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Glue under pressure: A bad prognostic sign for recurrence of otitis media with effusion

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Abstract

One hundred and thirteen children with bilateral otitis media with effusion (OME) underwent myringotomy and insertion of Shah grommets. They were classified into three groups according to the presence or absence of 'glue under pressure' unilaterally or bilaterally. The follow up period ranging between 18 and 32 months determined the comparative rate of recurrence of OME and the number of grommet reinsertions. This study shows a significantly higher incidence of recurrent OME, requiring grommet reinsertion, in ears with glue under pressure (60 per cent) compared to those with glue not under pressure (7.4 per cent). Thus it was possible to identify a subset of children with OME who have a poorer prognosis for recurrence and who should be treated with long-stay grommets in the first instance.

Introduction

Otitis media with effusion (OME) is the commonest cause of childhood hearing impairment in the United Kingdom (Ramsden *et al.*, 1977). Since Armstrong (1954) initiated the treatment of OME with polyethylene ventilation tubes, large numbers of children have been treated in this way. For example, in 1985 an estimated 59,160 in England and Wales underwent myringotomy with or without grommet insertion. The surgical treatment varies, and consists of a combination of myringotomy, ventilation tube (grommet) insertion and adenoidectomy (Lesser *et al.*, 1986). Bluestone (1982) advocated grommet insertion as the initial surgical treatment of OME, rather than adenoidectomy and myringotomy to avoid recurrent or residual middle ear fluid. Hibbert and Stell (1982) found no correlation between adenoid mass and the presence of effusion, although Maw and Parker (1989) have shown reduced rates of recurrence following adenoidectomy plus grommets.

The use of grommets is increasingly recognized as conferring no long-term benefit to hearing nor protection against attic retraction (Skinner *et al.*, 1988). Grommets also increase the development of tympanosclerosis and areas of atrophy in the tympanic membrane (Slack *et al.*, 1984). For these reasons it is important to make every effort to minimize the number of grommets inserted.

One of us (CW) had noticed that some children had 'glue under pressure', that is, where the middle ear effusion spurted out through the myringotomy incision, and that this seemed to lead to an increase in the need for further grommets. The aim of this study is to determine whether 'glue under pressure' is indeed a bad prognostic sign for recurrence of middle ear effusion.

Patients and methods

One hundred and thirteen children whose ages ranged from one to 10 years were studied. All had bilateral otitis media with effusion (OME) and were treated with myringotomy and grommet insertion. These children had their operation between 1 January 1989 and 31 December 1989 and satisfied the following criteria to be included in this study:

(1) No previous history of ear surgery.
(2) Operation was done by a single consultant otologist.
(3) A positive finding of a bilateral middle effusion at myringotomy.
(4) Insertion of one type of grommet—Exmoor Shah (A6 | T5WW).
(5) A minimum follow up period of 18 months after surgery.

The children were diagnosed as having OME by otoscopy, tympanometry and audiometry. Operation was decided upon when medical treatment had failed to resolve the middle ear effusion. All children had their operation within two weeks of being seen in the outpatient department. Shah grommets were inserted under a general anaesthetic through a radial incision in the anterosuperior quadrant of the tympanic membrane. Some children had their tonsils and/or adenoids removed for other specific indications.

The patients were followed up in the outpatient department on a regular basis and examined by otoscopy, tympanometry, and audiometry. The site and patency of the grommets, the condition of the tympanic membranes, and the hearing level were tested. Children with persistent recurrence of middle ear effusion and deafness were treated by further grommet insertion.

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TABLE I
SEX DISTRIBUTION BETWEEN THE THREE GROUPS

	Bil. GUP N = 28	Uni. GUP N = 9	Bil. Glue N = 76
Male	19 (68.9%)	5 (55.5%)	38 (50%)
Female	9 (32.1%)	4 (45.5%)	38 (50%)

TABLE II
AGE DISTRIBUTION AT TIME OF FIRST GROMMET INSERTION

	1–3	4–5	6–7	8–10
Bil. GUP N = 28	6 (21.5%)	19 (67.8%)	3 (10.7%)	0 (0%)
Uni. GUP N = 9	2 (22.2%)	3 (33.3%)	4 (44.5%)	0 (0%)
Bil. Glue N = 76	12 (15.7%)	30 (39.6%)	20 (26.3%)	14 (18%)

TABLE III
ADENOID AND TONSILS REMOVED AT TIME OF FIRST GROMMET INSERTION

	Bil. GUP N = 28	Uni. GUP N = 9	Bil. Glue N = 76
Ads.	6 (21.4%)	2 (22.2%)	20 (26.3%)
Ads. & Ts.	1 (3.5%)	0 (0%)	1 (1.3%)

TABLE IV
INCIDENCE OF RECURRENT OME AFTER FIRST GROMMET INSERTION

Patients	Bil. GUP N = 28	Uni. GUP N = 9	Bil. Glue N = 76	Total N = 113
2nd grommet	18 (64.3%)	3 (33.3%)	6 (7.8%)	27 (24%)
3rd grommet	2 (7.1%)	0 (0%)	1 (1.3%)	3 (2.6%)

TABLE V
RECURRENT OME IN EARS WITH GUP/GLUE

Ears	GUP N = 65	Glue N = 161	Total N = 226
2nd grommet	39 (60%)	12 (7.4%)	51 (22.6%)
3rd grommet	2 (3.1%)	2 (1.2%)	4 (1.8%)

TABLE VI
EXTRUSION OF SHAH GROMMETS

Time (months)	Grommet (out)	Grommet (in)
18	150 (87.2%)	22 (12.8%)
24	163 (94.7%)	9 (5.3%)
30	172 (100%)	0 (0%)

The follow up period ranged from 18 to 32 months. Children were discharged after extrusion of both grommets and the return of normal hearing.

Results

One hundred and thirteen children were included in this study after satisfying the entrance criteria. They were classified into three groups, depending on whether the middle ear effusion was under pressure or not, as follows:

Group 1: Those with bilateral glue under pressure
Bil. GUP = 28 (24.8 per cent)

Group 2: Those with unilateral glue under pressure
Uni. GUP = 9 (7.9 per cent)

Group 3: Those with bilateral glue not under pressure.
Bil. Glue = 76 (67.3 per cent)

Table I shows the sex distribution between the three groups. In the first group 68.9 per cent were males, while in the other two groups the number of both males and females was similar.

The age distribution is demonstrated in Table II. The majority of children (67.8 per cent) with bilateral glue under pressure were between 4–5 years.

Table III shows the number of children who had their adenoids and tonsils removed at the time of first grommet insertion. In children who did not have adenoidectomy, there was 61.9 per cent recurrence of OME in the Bil. GUP group (n = 21) compared to 7.2 per cent in the Bil. Glue group (n = 55). Those who had adenoidectomy, there was 66.6 per cent recurrence of OME in the Bil. GUP group (n = 6) compared to 10 per cent in the Bil. Glue group (n = 20). These percentages shows that recurrent OME is significantly higher in the Bil. GUP group whether the adenoid is removed or not.

The incidence of recurrent OME in the three groups is shown in Table IV. 64.3 per cent of children with Bil. GUP had recurrent OME in both ears demonstrated at surgery for second grommet, while 7.1 per cent required a third grommet. 33.3 per cent of children with Uni. GUP had recurrent OME on the same side. Only 7.8 per cent of children with Bil. Glue had recurrence of OME requiring a second pair of grommets and 1.3 per cent needed a third. Statistical analysis using chi-square test showed a significant difference in the incidence of recurrent OME between the first and third groups demonstrated at surgery for insertion of a second grommet ($\chi^2 = 36.65$, $P<0.001$).

Table V shows the difference in the recurrence rate of OME between ears with GUP and those with simple glue. Sixty per cent of ears with GUP required a second grommet while only 7.4 per cent of ears with simple glue had a second grommet.

Eighty-six children (76 per cent) had no recurrence of the OME after the first grommet insertion. Table VI shows the extrusion rate of Shah grommets in these children after 18, 24 and 30 months. 12.8 per cent of grommets remained *in situ* and patent after 18 months, and all grommets were extruded after 30 months.

Discussion

Nothing seems to have been written previously about 'glue under pressure' nor its effects on recurrence rates of OME following extrusion of the first set of grommets. This study demonstrates that this sub-group of children

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have a higher incidence of recurrent OME, requiring more grommet reinsertions, than those with simple glue. In 113 children with bilateral OME, 24.8 per cent had bilateral GUP, 7.9 per cent had unilateral GUP, and 67.3 per cent had bilateral glue not under pressure. 67.8 per cent of children with bilateral GUP were between 4–5 years. A second grommet was inserted in 64.3 per cent of children with bilateral GUP, in 33.3 per cent of children with unilateral GUP, and in 7.8 per cent of children with bilateral glue not under pressure.

Gibb and Mackenzie (1985) compared the extrusion rates of different types of grommets and found that Shepard tubes were expelled within six to nine months. The Shah tube tended to extrude between nine to 15 months and the longest retained pattern proved to be the Sheehy collar button, *in situ* 15 to 24 months. In our study, a conventional Shah grommet was used in all children to eliminate the variability in extrusion rate of different types of grommets. At 18 months after insertion, 87.2 per cent of Shah grommets were extruded and at 30 months all were extruded.

In our study, 22.6 per cent of ears with bilateral OME required a second grommet while 1.8 per cent required a third grommet. However, 60 per cent of ears with GUP required a second grommet and 3.1 per cent required a third grommet. In ears with glue not under pressure, 7.4 per cent had a second grommet and 1.2 per cent had a third grommet. Tos and Poulsen (1976) reported 23 per cent reinsertions at five to eight years follow up. Kilby *et al.* (1972) at a two-year follow up found that 30 per cent of the ears had effusion after one grommet insertion. Barfoed and Rosborg (1980) at four to seven years follow up found that 61 per cent of ears had repeated grommet insertions. All seem to agree that OME may be a condition lasting several years and that long term control and treatment are mandatory. The ideal period of intubation for the majority of children with OME remains to be determined, however, every effort should be made to minimize the number of grommet insertions.

Because of the significantly higher incidence of recurrent OME in children with 'glue under pressure', they should be treated with the longer retained pattern of grommets to try to decrease the number of reinsertions.

Key words: Otitis media with effusion

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