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Audit Articles

A confidential comparative audit of stapedectomies: results of the Royal College of Surgeons of England Comparative Audit of ENT Surgery 1994

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Abstract
This paper presents the results of a national confidential comparative audit of stapedectomy: 185 operations by 28 consultants over a two-year period were retrospectively analysed. This included 10 revision procedures. Small fenestra stapedectomies accounted for 63 per cent of the total. Thirty-nine per cent of consultants operated on the second ear. Of the 168 stapedectomies in which the hearing change was known at six months, 87 per cent achieved improved hearing, eight per cent had no change and five per cent were worse. The overall complication rate was 30 per cent with a 'dead ear' rate of two per cent.

Key words: Peer review; Otolaryngology; Stapes surgery

Method

This study formed part of the third annual Comparative ENT Audit by the Royal College of Surgeons of England (RCS). All 411 consultant ENT surgeons working in NHS hospitals in England and Wales were contacted by post and invited to submit their data on stapedectomies performed during the two years 1991 and 1992. The data was collected retrospectively and returned to the RCS on a printed proforma. The audit requested information concerning the number of procedures performed and the proportion of second ear, revision and small fenestra stapedectomies. In addition, the results of stapedectomy were analysed in terms of closure of the air-bone gap, hearing change and complications. A minimum follow-up period of six months was stipulated for this data. Confidentiality was assured by assigning a unique number to each proforma returned, identification of patient and surgeon having been removed at source.

For presentation to ENT surgeons at the RCS audit meeting, the consultant identification numbers were removed from the aggregated data and replaced by rank numbers, which were then used by surgeons to identify their position on a chart by means of an individual 'ranking sheet'. In order to display the data in the charts in an hierarchical manner, a surgeon's rank number varied from chart to chart.

Where surgeons submitted data for less than 24 months, this was represented by annotations on the charts and was taken into account when estimating the means. Two consultants operating in more than one hospital submitted separate sets of data for each location and these were combined for this report. At the final analysis, 102 sets of data were returned from 95 consultants, including 30 sets of stapedectomy data from 28 consultants.

Results

Overall figures

One hundred and eighty-five stapedectomies were reported by 28 consultants. This represented an average of about seven stapedectomies per consultant per 24 months (range one to 21 procedures). Second ear stapedectomies accounted for 18 per cent of the total and five per cent of stapedectomies were revision procedures: 63 per cent of all stapedectomies used the small fenestra technique: 11 of the 28 consultants (39 per cent) performed at least one second ear stapedectomy.

The relative number of small fenestra stapedectomies as a proportion of each consultant's total is shown in Figure 1. Fifteen of the 28 consultants (54 per cent) performed the majority of their stapedectomies using a small fenestra technique, presumably because this was their technique of choice. It is

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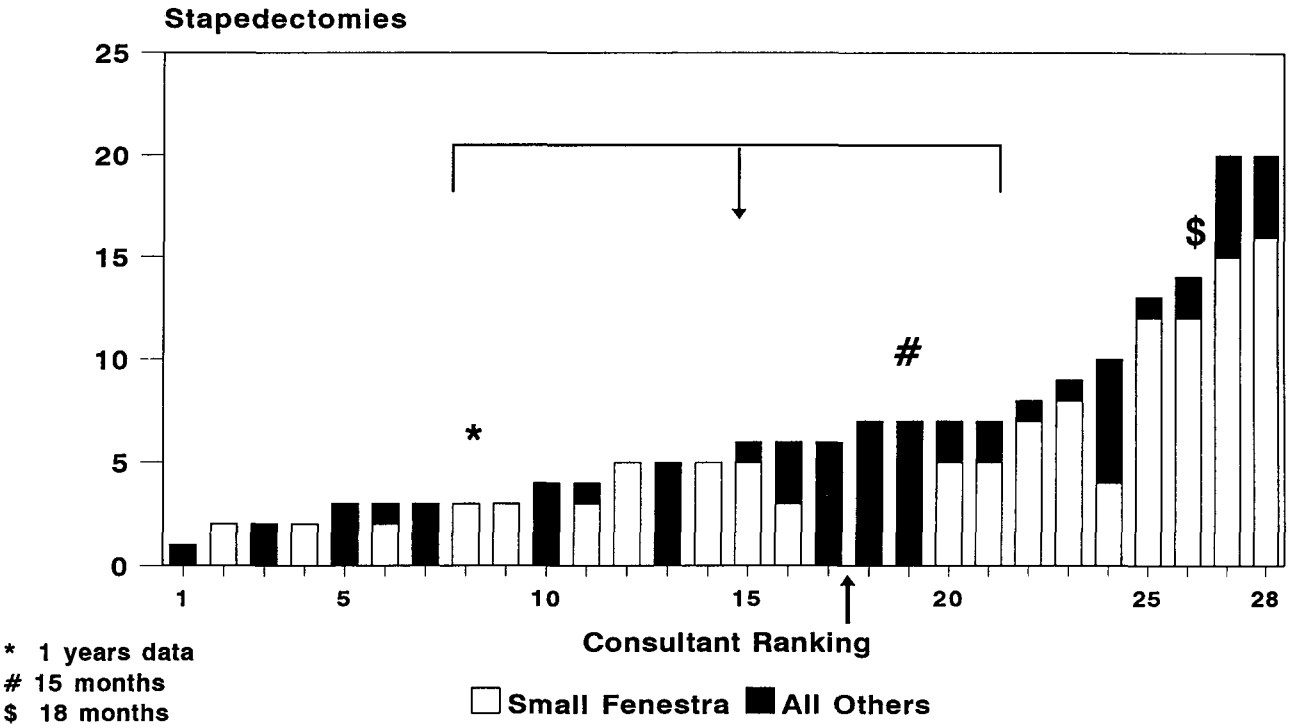

FIG. 1

Small fenestra stapedectomies as a proportion of the total performed. (Total reported: 185; mean seven per 24 months; small fenestra: 117; 63.2 per cent).

interesting to note that in the case of those surgeons performing more than five stapedectomies in 24 months, none used a small fenestra stapedectomy in all of their patients. This may reflect a change of plan necessitated by intra-operative circumstances. Nine surgeons performed all of their stapedectomies using a large fenestra technique.

Closure of the air-bone gap (Table I)

Surgeons were asked to compare the pre-operative bone conduction with the post-operative air conduction over a range of frequencies to produce an average value. The suggested frequencies were 500, 1000, 2000 and 4000 Hz.

In 10 per cent of patients the gap closure at six months was unknown. Removing the unknown results, 39 per cent of stapedectomies achieved complete or over-closure of the air-bone gap and 34 per cent achieved closure to within 10 dB at six months.

TABLE I

STAPEDECTOMY: AIR–BONE GAP CLOSURE. TOTAL KNOWN NUMBERS WITH AIR–BONE GAP CLOSURE REPORTED WAS 166

	Total numbers reported	As percentage of total
Numbers with complete/ overclosure	65/166	39.2%
Numbers with closure to within 10 dB	56/166	33.7%
All others	45/166	27.1%

TABLE II

STAPEDECTOMY: KNOWN HEARING CHANGE. TOTAL KNOWN NUMBER WITH HEARING CHANGE REPORTED WAS 168

	Total numbers reported	As percentage of total
Improved	146/168	86.9%
No change	14/168	8.3%
Worse	8/168	4.8%

Hearing change (Table II)

Perhaps more pertinent in terms of patient satisfaction was the actual hearing change, calculated by comparing post-operative air conduction with pre-operative air conduction averaged over the same frequencies.

'Improved hearing' was defined as an improvement of more than 10 dB on the pre-operative air conduction and 'worse' as an average post-operative air conduction at least 10 dB below the pre-operative value. 'No change' represented a post-operative value between +10 and -10 dB of the pre-operative hearing.

TABLE III

STAPEDECTOMY: COMPLICATIONS. TOTAL NUMBER OF COMPLICATIONS REPORTED WAS 56; COMPLICATION RATE 30.3 PER CENT

Complication	Total numbers reported	As percentage of total (range)
Temporary vertigo	16	8.6% (0–46.2%)
Persistent vertigo	3	1.6% (0–33.3%)
Temporary taste disturbance	10	5.4% (0–40.0%)
Persistent taste disturbance	4	2.2% (0–20.0%)
Dead ears	4	2.2% (0–50.0%)
Others	19	10.3% (0–33.3%)

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Nine per cent of results were unknown at six months. If the unknown results were removed, 87 per cent of 168 stapedectomies achieved improved hearing, eight per cent no change and five per cent worse hearing at between six and 36 months.

Complications (Table III)

In total 56 complications were reported from 185 procedures, a complication rate of 30 per cent. Although no guidelines were issued as to the meaning of 'temporary' and 'persistent', it was assumed that surgeons had defined a symptom as persistent if it was present at six months.

There were three cases of persistent vertigo and four cases of persistent taste disturbance. Two per cent of all stapedectomies suffered a profound sensorsineural hearing loss (dead ear). All four dead ears were from different consultants and as a ratio of number of cases performed by that surgeon in the two-year period were one in 10, one in nine, one in six and one in two.

Discussion

The results of this audit in terms of hearing change closely conform with published results from individual surgeons with an interest in stapedectomy. Shea (1985) quoted improved hearing in 85 per cent of the ears he had operated on, slight improvement in 10 per cent, and some degree of sensorineural loss in five per cent, in which two per cent suffered a total hearing loss. Our figures were 87, eight and five per cent, with a dead ear rate of two per cent.

Further comparison with published rates of immediate sensorineural deafness suggest that our cohort of otolaryngologists seemed to fare no worse than the dedicated otologist. Smyth and Hassard (1978) recorded a rate of 3.5 per cent in 713 operations, Kaplan and Shambaugh (1961) quoted four per cent and Morrison (1962, 1987) in his series of 1000 stapedectomies recorded rates of four per cent for his first 50 cases, two per cent for the next 50, zero per cent for the next 500 and 0.25 per cent for the subsequent 400.

The results are very similar to those from a British teaching hospital (Leighton *et al.*, 1991). In the Oxford retrospective study of 179 stapedectomies performed over a 17-year period, closure of the air-bone gap to within 10 dB was achieved in 73 per cent of ears for consultants and in 79 per cent of ears for trainees. In this audit 73 per cent of stapedectomies (performed by consultants and trainees) achieved closure to within 10 dB. The Oxford dead ear rate was three and four per cent for consultants and trainees respectively.

We specified a minimum follow-up period of six months in order to submit data on hearing status. In nine per cent of all stapedectomies the hearing status at six months was unknown. It is known that the majority of cases of sensorineural deafness occur in the peri-operative or immediate post-operative period. In addition Smyth *et al.* (1980) in a long-term follow-up of 715 stapedectomies, recorded an average deterioration in mean hearing threshold over 10 years of only 3 dB for small fenestra operations (0.3 mm Teflon) and 10 dB for large fenestra operations.

Thus it is reasonable to suggest that six months is an unnecessarily long follow-up period for the purpose of assessing the success or failure of a stapedectomy.

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