

TCOMES RESEARCH AFTER POSTERIOR FOSSA VESTIBULAR NEURECTOMY

10-year experience

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Abstract

Objective: To determine if the patient's perceived outcome after posterior fossa vestibular neurectomy is similar to the surgeon's perceived outcome.

Design: A questionnaire, which addresses patient life-style, and incidence of vertigo, balance function, hearing, tinnitus, aural fullness, incidence of failures and complications, was sent to patients. If the patients did not respond, an effort was made to contact them by telephone. This report presents the results of the questionnaire and compares results, based on AAO-HNS 1995 criteria for reporting outcomes in the management of Menière's disease.

Setting: Private practice referral center.

Subjects: Patients who underwent posterior fossa vestibular neurectomy from 1978 to 1998.

Interventions: None.

Outcome measures: Patients' responses.

Results: Eighty-eight percent of patients felt that the vertigo caused by their Menière's disease was cured after surgery; 22% felt that the surgery made their hearing 'significantly worse'. After surgery, 95% felt their balance function 'rarely' or 'never' prevented them from carrying out their normal daily activities.

Conclusion: Patients' perception of outcome after posterior fossa vestibular neurectomy was similar to surgeons' and to what has previously been reported.

Introduction

Patients with Menière's disease who have episodic vertigo and hearing better than normal (within 15 dB pure-tone average and 20% speech discrimination), posterior fossa vestibular neurectomy has been our procedure of choice since 1978¹. Complications have been minimal, and no facial paralysis, meningitis, or death has occurred in our series¹⁻⁷. In numerous studies of our patients, it has been demonstrated that vertiginous attacks have been cured or improved in over 90% of patients, with preservation of hearing in most cases¹⁻⁷. Outcomes for these studies were based on the prevailing reporting

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guidelines as set by the American Academy of Otolaryngology – Head and Neck Surgery's (AAO-HNS) Hearing and Equilibrium Committee^{8,9}. In a 1990 survey of the members of the American Otological Society and the American Neurotology Society, 100% of 58 surgeons, who performed a combined total of 2820 vestibular neurectomies, were satisfied with the technique⁵. However, an important outcome measurement in any treatment modality is whether or not the patients feel better and/or consider themselves cured. In an effort to ascertain whether the patient's perception of the surgical outcome agrees with the surgeon's criteria of success, a comprehensive outcomes questionnaire was developed. In this article, the patient's perceived outcome compared with the outcome in our series of posterior fossa vestibular neurectomies, based on the 1995 AAO-HNS Committee on Hearing and Equilibrium guidelines for the diagnosis and evaluation of therapy in Menière's disease.

Materials and methods

A 63-question survey was sent out to all patients who underwent posterior fossa vestibular neurectomy through our practice from 1978 to 1998 (Fig. 1). The questionnaire addresses preoperative and postoperative vertigo, hearing level, balance function, tinnitus, and surgical complications. Some of the questions in Figure 1, which are similar to the ones shown, were deleted to save space. Seventy-eight patients underwent retrolabyrinthine vestibular neurectomy (RVN), 14 patients underwent retrosigmoid internal auditory canal vestibular neurectomy (RSG-IAC), and 126 patients had a combined retrosigmoid-retrolabyrinthine vestibular neurectomy (RRVN). A complete description of these techniques has been described previously¹⁻³. An attempt was made to contact by telephone all those patients who did not reply or whose replies were unclear or incomplete. The responses from the questionnaire formed the database for this study. All data were collected and stored on an IBM-compatible personal computer using a Microsoft Excel spreadsheet software package (Office 97 version; Microsoft Corporation, Bothell, WA).

Results

Two hundred and eighteen questionnaires were sent to patients who underwent posterior fossa vestibular neurectomy. Of those, six were deceased and a further 86 could not be located. Of the 126 questionnaires delivered, 88 (70%) were completed and returned. The questions and corresponding answers in percent are shown in Figure 1.

The 1995 recommendations of the Committee on Hearing and Equilibrium of the AAO-HNS for the evaluation of therapy in Menière's disease were used to select certain questions for closer evaluation⁹. The committee uses the reporting of the number of episodes of vertigo, hearing thresholds, word recognition, and functional level, the parameters to evaluate therapy in Menière's disease.

The following are questions that relate particularly to the 1995 AAO-HNS guidelines: Regarding vertigo, 90% of respondents described their vertigo as 'severe' either 'often' or 'all the time' prior to surgery (Question #1). Postoperatively, 88% of patients

TIGO: BEFORE SURGERY

Before surgery, my vertigo (spinning) attacks were severe:

- a) Never 0% b) Rarely 0% c) Occasionally 7% d) Often 68% e) All of the time 22%
f) Don't remember 0%

Before surgery, my vertigo attacks were mild:

- a) Never 25% b) Rarely 20% c) Occasionally 25% d) Often 22% e) All of the time 5%
f) Don't remember 2%

Before surgery, my spinning attacks affected my life style:

- a) Never 0% b) Rarely 0% c) Occasionally 12% d) Often 46%
e) All of the time 38% f) Don't remember 1%

Before surgery, I had warning of vertigo attacks:

- a) Never 32% b) Rarely 20% c) Occasionally 20% d) Often 20%
e) All of the time 8% f) Don't remember 1%

Before surgery, my spinning attacks prevented me from going to work:

- a) Never 4% b) Rarely 3% c) Occasionally 23% d) Often 42%
e) All of the time 20% f) Don't remember 4%

TIGO: AFTER SURGERY

The surgery stopped my severe vertigo attacks:

- a) Not at all 1% b) A little bit 0% c) Partially 9% d) Completely 88%
e) Don't remember 1%

After surgery, my vertigo (spinning) attacks were severe:

- a) Never 18% b) Rarely 43% c) Occasionally 31% d) Often 0%
e) All of the time 0% f) Don't remember 6%

After surgery, my vertigo (spinning) attacks occurred when I changed body position:

- a) Never 6% b) Rarely 13% c) Occasionally 66% d) Often 6%
e) All of the time 0% f) Don't remember 6% g) For a short time after surgery 0%

After surgery, my spinning attacks prevented me from going to work:

- a) Never 25% b) Rarely 33% c) Occasionally 16% d) All of the time 8%
e) Don't remember 8% f) Often 8%

The surgery helped cure my vertigo (spinning) attacks:

- a) Never 0% b) Rarely 1% c) Occasionally 1% d) Often 8%
e) Completely 87% f) Don't remember 1%

I would recommend vestibular neurectomy to treat attacks of Menière's disease:

- a) Not at all 3% b) With some reservation 20%
b) Would recommend surgical treatment without reservation 76%

The surgery was worse than the disease:

- a) Not true 77% b) A little bit 9% c) Partially 8% d) Completely 3%
b) e) Don't remember 1%

ANCE: BEFORE SURGERY

I had balance problems without vertigo attacks before surgery:

- a) Never 41% b) Rarely 12% c) Occasionally 18% d) Often 21%
e) All of the time 2% f) Don't remember 3%

- g. I had balance problems with vertigo attacks before surgery:
 a) Never 1% b) Rarely 1% c) Occasionally 10% d) Often 44%
 e) All of the time 40% f) Don't remember 1%
- h. My balance was, poor before surgery:
 a) Never 27% b) Rarely 10% c) Occasionally 23% d) Often 28%
 e) All of the time 7% f) Don't remember 2%
- i. My balance was good before surgery:
 a) Never 10% b) Rarely 14% c) Occasionally 21% d) Often 21%
 e) All of the time 27% f) Don't remember 3%

BALANCE: AFTER SURGERY

- g. The surgery affected my balance permanently:
 a) Never 23% b) Rarely 15% c) Occasionally 21% d) Often 15%
 e) All of the time 13% f) Not sure 9%
- h. My balance was poor after surgery:
 a) Never 28% b) Rarely 22% c) Occasionally 29% d) Often 10%
 e) All of the time 8% f) Not sure 1%
- i. My balance was good after surgery:
 a) Never 2% b) Rarely 10% c) Occasionally 12% d) Often 33%
 e) All of the time 35% f) Not sure 3%
- j. I have constant imbalance problems since surgery:
 a) Never 36% b) Rarely 23% c) Occasionally 21% d) Often 10%
 e) All of the time 8%
- k. My balance problems keep me from doing sports:
 a) Never 53% b) Rarely 15% c) Occasionally 15% d) Often 6%
 e) All of the time 10%
- l. My balance problems prevent me from doing daily activities:
 a) Never 60% b) Rarely 17% c) Occasionally 18% d) Often 3%
 e) All of the time 0%
- m. Do you think the surgery affected your ability to balance:
 a) Never 33% b) Rarely 28% c) Occasionally 22% d) Often 13%
 e) All of the time 2%
- n. The surgery did not affect my balance significantly:
 a) Never 28% b) Rarely 33% c) Occasionally 21% d) Often 9%
 e) All of the time 6%
- o. Do you think you have compensated for the loss of one balance nerve:
 a) Completely 48% b) Partially 42% c) Not at All 2% d) Don't know 7%
- p. Do you think vestibular neurectomy affected your balance significantly:
 a) Completely 18% b) Partially 47% c) Not at All 22% d) Don't know 11%

RING: BEFORE SURGERY

Was your hearing decreased before the surgery:

- a) Not at all 8% b) Slightly 39% c) Significantly 47% d) Don't remember 4%

RING: AFTER SURGERY

Do you think the surgery made your hearing worse:

- a) Not at all 35% b) Slightly worse 29% c) Improved 3% d) Don't know 8%
e) Significantly worse 22%

Has your hearing decreased progressively after the surgery:

- a) Not at all 24% b) Slightly 45% c) Significantly 28% d) Don't remember 1%

If your hearing was worse after surgery, did this bother you:

- a) Not at all 20% b) Slightly 58% c) Significantly 17% d) Don't remember 2%

ITUS: BEFORE SURGERY

Did you have noise in your ear before surgery?

- a) Not at all 10% b) Partially 13% c) Yes 71% d) Not sure 0%
e) Don't remember 4%

YOU MARKED "a" FOR # 31, PROCEED TO QUESTION # 36

Did the surgery make the noise in your ear better?

- a) Not at all 52% b) Partially 10% c) Yes 24% d) Not sure 9%
e) Don't remember 4%

Did the surgery make the noise in your ear worse?

- a) Not at all 54% b) Partially 12% c) Yes 16% d) Not sure 14%
e) Don't remember 1%

Do you think the surgery had any affect on the noise in the ear?

- a) Not at all 31% b) Partially 13% c) Yes 35% d) Not sure 17%
e) Don't remember 2%

Have you learned to live with the noise in your ear?

- a) Not at all 1% b) Partially 10% c) Yes 82% d) Not sure 1%
e) Don't remember 4%

Has the surgery improved the pressure in the ear?

- a) Not at all 15% b) Partially 16% c) Yes 44% d) Not sure 19%
e) Don't remember 3%

PLICATIONS FROM THE SURGICAL PROCEDURE

Did you have a complication from the surgery?

- a) No 74% b) Minor 4% c) Temporary 12% d) Permanent 7%
e) Don't know 1%

YOU MARKED "a" FOR # 37, PROCEED TO QUESTION # 40

Did the complication affect your lifestyle?

- a) Not at all 14% b) Partially 42% c) Yes 38% d) Not sure 4%

- Did the complication change the result of your surgery?
 - a) Not at all 61% b) Partially 4% c) Yes 9% d) Not sure 23%
 - e) Don't remember 0%
- Do you recommend vestibular neurectomy for treatment of this disease?
 - a) Not at all 1% b) Maybe 20% c) Completely 75% d) Not sure 2%
- Did you get Menière's disease in the opposite ear?
 - a) Yes 1% b) No 93% c) Not sure 3% d) Don't remember 1%
- Did you have headaches after the surgery?
 - a) Mild 27% b) Temporary 15% c) Severe 1% d) Permanent 1% e) None 44%
- If you had headaches, were they worse than the Menière's disease?
 - a) No 70% b) Maybe 15% c) Yes 18% d) Not sure 2% e) Don't remember 0%
- Was there pain after the surgery?
 - a) Mild 43% b) Severe 8% c) Temporary 27% d) Permanent 2%
 - e) Don't remember 18%

g. 1. Cont'd

'significantly' decreased prior to surgery (Question #27). After surgery, 35% felt that the operation had not affected their hearing, 29% felt that it had made their hearing 'slightly worse', and 22% felt that it had made their hearing 'significantly worse' (Question #28). Hearing decreased progressively 'significantly' in 28%, 'slightly' in 10%, and 'not at all' in 24% of patients after surgery (Question #29).

With regard to functional disability, 38% of patients responded 'all the time', 46% responded 'often', and 12% responded 'occasionally' when asked if the vertigo affected their lifestyle (Question #3). The vertigo prevented patients from working prior to surgery 'all the time' in 20%, 'often' in 42%, 'occasionally' in 23%, and 'rarely or never' in 7% of respondents (Question #5). Of the 12 respondents who were not 'completely' cured of their vertigo, only two felt that the vertigo prevented them from working 'often' or 'all the time' (Question #9).

After surgery, patients felt that their balance prevented them from doing sports 'all the time' in 10%, 'often' in 6%, 'occasionally' or 'rarely' in 30%, and 'never' in 53% (Question #21). After surgery, patients felt that their balance prevented them from carrying out daily activities 'all the time' in 0%, 'often' in 3%, 'occasionally' or 'rarely' in 35%, and 'never' in 60% (Question #22). A follow-up telephone interview with patients who 'occasionally' or 'rarely' felt that their balance prevented them from carrying out daily activities revealed that these patients would still have undergone vestibular neurectomy for their Menière's disease.

With regard to tinnitus, 34% felt that their tinnitus had improved at least 'partially' after surgery (Question #32). With regard to aural fullness, 60% felt that the pressure in their ears had improved at least 'partially' after surgery (Question #36).

Nineteen percent of patients felt that they had either a 'temporary' or 'permanent' complication from surgery (Question #37). Of the 21 respondents to Question #38, 10% felt that the complication affected their lifestyle. The complication most affecting

Discussion

In a study of the 78 patients who underwent RVN, 88% were completely cured of the vertigo, and an additional 7% were substantially improved⁷. In 14 patients who underwent RSG-IAC vestibular neurectomy, 90% were completely cured of their vertigo⁷. In 126 combined RRVN procedures, complete cure of vertigo was accomplished in 85%, with substantial improvement in a further 7%⁷. In a review of 118 patients who underwent vestibular neurectomy, Glasscock *et al.* showed that 95% of patients had complete or substantial cure of vertigo¹⁰. In a review of 104 patients with Menière's disease who underwent RVN, Nguyen *et al.* showed that 93% of patients had complete or substantial improvement of vertigo¹¹. In a recent study, Pappas and Pappas demonstrated complete or marked improvement of vertigo in 90% of 34 patients¹². In the present questionnaire, 88% of patients who underwent vestibular neurectomy felt that the vertigo caused by their Menière's disease was cured, which is a similar result to previous studies.

In a 1996 study on hearing results after posterior fossa vestibular neurectomy, 66% of patients who were evaluated at 18-24 months after surgery had stable or better hearing; profound hearing loss developed in 10% of patients within six months of surgery; six patients recovered to preoperative hearing levels within 24 months; and another three patients improved from the profound level at 24 months, which left 19% with permanent profound hearing loss⁶. Wazen *et al.* demonstrated preservation of pure-tone average (PTA) in 82% of patients and speech discrimination score (SDS) in 80% after RVN¹³. Pappas and Pappas were able to preserve hearing in 57% of patients at 18-24 months after surgery¹². Nguyen *et al.* found hearing to be worse in one-third of patients with regard to PTA, speech reception (SRT), and SDS¹¹. When the criteria for change included either PTA or SDS, 43% of patients had decreased hearing¹¹. Glasscock *et al.* also found that hearing decreased in 40% of patients after RVN and in 36% after RSG vestibular neurectomy¹⁰. In the present study, patients' responses demonstrated that only 22% felt that the vestibular neurectomy had made their hearing 'significantly worse'. Hearing decreased progressively after vestibular neurectomy 'significantly' in 28%, 'slightly' in 45%, and 'not at all' in 25% of patients after surgery. Patients may be more lenient with regard to hearing results after treatment for Menière's disease, since their primary problem is vertigo. In Question 7, 72% of 67 patients felt that the hearing loss after surgery bothered them either 'slightly' or 'not at all'.

The results of posterior fossa vestibular neurectomy have been particularly pleasing in terms of patient satisfaction and functional ability. Most patients are able to return to activities they had had to give up because of Menière's disease. These include activities requiring significant eye-hand coordination, such as playing golf, and activities requiring a good sense of balance, such as riding a bicycle. In some respects, this is the most consequential outcome criterium since it is the patients' inability to perform their daily activities that makes them want to have surgery. Eighty-four percent of patients felt that the vertigo affected their lifestyle 'all the time' or 'often' before surgery. In an effort to improve the objectivity when reporting functional results in Menière's patients, the 1995 Committee on Hearing and Equilibrium issued some

year and/or received compensation because of his/her disability. In a study of 126 patients who underwent the combined RRVN procedure, the average preoperative functional level was 4.2, while the average postoperative functional level was 1.3 in the same series⁷. Glasscock *et al.* found that 96% of patients after RVN and 93% of patients after RSG vestibular neurectomy claimed either mild or no disability¹¹. Pappas and Pappas found that 80% had functional levels of 1 or 2 after vestibular neurectomy¹². In the present study, vertigo prevented 62% of patients from working prior to surgery 'all the time' or 'often'. Of the 12 respondents who were not 'completely' freed of their vertigo, only two felt that the vertigo prevented them from working 'often' or 'all the time'. After surgery, 83% of patients felt that their balance prevented them from doing sports 'rarely' or 'never'. After surgery, 95% of patients felt that their balance prevented them from carrying out daily activities 'rarely' or 'never'. Tinnitus and aural fullness were not typically evaluated in our patients after posterior fossa vestibular neurectomy. However, in the present study at least a partial improvement of tinnitus was indicated by 34% of patients. A partial improvement of aural fullness was indicated by 60% of patients. At 18-24 months after surgery, Pappas and Pappas found tinnitus to be improved in 51% and aural fullness in 81% of patients¹²; Nguyen *et al.* found a 46% improvement of tinnitus and a 69% improvement of aural fullness¹¹; and Glasscock *et al.* found a 36% improvement of tinnitus and a 3% improvement of aural fullness after RVN¹⁰. These are unexpected outcomes after vestibular neurectomy, since cochlear function is not typically affected.

In previous studies, complications after posterior fossa vestibular neurectomy have been few. There have been scattered reports of cerebral spinal fluid leakage, wound infection, sensorineural hearing loss, headaches, and facial paralysis^{1-7,10-13}. In the present series, headache was the most significant complication. Headaches have been associated with drilling the posterior edge of the internal auditory canal. Over time, this problem seemed to resolve itself in most patients.

Conclusions

In general, patients' responses to outcome questions regarding vertigo, hearing, and functional impairment, were similar to our perception when using outcomes based on the 1995 AAO-HNS guidelines. Many other series have shown similar results. After 10 years of posterior fossa vestibular neurectomy, the outcomes for treating patients with Menière's disease have been satisfactory to both the patients and the surgeons.

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