Robotic-Assisted Versus Open Techniques for Living Donor Kidney Transplant Recipients: A Comparison Using Propensity Score Analysis

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Disclosure

I have no financial interests or relationships to disclose.
Following the rapid advancements in minimally invasive urology, living donor robotic-assisted kidney transplantation (RAKT) has developed into a feasible alternative to open kidney transplantation (OKT).
In this study, we compare RAKT to OKT using a propensity score analysis to elucidate the efficacy of RAKT as an alternative to OKT.
Methods

- 101 LDKT (January 2016 – June 2018)
  - Selection based on robot availability
- Propensity score matching
  - Recipient age, donor age, race, gender, BMI, dialysis, pre-operative SCr, cPRA)
  - 35 cases in each group
- Primary outcomes
  - Perioperative factors: EBL, CIT, WIT
  - Patient outcomes: LOS, Narcotics consumed (POD #0, 1, 2), Change in SCr (POD #3, 7, 14, 6 mo, 12 mo)
Results

- 101 LDKT
  - 65 OKT, 35 RAKT
  - Mean age 49 (52 vs 46)
  - 61M, 40F
  - 62 white, 29 black, 10 other
  - 65 OKT, 35 RAKT

<table>
<thead>
<tr>
<th>Variables</th>
<th>Open</th>
<th>Robotic</th>
<th>P values</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIT (min)</td>
<td>83 (58-115)</td>
<td>77 (58-116)</td>
<td>0.86</td>
</tr>
<tr>
<td>WIT (min)</td>
<td>38 (34-48)</td>
<td>49 (43-53)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>EBL (mL)</td>
<td>150 (100-200)</td>
<td>62.5 (50-150)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>OR Time (min)</td>
<td>308 (272-354)</td>
<td>294 (279-314)</td>
<td>0.87</td>
</tr>
</tbody>
</table>
## Results

### Postoperative narcotics consumed

<table>
<thead>
<tr>
<th>Variable</th>
<th>Open</th>
<th>Robotic</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NARC Score (morphine equivalents)</td>
<td>31.8 (16.0-52.5)</td>
<td>23.3 (18.1-49.9)</td>
<td>0.98</td>
</tr>
<tr>
<td>POD #1</td>
<td>34.9 (21.3-53.0)</td>
<td>36.5 (21.5-46.7)</td>
<td>0.87</td>
</tr>
<tr>
<td>POD #2</td>
<td>28.5 (11.0-47.5)</td>
<td>24.0 (13.3-43.8)</td>
<td>0.91</td>
</tr>
</tbody>
</table>

### Post-operative serum creatinine

<table>
<thead>
<tr>
<th>Variable</th>
<th>Open</th>
<th>Robotic</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCr (3 day)</td>
<td>1.72 (1.24-2.57)</td>
<td>1.75 (1.24-2.55)</td>
<td>0.93</td>
</tr>
<tr>
<td>SCr (1 wk)</td>
<td>1.58 (1.21-2.28)</td>
<td>1.42 (1.19-2.14)</td>
<td>0.73</td>
</tr>
<tr>
<td>SCr (2 wk)</td>
<td>1.47 (1.15-1.99)</td>
<td>1.54 (1.18-2.03)</td>
<td>0.70</td>
</tr>
<tr>
<td>SCr (6 mo)</td>
<td>1.48 (1.18-1.77)</td>
<td>1.44 (1.24-1.97)</td>
<td>0.44</td>
</tr>
<tr>
<td>SCr (1 yr)</td>
<td>1.33 (1.16-1.50)</td>
<td>1.37 (1.14-1.67)</td>
<td>0.74</td>
</tr>
</tbody>
</table>

### Complications:

- **Conversion to open**
  - 2 early in center experience
  - 1 during study period (venous hypertension, bleeding)

- **Ureteral obstruction**
  - N = 2 (no amenable to non-operative management)
Discussion

- RAKT offers a minimally invasive alternative to OKT, with similar graft and patient outcomes.
- Notably, this study compares RAKT to OKT with a heterogeneous study population, using propensity scoring.
- Although the small sample size limits our ability to detect differences in graft and patient outcomes, trends demonstrate shorter lengths of stay, shorter operative times, and less blood loss for RAKT recipients.
Conclusion

Similar to the advent living donor nephrectomy, early findings in RAKT demonstrate a safe and reasonable alternative for kidney transplantation in various populations.