Bariatric Surgery is Associated with Decreased Calcineurin Inhibitor Time in Therapeutic Range after Heart Transplantation

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BACKGROUND

- Obesity increases the risk for heart failure and can lead to worse outcomes after orthotopic heart transplant (OHT).
- Severe obesity is a relative contraindication to OHT at many centers due to higher morbidity and mortality after transplant.
- Bariatric surgery (BSg) is an effective conduit to OHT eligibility, but little is known about how BSg affects outcomes after OHT.

METHODS

- Medical records were reviewed from OHT recipients between 1/2018-4/2019.
- Patients with a history of BSg prior to OHT were compared to patients without a prior history of BSg (OHT).
- Tacrolimus and cyclosporine trough levels, cardiac biopsies, and LVEF were collected for the first 6 months post-OHT.

OBJECTIVE

- The purpose of this study was to determine if bariatric surgery is associated with greater CNI variability in OHT recipients.

RESULTS

1. Clinical characteristics of BSg+OHT patients were similar to OHT patients.

Table 1. Clinical characteristics for Orthotopic Heart Transplant (OHT) Patients with and without a prior history of Bariatric Surgery.

<table>
<thead>
<tr>
<th>Clinical Characteristics</th>
<th>BSg+OHT (N=36)</th>
<th>OHT (N=54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>53.3 ± 13</td>
<td>57 ± 18</td>
</tr>
<tr>
<td>Female Gender</td>
<td>4 (11.1%)</td>
<td>13 (24.1%)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>36.9 ± 4.5</td>
<td>38.4 ± 4.5</td>
</tr>
<tr>
<td>Baseline LVEF 1 week post-OHT (%)</td>
<td>62 ± 3</td>
<td>67 ± 7</td>
</tr>
<tr>
<td>LEVF 6 months post-OHT (%)</td>
<td>62 ± 8</td>
<td>61 ± 7</td>
</tr>
<tr>
<td>Patients with at least one episode of 1R/2a rejection</td>
<td>3 (7%)</td>
<td>21 (19%)</td>
</tr>
<tr>
<td>Patients with at least one episode of 2R/3a rejection or more greater severity by biopsy</td>
<td>1 (2%)</td>
<td>11 (20%)</td>
</tr>
<tr>
<td>Ciclosporine used as the post-OHT CNI</td>
<td>1 (2.8%)</td>
<td>5 (9%)</td>
</tr>
<tr>
<td>Tacrolimus used as the post-OHT CNI</td>
<td>35 (97.2%)</td>
<td>49 (91%)</td>
</tr>
</tbody>
</table>

2. CNI variability analysis by TTR, Rosendaal TTR, and CV:

Table 2. CNI variability for Orthotopic Heart Transplant (OHT) Patients with and without a prior history of Bariatric Surgery.

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Figure 1. CNI levels were significantly less likely to be within therapeutic range among BSg+OHT vs. OHT patients (12.5% vs 31.1%, p=0.04).

Figure 2. CNI levels were less likely to be within therapeutic range among BSg+OHT vs. OHT patients as calculated by the Rosendaal TTR method, although the results did not reach statistical significance (19.2% vs 38.6%, p=0.1).

Figure 3. The coefficient of variation was lower among BSg+OHT vs. OHT patients suggesting greater CNI variability although statistical significance was not reached (46.7% vs 55%, p=0.1).

3. Greater CNI TTR was associated with fewer episodes of cellular rejection, r = 0.31, p=0.025.

4. LVEF measured by echocardiogram at 1 and 24 weeks did not correlate with CNI variability.

CONCLUSIONS

- BSg patients may warrant additional monitoring and adjustment of CNI levels in the early post-OHT period.
- Episodes of rejection and overall graft function were similar for BSg+OHT patients suggesting that a history of BSg should not be a contraindication to transplant.
- Larger studies are needed to determine long-term outcomes post-OHT in the BSg population.

DISCUSSION

- The main finding of this study was CNI TTR was lower in OHT patients with a prior history of BSg.
- A trend for greater variability in CNI levels was also noted in BSg+OHT patients using two separate measures of variability: Rosendaal TTR and CV.
- We hypothesize that anatomical alterations in absorption after BSg account for this greater CNI variability.
- Previous studies have shown that greater CNI variability is associated with cellular rejection and graft failure in heart, lung, intestine, and kidney transplant recipients.
- A change in LVEF at 1 and 24 weeks was not observed in this study presumably due to early treatment of rejection once identified on cardiac biopsy.
- The main limitation of this study was the small sample size of patients with a history of BSg.

DISCLOSURES

- There are no conflicts of interest to disclose.

For more information:
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