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Is Endolymphatic Sac Surgery Beneficial For Meniere’s Disease?

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BACKGROUND

Meniere’s disease is characterized by episodes of recurrent vertigo, low-frequency sensorineural hearing loss, and tinnitus with or without aural fullness. Initial treatment has long consisted of low salt diet and diuretics. Betahistine, antihistamines, benzodiazepines, and corticosteroids have also been used in the medical treatment of Meniere’s. The goal of treatment is to allow patients to maintain their daily activities by reducing the incapacitating attacks of vertigo and to preserve hearing. Although 60% to 87% of patients report maintaining their daily activities with medical management, Meniere’s is well known for being associated with a strong placebo effect causing the true efficacy of these treatments to remain contested. For patients who continue having severe attacks of vertigo despite medical management, several procedures can be considered. Destructive procedures such as aminoglycoside instillation into the middle ear, vestibular or cochleovestibular nerve section, and labyrinthectomy pose a higher risk of hearing loss. Non-destructive options primarily used are endolymphatic sac surgery (ESS) and intratympanic steroid injections. ESS for Meniere’s disease was first described in 1927, and almost a century later controversy still exists about the efficacy of ESS and whether the sac should be decompressed, opened, or shunted. The purpose of this study is to explore if ESS is effective in the management of medically refractory Meniere’s disease.

LITERATURE REVIEW

There have been few randomized controlled trials (RCT) to assess the efficacy of ESS. Pullens et al. found two RCT involving a total of 59 patients and published the findings in a Cochrane Review in 2013. In one trial Bretlau et al. compared endolymphatic sac shunts to a simple mastoidectomy in a double blinded study that had a follow-up period of 9 years. There was no significant difference in symptom improvement between the ESS group and placebo group, nor were there any reported complications or side effects for either group. The active surgery group did have improved hearing compared to preoperatively while the placebo group did not. The trial by Thomsen et al. compared endolymphatic sac shunts to myringotomy and grommet, and this study was double blind until just before the intervention. The follow-up period was 1 year, and they also did not find a significant difference in symptom improvement between the ESS and placebo group. The two groups did not have a difference in hearing before or after surgery, but one patient had anacusis and another severe sensorineural hearing loss after ESS. There has been considerable criticism of these studies, statistical methods, and findings, but Pullens et al. concluded that there was a 70% overall improvement in patient symptoms for both studies no matter the intervention performed, which is consistent with the strong placebo effect characteristic of this disorder. The authors’ conclusions of the review included the possibility that any intervention, surgical or nonsurgical, could have a beneficial effect on the disease. The evidence in these trials remained insufficient to support a beneficial effect of ESS in Meniere’s disease, and additional RCT would be helpful in evaluating any surgical intervention for Meniere’s.

A 2015 systematic review by Lim et al. included analysis of 11 studies; these included one RCT, two controlled trials, and eight single arm cohort studies. These studies included different types of ESS: simple decompression with or without ballooning, insertion of shunt, and ablation of the sac. Follow-up ranged from 12 months to 13.5 years and two studies reported results with less than 2-year follow-up. Overall, 68% to 90% of patients who underwent ESS had substantial improvement to complete resolution of symptoms. Four cases of anacusis were reported for 2,287 patients. Hearing was reported stable or improved in 35% to 83% after ESS. One study showed significant improvement of vertigo and hearing
for ESS (62%) compared to intratympanic gentamicin injection (56%). The conclusion was low level III evidence to support the use of ESS in treating Meniere’s disease. There was concern for confounding due to placebo effect and natural disease progression. The recommendation was for larger, double-blind RCTs.3

Sood et al. performed a systematic review and meta analysis for sac decompression and mastoid shunt placement with or without silastic. They analyzed 36 articles and used vertigo control and hearing preservation as endpoints for short (<12 month) and long (>24 month)–term follow-up. They found that at least 75% of patients who failed medical therapy achieved vertigo control in the short and long-term with ESS that included decompression alone or with shunt placement. Long-term analysis of 22 articles with 1,419 patients had 64% to 80% stable to improved hearing results. The two procedures provided similar rates of vertigo success, but using silastic had significantly worse hearing.1

Chung et al. studied histology from 15 temporal bones from ESS patients. Endolymphatic hydrops was found in all cases. Eight of the 15 patients reported relief from vertigo after the surgery. Five were found to not have the sac exposed and four of those had symptom relief. Four of eight patients had relief from vertigo when the sac was exposed, but the shunt failed to reach the lumen. Two cases were found to have a shunt within the lumen, but neither patient had reported vertigo control. Although over half of the patients reported symptom control, there was no histopathologic evidence by which the mechanism was explained.4

Kato et al. developed a Meniere’s Disease Outcomes Questionnaire. This pilot study assessed quality of life changes in patients who underwent ESS for Meniere’s disease. There were 159 responses and they found a significant improvement in quality of life for 87% of patients. They concluded that this questionnaire could be used to assess quality of life changes for any Meniere’s disease intervention.5

BEST PRACTICE SUMMARY

Based on current literature, surgery for control of vertigo in Meniere’s disease has control rates ranging from 53% to 90% for at least 1 and up to 13.5 years. The mechanism by which surgery causes improvement is unknown, and there are not sufficient studies to elucidate a benefit of ESS over placebo. ESS can be considered in patients that are refractory to medical management as a nondestructive option as risk to hearing is low.

LEVEL OF EVIDENCE

The current literature has been reviewed and has many limitations including noncontrolled trials and short follow-up periods; however, follow-up for most studies was well beyond 2 years, which should account for the natural course of the disease. There is a large risk for bias in these studies and many included patients that would now be diagnosed with vestibular migraine which was not a recognized diagnosis when the studies were conducted. Overall there is a low level III evidence that ESS is effective and RCT are needed to determine true effectiveness versus placebo.

BIBLIOGRAPHY