Abstract

**Objective:** The purpose of this report is to relate a single institution's experience with middle ear disease and the incidence and efficacy of tympanostomy tube (PET) insertion in children with Down syndrome.

**Methods:** Retrospective chart review of 130 consecutive pediatric Down Syndrome patients seen at a single tertiary care children's hospital between the years 2001-2007. The incidence of tympanostomy tube insertion for middle ear disease as well as the age of the patients at tube insertion was analyzed.

**Results:** The mean age of the patient population was 4.5 years, ranging from 8 months to 10 years. 41/130 patients (31.5%) were treated with tympanostomy tube insertion for middle ear disease. Of this group, 11/41 patients (26.8%) required second and third tube insertions, respectively, for persistent pathologic and failed tube function. The mean age at first tube insertion was 3.3 years, while the mean age at second and third tube insertion was 5.9 and 6.6 years. The mean age of the non-PET, PET, and multiple PET patients was 4.2, 5.3, and 7.45 years, respectively. Outcome measures included a documented conductive hearing loss on audiological assessment and/or persistent middle ear effusion on physical exam.

**Conclusion:** Children with Down syndrome have an increased incidence and persistence of middle ear disease. Additionally, affected children may require multiple surgical interventions for persistent ear disease and failed tube function. The multiple medical problems often associated with Down syndrome result in increased anesthetic risks for these patients. We propose the utility of a durable tympanostomy tube for more efficient treatment and the avoidance of multiple surgical interventions.

Introduction

Down syndrome occurs in approximately 1/700 live births. Recurrent otitis media with effusion and hearing loss are present in up to 78% of these patients. A relationship between even mild hearing loss and detrimental language, emotional, and educational development has been well established, and this relationship may be more pronounced in children with developmental delays. Tympanostomy tube (PET) insertion for conductive hearing loss in Down patients can result in normal hearing levels. However, multiple PET insertions are often required, subjecting these children to the associated anesthetic risks. The incidence and efficacy of PET insertion in these children is presented and characterized from a referral base through a Down syndrome specialty clinic.

Methods

Retrospective chart review of 130 consecutive pediatric Down Syndrome patients seen at a single tertiary care children's hospital between the years 2001-2007. The incidence of tympanostomy tube insertion for middle ear disease as well as the age of the patients at tube insertion was analyzed. Statistical methods used included the unpaired t-test and one-way ANOVA for the generation of P value and statistical significance.

Results

The mean age of the patient population was 4.5 years, ranging from 8 months to 10 years. 41/130 patients (31.5%) were treated with tympanostomy tube insertion for middle ear disease. Of this group, 11/41 patients (26.8%) required second and third tube insertions, respectively, for persistent pathologic and failed tube function. The mean age at first tube insertion was 3.3 years, while the mean age at second and third tube insertion was 5.9 and 6.6 years. The majority of patients underwent their first tube insertion after four years of age. The mean age of the non-PET, PET, and multiple PET patients was 4.2, 5.3, and 7.45, respectively. These age differences reached statistical significance. Outcome measures included a documented conductive hearing loss on audiological assessment and/or persistent middle ear effusion on physical exam.

Table 1: Data Summary

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Total population</th>
<th>Non-PET</th>
<th>PET</th>
<th>Multiple PET</th>
<th>Non-PET vs. PET</th>
<th>Multiple PET vs. PET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-PET</td>
<td>129</td>
<td>88</td>
<td>41</td>
<td>11</td>
<td>77</td>
<td>11</td>
</tr>
<tr>
<td>PET</td>
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<tr>
<td>Multiple PET</td>
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<tr>
<td>P-value</td>
<td>0.043</td>
<td></td>
<td></td>
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<td>0.009</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Conclusion

Children with Down syndrome have an increased incidence and persistence of middle ear disease, and these data suggest that Down patients may have a prolonged natural history of chronic otitis media with effusion. Additionally, affected children may require multiple surgical interventions for persistent disease and failed tube function. The multiple medical problems often associated with Down syndrome result in an increased anesthetic risk for these patients. Therefore, we propose the utility of a durable tympanostomy tube for more efficient treatment and the avoidance of multiple interventions.

References