Vestibular schwannoma management: current practice amongst UK otolaryngologists – time for a national prospective audit

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ABSTRACT

INTRODUCTION It is generally agreed that the successful management of a vestibular schwannoma (VS) usually involves close collaboration between a neuro-otologist and neurosurgeon. In addition, it is accepted that the experience of the team managing such tumours is one of the key determinants of outcome after surgical intervention. The aim of this study was to identify current practice in the management of such tumours amongst otolaryngologists in the UK and to observe whether such collaborative working practices exist.

MATERIALS AND METHODS A cross sectional postal questionnaire survey of consultant members of the British Association of Otorhinolaryngologists – Head and Neck Surgeons (n = 542).

RESULTS A total of 336 replies were received (62%). Of respondents, 299 consultants referred their patients to another surgeon for further management; 242 referred to another ENT surgeon (80.9%), 29 to a neurosurgeon (9.7%) and 28 to a combined team (9.4%). Twenty-eight of the responding otolaryngologists (8.6%) managed the tumours themselves, of whom 22 worked with a neurosurgeon. Of these 28 neuro-otologists, nearly two-thirds (64%) had been undertaking VS surgery for more than 10 years. The total number of patients with a VS referred to these 28 consultants during 2001 was 775, with a mean caseload of 29.8, median 23 and a range of 4 to 102 per surgeon. Seven of the 28 otolaryngologists chose their surgical approach entirely based on the size of the tumour. Eight consultants preferred the sub-occipital (SO) approach, 10 the trans-labyrinthine (TL) approach, three chose between SO and TL approaches. The majority of surgeons had a prospective, computer-based data collection and were willing to give further information about their outcomes and complications.

CONCLUSIONS Amongst the otolaryngologists surveyed in the UK, we have identified 28 neuro-otologists who undertake VS surgery. The majority work with neurosurgical colleagues, confirming collaborative practice. The wide range in caseload raises the issue of training and maintaining standards and in the first instance we recommend a prospective national audit of VS management and outcomes with our neurosurgical colleagues. This would also be of value in manpower planning particularly if a minimum caseload could be identified below which results were seen to be less good.

KEYWORDS

Vestibular schwannoma – Acoustic neuroma – Audit – Management – Collaboration

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For such a relatively rare tumour, the management of vestibular schwannoma (VS) continues to hold a remarkable fascination for both neurosurgeons and neuro-otologists. In most successful series, it would seem there is close collaboration between the otologist and neurosurgeon, each of whom brings his or her own expertise to the team. In the last 3 decades, the results of surgical intervention have been substantially improved, not only by technical advances such as the universal adoption of the operating microscope and facial

nerve monitoring, but also by the formation of cohesive and effective neuro-otology teams undertaking such surgery. In 2002 the British Association of Otolaryngologists – Head and Neck Surgeons (ENT UK) produced the collaborative consensus document *Clinical Effective Guidelines Acoustic Neuroma (Vestibular Schwannoma)*.¹ The recommendations in this report included comments on teamwork between neuro-otologists and neurosurgeons, sufficient caseload to maintain expertise and the importance of systematic audit of

outcomes. To this end, we conducted a postal survey to identify the current practice in the management of vestibular schwannoma amongst otolaryngologists across the UK.

Materials and Methods

In August 2002, all consultant members of the British Association of Otolaryngologists – Head and Neck Surgeons resident and working in the UK ($n = 542$) were sent a postal questionnaire (Appendix). This was a cross-sectional survey designed to define the practice of ENT consultants across the country in the management of patients with a vestibular schwannoma and to identify the teams involved in surgical treatment.

Results

Referral patterns

A total of 336 responses were received (62%). Nine replies were excluded, as they were either from retired practitioners or returned posts due to change of address. We

could, therefore, analyse 327 responses. The majority (299) of consultants referred their patients with vestibular schwannoma to another surgeon for management. Of these: 242 (80.9%) referred their patients to another ENT surgeon; 29 (9.7%) to a neurosurgeon; 28 (9.4%) to a combined clinic run by an ENT surgeon and a neurosurgeon (Fig. 1).

Collaborative practice

Twenty-eight (8.6%) consultants were identified as performing surgery for VS, of whom the majority (22) worked with a neurosurgeon. Four undertook surgery either independently or with a neurosurgeon. One surgeon performed the excision by himself in 90% of cases and obtained neurosurgical input in 10%. This was through necessity rather than design and is not a reflection on his philosophy regarding collaborative practice. Another otologist helped the neurosurgeons with the dissection of internal acoustic meatus alone.

Table 1 Number of patients with vestibular schwannoma referred during the surgeon's practice

Number of patients referred	Number of consultants ($n = 27$)*
Less than 100	8
100–500	15
500–1000	2
More than 1000	2

*One surgeon did not have records.

Table 2 Different referral rates of consultants during the year 2001

Number of patients referred	Number of consultants ($n = 26$)*
Less than 25	14
25–50	7
51–75	3
76–100	2

*Two consultants did not have records.

Table 3 Management plan of 767 patients seen in 2001

Treatment option	Number of patients
Observation	318
Radiotherapy	63
Microsurgery	386

Three consultants did not have records.

Experience and caseload

Eighteen out of 28 (64%) consultants had been undertaking VS surgery for more than 10 years, 6 within the past 5 years and 4 surgeons for the past 5–10 years. Tables 1 and 2 show the number of patients with a VS referred to these consultants during their practice and during 2001, respectively. The total number of VS patients referred during 2001 to the 28 neuro-otologists was 775, with a mean caseload of 29.8, median 23 and a range of 4 to 102 per surgeon (Fig. 2). Two surgeons did not specify their caseload.

Surgical approach

The various management plans of the 775 patients referred in 2001 are summarised in Table 3 and shown in detail for each surgeon in Figure 3. Twenty-one otologists were referred less than 50 cases in 2001 (Fig. 4) whilst 4 surgeons were referred more than 50 cases in that year. It is interesting to note that amongst the four otologists with the largest annual caseload, microsurgical removal of the tumours was undertaken much more frequently than referral for radiosurgery (Fig. 5). In contrast, the 21 otologists with an annual caseload of less than 50 were just as likely to serially observe tumours as intervene surgically or with radiotherapy.

Seven out of 28 chose their surgical approach entirely based on the size of the tumour. Eight preferred the retro-sigmoid (RS) approach and 6 the trans-labyrinthine (TL) route. Seven surgeons, in addition to considering the size of the tumour, also had preference for particular approaches. Of these, four otologists preferred the TL approach, one chose the TL route (75%) over the RS (25%), another undertook RS surgery (60%) over the TL approach and one otologist utilised both approaches almost equally. None of the surgeons preferred the middle fossa (MF) approach and saw it as being applicable only for highly selected cases.

Figure 3 Management plan of patients with a vestibular schwannoma in 2001 (n = 25, data not available from 3 surgeons).

Figure 4 Vestibular schwannoma management in 2001: surgeons with less than 50 cases referred per year (n = 21, data not available from 3 surgeons).

Data collection

Table 4 shows the details of method of data collection by the surgeons. The majority of the otologists (25 of 28) were willing to provide further information about the outcome and complications of VS management in the future whilst three could not do so as the detailed data collection was undertaken by their neurosurgical colleague.

Figure 5 Vestibular schwannoma management in 2001: surgeons with more than 50 cases referred per year (n = 4).

Discussion

The care of patients with a vestibular schwannoma requires multidisciplinary teamwork with access to the full range of the specialist support services that such patients may need. Centres offering this care should have an otolaryngologist and a neurosurgeon with a specialist interest and training in neuro-otology and skull base surgery as well as access to specialist facilities in stereotactic neurosurgery.¹ Several authors²⁻⁴ have pointed out the improved surgical outcome of such a team work. Our survey has identified 28 neuro-otologists

Table 4 Method of data collection

Data collection	Yes	No	No response
Prospective	21	3	4
By self	17	8*	3
Computer based	17	4	7

*In 4 hospitals, data collection was done by a neuro-surgical colleague and in one by a dedicated nurse practitioner. In 3 cases, it was not clear who collects the data.

who perform this surgery in the UK with the majority, but not all, working with a neurosurgeon.

In this survey of the 542 ENT surgeons polled, 336 replies were received (62%). We believe that the non-responders (38%) are more likely to be those consultants who do not undertake vestibular schwannoma surgery. We are aware, however, of one ENT surgeon involved in such surgery who failed to respond to the questionnaire despite several attempts to contact him.

Of those that replied, 242 otolaryngologists referred their VS patients to a neuro-otologist and a further 28 to a combined team for management. Taking into account the number of patients referred in 2001, the majority of the neuro-otologists (22 of 26, two not specifying their case load) had a caseload of less than or equal to 50 per year (mean, 21; median, 20; range, 4–50). In this group, the referral rate to these surgeons was not influenced by the number of years of their experience in undertaking VS surgery. Four surgeons received more than 50 referrals per year (mean, 76.5; median, 76; range, 52–102). Of these, three surgeons had been undertaking VS surgery for more than 10 years. The reason behind such a range of referral rates is not explained solely by the number of years of practice as the two parameters did not correlate in this survey. Several questions need to be answered with regards to caseload and service planning. Should there be a minimum number of VS procedures (or indeed cases referred to manage) per annum in order to maintain skills and competency? How does this fit in with regional variations in referral rates and regional requirements? How many centres should there be managing such patients? What constitutes a team: one otologist and one neurosurgeon, two of each or combinations thereof? It is beyond the scope of this survey to answer all these questions but these issues need to be addressed.

The literature regarding training of neuro-otologists may help to answer the question of competency and maintenance of skills. Surgeons commencing vestibular schwannoma surgery should be appropriately trained, preferably having carried out an adequate number of procedures under supervision prior to establishing an independent practice.¹ A learning curve of 20 cases was demonstrated in the study from Welling and colleagues⁵ to be necessary for attaining acceptable standards in the surgical removal of a VS by a new surgical team. Using facial function as an outcome parameter, they demonstrated a statistically significant improvement in the number of patients achieving House-Brackmann (HB) grade I facial nerve function (that is, normal function) between the first 20 patients (35% HB grade 1) and the ensuing 7 groups of 20 patients (74% HB grade 1).

In contrast, Buchman *et al.*⁶ found that about 60 cases were necessary before the new team could achieve results similar to those of highly experienced surgeons. In another study of 300 patients undergoing VS excision, 52% of the first 50 cases had satisfactory outcomes (HB grades I–III), whereas in the last 50

cases 92% had a satisfactory outcome.⁷ In reality, it would seem that irrespective of the experience gained during training, the learning curve for this type of surgery continues well into independent practice; therefore, in order to maintain acceptable standards, the team managing such tumours has to have an adequate referral case load. The precise number to be managed per year, however, is not defined (it may not be possible or indeed helpful to define it accurately) and currently this issue is open to debate.

What this survey does show is a wide range of cases referred to neuro-otologists in the UK per annum (4 to 102) and only a prospective audit amongst this group of surgeons will clarify whether the surgical outcomes of those with a small caseload fall below the acceptable standard. Alternatively, there may be some surgeons with a not so very small caseload with poor results.

Finally, with regards to the management of patients referred to the 28 neuro-otologists during 2001, 386 cases (50.3%) had their tumours removed whilst the remainder were either treated with stereotactic radiotherapy or were observed with serial imaging. Whilst documented in the results section of this paper, the relative merits of the various surgical approaches, as well as the other options (stereotactic radiotherapy and watchful-waiting) are considered beyond the scope of this paper.

This survey has highlighted the need for a national audit of vestibular schwannoma management in order to compare outcomes across centres to ensure that a uniformly acceptable standard of patient care is available nationally. According to our results, the majority of surgeons keep prospective, computer-based records of their VS cases and are willing to provide information about the outcome and complications in the future. In addition, it will be useful to define a minimum data set for prospective collection that could be audited locally. This, in turn, will facilitate the development of a national audit, allowing surgeons to monitor their results in relation to their peers.

To this end, The British Skullbase Society (BSBS) devoted considerable time to this issue at its meeting in Manchester in October 2003. At this meeting a similar survey of UK neurosurgeons was presented (Gooden *et al.*, unpublished data at the time of writing) which yielded similar observations to this survey: evidence of collaborative practice but a diverse range of caseload and an over-riding need for a prospective national audit. The meeting concluded with the setting up of a small working party within the society whose role is to construct a collaborative national prospective audit based on the observations in this study and those of our neurosurgical colleagues.

Conclusions

In the UK, the majority of ENT surgeons diagnosing a vestibular schwannoma in a patient will refer the patient to

a colleague or team with particular expertise in managing such tumours. This survey has identified 28 ENT subspecialists (neuro-otologists) who provide such a service in the UK. The majority work with neurosurgeons. There is, however, a wide range in caseload and experience and the outcomes of surgical intervention at a national level is not known. In order to address this issue and to maintain standards in the future, we recommend a national collaborative prospective audit of vestibular schwannoma management with our neurosurgical colleagues.

Acknowledgement

Parts of the data were presented at the British Skull Base Society meetings held in London in December 2002 and Manchester in October 2003 and at the 4th International Conference on vestibular schwannoma and other CPA lesions in Cambridge in July 2003.

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Appendix

Acoustic neuroma management – UK practice questionnaire

1. What is your base NHS hospital?
2. If you diagnose the presence of an acoustic neuroma in a patient, do you:
 - (i) Refer the case to a neurosurgeon for management?
 - (ii) Refer the case to another ENT surgeon for management?
 - (iii) Refer the case for radiosurgery?
 - (iv) Manage the case yourself?
 - (v) Manage the case with a neurosurgical colleague? (If you manage the case yourself, with or without a colleague, please answer the remaining questions)
3. How long have you been managing acoustic neuromas?

Less than 1 year

1–5 years

5–10 years

More than 10 years
4. How many patients with acoustic neuroma have been referred to you during your practice?
5. How many patients were referred to you for management in 2001?
6. Of the patients referred in 2001, how many:
 - (i) Are under observation with serial imaging?
 - (ii) Referred for or undergone radiosurgery
 - (iii) Are awaiting or have undergone microsurgical removal
7. For those patients who are awaiting or have undergone surgery, what is your usual surgical approach (i.e. more than 90%)?
 - (i) Sub-occipital
 - (ii) Trans-labyrinthine
 - (iii) Middle fossa
 - (iv) Depending on the individual case and tumour size
8. Is your data collection (please delete as appropriate)

(i) Prospective?	Yes/No
(ii) Undertaken by you?	Yes/No
(iii) Computer based?	Yes/No
9. Would you be willing to provide information about the outcome and complications in a subsequent questionnaire?

Yes/No
10. Would you like to receive a summary of the data collected?

Yes/No

THANK YOU