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Short communication

Use of pre-reduced swabs in bacteriology of chronic suppurative otitis media

R. INDUDHARAN, DIP.N.B.(ORL), M.S.(ENT)*, J. ASHRAFUL HAQ, M.B.B.S., M.PHIL., PH.D.†

Abstract
A simple, safe and effective procedure for improving the bacterial isolation in chronic suppurative otitis media (CSOM) is described. It is most useful for the isolation of aerobes as well as anaerobes from the middle ear.

Key words: Otitis media, chronic suppurative; Microbiology; Bacteria, anaerobic

Introduction

The techniques of anaerobic bacteriology have improved during recent years. Anaerobic bacteria from CSOM were infrequently isolated in the past, but later studies have emphasised the importance of anaerobes (Gorbach and Barlett, 1974) as they are mainly responsible for the foul smell of the ear discharge and also for the otogenic intracranial infections (De Louvois *et al.*, 1977). Anaerobes isolated from the middle ear vary from no anaerobes (Cooke and Raghuvaran, 1974; Deka and Kacker, 1975) to above 50 per cent of isolated organisms (Brook, 1980). This variability in the recovery rate of anaerobes is mainly due to the techniques by which middle ear specimens are collected, transported and processed in the laboratory apart from the aetiological differences in different geographical locations.

We describe here a simple, yet safe and effective, method of collecting and transporting middle ear specimens so that the bacteriological isolation will be reliable for both aerobic and anaerobic organisms.

Method

The external ear canal was cleaned of ear discharge with suction and then swabbed with ethyl alcohol followed by povidone iodine. A 28-gauge pre-reduced nichrome wire swab was used for collection of middle ear specimens. The swab was prepared as follows: a 10 cm length of 28 gauge nichrome wire was bent completely back on itself at a length of 1 mm from the tip end, to avoid accidental injury to the middle ear by the sharp wire end. Then a small wisp of cotton wool is applied at the tip to make the swab. This was immersed in a screw-capped tube of 12.5 cm length filled with Stuart's medium, sterilised by autoclaving and sent to the clinic for collection of middle ear specimens (Figure 1). The autoclaving removes the entrapped oxygen in the swab and keeps it in a reduced state.

The pre-reduced swab was passed into the middle ear through the perforation in the tympanic membrane and the

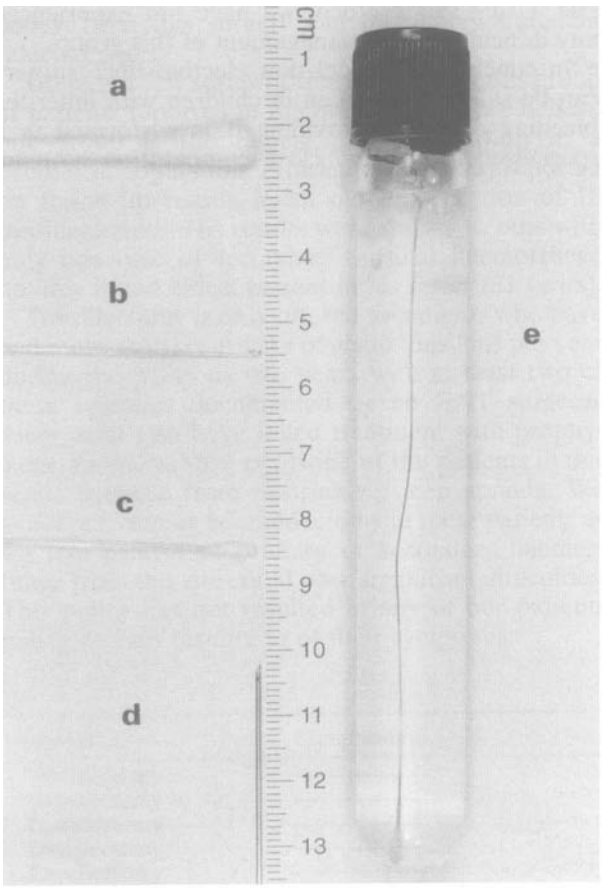

FIG. 1
Materials used for collection of middle ear specimen. (a) Sterile conventional swab (b) nichrome wire with the wire end bent completely back on itself (c) nichrome wire swab (d) 18 gauge needle tip showing the sharp bevelled edge and (e) pre-reduced 28-gauge nichrome wire swab in Stuart's medium.

From the Departments of Otolaryngology* and Microbiology†, School of Medical Sciences, University of Science Malaysia, Kelantan, Malaysia.
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middle ear discharge was swabbed. The swab was immediately placed in the tube containing the transport medium. The specimen was transported to the laboratory where it was processed routinely for culture of aerobes and anaerobes within four hours. The middle ear was cleaned of the discharge by suction after collection of the specimen.

Thirty-four consecutive middle ear samples yielded organisms using this technique. The most common organism isolated was *Pseudomonas aeruginosa* (44.15 per cent). Anaerobes were isolated from two samples (5.88 per cent).

Discussion

The conventional method of obtaining middle ear samples is by inserting a sterile cotton tip on an applicator into the external ear canal (Finegold and Baron, 1986). The material is then transported in a sterile test tube for microbiological examination. This technique is inadequate as the tip of the applicator cannot reach the focus of the infection in the middle ear (Papastavros *et al.*, 1985) and the sample gets contaminated with the discharge collected in the external ear canal. This is especially important in paediatric patients whose external ear canal is narrow. As the discharge is exposed to atmospheric oxygen it will not yield anaerobic organisms (Papastavros *et al.*, 1985). Moreover, as it gets contaminated with the external ear canal flora, it becomes an unreliable representation of the organisms of the middle ear. The technique of sending the specimen in a sterile test tube might also result in poor isolation of anaerobes as it is constantly exposed to atmospheric air in the test tube until processed in the laboratory.

A nichrome wire loop has been used (Raju *et al.*, 1990), but it has the following disadvantages namely (a) the specimens collected should be immediately inoculated into the culture medium, (b) it is not suitable for transportation as it dries up and (c) the anaerobes die on contact with atmospheric air.

Another method of collecting middle ear specimens is by aspiration through the perforation in the tympanic membrane using a 2 ml disposable syringe, fitted either with a 24 gauge needle (Papastavros *et al.*, 1985) or with an 18-gauge needle (Brook, 1994; Erkan *et al.*, 1994; Brook and Santosa, 1995), covered by a plastic canula. The tip of the needle is bent to avoid accidental trauma. We feel that both these techniques are dangerous as the needle end is sharp and likely to cause injury to the middle ear. The bevelled edge of the needle may not get immersed in middle ear discharge as the space in mesotympanum is only 2 mm or less even in adults. Further, the middle ear discharge usually will be inadequate to be aspirated into a syringe. Raju *et al.* (1990) have reported identical results with conventional ear swab cultures and those from middle ear aspirates. Their anaerobic isolation rate was only four per cent by both methods. Since several studies have shown that cultures should be obtained directly through the perforated ear drum after cleaning of the external ear canal (Brook, 1980; Brook, 1993), we recommend the use of a 28-gauge nichrome wire swab for collection of middle ear specimens. The use of our pre-reduced nichrome wire swab has obviated the disadvantages discussed. The swab is safe and as pre-reduced is expected to give a higher yield of anaerobes. Also, this swab can be easily passed through the perforation into the middle ear of both children and adults and is cheap compared to commercially available anaerobic transport systems.

Conclusion

The authors use pre-reduced 28-gauge nichrome wire swabs for the collection of middle ear specimens for bacteriology. This method is practical, economical and safe even for use in children and is expected to isolate a higher percentage of anaerobes from middle ear discharge.

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Address for correspondence:
J. Ashraful Haq, M.B.B.S., M.Phil., Ph.D.,
Department of Microbiology,
School of Medical Sciences,
University of Science Malaysia,
16150 Kubang Kerian, Kelantan, Malaysia.

Fax: 09-7653370