

Audit of the incidence of persistent perforation of the tympanic membrane following grommet removal or extrusion

G. B. TODD (Salisbury)

Abstract

The incidence of persistent perforation following grommet removal or extrusion in 210 ears was assessed, and found to be zero per cent. Collar button grommets were retained longer than Shepard grommets, and the percentage of ears requiring two or more tube insertions was 51.9 per cent.

Key words: Tympanostomy tube insertion; Tympanic membrane, perforation; Audit

Introduction

As a result of an audit assessing the incidence of persistent perforation following T-tube removal or extrusion (completed November 1991), it was decided as policy to insert T-tubes as a tertiary procedure after two grommet insertions. In addition a follow-up audit was undertaken with the following objectives:

1. To assess the incidence of persistent perforation following grommet removal or extrusion and compare against published standards.
2. To observe whether the incidence of persistent perforation was related to:
 - (a) The grade of surgeon who carried out the operation.
 - (b) The length of time the grommets remained in the ear.
 - (c) Whether the grommets were spontaneously extruded or surgically removed.
3. To compare the length of time two different types of grommet are retained in the ear, to a standard of nine months.
4. To assess the incidence of persistent perforation following grommet removal or extrusion where two or more grommets have been inserted.

5. To assess the number and percentage of ears requiring two or more tube insertions.

In the literature, the rate of persistent perforation following grommet removal or extrusion varies from 0.5 to 3 per cent (Table I).

Method

A retrospective audit was carried out on all patients who had grommets inserted between the first of April 1987 and the thirty-first of March 1988 which were subsequently extruded or surgically removed and who were then followed-up. Patients who had moved from the area (two) or repeatedly did not attend clinic appointments (four) were therefore eliminated from the study. Patients were identified from the theatre log book and OPCS coding. A 99 per cent retrieval of case notes was achieved. Patients who had two or more tubes inserted, both before and after the period of study, were noted. Both private and N.H.S. patients of all ages were included in the sample.

Results and discussion

Objective 1: incidence of persistent perforation in grommets inserted once in period of study

TABLE I

RESULTS OF PREVIOUS SERIES

Authors	No. of ears	Persistent perforations	Percentage
Mawson and Fagan (1972)	202	10.5	0.5
Birck and Mravec (1976)	2327	14	0.6
Pappas (1974)	1460	13	0.9
Curley (1986)	1086	10	0.9
Schmidt and van Bolhuis (1965)	200	3	1.5
Hughes <i>et al.</i> (1974)	838	13	1.5
McLelland (1980)	697	13	1.9
Kilby <i>et al.</i> (1972)	52	1	2
MacKinnon (1971)	165	5	3

TABLE II

INCIDENCE OF PERSISTENT PERFORATION FOLLOWING GROMMET INSERTIONS

Number of patients studied:	N.H.S.	105
	Private	13
	Total	118
Number of grommets inserted: (once in period of study)	N.H.S.	185
	Private	25
	Total	210
Number of perforations	N.H.S.	0
	Private	0
	Total	0
Percentage of persistent perforation:		0

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TABLE III

NUMBER OF GROMMETS EXTRUDED AT SIX MONTHLY INTERVALS

Months	Shepard	Collar button	Total
0-6	69	1	70
7-12	101	11	112
13-18	13	4	17
19-24	2	4	6
25-30	0	1	1
31-36	1	3	4
Totals	186	24	210

TABLE IV

COMPARISON OF EXTRUSION RATES OF SHEPARD AND COLLAR BUTTON GROMMETS

Percentage number of grommets extruded in six months:	
Shepard	69/186 = 37.1 per cent
Collar button	1/24 = 4.2 per cent
Total	70/210 = 33.3 per cent
Percentage number of grommets extruded in 12 months:	
Shepard	170/186 = 91.4 per cent
Collar button	12/24 = 50.0 per cent
Total	182/210 = 86.7 per cent

TABLE V

PERCENTAGE OF GROMMETS RETAINED FOR MORE THAN NINE MONTHS

Shepard	78/186 = 42 per cent
Collar button	18/24 = 75 per cent

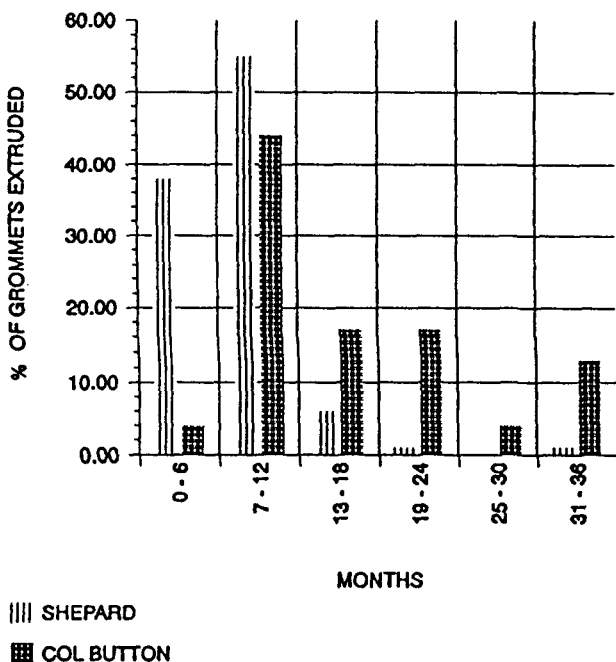


FIG. 1

Comparison of grommet retention time.

A total of 213 grommets were inserted during the period of study (Table II). Persistent perforation was defined as a perforation of the tympanic membrane not healing within six months. Three patients whose tympanic membrane was perforated before grommet insertion were excluded, leaving a sample of 210 grommets. Therefore, the zero percentage rate of persistent perforation was

below the published standard of 0.5 to 3 per cent and met the objective standard of zero per cent.

Objective 2

As there were no perforations the second objective was not carried out.

Objective 3: length of time grommets are retained in the ear; comparison of Shepard and collar button grommets

The indicator was that grommets should be retained in the ear for nine months. The standard was 100 per cent. The audit revealed a difference in results of the two different types of grommet used (Tables III and IV).

With a sample size of 630 children aged 0-12 years over a two-year period, Curley (1986) found at the six-month review that 45.8 per cent of grommets had been extruded increasing to 80.8 per cent at a year. Of the grommets used in this study 94.8 per cent were Shepard. In Salisbury, 33.3 per cent of grommets were extruded at six months and 86.7 per cent at a year. However, in this study 91.4 per cent of Shepard grommets were extruded at twelve months.

The standard for grommet retention was set at nine months. Although the sample size of collar button grommets was small, the results demonstrate that collar button grommets are retained for longer in the ear. Only 42 per cent of Shepard grommets met the standard of remaining in the ear for nine months or more (Table V and Fig. 1).

Objective 4: the incidence of persistent perforation following two or more grommet insertions

The standard was zero per cent. All ears had grommets

TABLE VI

NUMBER OF EARS WITH GROMMETS INSERTED AS FURTHER PROCEDURES

Secondary procedure:	N.H.S.	24
	Private	5
	Total	29
Tertiary procedure:	N.H.S.	7
	Private	0
	Total	7
Quaternary procedure:	N.H.S.	1
	Private	0
	Total	1
Total number of reinsertions:		37
Number of perforations:	N.H.S.	0
	Private	0
	Total	0
Percentage of persistent perforation		0

TABLE VII

NUMBER AND TYPES OF TUBES INSERTED AS PRIMARY PROCEDURES ONLY

Number of ears having primary grommets inserted:	N.H.S.	84
	Private	17
	Total	101
Number of ears having primary T-tubes inserted:	N.H.S.	0
	Private	0
	Total	0
Total number of ears with primary tubes inserted:		101

TABLE VIII

NUMBER AND TYPES OF TUBES INSERTED AS SECONDARY PROCEDURES

Number of ears having secondary grommets inserted:	
N.H.S.	24
Private	5
Total	29
Number of ears having secondary T-tubes inserted:	
N.H.S.	45
Private	2
Total	47
Total number of ears with secondary tubes inserted:	
	76

TABLE IX

NUMBER AND TYPE OF TUBES INSERTED AS A TERTIARY PROCEDURE

Number of ears having tertiary grommets inserted:	
N.H.S.	7
Private	0
Total	7
Number of ears having tertiary T-tubes inserted:	
N.H.S.	18
Private	0
Total	18
Total number of ears with tertiary tubes inserted:	
	25

TABLE X

NUMBER AND TYPE OF TUBES INSERTED AS A QUATERNARY PROCEDURE

Number of ears having quaternary grommets inserted:	
N.H.S.	1
Private	0
Total	1
Number of ears having quaternary T-tubes inserted:	
N.H.S.	6
Private	1
Total	7
Total number of ears with quaternary tubes inserted:	
	8

inserted during the period of study and further grommets inserted either before or after this operation (Table VI). There were no persistent perforations in any ears in which grommets had been inserted two or more times. The zero per cent standard was, therefore, met.

Objective 5: the number and per cent of ears requiring two or more tube insertions

Seventy-six ears had tubes inserted as a secondary procedure only, 25 required three intubations and eight required four (Tables VII, VIII, IX, X and Fig. 2). A total of 210 ears had tube insertions between the first of April 1987 and the thirty-first of March 1988. Of these 109 (51.9 per cent) were carried out as a second or further procedure; much higher than in other series, which ranged from 12.5–39 per cent (Mackinnon, 1971; Mawson and Fagan, 1972; Pappas, 1974; McLelland, 1980; Curley, 1986) (Table XI and Fig. 3).

Conclusion

The rate of persistent perforation of the tympanic membrane following grommet extrusion or removal was zero per cent, well below the standard of 0.5–3 per cent. Inser-

ting grommets two or more times did not affect the rate of perforation of zero per cent.

Seventy-five per cent of collar button grommets met the standard of being retained in the ear for nine months as opposed to 49.3 per cent of Shepard grommets.

The percentage of ears which had tubes inserted once was 48.1:36.2 per cent of ears had secondary tube inser-

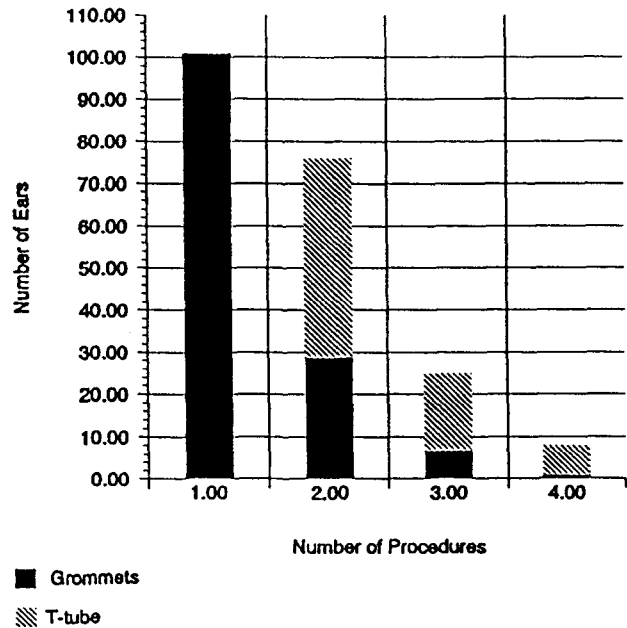


FIG. 2

Number of grommets and T-tubes inserted as primary, secondary, tertiary and quaternary procedures.

TABLE XI

PERCENTAGE OF EARS HAVING TUBES INSERTED AS PRIMARY, SECONDARY, TERTIARY OR QUATERNARY PROCEDURES

Total number of ears included:	210
% of ears having only primary tube insertion:	101/210 = 48.1 per cent
% of secondary tube insertions:	76/210 = 36.2 per cent
% of tertiary tube insertions:	25/210 = 11.9 per cent
% of quaternary tube insertions:	8/210 = 3.8 per cent
Total number of ears having tube reinsertions: 109/210 = 51.9 per cent	

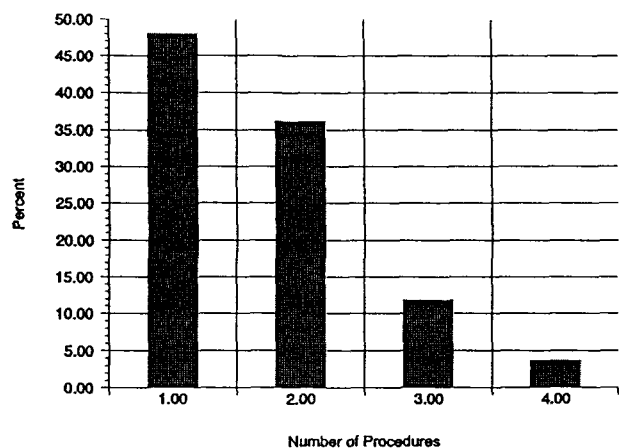


FIG. 3

Percentage of ears having primary, secondary, tertiary or quaternary tube insertions.

tions: 11.9 per cent tertiary insertions: 3.8 per cent quaternary insertions: 51.9 per cent of ears required tube reinsertions.

Change of practice

This audit confirms the policy of inserting T-tubes as a tertiary operation following two grommet insertions. Shepard grommets are no longer being used in the Salisbury Hospitals.

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Address for correspondence:

Mr G. B. Todd, F.R.C.S.,
Department of Otolaryngology,
Salisbury District Hospital,
Salisbury,
Wiltshire SP2 8BJ.