Risk factors for surgical site infections following spinal fusion surgery

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INTRODUCTION

- Surgical site infection (SSI) following spinal fusion surgery, although rare, contributes to increased morbidity and mortality.1
- Research indicates that patients with neuromuscular scoliosis develop SSIs following spinal fusion at a rate of 6-13%, while patients with idiopathic scoliosis develop SSIs at a rate of 0.9%-3.4.
- In adults, SSI is associated with higher American Society of Anesthesiologists (ASA) classification level 5,6.
- In typically developing children, SSI is associated with BMIs in the 95th percentile or greater.7
- Few studies have analyzed risk factors for SSI in vulnerable pediatric populations undergoing spinal fusion surgery for scoliosis.
- We hypothesized that neuromuscular scoliosis, abnormal lab results and other patient-related features would be risk factors for SSI.

METHODS & MATERIALS

- Retrospective analysis of 184 patients (mean age = 15.4 years, 79 males) who underwent 202 spinal fusion surgeries or revisions at a tertiary hospital between 2014 and 2016.
- Primary variables: BMI, scoliosis diagnosis, ASA classification level.
- Secondary variables: Continence, surgery preparatory clinic attendance, age, gender.
- Mann-Whitney U and Chi square analyses used.

RESULTS

Patients were significantly more likely to incur a SSI if they:
- Presented with neuromuscular scoliosis.
- Were classified as ASA level III.
- Attended a surgery preparatory clinic.
- Were incontinent.

DISCUSSION

- This work adds to a small body of literature supporting neuromuscular scoliosis and higher ASA classification level as risk factors for SSI.
- The findings of incontinence and attendance at a surgery preparatory clinic as significant risk factors for SSI could be correlated with the finding of neuromuscular scoliosis as a risk factor for SSI. Patients with neuromuscular scoliosis are more likely to be incontinent than patients with idiopathic scoliosis and clinicians are more likely to refer these patients to a surgery preparatory clinic.
- Fecal and urine contamination from diaper use could also infect post-surgical sites.
- Our findings do not support higher BMI as a risk factor for SSI, likely because the majority of our patients (69.6%) had non-idiopathic scoliosis, which increases risk for malnutrition and poor growth.
- Assessment of lab values could not be determined due to the large amount of missing data. This limitation suggest clinicians do not routinely order pre-surgical labs.

Table 1: BMI, Pre-surgery clinic attendance, incontinence and feeding tube use stratified by SSI

<table>
<thead>
<tr>
<th>Variable</th>
<th>No SSI acquired</th>
<th>SSI acquired</th>
<th>P-value</th>
<th>Normal range</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (n = total # of patients)</td>
<td>20.2 (5.3)</td>
<td>22.1 (7.7)</td>
<td>0.595</td>
<td>18.5-24.9</td>
</tr>
<tr>
<td>Surgery preparatory clinic*</td>
<td>40/178 (22.2%)</td>
<td>9/22 (40.9%)</td>
<td>0.05*</td>
<td></td>
</tr>
<tr>
<td>Incontinence*</td>
<td>48/178 (28.7%)</td>
<td>32/30 (60.0%)</td>
<td>0.002*</td>
<td></td>
</tr>
<tr>
<td>Feeding tube use for all nutrition</td>
<td>26/178 (14.6%)</td>
<td>6/21 (28.6%)</td>
<td>0.3</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Incidence of SSI by scoliosis type

Figure 2: Incidence of SSI by ASA classification level

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References

Note
Includes any SSI acquired over all surgeries, including revisions.