Otolaryngology Complications in Pediatric Small Bowel Transplant Patients: A 23-Year Experience

Matthew S. Johnson, MD1; John F. Guynan, MD1; Wendy J. Grant, MD2; Dwight T. Jones, MD1
1University of Nebraska Medical Center - Department of Otolaryngology
2University of Nebraska Medical Center - Department of Surgery Transplant Division

Abstract

Objectives: To evaluate the otolaryngology complications of pediatric small bowel transplant recipients at a high-volume transplant center.

Methods: A retrospective chart review was performed on 288 patients age 18 and under who received a small bowel transplant either alone or as part of a multi-visceral transplantation from 1990 – 2013. All post-transplantation otolaryngology diagnoses, complications and operations were recorded. The number of intubations, cumulative intubation length, and survival rates were also recorded.

Results: Three hundred and twenty-two transplants were performed in 288 patients with 283 first-time transplants. The cohort was 54.3% male and 59.0% white from 39 states and 3 countries. Age at first transplant ranged 15 weeks to 18 years (mean 3 years). Overall mortality was 41.3%. Nearly 65% of patients required intubation beyond the first post-operative day with cumulative intubation lengths ranging 1 – 251 days (mean 36.8). Thirty-seven patients (13.3%) required tracheostomy. Otolaryngologic diseases included adenotonsillar hypertrophy (23.3%), sinusitis (21.0%), otitis media (14.7%), adenotonsillectomy post-transplantation lymphoproliferative disorder (5.4%), epistaxis (4.7%) and tracheal stenosis (2.5%). Ten intubated patients (5.0%) developed subglottic stenosis. Operations included tonsillectomy (22.3%), laryngoscopy and bronchoscopy (13.3%), tracheostomy (13.3%), myringotomy and tube placement (11.9%), adenotonsillectomy (2.2%), and endoscopic sinus surgery (2.2%). Length of intubation was associated with tracheostomy placement (p <0.0001) and airway complications (p = 0.0036) including subglottic stenosis (p = 0.0032). Subglottic stenosis was associated with decreased survival (p = 0.0039).

Conclusions: Pediatric small bowel transplant recipients frequently encounter otolaryngologic complications. Long-term intubation was associated with increased likelihood of subglottic stenosis and subsequent decrease in survival.

Introduction

Intestinal transplantation is a relatively recent development within the field of transplantation. Initial proliferation of this technique was hampered by high rates of rejection, graft failure, and mortality. FDA approval of tacrolimus (Prograf) in 1994 brought about a revolution in the immunosuppressive care of solid organ transplants and this was soon translated to intestinal transplants. This led to an increase in graft survival and mortality from 11% and 28%, respectively, to greater than 50%. Improving outcomes and improved surgical technique have led to the implementation of this procedure in 51 centers worldwide.

Pediatric patients receive about two-thirds of all intestinal transplants due to the primary etiologic diseases being most prevalent in this population. These include necrotizing enterocolitis, intestinal volvulus, and gas trochisis leading to short-gut syndrome.

Potent immunosuppression via triple therapy including a calcineurin inhibitor (usually tacrolimus), corticosteroid, and antiproliferative agent (azathioprine) has become the standard at many centers. Increasing survival and decreased rejection has led to patients developing significant non-transplant complications, many of which manifest in the ears, nose and throat. Infectious diseases such as otitis, sinusitis, and tonsillitis are common problems leading to otolaryngology consultation in solid organ transplant recipients. Due to the need for frequent and sometimes prolonged intubations, airway complications are also a concern for these patients.

The University of Nebraska Medical Center leads the nation in pediatric intestinal transplant volume. Otolaryngologists within our institution have noted an increase in the volume of consultations within this patient population. No literature is available on the incidence of otolaryngologic diseases and operations in this group. A retrospective review was therefore designed to evaluate the otolaryngology complications of pediatric small bowel and multi-visceral transplant recipients at our high-volume center.

Methods

IRB approval was obtained for this descriptive retrospective chart review. All patients who underwent small bowel transplantation either alone or as part of a multi-visceral transplantation were included beginning with the inception of the UNMC small bowel transplantation program in 1990. Ten patients were excluded for incomplete records. We hypothesized that intestinal transplant recipients would have a high incidence of otolaryngologic complications and operations.

Results

| Total # of patients | 288 |
| Total # transplants performed | 322 |
| First transplant elsewhere | 5 |
| # excluded for incomplete data | 10 |
| Total # of patients | 278 |
| Total # of transplants reviewed | 312 |
| Gender | Male 151 (54.3%) |
| Age (at time of first transplantation) | White 164 (59.0%) |
| Black or African American | 45 (16.2%) |
| Hispanic/Latino | 46 (16.5%) |
| Other Race or Unknown | 23 (8.3%) |
| Residence | States, 3 countries, 5 unknown |
| Transplant date range (all transplants) | October 1991 - May 2013 |
| # Died | 115 (41.4%) |
| # of patients with 2 transplants | 23 (8.3%) |
| # of patients with 3 transplants (or more) | 4 (1.4%) |
| Survival length range | 0.8 - 24.6 years (mean 4.8, median 2.9) |
| # of each transplant type | B 80, BP 118, LB 7, LBKP 106 |
| # of transplant surgeons | 8 |

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otitis</td>
<td>7</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>32</td>
</tr>
<tr>
<td>T&amp;A</td>
<td>42</td>
</tr>
<tr>
<td>T&amp;A PTLD</td>
<td>6</td>
</tr>
<tr>
<td>T&amp;A hypertrophy</td>
<td>23</td>
</tr>
<tr>
<td>Tracheomalacia</td>
<td>38</td>
</tr>
<tr>
<td>T&amp;A related diagnoses and surgery rates</td>
<td>38</td>
</tr>
<tr>
<td>Mean length of intubation</td>
<td>36.8 days (range 1-251)</td>
</tr>
<tr>
<td>Mean # intubations 2 (range 1-6)</td>
<td>40 tracheostomies performed in 38 patients (13.7%)</td>
</tr>
<tr>
<td>13 decannulated (34.2%)</td>
<td>OR of death after trach = 1.81</td>
</tr>
<tr>
<td>Mean # intubations in SGS</td>
<td>82 days (range 19-209)</td>
</tr>
</tbody>
</table>

Conclusion

Pediatric small bowel transplant recipients receive aggressive immunosuppression and frequently require prolonged and repeated intubation. These patients therefore have a high incidence of ENT-related diagnoses and need for surgery. Otolaryngology consultation was obtained in 55% of all patients and 44% underwent some type of otolaryngology intervention. Long-term intubation was associated with increased likelihood of subglottic stenosis (p = 0.0032) and subsequent mortality (p = 0.039). These retrospective results are assumed to underestimate diagnosis and surgery rates. Otolaryngologists should be aware of the otolaryngologic complications of small bowel transplantation and its requisite immunosuppression.

Contact

Matt Johnson, MD
University of Nebraska Medical Center - Department of Otolaryngology
981225 University of Nebraska Medical Center
Omaha, NE 68198-1225
Phone 402-559-7005
Email matt.johnson@unmc.edu

References