Setting the standard – UK neurosurgical acoustic neuroma practice

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ABSTRACT

INTRODUCTION The aim of this study was to determine how current practice in the UK and Ireland complies with the Clinical Effectiveness Guidelines for the Management of Acoustic Neuromas.

MATERIALS AND METHODS A survey of units and consultants using a standardised questionnaire was carried out.

RESULTS Fifty-six neurosurgeons treat acoustic neuromas in 33 out of 34 units. In 27 units, one or two surgeons specialise in this area. Caseload per annum per surgeon ranged from 2 to 30, median 15. Forty-one neurosurgeons (75%) work with an ENT surgeon. All surgeons use facial nerve monitoring during surgery. All neurosurgeons informed patients about stereotactic radiosurgery, tending to recommend it for medically unfit patients, and those with small tumours.

CONCLUSIONS Overall, 26 units (79%) and 40 surgeons (73%) met the criteria for good surgical practice. The main reasons for non-compliance were a lack of teamwork with ENT, and insufficient caseload to maintain surgical expertise.

KEYWORDS

Acoustic neuroma – Vestibular schwannoma – Practice guidelines – Surgery – Radiosurgery

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In 2002, the British Association of Otorhinolaryngologists – Head and Neck Surgeons (BAO-HNS) produced *Clinical Effectiveness Guidelines* for the management of acoustic neuromas.¹ This is a consensus document with representation from:

British Acoustic Neuroma Association
British Association of Audiological Physicians
British Association of Otorhinolaryngologists –
Head and Neck Surgeons
British Society of Audiology
British Society of Neuroradiologists
British Skull Base Society
Royal National Institute for the Deaf People
Society of British Neurological Surgeons

The report makes the following recommendations:

1. There should be teamwork between neurosurgeons and ENT surgeons with a specialist interest in neuro-otology.
2. The full range of management options should be offered to patients including interval scanning, micro-surgery and stereotactic radiosurgery.
3. Caseload should be sufficient to maintain surgical expertise.

4. Facial nerve monitoring should always be used.
5. Regular and systematic audit should be performed.
6. Appropriate supportive services should be available.

Within the guidelines of clinical governance, all British neurosurgical centres are required to audit their results, and they also have to have access to intensive care, as well as specialist neuroradiology and neuro-anaesthesia. Therefore, the main criteria for good practice from these guidelines were distilled as teamwork, offering the full range of management options, satisfactory caseload and facial nerve monitoring. We were interested in assessing the current practice in the UK and Ireland and compliance with these guidelines.

Materials and Methods

A questionnaire survey was created to establish the practice of the surgeons and their units based on the guidelines. The survey was approved and supported by the Clinical Standards Committee of the Society of British Neurological Surgeons (SBNS), which helped generate an excellent response level.

Each unit was contacted to identify the neurosurgeons that operated on acoustic neuromas. Those surgeons were then sent questionnaires to establish their practise, which included:

1. The number of cases operated on per year and what approaches were used?
2. Does the neurosurgeon operate with an ENT surgeon?
3. Is facial nerve monitoring used?
4. What treatment options were patients informed of and what is their policy for stereotactic radiosurgery?

Results

We identified 56 neurosurgeons that treat acoustic neuromas and were able to obtain satisfactory responses from all. Thirty-three out of 34 units in the UK and Ireland perform surgery for acoustic neuromas. One unit referred all patients to other centres for treatment due to a lack of adequate surgical caseload. Forty-one neurosurgeons (75%) worked in conjunction with a specialist neuro-otolaryngologist. Those that worked alone would only use a posterior fossa approach and performed 10 or fewer operations per annum. The majority of surgeons offered a range of surgical approaches. Preferred operative approaches were posterior fossa and trans-labyrinthine. Operative approach was decided subject to the case and surgeon's experience (Fig. 1). All surgeons routinely used facial nerve monitoring during surgery.

In 27 out of the 33 units that treat acoustic neuromas (82%), one or two designated surgeons sub-specialised in this work. In six, three or more surgeons performed elective acoustic neuroma surgery (Fig. 2).

Annual caseload ranged from 2–30 tumours per surgeon (median, 15; mean, 14.4; Fig. 3 and Table 1).

As expected, the annual caseload per surgeon was higher in those units with fewer surgeons sub-specialising in this area (Table 1). In those units with three or more surgeons, the annual caseload varied from 2–30 (median, 6.5; mean, 9.3; SD, 7.4) with one or two surgeons tending to

Table 1 Range, median and mean annual caseload per surgeon related to number of surgeons in unit

Number of surgeons	Range of annual caseload	Median	Mean $\pm$ SD
1	5–30	20	18.4 $\pm$ 7.8
2	2–30	17.5	15.9 $\pm$ 8.4
3	2–30	6.5	8.9 $\pm$ 7.7
4	2–20	7.5	9.9 $\pm$ 7.5

operate on the majority of the tumours. Half of the surgeons in these units operate on 5 or fewer tumours per annum.

All neurosurgeons informed patients about stereotactic radiosurgery. One unit referred all patients primarily for stereotactic radiosurgery. If they were unsuitable for this, the patients would be referred to another centre for surgery. Another unit stated that they had concerns over this treatment because they believed there to be a long-term malignant potential. Therefore they would not recommend it but did inform patients about it. We found a tendency to recommend radiosurgery in medically unfit patients, and those with small tumours less than 3 cm.

There is controversy as to what is a satisfactory caseload to develop and maintain surgical competency. We considered that few would disagree that an annual surgical caseload of less than 5 was insufficient. Based on that criterion, 26/33 (79%) units, and 40/55 (73%) surgeons met the criteria for good surgical practice. The reasons for non-compliance were a lack of teamwork with ENT, and insufficient caseload to maintain surgical expertise (Table 2).

Discussion

Acoustic neuromas are benign, slow-growing tumours that arise from the sheath of the vestibular nerve.¹ Pathologically, they are vestibular schwannomas. Overall, they represent about 6% of all intracranial tumours.¹ Most frequently, they present with unilateral hearing impairment.¹ If left untreated, the continued growth will usually cause compression of the brainstem and fourth ventricle with resultant raised intracranial pressure.¹ However, symptoms at presentation can be very varied, and may not even include hearing impairment.¹

Due to their complex relations and anatomy, surgery for acoustic neuromas is a highly specialised matter. The fact that they are benign and usually slow-growing means that surgery is usually elective. These characteristics enable patients to travel to specialist centres for treatment.

Several tools exist to aid the surgeon, one of which is the facial nerve monitor. The *Clinical Effectiveness Guidelines*

Table 2 Reasons for non-compliance with guidelines

Reason	Units	Surgeons
No ENT/neurosurgical teamwork	1	3
Annual surgical caseload	1	2
Annual surgical caseload and no ENT teamwork	6	11

consider the use of this instrument mandatory. In our study, all neurosurgeons reported using facial nerve monitoring.

The majority of units had 1 or 2 designated super-specialist neurosurgeons and most of these worked in conjunction with a specialist neuro-otolaryngologist – a teamwork approach that is considered essential by the guidelines.

A learning curve has been described in acoustic neuroma surgery with a plateau being reached between 20 and 100 cases (Table 3).^{2–6} Annual reported caseload was 2–30, with most in the range of 15–25 cases per annum. It is important that those undertaking vestibular schwannoma surgery are operating on enough cases to gain the initial experience required, and to maintain their competency in this procedure subsequently. This does then raise a question as to what would be considered a minimum annual caseload. However, this is likely to be different between an established acoustic neuroma surgeon and a trainee.

Of note, surgeons operating on more than 10 tumours per annum all complied fully with the guidelines for good practise, as did their units. Eight out of 15 surgeons operating on 5–10 tumours per year would not have complied due to lack of ENT collaboration and the consequence of this also limiting their choice of surgical approach.

Examining the pattern of practice within units we found that where 3 or 4 surgeons were operating, there was a tendency for the caseload to be sufficient for only 1 or 2 surgeons and insufficient for their colleagues. This suggests a case for further sub-specialisation to reduce the number of

Table 3 Learning curve for surgical practice

	Minimum number
Wiet <i>et al.</i> ⁶	Unspecified
Welling <i>et al.</i> ⁵	20
Moffat <i>et al.</i> ⁴	40
Buchman <i>et al.</i> ²	60
Elsmore & Mendoza ³	100

operating surgeons and hence increase their operative caseload for these tumours. It may be reasonable to suggest that the number of operating surgeons in each unit should be determined by the caseload of that unit, so that patient demands are satisfied and surgical skills are maintained.

As a result of this survey, neurosurgeons in a number of units have reported changes in their pattern of practice.

The response rate for this survey was extremely pleasing, and suggests openness amongst neurosurgeons in the UK and Ireland to audit of their practice and the consequent benefits to patients of this. This is something that is becoming increasingly important as we seek to improve patient care.

Acoustic neuroma surgery requires a comprehensive approach by different specialist teams working together. *Clinical Effectiveness Guidelines* for the management of acoustic neuromas have been published by a multidisciplinary working party. This study highlights many areas of excellence in clinical practice, but also the need for change and improvement. The challenge is now for neurosurgeons in the UK and Ireland to examine their practice and make any necessary adjustments.

Conclusions

Most surgeons and most units currently performing acoustic neuroma surgery within the UK and Ireland comply with the current recommendations for good practice. Compliance would be improved by collaboration with specialist neuro-otolaryngologists and by further sub-specialisation within neurosurgical units.

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