INTRODUCTION

The clinical course of Meniere’s disease (MD) is highly variable. The inability to predict disease progression remains a source of frustration for both patients and clinicians. The prolonged disease course and potential for symptom resolution underlie the importance of following these patients for many years and critically analyzing MD treatment outcomes. Endolymphatic sac procedures have a growing profile of safety and efficacy as a non-destructive surgical treatment for MD. The exact mechanism of its benefit is unknown and variations of the procedure continue to be debated in the literature. Recent insights into the pathophysiology of MD indicate that inflammation plays a critical role in the development of spontaneous endolymphatic hydrops. The importance of inflammation in MD is illustrated by the role that oral and intratympanic steroids play in its management.

The goal of this study is to describe a modification of the endolymphatic sac decompression with silastic shunt placement in which intraoperative steroids are delivered directly into the inner ear at the time of shunt placement. Our results provide long-term data and are supplemented with a patient questionnaire.

METHODS AND MATERIALS

Retrospective chart review of patients surgically treated with endolymphatic sac decompression and shunt placement at University Hospitals Case Medical Center in Cleveland, OH between 2002 and 2013. All adult patients met criteria for intractable definite or probable MD. Patients with possible MD or cochlear hydrops were excluded from the study. Patients had to have follow-up with either an audiogram, returned questionnaire, or both.

Preoperative and postoperative data were collected via retrospective chart review and a patient questionnaire in accordance with the IRB. The patient questionnaire supplemented clinical documentation and addressed preoperative, postoperative (18 – 24 months), and long-term (> 24 months) functional levels, tinnitus, aural fullness, subjective hearing, and quality of life. The patients were asked to report if the symptoms were better, worse, or the same after surgery.

There were four variations on intraoperative steroid delivery:
- Group A did not receive any local steroids
- Group B received an IT injection of dexamethasone prior to the postauricular incision
- Group C had dexamethasone instilled directly into the endolymphatic sac via steroid soaked gelfoam at the time of shunt placement
- Group D received dexamethasone via both the IT and direct instillation techniques.

RESULTS

A total of 124 patients underwent endolymphatic sac decompression with shunt placement, 97 of those patients met the inclusion criteria. Females were 55.6% of the patients. All patients had failed medical therapy, which included 14 (14.1%) having an in-office IT steroid injection prior to surgery. The mean age at the time of surgery was 51.8 years old (range, 22 – 76 years old). All patients underwent a mastoidectomy with wide decompression of the posterior fossa plate as well as opening of the endolymphatic sac with placement of a T-shaped silastic shunt. There were no reported intraoperative complications and no postoperative cerebrospinal fluid leaks. The mean postoperative follow-up was 34.5 months (range, 3 – 112 mo). Forty-one patients (42.3%) returned the questionnaire.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Follow-up (mo)</th>
<th>Change in Hearing Stage</th>
<th>Change in PTA (dB)</th>
<th>Change in Functional Level</th>
<th>Class A/B Verigo Control (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(n=9)</td>
<td>62.4</td>
<td>+ 0.1</td>
<td>+ 15.3'</td>
<td>- 1.0</td>
</tr>
<tr>
<td>B</td>
<td>(n=32)</td>
<td>44.0</td>
<td>+ 0.3</td>
<td>+ 7.2</td>
<td>- 1.1</td>
</tr>
<tr>
<td>C</td>
<td>(n=4)</td>
<td>17.5</td>
<td>0.0</td>
<td>- 6.1</td>
<td>- 1.7</td>
</tr>
<tr>
<td>D</td>
<td>(n=52)</td>
<td>25.1</td>
<td>+ 0.3</td>
<td>+ 7.6</td>
<td>- 2.1</td>
</tr>
</tbody>
</table>

Table 1. Summary of objective data. Group A had a statistically significant increase in PTA, indicating worse hearing. All groups had an improvement in functional level and vertigo control.

DISCUSSION

The practice of instilling steroids directly into the endolymph sac during an endolymphatic sac procedure was first described by the Japanese group of Kitahara et al. (2008). To our knowledge, we are the second group to promote this technique and the first in the United States.

The concept that steroids may improve MD control is supported by recent insights into the pathophysiology of the disease. The endolymphatic sac assists with endolymph homeostasis and also provides an immunologic response for the inner ear. The trigger for endolymphatic sac inflammation has been credited to infections, metabolic disorders, allergies, stress, and autoimmune mechanisms. The downstream effect of this inflammation, regardless of its cause, is the disruption of inner ear subepithelial blood vessels and osseous periductal channels, likely contributing to endolymphatic hydrops. This inflammatory cascade helps explain the beneficial effect of oral and IT corticosteroids in the management of MD. Likewise, applying a steroid directly into the endolymphatic sac as well as diffusion through the round window membrane during surgery may also provide additional benefit during endolymphatic sac procedures and have a long-term effect on the pathophysiology of MD.

CONCLUSIONS

Endolymphatic sac decompression with silastic shunt placement offers a safe and effective long-term treatment for intractable MD. The addition of topical steroids may mitigate a possible link between hearing decline and use of a silastic shunt. Larger studies are needed to determine if local steroids provide additional benefits during endolymphatic procedures.

REFERENCES


CONCLUSIONS

Endolymphatic sac decompression with silastic shunt placement offers a safe and effective long-term treatment for intractable MD. The addition of topical steroids may mitigate a possible link between hearing decline and use of a silastic shunt. Larger studies are needed to determine if local steroids provide additional benefits during endolymphatic procedures.

REFERENCES