

Simultaneous Liver-Kidney Transplantation Following Standardized Medical Eligibility Criteria and Creation of the Safety Net: Less Appears to Be More

SEE ARTICLE ON PAGE 1106

Renal dysfunction is common among liver transplantation (LT) candidates and can present in various phenotypes. Approximately 10% of LT candidates undergo simultaneous liver-kidney transplantation (SLKT), although the majority of SLKT recipients that underwent transplantation prior to August 2017 have been found to develop recurrent renal dysfunction. According to a recent multicenter observational study, after a median follow-up of 5 years following transplantation, at least two-thirds of SLKT recipients developed stage 3 chronic kidney disease and one-fifth had advanced chronic kidney disease.⁽¹⁾ These outcomes demonstrate the challenges in appropriate selection of SLKT candidates as well as complexities in preserving renal function after transplantation.

Abbreviations: eGFR, estimated glomerular filtration rate; KALT, kidney after liver transplantation; LT, liver transplantation; OPTN, Organ Procurement and Transplantation Network; SLKT, simultaneous liver-kidney transplantation; UNOS, United Network for Organ Sharing.

Address reprint requests to Pratima Sharma, M.D., M.S., Division of Gastroenterology and Hepatology, Michigan Medicine, University of Michigan, 3912 Taubman Center, 1500, E Medical Center Dr., Ann Arbor, MI 48109. Telephone: 734-615-8468; FAX: 734-763-4574; E-mail: pratimas@med.umich.edu

Received May 25, 2021; accepted May 26, 2021.

Copyright © 2021 by the American Association for the Study of Liver Diseases.

View this article online at wileyonlinelibrary.com.

DOI 10.1002/lt.26182

Potential conflict of interest: Nothing to report.

Prior to 2017, SLKT utilization was highly variable among transplantation centers because of lack of consensus on medical eligibility criteria.⁽²⁾ This led to increased utilization of SLKT even among candidates for whom potential recovery of renal function after LT alone was plausible.⁽³⁾ Because of the lack of specific policy addressing SLKT medical eligibility and inconsistencies in allocation such as regional sharing of deceased donor renal grafts to SLKT candidates, the Organ Procurement and Transplantation Network (OPTN) and the United Network for Organ Sharing (UNOS) organized a consensus committee to address the allocation of organs to individuals with end-stage liver disease and renal dysfunction. This group developed a revised SLKT policy, which was based on data review, discussion, and deliberation, and was implemented on August 10, 2017.⁽⁴⁾ The current SLKT allocation policy includes standardized medical eligibility criteria. In addition, given the difficulty in predicting renal recovery among patients undergoing LT alone, the policy created the option of a “safety net,” which promotes LT alone by conferring priority for kidney after liver transplantation (KALT) in patients without renal recovery within 1 year of LT.⁽⁵⁾ Data demonstrating the impact of this 2017 OPTN/UNOS policy change on SLKT utilization and outcomes are now emerging.

In this issue of *Liver Transplantation*, Samoylova and colleagues⁽⁶⁾ investigated the impact of this 2017 policy change on utilization of SLKT and KALT. Using data from UNOS Standard Transplant Analysis and Research files, the authors examined the outcomes of 6332 adult SLKT recipients from 2007 to 2019. They divided the SLKT recipients into 3 temporal cohorts based on timing of transplantation before and after the 2017 policy change (2007-2012,

2012-2017, and 2017-2019). An additional cohort of 198 KALT recipients was evaluated separately to examine the utilization of KALT prepolicy and postpolicy change.

This authors' findings suggest that the 2017 policy change has succeeded in establishing a more directed utilization of renal grafts for SLKT as intended. Although there was no significant change in the overall rate of SLKT over time, a reduction in SLKT utilization in patients with estimated glomerular filtration rate (eGFR) >30 mL/min was seen. The median eGFR for those who were not on dialysis was significantly lower compared with prepolicy cohorts. Moreover, there was greater uniformity in medical eligibility criteria and decreased variability of eGFR at the time of SLKT following the 2017 policy change. The utilization of the safety net among LT alone recipients with end-stage renal disease led to KALT rates more than 2-fold higher than in the prepolicy cohorts.

Given the ever-growing utilization of LT for patients with nonalcoholic steatohepatitis and associated metabolic comorbidities contributing to renal dysfunction, there has been growing anticipation among the transplant community of the need for greater utilization of SLKT due to the nonalcoholic fatty liver disease epidemic. Samoylova and colleagues confirmed the highest increased proportion of SLKT among patients with nonalcoholic steatohepatitis over time while the proportion of patients with a primary diagnosis of viral hepatitis decreased. Recent examination of granular data from the United States Simultaneous Liver-Kidney Transplantation Consortium showed similar trends in changing demographics and etiology of liver disease.⁽⁷⁾


There had been concern that the 2017 policy change could result in a posttransplantation survival decrement;⁽⁸⁾ however, Samoylova and colleagues showed similar survival after SLKT between the prepolicy and postpolicy cohorts, refuting such concerns.⁽⁶⁾ The coupling of increased KALT utilization with noninferior posttransplantation survival demonstrated in this study further supports the efficacy of the safety net for patients with post-LT renal dysfunction.^(9,10)

While the findings of this study are reassuring, it is important to note that several questions remained unanswered. To begin with, the authors used conservative criteria to define renal dysfunction among actively listed or transplanted patients. While this method was performed to reflect patients that "may reasonably receive" SLKT or KALT and simulate the 2017 SLKT allocation

policy criteria, it may have inadvertently captured some patients either not intended for SLKT or missed some patients deferred for KALT. Second, data were extracted from the UNOS database, which lacks granularity to determine nuances of renal dysfunction especially among the prepolicy revision cohort. Delays in UNOS data reporting may also have contributed to limited data among the postpolicy revision cohort, which was already limited by a small size and a short follow-up time. Lastly, this study did not address the incidence of delayed renal graft function, immunosuppression usage prepolicy and postpolicy change, nor the phenotypes of KALT recipients that required the safety net.

All in all, the authors should be commended on their investigation on the early impact of the 2017 UNOS/OPTN policy change on SLKT utilization and outcomes especially given the limited data available in this area to date. Their findings suggest that the SLKT allocation policy change has led to a more streamlined utilization of renal grafts as well as an effective safety net. Ultimately regular evaluation of data is needed to better determine short- as well as long-term outcomes between SLKT and KALT recipients. In addition, studies examining predictors of post-LT renal recovery and nonrecovery are needed to help build clinical understanding and more informed indications for dual organ transplantation among LT candidates with renal dysfunction.

Dempsey L. Hughes, M.D. ¹

Pratima Sharma, M.D., M.S. ^{1,2}

¹Division of Gastroenterology and Hepatology
Michigan Medicine

University of Michigan

Ann Arbor, MI

²Division of Gastroenterology

Veterans Affairs Medical Center

Ann Arbor, MI

REFERENCES

- 1) Sharma P, Sui Z, Zhang M, Magee JC, Barman P, Patel Y, et al. Renal outcomes after simultaneous liver-kidney transplantation: results from the US multicenter simultaneous liver-kidney transplantation consortium. *Liver Transpl* 2021;27:1144-1153.
- 2) Nadim MK, Sung RS, Davis CL, Andreoni KA, Biggins SW, Danovitch GM, et al. Simultaneous liver-kidney transplantation summit: current state and future directions. *Am J Transplant* 2012;12:2901-2908.
- 3) Levitsky J, Baker T, Ahya SN, Levin ML, Friedewald J, Gallon L, et al. Outcomes and native renal recovery following simultaneous liver-kidney transplantation. *Am J Transplant* 2012;12:2949-2957.
- 4) Formica RN, Aeder M, Boyle G, Kucheryavaya A, Stewart D, Hirose R, Mulligan D. Simultaneous liver-kidney allocation

policy: a proposal to optimize appropriate utilization of scarce resources. *Am J Transplant* 2016;16:758-766.

- 5) Boyle G. Simultaneous Liver Kidney (SLK) Allocation Policy. OPTN/UNOS Public Comment Proposal. Published August 10, 2017. https://optn.transplant.hrsa.gov/media/1192/0815-12_SLK_Allocation.pdf. Accessed April 25, 2021.
- 6) Samoylova ML, Wegermann K, Shaw BI, Kesseli SJ, Au S, Park C, et al. The impact of the 2017 kidney allocation policy change on simultaneous liver kidney utilization and outcomes. *Liver Transpl* 2021;27:1106-1115.
- 7) Cullaro G, Sharma P, Jo J, Rassiwalla J, VanWagner L, Wong R, et al. Temporal trends and evolving outcomes after simultaneous liver-kidney transplant (SLKT): results from the United States SLKT consortium. *Liver Transpl*. doi: 10.1002/lt.26232. Online ahead of print.
- 8) Cullaro G, Hirose R, Lai J. Changes in simultaneous liver-kidney transplant allocation policy may impact post-liver transplant outcomes. *Transplantation* 2019;103:959-964.
- 9) Cullaro G, Verna E, Edmond J, Orandi BJ, Mohan S, Lai JC. Early kidney allograft failure after simultaneous liver-kidney transplantation: evidence of utilization of the safety net? *Transplantation* 2021;104:816-823.
- 10) Jiang DD, Roayale K, Woodland D, Orloff S, Scott D. Survival and renal function after liver transplantation along in patients meeting the new United Network for Organ Sharing simultaneous liver-kidney criteria. *Clin Transplant* 2020;34:e14020.