them donated the right lobe, whereas the other donor underwent a left hepatectomy. No blood transusions were needed intra- or postoperatively, and neither of the donors experienced any postoperative complications. Lengths of hospital stays were 6 and 4 d.

Following surgery and hospital discharge, the donor is seen back in the transplant clinic at 1 wk, 1 mo, 3 mo, 6 mo, 1 y, and 2 y postdonation. All patients undergo an MRI at their 3-mo visit to assess for adequate liver regeneration. The donors are also followed regularly by their Primary Care Physician throughout, and after, the transplant clinic follow-up period. In our cohort, 1 donor was able to return to work 22 d after donation and other within 28 d of donation. At the 3-mo follow-up, the 3 donors were doing well with no long-term problems encountered. None of the donors has reported any postdonation psychological distress. Of note, 2 donors have continued their involvement in the transplant community after ALLD with 1 donor on the bone marrow registry and the other successfully completing ALKD at another institution.

Recipient Contact
Three months after the transplant, the team gives the donor and recipient the option of connecting with the other individual. The Transplant Department can facilitate the contact, but both parties must agree upon the method of contact before any action is taken. Following the donation, 2 of the donors had some form of contact with their recipients—1 donor accepted a note from the recipient (delivered via the transplant team), and the other donor-and-recipient pair arranged a meeting with the help of the transplant team (Figure 1).

Donor Survey
All individuals meeting the inclusion criteria for this manuscript who initiated the process of becoming an ALLD at the University of Virginia by contacting our LLD transplant coordinator were invited to participate in a questionnaire regarding their motivations and experiences throughout the process. All participants were asked about how they heard about ALLDs, why they chose to become a liver donor, if they had a past history of performing other altruistic acts, and if they have remained active in the transplant community in any way. Those who did not complete the donation process were asked about the factors that contributed to their decision to refrain from donating. Those who completed the donation process were asked about barriers or challenges faced throughout the entire process, benefits they may have experienced from donating, and their motives in deciding whether to contact their liver recipient.

A total of 8 out of the 41 individuals that initiated ALLD at the University of Virginia at the time of preparation of this manuscript responded to our survey (19.5%). Six of the respondents did not complete the donation process, whereas 2 respondents successfully completed ALLD.

Initiation of Donation
Figure 2A shows the donors’ primary means of learning about ALLD. Although their sources of learning about ALLD were different, the motives for initiating the ALLD process were very similar among the respondents (Figure 2B). The most popular response, given by 5 individuals (62.5%), was that their desire to become a liver donor stemmed from “want[ing] to do something nice.”

| Cause of ineligibility                      | Number of potential donors |
|--------------------------------------------|-----------------------------|
| Presence of previous medical history        | 5                           |
| Presence of cardiovascular risk factors     | 4                           |
| Recent suicidal ideation/atempt (<5 y)     | 3                           |
| Recent kidney donation (<1 y)              | 2                           |
| Multiple abdominal surgeries               | 1                           |
History of Altruism

All respondents had a prior history of at least 1 altruistic act, though most reported more than 1 (Figure 2C). The most common altruistic act was donation of blood products, which 7 of the 8 respondents reported doing in the past.

Reason for Ending ALLD Evaluation Process

Reasons for terminating ALLD evaluation were varied among the respondents and some cited multiple considerations that factored into their decision (Figure 2D). Two potential donors were declined by the transplant team. One anonymous directed donor ended the evaluation process because he/she received word that the intended recipient was removed from the transplant waiting list. Another person cited a better understanding of the risks associated with donating as the reason for termination. One potential donor stated that he/she did not proceed with donation because he/she could not specify recipient characteristics and because of financial concerns surrounding donation. Financial concerns also influenced another potential donor, who reported that input from family and friends concerned about “the recovery and financial hit from missed work” contributed to his/her decision to cease ALLD evaluation.

Continued Involvement in Transplant Community

After either concluding ALLD evaluation or completing ALLD, 3 individuals report still being active in the transplant community, 1 person is on the bone marrow registry, and the other 2 continue to advocate for living donations either directly or through social media. Notably, all 3 of these individuals have completed anonymous living donation—whether liver or kidney. One individual said he/she is not currently active in the transplant community but would still be willing to donate his/her liver. Yet another reported being inactive at the time of response but is now considering living kidney donation after completion of ALLD.

Anonymous Living Liver Donor Experience

Table 3 shows the responses from 2 individuals who completed ALLD. Neither reported any regrets with the donation, and both affirmed they would donate again if they could.

DISCUSSION

It is well known that there is a significant liver graft shortage worldwide.7 This fact is well reflected by the length and high mortality rates of LT waiting lists.2,7 In this study, we described how we successfully screened 41 individuals who came forward as potential anonymous living liver donors and completed 3 ALLDs, thereby demonstrating the feasibility of an ALLD program. More candidates have been evaluated since the preparation of this article. Among those, 3 additional candidates already completed the donation process, however, they were not included in this article due to having a follow-up period <3 mo from donation.

Increasing ALLD programs has the potential to help increase liver grafts. However, many barriers still exist from the institutional, donor, and recipient perspectives. Identifying and addressing these barriers could have a tremendous impact on shortening the LT waiting list. Ethical concerns are one of the primary barriers to institutions establishing an ALLD program.5,10,12 Nonmaleficence is one of the basic principles of medical ethics, yet LLD, by definition, harms the donor for the benefit of the recipient. Thus, it is important to balance the risks and benefits in LLD. In applying this analysis to living organ donation, Ross et al argued that the donors who are morally intimate with their recipient should be allowed to assume greater risks than a stranger as increased intimacy begets increased duty and benefit. Thus, the author claims anonymous donors should not be allowed to assume the same risks because they do not get the benefit of saving the life of someone intimately related to them.10 However, in numerous studies, anonymous donors consistently report self-satisfaction or personal growth from their decision to become an anonymous donor.3,5,6,12 This is consistent with the report of 1 of our ALLDs who said they benefitted psychologically from “knowing someone else had another chance at life.” This demonstrates that anonymous donors do in fact receive some benefits in return for their donation, which mitigates one of the main ethical concerns that anonymous donors have an unbalanced risk-to-benefit ratio.

Lack of resources and logistical complexity may pose additional hurdles to healthcare systems establishing an
ALLD program. Evaluation policies, and therefore ALLD program complexity, can differ greatly among institutions. Some institutions require donors to undergo multiple screening processes, a “battery of psychosocial tests,” and series of interviews with the donor and their support system members. In contrast, our program only requires anonymous donors to undergo a neuropsychology evaluation on top of the evaluation process that all living donors experience. To ease the burden on a single institution, ALLD programs have also collaborated with their regional OPO. The OPO helps with the initial screening, education, and psychosocial evaluation of the patient and then coordinates transfer of the patient’s care to one of its affiliated transplant centers. Thus, the issue of ALLD program complexity can be addressed by utilizing simplified policies that experienced institutions have found successful or partnering with regional programs to reduce the burden placed on a single institution.

Establishing ALLD programs might have the potential to increase the liver donor pool, but barriers to completing the ALLD process persist. On the recipient end, a lack of insurance that adequately covers both the recipient and donor for the living donor surgery, follow-ups, and potential complications remains a challenge. This acts as an obstacle to a lifesaving transplant, especially for recipients that are at a financial disadvantage. Likewise, potential donors are also impacted by financial concerns associated with becoming an ALLD (eg, expenses for travel, meals, and lost wages). Our survey indicated that at least 2 donors (25% of responses) decided not to complete the donation process due to financial concerns. Aid programs like Ontario’s Transplant Patient Expense Reimbursement program, which helps partially cover the out-of-pocket expenses of donation, can help alleviate
TABLE 3.
Survey responses from two individuals who completed ALLD

| Survey question | Donor responses 1 | Donor responses 2 |
|-----------------|-------------------|-------------------|
| Did you experience any medical, psychological, or social barriers in your recovery process after donation? | “I had to stay in hospital an extra few days. It was hard being patient with giving myself time to heal and getting back to activities, but no regrets with donating.” | “Nausea and constipation.” |
| What was the biggest challenge you experienced throughout the entire donation process? | “Having to be patient with test results [throughout the evaluation] and then patience with the recovery.” | “Discovery of and treatment of TB exposure. COVID restricting spouse from visiting was emotional.” |
| What benefits, if any, have you experienced from donating a portion of your liver? (eg, psychological, social) | “Don’t think received much social benefits except through church, family, and family friends. Also psychologically benefited from knowing someone else had another chance at life.” | “Knowing that a family out there gets to have their loved one a little longer is most gratifying.” |
| Why did you or why did you not choose to meet with your liver recipient after the procedure was completed? | “I wanted to put a face and name to person who shares a body part. I would’ve been ok not knowing, too, but I wanted to see face to face.” | “My initial decision to donate was for a particular person, but due to a rapid decline in her health, she received another liver… it was a very stressful, emotional time for me, and I made the decision to just help someone without the emotions that come from “knowing” them.” |
| After having completed the living liver donation process and having had time to reflect on the process, would you donate again if you could? | “Yes” | “Yes” |

The individuals responded to inquiries about barriers, challenges, benefits, postdonation decision making, and reflections from their ALLD experience. Define ALLD, COVID, and TB in Table 3.

these concerns. Additionally, all health costs in Canada are covered by their single-payer healthcare system, and all patients—donors and recipients alike—are eligible for 3 mo of short-term disability benefits. This further helps ensure financial security for donors who are trying to perform a charitable act. In the United States, the Lost Wages Demonstration Project has taken a step in this direction by providing wage reimbursement for solid organ living donors. As a pilot program, although the project is currently limited to 7 institutions and is scheduled to end in January 2022. Additional programs and policies should be created—building upon this project and following the examples set by successful programs in Canada—to provide adequate financial assistance for the benevolent individuals who would like to become ALLDs. This aid could help allay the concerns of the potential donors and increase the number of individuals willing to come forward as an ALLD.

A lack of compatible recipients at a particular institution is another obstacle for ALLDs. During the study period, our program evaluated and subsequently declined/deferred 2 potential donors because their liver anatomies were not a suitable match for any potential recipients at our institution. These patients would likely still desire the opportunity to donate; this is supported by our survey results in which individuals who were declined by our program expressed disappointment and a continued willingness to donate if they were allowed to. This problem could be remedied by expanding the donation options for the potential donors. These individuals should be offered the opportunity to undergo ALKD evaluation if they desire. Alternatively, increased coordination between institutions could help create liver paired exchange programs such as those already implemented for kidney donation, particularly after a first successful experience in Canada. This would allow potential donors to complete their ALLD journey and allow institutions to more rapidly provide a liver to their patients in need. These coordinated efforts between anonymous organ donation programs could potentially help increase the donor pool.

Insufficient awareness about ALLD programs poses another hurdle for donation. Publicity for ALLD programs is currently lacking, leading to a dearth of public awareness about ALLD. According to our survey, 4/7 individuals learned about ALLD programs by actively searching for it themselves on the internet. Two others already knew about ALLD because they had anonymously donated a kidney. Only one person came across information about ALLD from social media. In contrast, more than two-thirds of donors who came forward for ALLD at the University of Toronto did so after learning about the need for organ donation via local, national, or social media. Without any media coverage or publicity campaigns, our program already saw more than 40 individuals who were interested in becoming ALLDs. With additional publicity and awareness (eg, through news, social media, billboards), this number could potentially increase dramatically.

There are some limitations to this study. First, as a retrospective study, donor outcomes and potential donor evaluation results were all dependent on proper provider documentation. Second, the survey results are susceptible to nonresponse bias. Only 8 of 41 (19.5%) individuals responded to the survey, meaning we do not know the motivations and experiences of the other 33 individuals. Consequently, we may be over- or underestimating the impact of certain factors that influenced potential donor decision-making throughout the evaluation process. Third, the limited number of publications on ALLD programs makes it difficult to draw conclusions and generalize them to the field of ALLD. The strengths of this study, though, are the presence of an established ALLD protocol in our institution that were consistently used to achieve successful donor evaluation, donor acceptance, recipient selection, donation, and follow-up. Our protocol and experience are currently growing and evolving. Implementation of a structured Living Donor Liver Transplant program at our center in the past years, as well as the training and recruiting of a dedicated team, is definitely helping the refinement of our practice and could be used as a reference for other transplant centers.
CONCLUSION

ALLD has the potential to save many lives by increasing the number of liver grafts and reducing liver transplant wait times. However, many liver transplant centers still do not accept ALLDs. Using our established protocols, our ALLD program has been successful in screening >40 potential donors and transplanting 5 anonymous living liver donors, thereby serving as one more example of an institution that has implemented policies to allow for this beneficial procedure. Our review revealed that institutional protocols can differ to suit the particular institution’s needs and still allow for successful ALLD. Lack of awareness about ALLD and financial concerns prevent individuals from coming forward to donate although. Adopting institutional policies to allow for ALLDs, creating financial aid programs for donors, and publicizing this information could significantly increase the number of individuals that come forward to anonymously donate their liver and save someone’s life.

REFERENCES

1. Bodzin AS, Baker TB. Liver transplantation today: where we are now and where we are going. Liver Transpl. 2018;24:1470–1475.
2. Kwong A, Kim WR, Lake Jr, et al. OPTN/SRTR 2018 annual data report: liver. Am J Transplant. 2019;20:193–299.
3. Goldaracena N, Jung J, Aravinthan AD, et al. Donor outcomes in anonymous live liver donation. J Hepatol. 2019;71:951–959.
4. Donors Recovered in the U.S. by Donor Type. Donors Recovered: January 1, 1988 - February 28, 2021. Organ Liver. OPTN website. Based on OPTN data as of March 23, 2021. Available at https://optn.transplant.hrsa.gov/data/view-data-reports/national-data/#. Accessed March 24, 2021.
5. Reese P, Gordon E. OPTN/UNOS Ethics Committee Report to the Board of Directors. Richmond, VA. 2015. Available at https://optn.transplant.hrsa.gov/media/1546/ethics_boardreport_20151201.pdf. Accessed March 24, 2021.
6. Wright L, Ross K, Abbey S, et al. Living anonymous liver donation: case report and ethical justification. Am J Transplant. 2007;7:1032–1035.
7. Jadlowiec CC, Taner T. Liver transplantation: current status and challenges. World J Gastroenterol. 2016;22:4438–4445.
8. Freeman RB Jr. The limits of altruism: selecting living donors. Virtual Mentor. 2012;14:272–277.
9. Moorlock G, Ives J, Draper H. Altruism in organ donation: an unnecessary requirement? J Med Ethics. 2014;40:134–138.
10. Ross LF, Glannon W, Josephson MA, et al. Should all living donors be treated equally? Transplantation. 2002;74:426.
11. Daar AS. Strangers, intimates, and altruism in organ donation. Transplantation. 2002;74:424–426.
12. Jendrisak MD, Hong B, Shenoy S, et al. Altruistic living donors: evaluation for nondirected kidney or liver donation. Am J Transplant. 2006;6:115–120.
13. Khetpal V, Moshallos E. An ethical appraisal of living-anonymous kidney donation using Adam Smith’s Theory of Moral Sentiments. Health Policy. 2018;122:1212–1221.
14. Jean-Bernard O. Good Samaritan liver donor in pediatric transplantation. Pediatr Transplant. 2009;13:155–159.
15. Reichman TW, Fox A, Adcock L, et al. Anonymous living liver donation: donor profiles and outcomes. Am J Transplant. 2010;10:2099–2104.
16. Organ Procurement and Transplantation Network. OPTN website. OPTN Policies Effective as of March 15, 2021. Available at https://optn.transplant.hrsa.gov/media/1200/optn_policies.pdf. Accessed March 24, 2021.
17. Ghent E, Robertson T, Young K, et al. The experiences of parents and caregiver(s) whose child received an organ from a living anonymous liver donor. Clin Transplant. 2019;33:e13667.
18. Bramstedt KA. What’s mine is yours: long-term experiences of good samaritan organ donors. J Patient Exp. 2018;5:16–20.
19. Rios A, López-Navaas A, Ayala-García MA, et al. Hospital-based multicenter study in Spain, Mexico and Cuba on attitudes to living liver donation. Gastroenterol HEPATOL. 2015;38:364–372.
20. Rios A, López-Navaas A, Ayala-García MA, et al. Attitudes of non-medical staff in hospitals in Spain, Mexico, Cuba and Costa Rica towards organ donation. Nefrologia. 2013;33:699–708.
21. Rios A, Conesa C, Ramirez P, et al; Redes Temáticas de Investigación Cooperativa: Estrategias para Optimizar los Resultados en Donación y Trasplante, Red CO3/03. Attitudes of resident doctors toward different types of organ donation in a Spanish transplant hospital. Transplant Proc. 2006;38:869–874.
22. Liu B, Liu S, Cui D, et al. The attitude toward living liver donation among the hospital personnel in a northeast China center with a liver transplant program. Transplant Proc. 2010;42:1460–1465.
23. Mishra A, Lo A, Lee GS, et al. Liver paired exchange: can the liver emulate the kidney? Liver Transpl. 2018;24:677–686.
24. Patel MS, Mohamed Z, Ghanekar A, et al. Living donor liver paired exchange: a North American first. Am J Transplant. 2021;21:400–404.