For Debate . . .

Glue ear: the new dyslexia?

NICK BLACK

Abstract

Several factors have led to the current epidemic of surgery for glue ear in children, including the widespread introduction of audiometry; greater recognition of the presence of fluid in the middle ear by general practitioners; the availability of more otolaryngologists; and technical advances such as the availability of antibiotics to treat postoperative infections and of flanged tympanostomy tubes (grommets). The need of surgeons to fill the vacuum caused by the decline in the number of adenotonsillectomies, and the fact that a diagnosis of glue ear legitimises the continued use of these operations, may also have contributed to the increase. Finally, glue ear may provide parents with a medical explanation of their children's poor educational performance, as the term dyslexia did in the past. The high social and public costs of this operation demand a reappraisal of its increasing use.

Introduction

The current epidemic of surgery for glue ear in children caused the rate of surgery to increase more than twofold in some regions between 1975 and 1983.¹ The predominant view of otolaryngologists is that the epidemic reflects an increase in the prevalence of the condition in the general population. This paper presents data from a wide variety of sources, all of which suggest that the epidemic reflects an increase in the apparent rather than the real prevalence of the condition.

Glue ear is a condition in which non-suppurative fluid accumulates in the middle ear.^{2,3} The viscosity of the fluid varies from thin serous liquid to thick tenacious glue, but the exact consistency becomes apparent only at the time of operation, when the contents of the middle ear are examined. Glue ear is primarily a condition of childhood: 90% of cases occur in children under the age of 10. In most children it is a self limiting condition, usually causing temporary, minor conductive deafness. In some children, however, it may persist for months or even years without any symptoms.

Contrary to current clinical opinion, glue ear is not a new condition. Clear descriptions of it are documented from the 1860s onwards, and there is even some evidence of earlier recognition.⁴ Current belief about its novel status has probably been caused by the frequent changes of name that the condition has undergone. Over 50 names have been documented over the past 120 years.

Methods of treatment have altered over the years.⁵ Surgery was used in the late 19th century but was then abandoned until the 1940s and 1950s in the United States and the 1960s in the United

Kingdom. The most common operations now performed entail a combination of myringotomy (incision of the ear drum), aspiration of any fluid in the middle ear, and adenoidectomy. Tympanostomy tubes (grommets) are often inserted in the ear drum with the aim of maintaining postoperative ventilation of the middle ear. The long term effectiveness of surgery is unknown.

The rate of surgery is the last step in a sequence that includes the morbidity of the condition; the rate of referral from general practitioners to specialists; and, finally, the rate of operation of the surgeons (fig 1). Each rate may be affected by a host of factors, some of which relate to the characteristics and behaviour of patients and some to the availability and organisation of health services.

FIG 1—Components of rate of surgery.

Factors affecting rate of surgery

MORBIDITY

The view of many clinicians that the morbidity of glue ear has increased cannot be investigated directly as reliable information for studying secular trends is not available. Indirect evidence, however, suggests that any changes in morbidity have been insignificant: firstly, the speed at which the rate of surgery has altered is inconsistent with the changing prevalence of a chronic condition.¹ The only exception to this would be if the prevalence of a major aetiological factor had dramatically increased, a proposal for which there is no current scientific support. Secondly, the distribution of the

Department of Community Medicine and General Practice, University of Oxford, Oxford

NICK BLACK, MD, MFCM, community physician

Correspondence to: Dr Nick Black, District Department of Community Medicine, Manor House, Headington, Oxford OX3 9DZ.

operation among the social classes is not consistent with the distribution of related conditions of the middle ear.¹ Purulent discharge from the middle ear, scarring and perforation of the ear drum, and audiometric performance are all more prevalent in the lower compared with the higher social classes.^{6,7} By contrast, a child in social class I is almost twice as likely to undergo surgery for glue ear as a child in social class V.

The third and final piece of evidence comes from a study of geographical variation in rates of surgery between health districts. Striking inconsistencies between adjacent districts suggest that the rate of surgery has little direct relation with the level of need in the population. For example, the rate in Oxfordshire (79.9/10 000 population aged 0-9) is over three times that in the neighbouring district of Cheltenham (23.7/10 000). This difference can be explained largely by differences in the clinical judgment of the surgeons. The influence of this clinical judgment on the value or appropriateness of surgery for treating glue ear is reflected in the variations in secular trends that have taken place in five health districts in the Oxford region. Figure 2 shows how the first year in which the rate of surgery for glue ear exceeded that for tonsillectomy "spread" around the region: Oxfordshire in 1974, Wycombe in 1976, West Berkshire in 1978, Northampton in 1979, and Kettering in 1984.

FIG 2—Secular trends in rates of surgery for glue ear and tonsillectomy/10 000 children aged 0-9 in five health districts in Oxford Regional Health Authority 1975-83.

RATE OF PRESENTATION

There are several explanations of why the rate at which children present to general practitioners may have increased since the 1960s. The first is that since the second world war all types of health services for children have increased with a commensurate increase in the rate at which conditions present. In the case of glue ear, this was encouraged by the widespread introduction of audiometry during the 1950s, about 10 years before the start of the epidemic of surgery.⁸ A similar trend occurred in the United States, where audiometry was introduced in the 1940s and the epidemic of surgery began in the 1950s. Audiometry performed in schools is often hampered by a lack of suitable conditions for examination. This gives rise to false positive cases because the ambient noise levels are often too high.⁹ There has also been a tendency to overestimate the objectivity and underestimate the subjectivity of the test.

Awareness of glue ear by the laity, especially parents, has also increased. A study of the influence of the family's health culture (health beliefs,

attitudes, and behaviour) suggested that children in certain families are more likely to be diagnosed as suffering from glue ear, rather than recurrent acute otitis media, than are children in other families.¹⁰ Consequently, these children are more likely to be treated surgically rather than medically. Children with an older sibling who has undergone surgery for glue ear are also at increased risk of having surgery themselves (table). Curiously, this association holds only if the older sibling is of the same sex. Aspects of the family's health culture may also partly explain the distribution of the operation among the social classes. The high rates of surgery among higher social classes may result from middle class parents seeking to attribute to medical reasons their child's failure to meet their expectations for development and education. This is reflected in the recent introduction of private screening clinics for educational underachievement, which have reported that 99% of the children screened suffer from glue ear.¹¹ This has led to the suggestion that surgery for glue ear is the "new dyslexia" (Linnie Price, personal communication).

Estimates of relative risk associated with history of ear problems in older siblings in patients and controls (unmatched analysis)

	No (%) of cases	No (%) of controls	Relative risk
<i>Male and female children</i>			
No of children	81	84	
History in all older siblings:			
Recurrent acute otitis media	20 (25)	33 (39)	0.52
Glue ear	22 (27)	14 (17)	1.81
<i>Male children only</i>			
No of children	48	46	
History in all older siblings:			
Recurrent acute otitis media	11 (23)	15 (33)	0.61
Glue ear	12 (25)	5 (11)	2.70
No of children	27	21	
History in male older siblings:			
Recurrent acute otitis media	6 (22)	8 (38)	0.46
Glue ear	7 (26)	1 (5)	6.68*
No of children	21	25	
History in female older siblings:			
Recurrent acute otitis media	5 (23)	7 (28)	0.77
Glue ear	5 (23)	5 (20)	1.19
<i>Female children only</i>			
No of children	33	38	
History in all older siblings:			
Recurrent acute otitis media	9 (27)	18 (47)	0.42
Glue ear	10 (30)	9 (24)	1.36
No of children	19	19	
History in older male siblings:			
Recurrent acute otitis media	6 (32)	9 (47)	0.53
Glue ear	5 (26)	7 (37)	0.60
No of children	14	19	
History in older female siblings:			
Recurrent acute otitis media	3 (21)	9 (47)	0.30
Glue ear	5 (36)	2 (11)	4.55

*p<0.01.

Recurrent acute otitis media defined as several attacks of acute otitis media treated with antibiotics.

REFERRAL OF CHILDREN FOR SPECIALIST ATTENTION

The recognition of glue ear by general practitioners has increased since the 1940s and 1950s, partly as a result of greater awareness of the condition and possibly because of the postwar refresher courses held for general practitioners in all aspects of medical care. Moreover, many doctors going into general practice after the second world war had gained wartime experience of diagnosing barotrauma, an acute condition in which fluid collects in the middle ear as a result of increased atmospheric pressure (a common consequence both of the development of submarines and of unpressurised flight at increasingly high altitudes). The rate of referral has also increased as specialist otolaryngology services have become more readily available: the provision of whole time equivalent consultant surgeons has doubled since 1969 (fig 3). Finally, differences in rates of referral between the social classes probably account for some of the distribution of surgery among the social classes. In several ear, nose, and throat conditions the rate of referral of people from social class I is higher than that of people from social class V.¹²

RATE OF SURGERY

Since the 1960s a change has occurred in the clinical criteria for surgical treatment. The shift from non-surgical treatment has partly reflected technical advances: the availability of antibiotics to treat postoperative middle ear infections and the development of a tympanostomy tube that can remain in place for several months.

A diagnosis of glue ear may also have been used to legitimise adenotonsillectomies during the 1950s and 1960s. Otolaryngologists came under increasing professional and public criticism for their widespread use of

FIG 3—Number of whole time equivalent consultant ear, nose, and throat surgeons for every million population (England and Wales 1949-81). Source: Department of Health and Social Security.

adenotonsillectomy in children with recurrent sore throats.¹³ If, however, at the time of operation the surgeons were able to show the presence of fluid in the middle ear by carrying out myringotomy then they could ascribe the tonsillectomy to aural symptoms rather than symptoms of the throat.¹⁴ Carrying out tonsillectomies for aural complaints was beyond both public and professional reproach. Another factor promoting surgery for glue ear was the decline in the number of tonsillectomies performed, which left a professional vacuum. The importance of this can be judged by the fact that although the national rate for tonsillectomy in England and Wales stopped falling around 1975, the rate of surgery for glue ear continued to increase.¹

Discussion

The current epidemic of surgery for glue ear appears to reflect an increase in the apparent rather than the real prevalence of the condition. There are at least three reasons why we should be concerned about this. The first is that the long term effectiveness of surgical treatment is not known: there is an urgent need for well designed randomised controlled trials of the various surgical procedures. Secondly, the use of tympanostomy tubes may possibly cause long term harm.¹⁵ In one study nearly half the children who had tubes inserted were found to have tympanosclerosis of the ear drum in the year or two after the operation.¹⁶ The long term consequences of this condition are uncertain, but long term effects on hearing cannot be ruled out. Thirdly, resources currently in use

for treating glue ear are not available for other purposes. An estimate in 1981 suggested that £50 million was being spent on adenoidectomy alone.¹⁷ Finally, glue ear is not a new phenomenon. There have already been three epidemics of myringotomy. The first took place before 1700, the second lasted from 1790 to 1820, and the most recent lasted from 1860 to 1890. On the basis of the duration of the last two epidemics the current epidemic might last 30 years—that is, until the 1990s—in the United Kingdom.

Some ear, nose, and throat surgeons have become increasingly concerned about the rising rate of surgery, but the alternative to operating is to accept therapeutic nihilism, which, they believe, would be failing to help children in need. Despite this many are concerned about being party to a soaring rate of surgery, a familiar experience given the history of tonsillectomy. The route of a path between nihilism and a surgical epidemic of doubtful value is poorly signposted. Indiscriminate use in the 1790-1820 epidemic led Schwartz to call for "the one grain of wheat to be separated from the chaff."¹⁸ It may be time to start winnowing again.

References

- Black NA. Surgery for glue ear—a modern epidemic. *Lancet* 1984;i:385-7.
- Scott-Brown. *Diseases of the ear, nose and throat*. Vol 2. *The ear*. 4th ed. London: Butterworths, 1979.
- Maran AGD, Stell PM. *Clinical otolaryngology*. Oxford: Blackwell Scientific Publications, 1979.
- Black NA. Is glue ear a modern phenomenon?—a historical review of the medical literature. *Clin Otolaryngol* 1984;9:155-63.
- Black NA. Fashion, science and technical change: the history of the treatment of glue ear. *Clin Otolaryngol* (in press).
- Davie R, Butler N, Goldstein H. *From birth to seven. The second report of the national child development study (1958 cohort)*. London: Longmans, 1972.
- Blaxter M. *The health of children*. London: Heinemann, 1981.
- Stephens SDG. Hughes' audiometer. *Br J Audiol* 1979;13 (suppl 2):11-12.
- Lescouffair G. Critical view on audiometric screening in school. *Arch Otolaryngol* 1975;101:469-73.
- Black NA. The 'health culture' of families as an influence on the use of surgery for glue ear—a case-control study. *Int J Epidemiol* (in press).
- Feinmann J. BUPA's glue ear under-achievers' clinic arouses controversy. *Medical News* 1983;15:17.
- Royal College of General Practitioners, Office of Population Censuses and Surveys, and Department of Health and Social Security. *Morbidity statistics from general practice 1970-71, socioeconomic analysis*. London: HMSO, 1982.
- Woodward JF. The changing practice of otolaryngology. *Arch Otolaryngol* 1956;64:486-513.
- Davison FW. Prevention of recurrent otitis media in children. *Ann Otol, Rhinol Laryngol* 1966;75:735-45.
- Mortensen EH, Lildholdt T. Ventilation tubes and cholesteatoma in children. *J Laryngol Otol* 1984;98:27-9.
- Kilby D, Richards SH, Hart G. Grommets and glue ears: two-year results. *J Laryngol Otol* 1972;86:881-8.
- Stell PM. Adenoidectomy. *Clin Otolaryngol* 1981;6:1-3.
- Roosa STJ. *Treatise on the diseases of the ear*. 1st ed. New York: William Wood and Co, 1873.

(Accepted 14 March 1985)

What action is advised for a nurse who has handled blood contaminated swabs from a patient with hepatitis caused by hepatitis B virus?

Hepatitis B virus may be present in all body secretions of a carrier but direct contact with blood and blood products forms the greatest potential risk in terms of handling.¹ Transmission of virus usually requires direct blood to blood contact—for instance, by accidental needlestick.² Unless the nurse has an open wound³ (cuts, abrasions, or active skin lesions such as eczema or psoriasis) no immediate specific action need be taken apart from thorough washing of hands and nails. The Immunisation Practices Advisory Committee for postexposure immunoprophylaxis⁴ recommends passive immunisation (hepatitis B immunoglobulin) for penetrating wounds—for instance, bites, percutaneous injury (needlestick)—or exposure to ocular or mucous membrane but not for closed skin contact with blood alone. General safety guidelines for health care personnel include the use of gloves when handling contaminated materials such as linen, dressings, etc, in addition to covering cuts or open wounds with waterproof dressings.⁵ As a timely reminder for the future, the nurse should be considered for active immunisation if she is at special risk of contact with known high risk carriers.—ELIZABETH FAGAN, lecturer/honorary senior registrar, liver unit, London.

1 Dienstag JL, Ryan DM. Occupational exposure to hepatitis B virus in hospital personnel: infection or immunization. *Am J Epidemiol* 1982;115:26-39.

2 Seef LB, Wright EC, Zimmerman HJ, et al. Type B hepatitis after needle-stick exposure: prevention with hepatitis B immune globulin. *Ann Intern Med* 1978;88:285-93.

3 Guadagnino V, Ayala F, Chirrianni A, et al. Risk of hepatitis B virus infection in patients with eczema or psoriasis of the hand. *Br Med J* 1982;284:84.

4 Morbidity and Mortality Weekly Report. Recommendations of the Immunisation Practices Advisory Committee. Post exposure prophylaxis of hepatitis B. *MMWR* 1984;33:285-9.

5 Advisory Committee for Health and Safety Commission. *Disposal of hospital waste*. London: DHSS, 1982. (HN/82)22.)

Do pneumococcal pneumonia and jaundice often occur together? If so what is the link?

The association of lobar pneumonia and jaundice has long been recognised and is said to be more common in Africans and American blacks. The topic has been well reviewed by Tugwell and Williams who prospectively studied 125 Nigerian patients with lobar pneumonia, of whom 28 also developed jaundice.¹ Among jaundiced patients there was a pronounced predominance of males and of G6PD deficiency. There was no single mechanism to explain jaundice, which was due to a combination of active haemolysis, hepatocellular damage, and cholestasis. Hepatitis B virus infection was not a factor. Jaundice was unrelated to the serotype of pneumococcus, the severity of pneumonia, or the length of history before institution of antibiotic treatment. Recovery was similar in jaundiced (93%) and in non-jaundiced patients (97%).—ROGER WILLIAMS, consultant physician and director of liver unit, King's College Hospital, London.

1 Tugwell P, Williams AO. Jaundice associated with lobar pneumonia. *Q J Med* 1977;46:97-181.