Predictors of ICU Admission Following Laparoscopic Gastric Sleeve in Morbidly Obese Adolescents: A retrospective study

Megan Campion MD1, Rajeef Subramanyam MD1, Lori Aronson MD1, Lili Ding PhD2, Michael Helmrath MD3, Thomas Inge MD1, Marc Mecoli MD1

Departments of Anesthesiology1, Statistics2, and Surgery3, Cincinnati Children’s Hospital Medical Center – Cincinnati, Ohio

Introduction

- It is estimated that 20% of adolescents in the United States are obese(1).
- The increase in prevalence of pediatric obesity is associated with both short- and long-term health concerns(2).
- Comorbidities of pediatric obesity are similar to adult patients and include obstructive sleep apnea (OSA). Severe OSA is an indication for weight loss surgery (WLS) in obese adolescents(3).
- The frequency of WLS in pediatric patients is increasing(4).
- Consensus as to the optimal postoperative destination of adolescents undergoing WLS is lacking.
- This retrospective study aimed to identify predictors of ICU admission following laparoscopic gastric sleeve procedure in morbidly obese adolescents at our institution over a 2-year period.

Methods

- IRB approval was obtained for this retrospective chart review.
- Data was collected from existing electronic records of all bariatric surgery cases done at CCHMC from 6/1/2014 to 6/1/2016:
  - Age, gender, BMI
  - Sleep apnea data: Preoperative PSG, AHI, severity of OSA, CPAP use
  - Surgical procedure, postoperative destination, total length of stay, postoperative complications.
- The data was analyzed with ICU admission as a binary outcome using logistic regression using backward elimination.
- Significant predictors with a p value of <0.1 in the univariate analysis was used to build a multivariate model.
- A receiver operating curve was constructed and area under the curve analyzed.
- The confounding effect of pan hypopituitarism on ICU admission was controlled for in the final model using the Firth penalized likelihood method.
- A p-value of 0.05 was considered significant in the final risk model.
- Analysis was done with SAS.

Results

Table 1. Demographic characteristics and unvariable analysis

<table>
<thead>
<tr>
<th></th>
<th>Overall [n = 73]</th>
<th>ICU [n = 12]</th>
<th>No ICU [n = 61]</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>16.9 (2.9)</td>
<td>17.7 (5.1)</td>
<td>16.7 (2.2)</td>
<td>0.54</td>
</tr>
<tr>
<td>Gender (M/F)</td>
<td>20 / 53</td>
<td>4 / 8</td>
<td>16 / 45</td>
<td>0.73</td>
</tr>
<tr>
<td>OSA (Mild/Mod/Severe)</td>
<td>20 / 9 / 13</td>
<td>2 / 1 / 8</td>
<td>18 / 8 / 5</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>CPAP Use</td>
<td>19</td>
<td>6</td>
<td>13</td>
<td>0.07</td>
</tr>
<tr>
<td>Panhypopituitarism</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>&lt; 0.0005</td>
</tr>
</tbody>
</table>

*P-value indicates comparison of characteristics between ICU and non-ICU cohorts.

Table 2. Logistical regression model predicting occurrence of ICU admission

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% Wald Confidence Limits</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panhypopituitarism</td>
<td>160</td>
<td>2.3–999</td>
<td>0.018</td>
</tr>
<tr>
<td>Mild OSA</td>
<td>4.3</td>
<td>0.21–90</td>
<td>0.49</td>
</tr>
<tr>
<td>Moderate OSA</td>
<td>10</td>
<td>0.42–241</td>
<td>0.71</td>
</tr>
<tr>
<td>Severe OSA</td>
<td>66.6</td>
<td>3.84–999</td>
<td>0.0007</td>
</tr>
</tbody>
</table>

Conclusions

- Identification of predictors of ICU admission following WLS in adolescents is important to ensure safe patient care and adequate resource allocation.
- Additional research is warranted to determine risk factors in severely obese adolescents undergoing WLS that should prompt consideration of ICU admission.
- At our institution, the presence of severe obstructive sleep apnea was an independent predictor for the occurrence of ICU admission and increased the odds of ICU admission.
- Patients with panhypopituitarism constitute a small cohort of obese patients who undergo WLS at CCHMC. However, they are routinely admitted to the ICU postoperatively to assist in fluid management.

References