Clinical Decision-Making Dilemma: Liver alone or Simultaneous Liver-Kidney Transplantation?

Phuong-Thu T. Pham1* and Phuong-Chi T. Pham2

1Department of Medicine, Nephrology Division, David Geffen School of Medicine at UCLA, Kidney Transplant Program, Los Angeles, CA 90095, USA
2Department of Medicine, Nephrology and Hypertension Division, UCLA-Olive View Medical Center, Sylmar, CA 91342, USA

With the introduction of the MELD score for the allocation of orthotopic liver transplant (OLT) in February 2002, a striking 278% increase in the number of simultaneous liver-kidney transplants (SLKT) was observed during the 9-year period post-MELD when compared with the preceeding 9-year in the pre-MELD era (pre- vs. post-MELD era, n = 1049 vs. 294, respectively) [1]. For OLT candidates with simultaneous end-stage kidney failure, SLKT is a well-established effective therapeutic option for virtually all suitable candidates. However, there have been no well-defined guidelines to determine whether a kidney transplant should be offered to OLT candidates who have chronic kidney disease (CKD) or prolonged acute kidney injury (AKI) secondary to hepatorenal syndrome (HRS) or acute tubular necrosis (ATN) while awaiting a liver transplant. Specific challenges in the decision making process include the accurate assessment of the degree of existing renal dysfunction in those with CKD and the prediction of the extent of renal function recovery in those with AKI with or without underlying CKD.

In 2008, a multidisciplinary American consensus conference convened to examine listing criteria for SLKT [2]. It was recommended that automatic approval for SLKT listing should be granted to patients with:

i. End-stage renal disease with cirrhosis and symptomatic portal hypertension or hepatic vein wedge pressure gradient > 10 mmHg
ii. End-stage liver disease (ESLD) and CKD with glomerular filtration rate (GFR) ≤ 30 mL/min
iii. AKI or HRS with creatinine ≥ 2.0 mg/dL and dialysis ≥ 8 weeks
iv. End-stage liver disease (ESLD) and CKD and biopsy demonstrating > 30% glomerulosclerosis or 30% fibrosis.

All other requests should be evaluated to determine appropriateness.

In 2011, a panel of experts consisting of representatives from the OPTN (Organ Procurement Transplantation Network) liver and kidney committees from various OPTN regions as well as experts from the previous consensus conference assembled in Los Angeles to set forth novel guidelines for SLKT in wailisted OLT candidates [3]. The SLKT Summit attendees recommended that SLKT should be considered in:

i. OLT candidates with persistent AKI ≥ 4 weeks with one of the following:
   (a) Stage 3 AKI as defined by modified Risk Injury Failure Loss (RIFLE) (i.e. a 3-fold increase in serum creatinine (Scr) from baseline, Scr ≥ 4 mg/dL with an acute increase of ≥ 0.5 mg/dL or on renal replacement therapy)
   (b) Proteinuria ≥ 2 g a day
   (c) Kidney biopsy showing > 30% global glomerulosclerosis or > 30% interstitial fibrosis
   (d) Metabolic disease

While current guidelines provide well-defined criteria for SLKT listing for the majority of OLT candidates with either well-defined acute or chronic kidney disease, many SLKT-indicated candidates fall short of the strict criteria set forth by such guidelines. In the authors’ opinion, classifying OLT candidates into those with 1) AKI, 2) CKD, and 3) AKI superimposed on CKD, along with assessing risk factors for poor renal function recovery could potentially more fairly identify the subset of OLT candidates who would benefit from a simultaneous kidney transplant.

Acute Kidney Injury (AKI)

Studies on the potential factors predicting non recovery of renal function or progressive CKD after OLT have yielded variable and conflicting results. Nonetheless, similar to the non-transplant settings, potential risk factors for poor renal recovery may include the presence of pretransplant comorbid conditions such as diabetes mellitus, hypertension, coronary artery disease, and advanced age. Prolonged ischemic or toxic insult to the kidneys prior to transplantation such as hemodynamic instability, bacterial infections and the repeated use of nephrotoxic drugs, and prolonged acute tubular necrosis (ATN) associated with severely reduced renal perfusion may all lead to irreversible renal damage and progressive chronic kidney disease. Additionally, the duration of pretransplant renal dysfunction must play a role in postoperative non-recovery of renal function [4].

The American consensus guidelines suggest AKI or HRS with creatinine ≥ 2.0 mg/dL and dialysis ≥ 8 weeks as a threshold for SLKT in OLT candidates with AKI requiring renal replacement therapy [2]. The 2012 SLK Transplantation Summit guidelines suggest SLKT in OLT candidates with persistent AKI (eGFR ≤ 35 mL/min by MDRD-6 equation or ≤ 25 mL/min by iothalamate studies) of ≥ 4 week duration or Stage 3 AKI as defined by modified RIFLE [3]. Different transplant programs set forth different thresholds for SLKT ranging from 4 to 12 weeks on dialysis. Similarly, serum creatinine cut off values at which OLT candidates are listed for SLKT vary widely among centers.

*Corresponding author: Phuong-Thu T. Pham, MD, Clinical Associate Professor of Medicine, Director Outpatient Services, Department of Medicine, Nephrology Division, David Geffen School of Medicine at UCLA, Kidney Transplant Program, Los Angeles, CA 90095, USA, Tel. (310) 794-1757; E-mail: PPham@mednet.ucla.edu

Received October 04, 2012; Accepted October 12, 2012; Published October 20, 2012

Citation: Pham PTT, Pham PCT (2012) Clinical Decision-Making Dilemma: Liver alone or Simultaneous Liver-Kidney Transplantation? J Transplant Technol Res 2:e115. doi:10.4172/2161-0991.1000e115

Copyright: 2012 Pham PTT, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
In the authors' opinion, SLKT should be considered at slightly higher GFR (e.g. eGFR 36-40 mL/min by MDRD-6) than those suggested by current guidelines in the subset of patients with AKI and concurrent comorbid conditions such as long-standing history of diabetes (particularly those with evidence of proliferative diabetic retinopathy) or poorly controlled hypertension, and older age due to worse renal recovery potential [5]. The SLKT Summit expert panels acknowledge that current guidelines provide enough guidance to those who should receive a concurrent kidney graft but yet retain enough flexibility to allow clinical decision making until we have adequate data to support policy development.

Chronic Kidney Disease (CKD)

The 2008 American consensus guidelines suggest SLKT in OLT candidates with an estimated GFR of ≤ 30 mL/min and criteria for CKD as defined by the National Kidney Foundation (i.e. duration >90 days) [2]. The 2012 SLKT Summit guidelines propose SLKT in OLT candidates with an eGFR ≤ 40 mL/min (MDRD-6) or GFR ≤ 30 mL/min (iothalamate clearance) [3].

In clinical practice, assessing for SLKT in OLT candidates with CKD and an estimated baseline GFR (MDRD-6) between 41-44 mL/min (MDRD-6) or GFR ≤ 30 mL/min (iothalamate clearance) [3].

In conclusion, when a kidney biopsy cannot be performed due to underlying coagulopathy and the associated increased risk of bleeding, proper risk stratification of patients with AKI and/or CKD is critical to distinguish patients with good renal prognosis from those with poor prognosis in whom SLKT is warranted. Until large prospective, multicenter, observational studies evaluating patient and graft outcomes of OLT candidates with AKI and/or CKD undergoing solitary liver vs. SLK transplants are conducted, evidenced-based clinical practice guidelines remain undefined. With the ever-increasing donor organ shortage, SLKT must be used judiciously.

References

1. United Network for Organ Sharing and Organ Procurement Transplantation Network (UNOS/OPTN) database as of September 2012.
2. Eason JD, Gonwa TA, Davis CL, Sung RS, Gerber D, et al. (2008) Proceedings of consensus conference on simultaneous liver-kidney transplantation (SLK). Am J Transplant 8: 2243-2251.
3. Nadim MK, Sung RS, Davis CL,Andreoni KA, Biggins SW, et al. (2012) Simultaneous Liver-Kidney transplantation Summit: Current state and future directions. Am J Transplant [Epub ahead of print].
4. Pham PT, Pham PC,Wilkinson AH (2007) Renal function outcomes following liver transplantation and combined liver-kidney transplantation. Nat Clin Pract Nephrol 3: 507-514.
5. Bagshaw SM (2006) Epidemiology of renal recovery after acute renal failure. Curr Opin Crit Care 12:544-550.
6. Pham PT, Pham PC (2012) Liver alone or simultaneous liver-kidney transplantation. www.curbsideconsultant.com

Submit your next manuscript and get advantages of OMICS

Group submissions

Unique features:

- User friendly/feasible website-translation of your paper to 50 world’s leading languages
- Audio Version of published paper
- Digital articles to share and explore

Special features:

- 200 Open Access Journals
- 15,000 editorial team
- 21 days rapid review process
- Quality and quick editorial, review and publication processing
- Indexing at PubMed (partial), Scopus, DOAJ, EBSCO, Index Copernicus and Google Scholar etc
- Sharing Options: Social Networking Enabled
- Authors, Reviewers and Editors rewarded with online Scientific Credits
- Better discount for your subsequent articles

Submit your manuscript at: www.omicsonline.org/submission/