

ORIGINAL ARTICLE

CLINICAL AND AUDIOLOGICAL PROFILES IN CHILDREN WITH CHRONIC OTITIS MEDIA WITH EFFUSION REQUIRING SURGICAL INTERVENTION

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To determine the characteristic presenting symptoms, otoscopic findings, audiological profiles and the intraoperative findings of children with chronic otitis media with effusion who required surgical intervention. A prospective cross sectional study was undertaken in the otorhinolaryngology clinic of USM Hospital (HUSM) involving 25 cases (50 ears) of children with chronic otitis media with effusion requiring surgical intervention from June 1999 to September 2001. Their ages ranged from 3 to 12 years old. The gender distribution included males at 72 % and females at 28 %. The presenting symptoms noted were hearing impairment (52%), otalgia (18%), ear block (16%) and tinnitus (14%). The otoscopic findings were fluid in the middle ear (40%), dullness (32%) and retraction of the tympanic membrane (28%). On audiometry, 24 ears had moderate deafness (48%), 16 ears had mild deafness (32%) while 4 ears had severe deafness (8%). With tympanometry, 42 ears out of the total 50 had a flat type B curve (84%) while 6 ears had type As curve (12%). During myringotomy, middle ear secretion was seen in 38 ears (76%) out of the 50 ears; 22 ears had mucoid secretion while 16 ears had serous secretion. Clinically, the commonest presenting symptom was hearing impairment (52%) while the most common otoscopic finding was fluid in the middle ear (40%). Audiologically, most patients had moderate conductive hearing loss (48%) and a type B curve (84%) on tympanometry. On myringotomy middle ear fluid was found in 76 % of the ears.

Key words : Clinical, Audiology, Otitis media with effusion.

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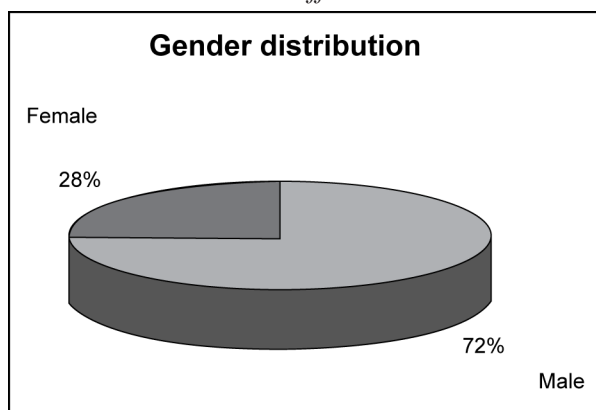
Introduction

Otitis media with effusion (OME) in children is one of the most common condition encountered by the practising otorhinolaryngologists in Malaysia. OME is an inflammation of the middle ear in which a collection of fluid is present in the middle ear space while the tympanic membrane is intact. The duration of the effusion can be acute (less than three weeks), subacute (three weeks to three months) or chronic (longer than three months) (1). The aetiology of otitis media is multifactorial which include adenoids hypertrophy, infection (viral or bacteria), allergy, environment and social factors (1).

Socioeconomic factors such as overcrowding, poor diet and lack of health care may contribute to the development of otitis media. Other risk factors include male gender, bottle feeding and position of feeding (children fed while in supine position are at a greater risk for OME than are children held upright) (1).

Many studies done abroad showed the prevalence rate of OMC ranged between 2 to 50 % (2). In Malaysia the prevalence of OME amongst school children aged between 7 to 12 years old was estimated to be 2.3% (3). In another study in Malaysia, Saim et al (4) found the prevalence rate of OME in preschool children was 13.8% and the

Figure 2 : Gender distribution in chronic otitis media with effusion.



prevalence was higher in children amongst urban areas than rural areas. They also found that bottle feeding during infancy and high socioeconomic status of the parents were statistically associated with higher incidence of OME while other factors such as race, premature delivery, passive smoking, allergy, asthma and family size, had no influence on the prevalence of otitis media with effusion.

There is no proper study on the clinical and audiological profiles on chronic otitis media with effusion in the Northeast of Malaysia where generally the patients who attended the public hospital are from a relatively poorer socioeconomic background with predominance of the Malay race. We performed this study to determine the characteristics of the presenting symptoms, the otoscopic findings, the severity of the hearing impairment and the intraoperative findings for children with chronic otitis media with effusion who required surgical intervention.

METHODOLOGY

A prospective cross sectional study was

undertaken in the otorhinolaryngology clinic of USM Hospital (HUSM) involving 25 cases of children (50 ears) having chronic otitis media with effusionfenar required surgical intervention from June 1999 to September 2001. The inclusion criteria included all patients between the ages of 3 to 12 years having chronic otitis media with effusion. The exclusion criteria include patients with otitis externa, patients with tympanic membrane perforation with or without infection and absence of signs and symptoms of otitis media with effusion for more than 12 months. The demographic data of the included patients were recorded in the data collection form.

The symptoms specifically sought were ear blockage, otalgia, tinnitus and hearing impairment. All patients were examined on both ears by an otorhinolaryngologist or a senior otorhinolaryngology medical officer using pneumatic otoscope (Diagnostic Otoscope; Welch Allyn, Skand. Falls, NY, USA) and otomicroscope (OPMI1FC-S2; Carl Zeiss, Thornwood, NY, USA). Presence of cerumens were removed by irrigation.

Figure 3: Symptoms in chronic otitis media with effusion.

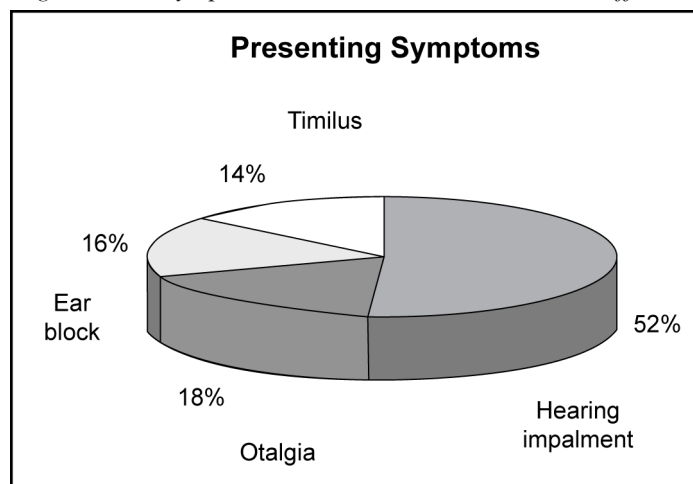
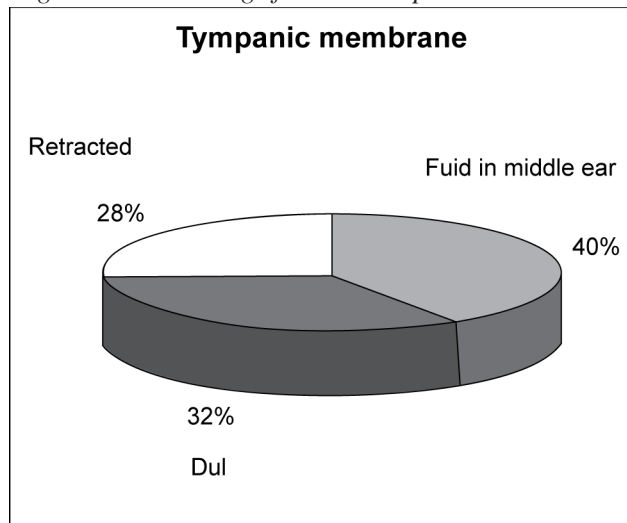


Figure 4 : Findings from otoscopic examination.



The character of the tympanic membrane was determined as appearance (whether normal, dull or retracted), presence of fluid in the middle ear as air bubbles or fluid level and the colour of the tympanic membrane (yellow, grey, blue or amber).

Tympanometry were performed in all patients. Hearing assessment was done by certified audiologists using play audiometry for those between 3-6 years old and pure tone audiometry (PTA) for patients between 7-12 years old. Tympanometric measurement was made using the middle ear analyzer model GSI 33 version 2.0 serial A 1354 (Garson-Stadler Inc., USA). Tympanometric curve results were classified according to modified Jerger's classification as types A, As, B or C (5). Type A and C curves were interpreted as no middle ear effusion while type B and As as predictive of middle ear effusion.

Type B curve is characterized by almost equal compliance values over the whole pressure range. The peak is typically absent. This is found in OME

since the fluid within the middle ear cannot be compressed and resulted in limited movement of the tympanic membrane (5). Type As curve is a shallow A curve with peak compliance at 0 mmH₂O that is normal middle ear pressure. When found in OME, it suggested stiffness of the middle ear structures as induced by adhesions (5).

For audiometric measurement the audiograph 455 was used. The audiograph 455 is a true two channel microprocessor-base digital audiometer with complete manual switching flexibility for comprehensive auditory research. For safety, the audiometer conforms to either UL544 or IEC 601-1 for medical equipment. All measurements were performed in an acoustically treated room. For this purpose the mini soundproof cabin mobile series 250 (Industrial Acoustics Company, Germany) was used.

It provided a controlled acoustic environment in which audiological examination can be undertaken. The degree of hearing impairment on audiometry was recorded as follows; (1) mild

Figure 5 : Hearing impairments in chronic otitis media with effusion.

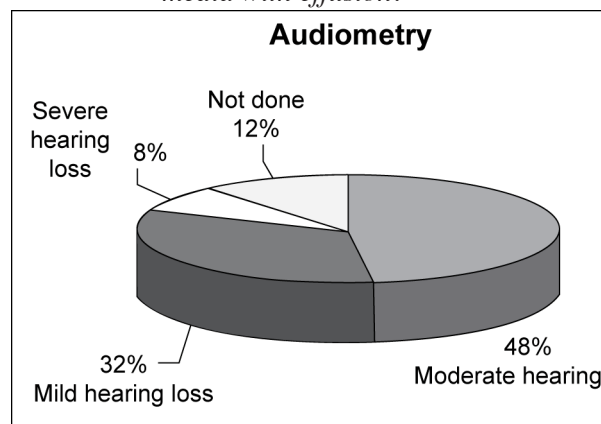
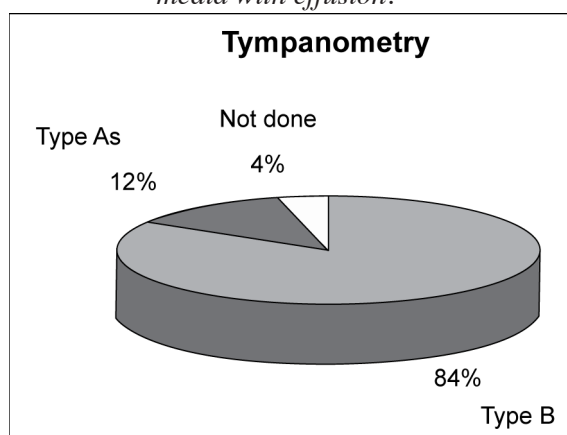


Figure 6 : Tympanometry in chronic otitis media with effusion.



hearing loss: 25 to 44 dB HL, 2) moderate hearing loss: 45 to 64 dB HL, 3) severe hearing loss: 65 to 80 dB HL and 4) profound hearing loss: more than 80 dB HL (6).

The operation was performed under general anaesthesia (GA). An operating microscope OPMI 1-FC (Carl Zeiss, Germany) was used to examine the tympanic membrane. Findings were recorded. An antero-inferior radial incision performed using myringotome knife. Any fluid was removed using suction. Ventilation tube was placed at the incision site. There were no postoperative complications noted in all patients and they were discharged well on the next day.

The results were analysed using a commercially available software programme, SPSS statistical programme Version 10.0 (SPSS Inc, Chicago, USA).

Results

A total of 25 patients with the diagnosis of

were recruited. The age in this series was from 3 to 12 years old. The mean age was 7.08 ± 2.50 and the median age was 7.00. All of the patients were Malay.

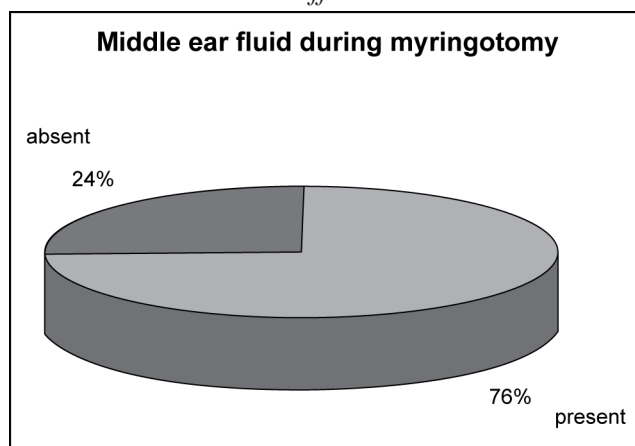
The gender composition was male 72 % and female 28 % as shown in Figure 2. Most common presenting complaint was hearing impairment (52%). The other presentations were otalgia (18%), ear block(16%) and tinnitus (14%) (Figure 3).

A total of 50 ears were examined. The findings identified were fluid in the middle ear, dullness and retraction of the tympanic membrane. Most common finding was fluid in the middle ear in as much as 40 % of cases (Figure 4).

All of the patients with chronic OME (a total of 50 ears) were assessed with tympanometry and 15 patients were tested with PTA while 7 patients tested with play audiometry. In 3 patients we could not do either tests as they were uncooperative.

On PTA or play audiometry, 24 ears had moderate conductive hearing loss, 16 ears had mild hearing loss while 4 ears had severe hearing loss (Figure 5).

Figure 7 : Intraoperative findings in chronic otitis media with effusion



With tympanometry, 42 ears had type B curve while 6 ears had type As curve (Figure 6). We could not do the test in one patient as the child was uncooperative.

During myringotomy, middle ear secretion was seen in 38 ears out of the 50 ears; 22 ears had mucoid secretion while 16 ears had serous secretion (Figure 7). None of the ears had purulent secretion.

Discussion

OME is a very common disease during childhood characterized by the presence of fluid in the middle ear without signs of an acute infection. The disease causes moderate hearing loss and if persisting may pose delayed language and speech development (7).

The most frequent presentation in OME is latent or overt hearing loss and the hearing loss often fluctuates in severity. When latent in infants and young children it may present with impaired speech and language development. There may be behavioural difficulties and scholastic retardation.

Otalgia often occurs frequently in a recurrent form. When present, it usually results from secondary infection of the fluid within the middle ear cleft. Invariably this resulted from an ascending eustachian tube infection. It is frequently coincides with colds or minor upper respiratory tract infections but occasionally followed sinus infection or an episode of allergic rhinitis (8).

Some children may complain of ear fullness or ear block. Tinnitus is another symptom that children described infrequently most probably due to eustachian tube dysfunction. In our study most of the patients presented with hearing impairment 52 %, followed by otalgia 18 %, ear block 16 % and tinnitus 14 % (Figure 3).

OME was diagnosed by history, otoscopic finding, conductive hearing loss on PTA or play audiometry and impedance tympanogram. The findings were shown in Figure 4, Figure 5 and Figure 6.

The degree of retraction of the pars tensa may be assessed by the derangement of the light reflex, medial displacement of the handle of malleus and by the prominence of the lateral process of the malleus. The degree of retraction of the tympanic membrane reflects the negative middle ear pressure which reduces the mobility of the membrane. The colour and loss of translucency of the membrane range from pale grey or amber to a black or so-called 'blue drum'. It may be thickened, dull and opalescent

or thin and reflective. Fluid levels and air bubbles may be visible within the middle ear cleft. Atelectatic change of the pars tensa and pars flaccida may be present to a variable degree. Pure tone audiometry provide some assessment of the severity of the disease. It can be used as a guide by which to monitor the progress and the effects of treatment. Tympanometry provides an effective screening test for the detection of negative middle ear pressure although it will not distinguish between such a pressure change with and without middle ear effusion.

The type of fluid found in the middle ear during myringotomy in cases of OME varied from a thick mucous "glue-like" secretion to thin serous fluid. Analysis of the constituents of the effusion showed that the viscosity is correlated with the concentration of mucin (9). A previous study suggested that different effusions because of various levels of enzymes and proteins correlated with recurrent cases of OME (10), whereas another study insisted that the type of effusion found on aspiration before myringotomy had no prognostic value (11).

Not all patients diagnosed clinically as having OME were found to have fluid present in the middle ear at myringotomy. It is still avidly debated in the literature whether this common occurrence is due to exposure to nitrous oxide during general anaesthesia (12-13).

Certain racial groups are believed to have a high incidence of otitis media with effusion: American natives (Indians and Eskimos), the Maori of New Zealand, natives of Guam, Greenland Eskimos, Australian aborigines and Laplanders (14). Differences in OME rates by race may reflect differences in access to the medical care, the socioeconomic status and the anatomic or biologic susceptibility.

The demography of this study was peculiar to the homogenous society of Kelantan. Our patients included in this series were all Malays. The finding that OME is more common among males than females is consistent with the male-to-female ratio found in other international studies (15-16).

Conclusion

Clinically, the commonest presenting symptom was hearing impairment (52%) while the most common otoscopic finding was fluid in the middle ear (40%). Audiologically, the hearing impairment ranged from mild to severe of which moderate conductive hearing loss being the highest

(48%) while most patients showed a flat type B curve (84%) on tympanometry. On myringotomy middle ear fluid was found in 76 % of the ears.

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