Paediatric Cholesteatoma Surgery:
Single-Staged Canal Wall Down approach
Results of a 5-year longitudinal study
Aaron Trinidade, FRCS(ORL-HNS)
Matthew Yung, PhD FRCS(ORL-HNS)
Ipswich Hospital NHS Trust, England, UK

INTRODUCTION
Residual or recurrent cholesteatoma following surgery in children can manifest only after many years; long-term follow-up is important. Currently no consensus on how long-term results following cholesteatoma surgery should be reported, with most reports varying in follow-up times and data analysis.

Kaplan-Meier survival analysis is becoming increasingly important in discussing residual/recurrent rates as the number of censored cases inevitably increases with observation time. Survival analyses standardised to a 5-year cut-off point allows for interpretation of outcomes against the background of patient follow-up and comparison with like studies. Follow-up is crucial in the interpretation of mastoid surgery success rates as in reality many patients are lost to follow-up.

In addition, the best surgical approach to cholesteatoma in children is the subject of much debate amongst otologists. CWU or CWD? Minimal social restrictions, swimming in particular.

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canal Wall Up (CWU)</td>
<td>Waterproofed ear</td>
</tr>
<tr>
<td>Multiple procedures to search for</td>
<td></td>
</tr>
<tr>
<td>recidivism</td>
<td></td>
</tr>
<tr>
<td>Canal Wall Down (CWD)</td>
<td>Recidivism easily observed in clinic</td>
</tr>
<tr>
<td>Statistical lower recidivism rate</td>
<td>Water restrictions</td>
</tr>
<tr>
<td></td>
<td>Compliance with serial cleanings</td>
</tr>
</tbody>
</table>

TECHNIQUE

OBJECTIVES
1. To report 5-year results of paediatric patients undergoing CWU surgery with 1ry obliteration for cholesteatoma in a prospective observational study using survival analysis.
2. To report otorrhea and waterproofing rates and audiological outcomes at 12 months post-op.
3. To report the number of additional procedures necessary at 5 years.

FOLLOW-UP
- Dedicated ear audit clinic at 3, 6 & 12 months and then yearly for 10 years.
- Serial audiograms and examinations for recurrence/residual cholesteatoma and epithelialization.
- Waterproofing assessment: parents asked about child’s experience in getting the ear wet during swimming or bathing.
- If cooperative, routine CT scan at 1 year if cavity is obliterated with hydroxyapatite granules. (MRI with DWI option was not available pre-2013.)
- Any space occupying lesion found underneath the granules is surgically explored.

OUTCOME DATA
1. Recurrent or residual cholesteatoma @ 5 years post-op.
2. Otorrhea @ 12 months post-op.
3. Waterproof status of the ear @ 12 months post-op.
4. Hearing outcome @ 12 months post-op.
5. Additional procedures needed following primary surgery.

Kaplan-Meier survival analysis was conducted to examine cholesteatoma recidivism post-operation with data censored at 5 years of follow-up. Cross-sectional analysis was used to describe audiological data, otorrhea and waterproofing after 12 months F/U.

RESULTS

DEMOGRAPHICS
- n = 55 children aged >16 years at operation date
- There were 58 ear operations in 55 patients
- 16 ♀; 42 ♂
- 3 patients had mastoid surgery on both ears
- The mean age at operation was 10.8 years

FOLLOW-UP: Overall, F/U rate was 72.4% (n=42/58)

CHOLESTEATOMA: The probability of residual cholesteatoma at 5 years of follow-up was 9.9% (95% CI. 3.8%–24.4%); this represented 4 patients in total. No recurrences were observed at 5 years. 3 patients experienced residual cholesteatomas after 5 years at 61, 72 and 95 months.

OTORRHEA: No children experiences otorrhea post-operatively.

WATERPROOFING: In 94.8% (n=55/58) of patients waterproofing in the operated ear was achieved by the next post-operative appointment and remained waterproofed throughout follow-up (data missing in two patients).

AUDIOLOGICAL DATA: Of the data available (n=16), at 12 months post-op:
- 62.5% (n=10) maintained hearing (change between -10 to +10dB)
- 12.5% (n=2) had hearing gain (>10dB)
- 25% (n=4) had hearing reduction
- 25% (n=4) had a post-op hearing level of ≤30dB.

CONCLUSIONS
1. CWD mastoidectomy with primary obliteration is a safe and reliable one-staged procedure for the treatment of cholesteatoma in children.
2. It is associated with good clinical, functional and social long term results.
3. It should be considered as the treatment of choice for cholesteatoma in children.