

Ventilation tube insertion using topical anaesthesia in children

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Abstract

Topical anaesthesia using EMLA cream is an established anaesthetic technique for ventilation tube insertion in adults. We report its use in 103 children (age range 3-12 years). Failure occurred in seven patients (6.8 per cent); complications occurred in two patients and were of a minor nature. This technique appears well tolerated provided the operator avoids the use of suction and allows a cream penetration time of greater than two hours. The use of a 'T' myringotomy is also recommended, to reduce tension on the drum at tube insertion.

Introduction

The use of EMLA cream providing topical anaesthesia for ventilation tube insertion in adults is now well recognized (Whittet *et al.*, 1988; Timms *et al.*, 1988). This paper reports the successful use of this technique in children.

The acceptance of topical anaesthesia for ventilation tube insertion in the paediatric population has widespread ramifications. In England and Wales otitis media with effusion is the most common reason for childhood surgery (Black 1984). An estimated one million children receive ventilation tubes in the USA each year, where this is the most common minor surgical procedure performed under general anaesthetic (Bluestone, 1982).

The use of EMLA cream has already revolutionized the insertion of intravenous cannulae in children (Maunuksela and Korpela, 1986), but for any anaesthetic technique to work in children the local anaesthetic effect must be total. The pharmacology of EMLA cream is such that a peak effect is not reached before one hour and continued anaesthesia may be achieved for up to four hours (Evers *et al.*, 1985). Therefore efficacious use of this topical anaesthetic must incorporate an adequate penetration time of at least one hour and preferably greater than two hours.

We report a case series of 109 unselected children who had myringotomy with or without tube insertion using EMLA cream topical anaesthesia.

Patients

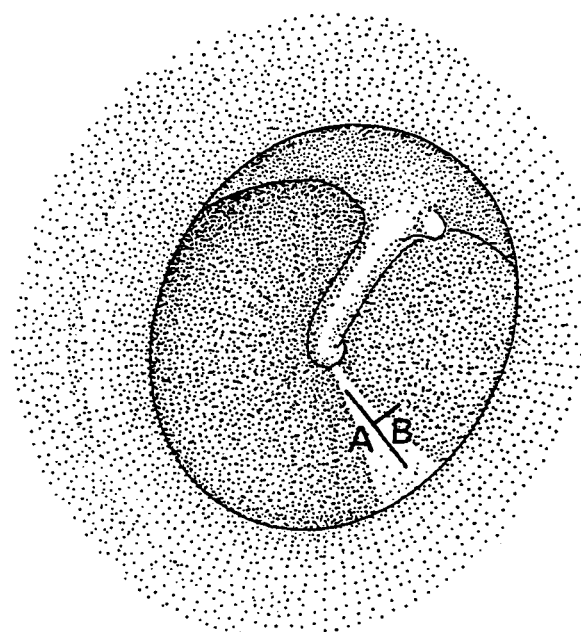
Between June 1989 and June 1990, 103 patients with an age range of 3-12 years (mean seven years) were included in the study. There were 46 females and 57 males. The series comprised all patients attending the senior author's clinic who were offered a trial of tube insertion using topical anaesthesia, and who consented. The main indications for surgery were otitis media with effusion and recurrent acute otitis media. Others included: tube and foreign body removal, and perforation debridement.

Method

The procedure is always performed during a morning separate from the initial consultation. A bleb of EMLA cream is instilled into the ear canal using a 5 ml Luer lock syringe and an 18 gauge steel cannula. The bleb is painted over the drum and medial external canal using a cotton-wool applicator, ensuring no air pockets are present. The canal is then filled with EMLA cream

from the syringe, again avoiding air pocket formation. Finally the cotton-wool is removed from the applicator and placed in the lateral external canal to seal off the area. Patients are then told to leave the clinic for three hours.

On return the child is seen immediately. A skilled nurse assistant distracts the child. The EMLA cream is carefully removed using a cotton-wool applicator, always avoiding the use of suction. Myringotomy is performed using a 'T' incision (Fig. 1) with a disposable 'Beaver blade'. If glue is encountered, microsuction is not routinely performed. Where indicated a Sheehy or Shepard type ventilation tube is inserted.



A = 3mm

B = 1.5mm

FIG 1

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TABLE I
PROCEDURES PERFORMED ON 103 PATIENTS

Myringotomy and tube	94
Myringotomy alone	6
Perforation debridement	2
Tympanoplasty tube removal	2
Foreign body removal	1
Procedure failed	7
	112

Results

One hundred and three subjects had 112 procedures performed, 39 were unilateral and 73 bilateral (Table I). Of the 103 children consented for the trial, in only seven (6.8 per cent) did the procedure fail. Failure occurred at various steps in the procedure but in most instances at the time of myringotomy. Children in the failed group had a younger age range (4–10 years), and average age (5.7 years). All failed cases went on to have their procedure performed under general anaesthetic.

Only two patients developed complications. One male aged six years suffered an obstructed tube, this had cleared by two months follow up with the use of topical drops. Another male aged seven years suffered premature extrusion of a tube within one week of surgery and required a revision procedure.

As noted with previous series (Timms *et al.*, 1988; Whittet *et al.*, 1988), post anaesthetic vertigo was not a complication seen when EMLA is used. Of the 94 children who had ventilation tubes inserted, 92 returned normal post-operative audiograms. Of the remaining two patients, one had a previously undiagnosed congenital sensorineural hearing loss. The second who had a mixed hearing loss noted pre-operatively, achieved closure of the air bone gap following tube insertion.

Discussion

EMLA cream provides effective anaesthesia of the tympanic membrane and external auditory canal in children. The pharmacological properties of the cream are such that a penetration time of greater than one hour and preferably at least two hours must be allowed before adequate anaesthesia is achieved. Previous authors (Timms *et al.*, 1988; Whittet *et al.*, 1988) recommended an anaesthetic time of 20 mins and accepted that the patient would score some discomfort on a pain chart. In the paediatric age group, the only acceptable pain level is nil, especially when bilateral or repeated procedures are contemplated. Our technique requires a penetration time of greater than two hours. To further reduce discomfort levels we elected not to perform suction at any stage, including suction of the anaesthetic cream out of the external canal and suction of any middle ear effusion. Sade *et al.* (1976) and Youngs and Gatland (1988) have already shown that failure to aspirate the middle ear effusion makes no difference to the post surgical audiometric gain, or the incidence of ventilation tube obstruction by residual effusion.

EMLA cream does not provide sufficient anaesthesia to allow

stretching of the normal tympanic membrane. This 'stretch' can be avoided by using a 'T'-shaped myringotomy (Fig. 1) which provides a greater width between wound edges compared with the standard radial myringotomy. Routine use of the 'T' incision seems necessary to give consistently good results in the paediatric age groups.

In this series only two patients suffered early post-operative complications. The follow up time is too brief to validly assess long-term complications although none have occurred to date.

Conclusion

We report a new technique of ventilation tube insertion in children using EMLA cream. The key to this procedure involves gaining a good rapport with the paediatric patient who is approached in a non-threatening way. The nurse-assistant must be expert at appropriate distraction techniques for each age group. We recommend an EMLA penetration time of greater than two hours to ensure total anaesthesia, avoidance of suction at all times, and the use of a 'T'-shaped myringotomy technique.

Since ventilation tube insertion is the most frequent procedure requiring a general anaesthetic in the western world, the potential economic and patient benefits of adopting a topical anaesthetic are vast.

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