Should We Continue to Prioritize SLK Over KTA Recipients

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Outline

• Balancing equity and utility
• SLKT in current era
• Recommendations
Balancing equity and utility
Competing interests

SLKT
Given survival advantage of SLKT vs LTA

KTA
Given survival advantage to avoid remaining on the WL/dialysis
Balancing utility versus equity

**UTILITY**

- greatest likelihood of medical benefit
  - Too restrictive may not help sickest patient.
  - SLKT gain is < collective benefit for giving kidney to two recipients.
  - SLKT benefit if sick patient but not maximized if need not critical.

**EQUITY**

- impact those that are sickest
  - Liberal policy minimizes benefit if futile transplants.
  - Denied KTA equitable access if SLKT at high rate especially if death not imminent.
  - SLKT sicker but deny first come first served principle applied to KTA.
Before allocating the kidney to KTA, host OPO must offer the kidney with the liver to

- local candidates who meet eligibility criteria
- and regional candidates who meet eligibility and have a MELD score of at least 35 or status 1A.

- Within 150 nautical miles of the donor hospital and have a MELD ≥ 15
- Within 250 nautical miles of the donor hospital and have a MELD ≥ 29
- Within 250 nautical miles of the donor hospital and status 1A or 1B.

Atleast true on Feb 25 2020 @10pm
1: Rising SLKT

Number of SLKT

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of SLKT</th>
</tr>
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<tbody>
<tr>
<td>2003</td>
<td>247</td>
</tr>
<tr>
<td>2004</td>
<td>280</td>
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<tr>
<td>2005</td>
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<td>2016</td>
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<td>2017</td>
<td>739</td>
</tr>
<tr>
<td>2018</td>
<td>677</td>
</tr>
<tr>
<td>2019</td>
<td>728</td>
</tr>
</tbody>
</table>
1: Rising SLKT

- **Percent of LTA**
  - 9% of LTA

- **Percent of KTA**
  - 3% of KTA

Accessed Feb 19, 2020
2: Center and regional variation in SLKT

Nadim M et al AJT 2012
3: SLKT vs. KTA systematically different

• **RACE for multi organ transplantation:**
  - African Americans 18% multi organ transplantation vs. 35% single organ transplant

• **INCOME for multi organ transplantation:**
  - Zip codes with higher median income (diff 5,717) for MOT

• **CHARACTERISTICS for multi organ transplantation:**
  - Recipient age: 3.6 years older
  - higher median and mean eGFR
  - WL deaths higher
  - KDPI 12% lower

• **SLKT pull from one region and disadvantage KTA in that area?**
4: Native renal recovery with SLKT

Among 77 patients that underwent renal scan out of 155 SLKT single center

<table>
<thead>
<tr>
<th>eGFR&gt;20</th>
<th>eGFR&gt;30</th>
<th>eGFR&gt;40</th>
</tr>
</thead>
<tbody>
<tr>
<td>51%</td>
<td>27%</td>
<td>17%</td>
</tr>
</tbody>
</table>
Summary of selected concerns

• Constant discussion about utility and equity
• Rising SLKT
• Center and regional variation
• Higher quality organs → SLKT along with creation of disparities
• Renal recovery in a significant portion (?)
SLKT in the current era: Is the need evolving?
1. LT candidate in current era is inherently sicker

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2018</th>
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<tbody>
<tr>
<td>ICU</td>
<td>11.5%</td>
<td>15%</td>
</tr>
<tr>
<td>Age &gt;65 yrs</td>
<td>11%</td>
<td>23%</td>
</tr>
<tr>
<td>DM</td>
<td>25%</td>
<td>29%</td>
</tr>
<tr>
<td>“NAFLD”</td>
<td>26%</td>
<td>33%</td>
</tr>
<tr>
<td>MELD&gt;35</td>
<td>12%</td>
<td>22%</td>
</tr>
<tr>
<td>MELD 30-34</td>
<td>10%</td>
<td>21%</td>
</tr>
<tr>
<td>Obese, BMI&gt;30</td>
<td>34%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Kwong A et al AJT 2020
1. There is more CKD pre LT: 8% → 15%
### 2. There is real CKD post LT

<table>
<thead>
<tr>
<th></th>
<th>1y</th>
<th>3y</th>
<th>5y</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFR&lt;60 CKD</td>
<td>24.1%</td>
<td>57.3%</td>
<td>61.2%</td>
</tr>
<tr>
<td>ESRD</td>
<td>5.1%</td>
<td>5.8%</td>
<td>6%</td>
</tr>
</tbody>
</table>

#### Measured GFR 1985-2015, 1100 recipients, 4700 measurements

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*Mazumder N et al ATC 2020*
3. SLKT: survival advantage in those with renal failure

2002-2012, unadjusted analysis
Paired Kidneys: Although kidneys allocated to SLK vs KT demonstrate worse short-term survival, this risk appears to be reversed when follow-up is extended long-term.

Graft survival longer 11 vs 10.5 years

Graft failure lower 11% vs 21%
4. SLKT criteria are now standardized

Candidates must meet at least one of the following conditions and confirm by Tx nephrologist:

1. CKD with GFR <60 mL/min for >90 days with:
   - ESRD on chronic RRT, or
   - GFR <30 at time of listing for kidney

2. Sustained AKI with:
   - 6 consecutive weeks of RRT, or
   - GFR <25 mL/min for 6 consecutive weeks, or
   - Combination of 2a and 2b for 6 consecutive weeks

3. Metabolic disease (hyperoxaluria, aHUS, familial non-neuropathic systemic amyloidosis, or methylmalonic aciduria

“Safety Net” Provision:
Liver transplant recipients with continued dialysis dependency or GFR ≤ 20 ml/min in the period 2-12 months after liver transplant will receive priority for kidney allocation for kidneys with KDPI>20%
4. Underlying principles of the new policy

- New Policy
  - ↓ SLKT
  - Should be candidate but criteria
  - ↑ KTA
  - ↓ "waste"
  - Safety Net
4. Most SLKT meet CKD criteria

~85% had severe renal dysfunction at time of transplant (>50% on dialysis)
4: KALT Kidney graft survival

<table>
<thead>
<tr>
<th></th>
<th>SLKT N=6,774</th>
<th>KALT 2-12mo N=117</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean KDPI (SD)</td>
<td>38 (26)</td>
<td>50 (22)</td>
</tr>
<tr>
<td>DCD</td>
<td>4%</td>
<td>20%</td>
</tr>
<tr>
<td>1y</td>
<td>95%</td>
<td>94%</td>
</tr>
<tr>
<td>3y</td>
<td>93%</td>
<td>94%</td>
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<tr>
<td>5y</td>
<td>90%</td>
<td>81%</td>
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<tr>
<td>10y</td>
<td>83%</td>
<td>49%</td>
</tr>
<tr>
<td>Obese, BMI&gt;30</td>
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<td>37%</td>
</tr>
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</table>

Jay CL et al JACS 2020
4. KALT Kidney graft survival (Safety net)

Patient survival after liver transplant for SLKT and KALT (deceased donors only).

Overall kidney graft survival for SLKT and deceased donor KALT.
Summary of recent changes

• Registrants are sicker and may need SLKT more than before

• SLKT offers a survival advantage especially for patients on dialysis

• There is acceptable long term graft survival

• New policy attempts to adjudicate candidates for SLKT and offers a safety net with acceptable outcomes
1. Scrutinize new policy: SLKT and safety net

• Will a ↓ SLKT → ↑ KALT

• SLKT criteria
  • What happens to patients that do not quite meet SLKT criteria

• KALT
  • Is KALT candidate different now compared to previous eras
  • How many were too sick for safety net and never made it
  • How many listed for safety net just in case but never received KALT
  • Which patients won’t do well with safety net
    - Age >60 years ad HD >90 d pre-LT
2. Standardize eGFR

Cirrhosis pts as compared to mGFR

All GFR

GFR<60

Unpublished data
• New eGFR developed in patients with cirrhosis

• 13,021 GFR iothalamate samples (3,177 patients, 30 years) at Baylor

• GRAIL: Variables similar to MDRD-6 variables which included Age, Gender, Race, Scr, BUN, Alb

• GRAIL is more precise (95% CI) and has less bias (eGFR-mGFR) as compared to other eGFR equations at low GFR (<30ml/min1.73m²)
GRAIL correctly classified more patients with low GFR at baseline and KALT within 5 years after LT.
3. Biomarkers to predict renal recovery

REVERSE Model: age, DM, OPN, TIMP-1 levels

Northwestern discovery

Baylor Cohort Validation

4. Monitoring of outcomes

• Better center-based risk stratification

• Can we predict need for 2nd organ better

• Systematic data collection, analysis and reporting

  • A high-risk LTA liver may be upgraded to SLKT to improve outcomes as not counted in center reportable data
Conclusion

• Balancing utility and equity is difficult in SLKT

• SLKT is not (always) a waste of a kidney
  • Approach needs to be streamlined
  • Earlier LT and SLKT not needed?

• Scrutinize safety net

• Prioritization may need to be nuanced
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