

Living donor liver transplantation could solve shortage of liver grafts in Greece

Nikolaos Machairas^{1,2}, Georgios C. Sotiropoulos²

¹Second Department of Propaedeutic Surgery, National and Kapodistrian University of Athens, Athens, Greece,

²Department of Liver Transplantation and Liver Surgery, National and Kapodistrian University of Athens, Athens, Greece

ABSTRACT

Organ shortage remains a major challenge in Greece, with low deceased donor rates limiting liver transplantation options. Living Donor Liver Transplantation (LDLT) offers a viable alternative, reducing waiting times, improving graft quality, and enabling elective scheduling. While LDLT introduces risks to donors, stringent medical and ethical evaluations mitigate these concerns. The successful completion of initial LDLT cases in Greece demonstrates its potential to address graft shortages. This article highlights the advantages, challenges, and future prospects of LDLT, advocating for its broader adoption as a transformative solution for liver transplantation in Greece.

Key Words: *Living donor; liver transplantation; Greece; organ shortage; donation*

Organ shortage, especially for liver transplants, remains a major worldwide health problem [1]. With increasingly high demand on one hand and limited availability of deceased donor organs on the other, patients commonly experience protracted waiting times, which in turn negatively impact both their survival and quality of life. Living Donor Liver Transplantation (LDLT), first performed in 1989, represents a significant alternative to deceased donor transplantation, which represents the principal source of liver grafts in the Western world [2,3]. By utilizing liver segments from selected living individuals, LDLT offers a potential solution to this major issue. In Greece, deceased donation suggests the only source of graft, whilst unfortunately, deceased donor rates remain low [4]. At this point, the establishment and development of LDLT programs could revolutionise the landscape of liver

transplantation, potentially reducing waiting lists and improving Greek patient outcomes.

During LDLT, an adequate portion of a healthy liver from a living donor is transplanted to a compatible recipient with end-stage liver disease [5]. One of the crucial advantages of this approach is that it significantly reduces waiting times, as the procedure can be scheduled electively [6]. This flexibility allows for optimal timing of the surgery, which can be decisive for patients whose health may otherwise significantly deteriorate while awaiting a suitable organ from a deceased donor [6,7]. Minimisation of the cold ischaemia time is another advantage of LDLT, which can further improve graft function and reduce post-transplant complications. For Greece, where the number of deceased donors remains largely inadequate, LDLT offers a significant benefit in terms of scheduling and quality of grafts. Livers from selected living donors are generally healthier, as donors undergo extensive medical evaluations to ensure the absence of liver diseases or other contraindications. Consequently, good quality grafts from healthy living donors tend to demonstrate better post-transplant function hence primary graft non-function ratings are reduced contrary to deceased donor grafts, especially those from marginal or extended criteria donors [8].

Corresponding author:

Nikolaos Machairas MD, PhD, FACS
Second Department of Propaedeutic Surgery
General Hospital of Athens "Laiko"
Ag. Thoma 17, 11527, Athens, Greece
e-mail: nmachair@med.uoa.gr

Submission: 16.10.2024, Acceptance: 29.12.2024

LDLT indeed offers numerous benefits, yet it also introduces major risks, particularly concerning the safety and well-being of the healthy individual who serves as the donor. Potential complications from LDLT include bile leaks, bleeding, infections, and, in rare cases, life-threatening issues [5]. The possibility of complications, as in any other major surgical procedure, highlights the importance of thorough medical evaluations and informed consent processes to ensure that healthy donors fully comprehend the risks involved. Notably, according to established guidelines the live donor risk includes a benchmark 0% mortality and <5% major morbidity rate [9].

Despite the increasing number of liver transplants being performed in Greece over the past years, the demand has consistently exceeded supply. This has been the result of several cultural, religious, and educational factors not adequately addressed by the Greek state [4]. Notwithstanding, some efforts to raise awareness about the importance of organ donation, Greece continues to hold one of the lowest deceased donor rates in the European Union [10]. Greece could effectively mitigate the current shortage of liver grafts by encouraging the development and acceptance of living donation programs. Most importantly, the successful performance of the first two LDLT procedures in Greece in early 2024 was a promising step towards establishing LDLT as a standard practice in the country.

Ethical considerations also play a pivotal role in the decision to proceed with LDLT. The procedure involves a healthy individual undergoing surgery for the benefit of another, which raises concerns about potential coercion and the ethical implications of subjecting a person to potential risks without direct medical benefit. To address these concerns, LDLT programs in Greece and elsewhere implement rigorous protocols for evaluating donors, including psychological assessments and independent donor advocacy, ensuring that donors make informed and voluntary decisions.

In Greece, the successful completion of the first 2 LDLT cases provides a proof of concept that could pave the way for future procedures. As LDLT becomes more common, the experience gained by Greek transplant teams will likely lead to improved surgical techniques, better post-operative care, and enhanced overall outcomes for both donors and recipients. Nonetheless, for LDLT to become a sustainable and effective solution to Greece's organ shortage, a supportive framework is mandatory [10]. This includes training and resources for transplant teams, as well as public education initiatives to raise awareness about the benefits and risks of living donation. Moreover, Greece could benefit from partnerships with other countries that hold well-established and efficient

LDLT programs to help the exchange of knowledge and the adoption of best practices. At this point, developing a culture of living donation demands for addressing public concerns and dispelling myths about organ donation is of paramount importance. The Greek Transplant Organization in conjunction with the Ministry of Education and the Ministry of Health need to promote educational campaigns that highlight the success stories of LDLT recipients and donors, emphasizing the life-saving potential of living donation. Additionally, efforts to streamline the legal and administrative aspects of LDLT will be essential to make the process more accessible and efficient.

Establishment and dissemination of LDLT represents a significant opportunity to address the ongoing organ shortage in Greece. We firmly believe that LDLT, as a safe and efficient alternative to deceased donor transplants, can reduce waiting times, improve patient outcomes, and foster a new culture of living donation. By building a robust LDLT framework and encouraging public acceptance, Greece can and needs to take meaningful steps toward overcoming its organ donation challenges and improving the lives of countless individuals in need of a liver graft. This effort, however, will not be fruitful if it is not collective, and all included parties need to work consistently and be fully aware of the benefits and challenges of LDLT.

Conflict of interest: *None*

REFERENCES

1. Lewis A, Koukoura A, Tsianos GI, Gargavanis AA, Nielsen AA, Vassiliadis E. Organ donation in the US and Europe: The supply vs demand imbalance. *Transplant Rev (Orlando)*. 2021;35(2):100585.
2. Strong RW, Lynch SV, Ong TH, Matsunami H, Koido Y, Balderson GA. Successful liver transplantation from a living donor to her son. *N Engl J Med*. 1990 May;322(21):1505-7.
3. Chan SC, Fan ST. Historical perspective of living donor liver transplantation. *World J Gastroenterol*. 2008 Jan;14(1):15-21.
4. Sotiropoulos GC, Machairas N. Organ donation during the financial crisis in Greece. *Lancet*. 2016 Sep;388(10048):957-8.
5. Hecht EM, Kambadakone A, Griesemer AD, Fowler KJ, Wang ZJ, Heimbach JK, et al. Living donor liver transplantation: Overview, imaging technique, and diagnostic considerations. *AJR Am J Roentgenol*. 2019 Jul;213(1):54-64.
6. Fisher RA. Living donor liver transplantation: Eliminating the wait for death in end-stage liver disease? *Nat Rev Gastroenterol Hepatol*. 2017 Jun;14(6):373-82.
7. Jackson WE, Malamon JS, Kaplan B, Saben JL, Schold JD, Pomposelli JJ, et al. Survival benefit of living-donor liver transplant. *JAMA Surg*. 2022 Oct;157(10):926-32.
8. Freise CE, Gillespie BW, Koffron AJ, Lok AS, Pruett TL, Emond JC, et al. Recipient morbidity after living and deceased donor liver transplantation: Findings from the

Living donor liver transplantation (LDLT) could solve shortage of liver grafts in Greece

- A2ALL Retrospective Cohort Study. *Am J Transplant*. 2008 Dec;8(12):2569-79.
9. Mehta N, Bhangui P, Yao FY, Mazzaferro V, Toso C, Akamatsu N, et al. Liver transplantation for hepatocellular carcinoma. Working Group Report from the ILTS Transplant Oncology Consensus Conference. *Transplantation*. 2020 Jun;104(6):1136-42.
10. Johnston-Webber C, Prionas A, Wharton G, Streit S, Mah J, Boletis I, et al. The National Organ Donation and Transplantation Program in Greece: Gap Analysis and Recommendations for Change. *Transpl Int*. 2023 May 25;36:11013.