

Paediatric day-stay myringoplasty: a review of 74 consecutive cases

C. RYAN, M.R.C.S., R.HARRIS, M.R.C.S., T. HUNG, F.R.C.S., J. KNIGHT, F.R.C.S.

Abstract

Day-case surgery is particularly attractive for children, allowing post-operative recovery in the safe environment of the family home. Myringoplasty using the traditional method of underlay temporalis fascia is usually performed as an in-patient. From 1995 to 2000, 74 myringoplasties were performed in a dedicated paediatric day surgery unit at the Mayday University Hospital. We have retrospectively reviewed the outcome results of these procedures and reported them here. Only three patients required admission overnight (four per cent) and six grafts failed (8.5 per cent) complying with accepted standards. This series suggests that day-case surgery is a safe and desirable practice for children undergoing myringoplasty. However, there should be the facility for admission if required.

Key words: Ambulatory Care; Ear, Middle; Surgical Procedures, Elective

Introduction

There is ongoing and increasing pressure to minimize the use of health service resources where possible. However this cannot be to the detriment of the patient. As outlined in the NHS Plan¹ the focus of the modern health service is on the patient's experience and our ability to provide the best quality of care for them. As with all surgical procedures myringoplasty in this patient group must be both effective and advantageous. A survey of consultant members of the British Association of Otolaryngology Head and Neck Surgeons on the management of mucosal chronic suppurative otitis media in the paediatric population showed a wide diversity of opinion, particularly with regard to minimum age.² The reported success rate of surgical closure of tympanic membrane perforations in children has also been extremely variable, however current articles have shown it to be a valid treatment modality.^{2,3} Myringoplasty using an endaural or post-aural approach and temporalis fascia underlay technique is usually associated with an overnight stay rather than day surgery. This accommodates the use of a pressure head bandage, prevention of exuberant activity post-operatively, observation for bleeding, and recovery from anaesthesia. However, within all surgical specialties there are recommendations to increase the ratio of day surgery to in-patient admissions and this is reinforced in The Royal College of Surgeons of England's revised guidelines for day surgery published in 1992.⁴

Throughout the literature there are increasing numbers of reports of alternative, less invasive methods of myringoplasty needing shorter periods of post-operative stay and of techniques which can be performed in the out-patient clinic obviating the need for any period of hospitalization at all.^{5–11} Unfortunately, many of these techniques are not suitable for a paediatric population. In this paper we report our experience of paediatric myringoplasty using general anaesthesia and the conventional temporalis fascia underlay technique. These procedures were undertaken in the Dolphin Unit at Mayday University Hospital, Surrey, UK, which is a centre set up in 1994 and dedicated to paediatric day-case surgery.

Materials and methods

We have reviewed consecutive children undergoing unilateral myringoplasty during the years 1995–2000. In no case was any other procedure performed during these operations. Children were seen in out-patients and placed on the waiting list after discussion with their parents. There were no formalized exclusion criteria although post-operative overnight paediatric admission could be arranged if felt necessary by the surgeon. One week prior to surgery the child and parents were seen on the day-care unit for nursing pre-assessment to ensure the need and fitness for surgery, and to familiarize the family with the unit. Children were admitted on the morning of surgery and seen by the surgeon and anaesthetist. All patients underwent general anaesthesia. The

TABLE I

Pre-operative assessment

- 1 week prior to surgery on paediatric day-case unit
- Assessed by paediatric nurses and anaesthetist
- Paediatric admission can be arranged if medically or socially needed
- Patient information leaflet provided

Operative technique

- Endaural approach
- Underlay temporalis fascia graft
- BIPP external auditory canal dressing
- No head bandage used
- Wound closed with subcuticular absorbable suture

Anaesthetic technique

- Pre-medication – Stemetil ± Temazepam
- Induction – Propofol, Fentanyl, Suxamethonium
- Endotracheal intubation and intravenous fluids
- Maintenance – inhalational anaesthesia
- Antiemetic – Ondansetron, Droperidol
- Analgesia – IM Codeine, PR Paracetamol and Diclofenac

Post-operative care

- Early mobilization and oral intake encouraged
- Minimum observation period 6 hours
- Paracetamol for post-operative analgesia

procedure was performed using an endaural (or rarely post-aural) approach and a temporalis fascia underlay graft. Patients were then observed on the unit for six to eight hours prior to discharge. Perioperative information leaflets were provided, however, follow-up telephone calls were not routine practice. More detail on the day-case surgical protocol is provided in Table I. Patients were then followed in out-patients after two weeks when aural packing was removed and Sofradex ear drops prescribed for one week. Subsequent follow-up appointments were at one, six and 12 months, and if the graft had successfully taken by this time, the patient was discharged. We have recorded patient and operative demographics, graft success rate, post-operative admission rate and pre- and post-operative audiometry. Statistics were performed by Student's *t* test. Statistical significance was accepted as $p < 0.05$.

Results

Over the six-year period reviewed 65 children underwent 74 unilateral myringoplasties, with no other associated procedure. Ossiculoplasties or any form of mastoid procedure were excluded from the review. Ages ranged from seven to 16 with an

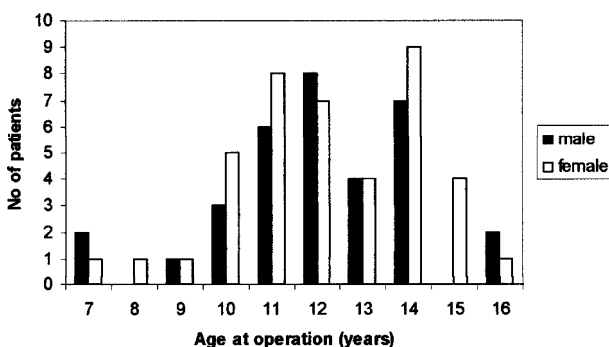


FIG. 1

Age and sex distribution of children undergoing myringoplasty.

TABLE II
PATIENT DEMOGRAPHICS

Sex	Male	Female
	33 (45%)	41 (55%)
Side of operation	Right	Left
	33 (45%)	41 (55%)
Revision operation	Yes	No
	3 (4%)	71 (96%)
Site of perforation	Posterior	Anterior
	12 (15%)	62 (84%)

average of 11.7 years (Figure 1). The distribution of sex, side of operation, revision surgery and site of perforation is shown in Table II. An anterior perforation was defined as one anterior to the handle of the malleus, and this may have been present pre-operatively or converted to anterior after removal of tympanic membrane tympanosclerosis. The operative time ranged from 45–135 minutes with an average of 71 minutes. Surgery was performed principally by one consultant (55 procedures, 74 per cent). The remaining 19 (26 per cent) myringoplasties were performed by registrars (17), and other consultants (2). Post-operative admission onto the paediatric ward was required by three (four per cent) children. One child had persistent wound ooze and one a minor wound haematoma which settled with ice and pressure during admission. A third child was admitted overnight due to insufficient post-operative time for the necessary observation period. All of these children were discharged home the following day. No patients required re-admission after discharge. Post-operative complications noted on follow-up review, other than graft failure, were seen in four (5.4 per cent) patients and these are listed in Table III. Sixty-five perforations were successfully closed at the time of the last out-patient review, six had a residual perforation and three patients were lost to follow-up. This translates to a success rate of 91.5 per cent. Of the six failed grafts, two were posterior perforations and four anterior. The ages of patients whose graft failed were seven to 14 years with an average of 11.5. All patients had pre-operative thresholds recorded, and 64 had post-operative thresholds. Averages of air conduction at 500 Hz, 1, 2 and 4 kHz are displayed in Figure 2. Analysis of the 64 patients with pre- and post-operative audiograms showed improvement at each frequency was statistically significant, 500 Hz ($p = 0.004$), 1 kHz ($p = 0.01$), 2 kHz ($p = 0.004$), 4 kHz ($p = 0.001$).

Discussion

Day case surgery is increasingly a part of ENT practice. The Royal College of Surgeons of England Comparative Audit Service in 1998 published an

TABLE III

Post-operative complications (4 patients)	Management
• Dehiscence of inferior end of endaural wound	Dressings
• Wound infection	Oral antibiotics
• Otorrhoea (2 patients)	Ear drops

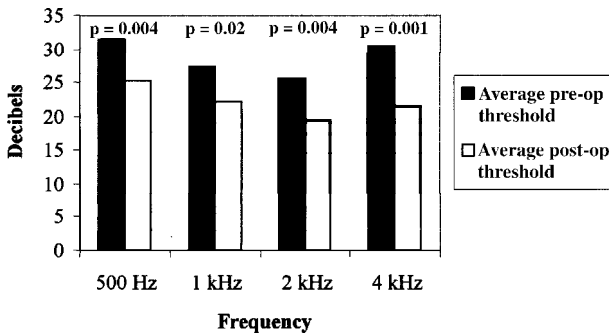


FIG. 2

Air threshold levels pre and post myringoplasty.

audit of ENT day surgery in England and Wales.¹² Twenty-one consultants contributed to this audit which revealed a mean day surgery rate of 31 per cent of all ENT surgery. Out of 3 962 reported day-case procedures only 14 (0.4 per cent) were formal myringoplasties. In the paediatric population there have been a number of reports advocating the safety of various day-case procedures, including two series from this department involving adenoidectomy¹³ and tonsillectomy.¹⁴ Parental satisfaction with day-case paediatric ENT surgery for a wide variety of procedures has been found to be high.¹⁵ However, caution has also been expressed regarding the need to tailor surgical practice to the patient population served by that unit, paying particular attention to adverse social and domestic conditions prevalent in some areas.^{16,17} We were fortunate in our series not to encounter difficulty with post-operative care at home, re-attendance to the General Practitioner or hospital, or parental acceptance of same day surgery for their child. Conventional myringoplasty is not at present a standard otolaryngological day surgical procedure. Our results, however, would suggest that this procedure is a safe and desirable option for children and should be considered for inclusion as an accepted day-case procedure.

In the current political climate there is continual pressure to maximize the use of available resources while providing a quality service for our patients. In an attempt to do this there are many published articles documenting various less time and cost consuming techniques for tympanic membrane perforation closure. These aim to shorten hospital stay, reduce operative time, reduce expenditure and introduce increasingly less invasive methods. Proposed day surgical techniques include fat graft myringoplasty under local anaesthesia,⁵ or general anaesthesia,⁶ permealatal tragal perichondrium graft⁷ and permealatal simple underlay myringoplasty.⁸ There are also alternative methods reported for use in the out-patient department. Such techniques are temporalis fascia homografts,⁹ homografts with fibrin glue,¹⁰ and temporalis fascia with free skin graft from the ear canal.¹¹ However many of these techniques are limited by the size and position of the perforation. Child and parental acceptance of local anaesthesia for tympanic membrane closure is also very unlikely in most instances. Therefore, at present, it remains optimal in this population to

persist with conventional successful surgical practice, while improving and promoting available day surgical facilities.

In 1996 Benson-Mitchell *et al.*¹⁸ reported their experience of day-stay myringoplasty in 21 consecutive patients using the temporalis fascia underlay technique and general anaesthesia. Thirty patients had initially been seen in the out-patient department, five were excluded for day-surgery, and four remained on the waiting list at the time of writing. No patients considered appropriate for day surgery required overnight stay and the day-stay perforation closure rate was 86 per cent. However, only six of the patients included in this series were children.

There have been no previous reports dedicated to following a paediatric population undergoing conventional temporalis fascia underlay myringoplasty as a day case. In our series there were no initial exclusion criteria for day surgery, however there was the facility for post-operative paediatric admission if felt appropriate. No patients were planned for overnight admission. Only three out of 74 patients (four per cent) required unexpected admission. Of these, one was due to protocol in the early stages and by limiting procedures to morning operating lists as is current practice, this child would not have required admission. Anaesthesia in our unit is specifically aimed at same day discharge and in this series no children required admission for post-operative nausea and vomiting. Our overall post-operative admission rate for medical reasons was therefore 2.7 per cent. This conforms with the recommended post-operative day-surgery admission rate of two to three per cent according to *Guidelines on Day Case Surgery* from The Royal College of Surgeons of England, 1992.⁴

A recent prospective audit published by the Royal College of Surgeons of England Comparative Audit Service, 1999 was compiled from information provided by 73 England and Wales Consultants regarding the outcome of all myringoplasties over a period of one year. The resulting mean graft take rate was 82.2 per cent.¹⁹ The successful closure rate in our day surgery series compares favourably with this at 91.5 per cent. We also found that the average age of children with successful myringoplasties did not differ from those with graft failure suggesting that any increased frequency of otitis media in younger children did not affect success rate in this series. However, our youngest patient was seven years old and eustachian tube dysfunction may not have played a significant role amongst our patients. It is also interesting that our anterior perforations had a higher success rate than posterior (93.5 vs 83 per cent). Average air conduction audiometry results at 500 Hz, 1 kHz, 2 kHz and 4 kHz were all statistically improved post-operatively compared with pre-operative readings, although improvement of hearing was not a primary aim of the operation in our current series.

Children represent a special population of patients in which day surgery is particularly desirable. Recovery is generally more rapid at home, the

child is less distressed and a return to other siblings is beneficial to both the child and parents. In our series, only three out of 74 (four per cent) patients required overnight stay and this was easily facilitated by pathways already in place to accommodate such a situation. In all day-case surgery there will be a small percentage of patients requiring post-operative admission and it is important that the route for admission be made clear. From our experience, we conclude that myringoplasty using traditional methods can safely be performed as a day-case procedure in children, without compromising post-operative outcome.

Acknowledgement

We would like to acknowledge the anaesthetic contribution made by Dr P. Walton and Dr T. Waddell.

References

- 1 *The NHS Plan: A Plan for Investment, A Plan for Reform*. London: Department of Health 2000
- 2 Lancaster J, Makura Z, Porter G, McCormick M. Paediatric tympanoplasty. *J Laryngol Otol* 1999;**113**: 628–32
- 3 Pignataro L, Berta L, Capaccio P, Zaghis A. Myringoplasty in children: anatomical and functional results. *J Laryngol Otol* 2001;**115**:369–73
- 4 Commission on the Provision of Surgical Services. *Guidelines for Day Case Surgery* 1992 London: Royal College of Surgeons of England
- 5 Kaddour H. Myringoplasty under local anaesthesia: day case surgery. *Clin Otolaryngol* 1992;**17**:567–8
- 6 Mitchell RB, Pereira KD, Lazar RH. Fat graft myringoplasty in children – a safe and successful day-stay procedure. *J Laryngol Otol* 1997;**111**:106–8
- 7 Quraishi M, Jones N. Day case myringoplasty using tragal perichondrium. *Clin Otolaryngol* 1994;**20**:12–4
- 8 Sakagami M, Mishiro Y, Tsuzuki K, Seo T, Sone M. Bilateral same day surgery for bilateral perforated chronic otitis media. *Auris Nasus Larynx* 2000;**27**:35–8
- 9 Kane R, Moffat D, O'Connor A. Outpatient myringoplasty. *J Laryngol Otol* 1980;**94**:1387–93
- 10 Naganuma H, Okamoto M, Shitara T, Tokumasu K. Myringoplasty in the outpatient clinic. *Acta Oto-Rhino-Laryngologica Belg* 1994;**48**:59–65
- 11 Chanvimalung W. A comparison of outpatient and standard myringoplasty. *Ear Nose Throat J* 2000;**79**:113–7
- 12 Brown PM, Fowler S, Ryan R, Rivron R. ENT Day Surgery in England and Wales – an audit by the Royal College of Surgeons (Eng) Comparative Audit Service. *J Laryngol Otol* 1998;**112**:161–5
- 13 Leighton SEJ, Rowe-Jones JM, Knight JR, Moore-Gillon VL. Day case adenoidectomy. *Clin Otolaryngol* 1993;**18**: 215–9
- 14 Hellier WPL, Knight J, Hern J, Waddell T. Day case paediatric tonsillectomy: a review of three years experience in a dedicated day case unit. *Clin Otolaryngol* 1999;**24**:208–12
- 15 Hicklin L, Tostevin PMJ, Wyatt ME. Parental satisfaction with paediatric day-case ENT surgery. *J Laryngol Otol* 1999;**113**:1072–5
- 16 Kishmore A, Haider-Ali AM, Geddes NK. Patient eligibility for day case paediatric adenotonsillectomy. *Clin Otolaryngol* 2001;**26**:47–9
- 17 Drake-Lee A, Weiner G. Suitability of children for ENT day case procedures. *Clin Otolaryngol* 1997;**22**:215–8
- 18 Benson-Mitchell R, Kenyon GS, Gardiner Q. Day-stay myringoplasty. *J Laryngol Otol* 1996;**110**:421–4
- 19 Kotecha B, Fowler S, Topham J. Myringoplasty: a prospective audit study. *Clin Otolaryngol* 1999;**24**:126–9

Address for correspondence:

Mr J. Knight,
ENT Consultant Surgeon,
Mayday University Hospital,
Thornton Heath,
Surrey, CR4 7YE, UK.

E-mail: jeffknight@mayday.nhs.uk

Miss C. Ryan takes responsibility for the integrity of the content of the paper.

Competing interests: None declared
