

Incidence and management of middle ear effusion in cleft palate patients

S. Lokman, FRCS, MS
T. Loh, MS
H. Said, FRCS
I. Omar, FRCS*

Department of Otorhinolaryngology

**Department of Surgery*

Medical Faculty, Universiti Kebangsaan Malaysia

Summary

For a complete overall rehabilitation of cleft palate patients a multi-disciplinary approach should be adopted. Plastic and Head and Neck Surgeons in whom most of the treatment are entrusted should be concerned not only at achieving palatal function and cosmetic acceptability but also the various other problems associated with cleft palate especially hearing loss. In this study, 66 patients with repaired and unrepaired cleft palates were examined for the presence of hearing loss due to middle ear effusion. The incidence of middle ear effusion was high (57.6%). It was also found that only eight of these patients (12.1%) ever complained of hearing loss or any associated symptoms and repair of the cleft palate did not influence the incidence of middle ear effusion. As such, screening should be done in all cleft palates and otolaryngologists should therefore play an important role in the multi-disciplinary team which should comprise the paediatrician, plastic surgeon, speech therapist, orthodontist and dental specialist.

Key words: Cleft palate, secretory otitis media.

Introduction

Over the years management of cleft lip and palate have been generally taken in the direction of palatal reconstruction and lip repair to achieve cosmetic acceptability and palatal function for speech and deglutition. Unfortunately, these patients are also at risk to several other problems among which is conductive hearing loss. The highly significant association with hearing loss and thus the equally important role of otolaryngologists in the management of these patients should always be highlighted for complete rehabilitation.

Middle ear effusion is an almost universal finding in children with cleft palate. This association was first reported by Alt (1878). He stressed the need for otological examination in patients with cleft palate and since then many reports had appeared in the literature related to the incidence of hearing loss in patients with cleft palate. Stool and Randal (1967) reported middle ear effusion confirmed by myringotomy in 94% of their 25 cleft palate infants while Paradise et al (1969) in a study of 50 infants diagnosed middle ear effusion in 49 of them. A similar study has never been done in Malaysia. Recognition and early detection of middle ear effusion in cleft palates is important because at this early

age, these children are acquiring speech and therefore a perfectly normal hearing is essential. Besides problems with speech and language skills, these patients are also at risk in relation to dental problem and malocclusion which should be treated simultaneously.

This paper presents a study on middle ear effusion in patients with cleft palate with particular emphasis on the importance of a multi-disciplinary approach in the overall management of the patient.

Material and Method

This study is primarily aimed at documenting the prevalence of middle ear effusion among cleft palate children and highlight the importance of hearing assessment in the management. Patients with cleft palate were randomly selected from those presenting for treatment at the Department of Plastic Surgery and Department of Otolaryngology Universiti Kebangsaan Malaysia and General Hospital Kuala Lumpur between August 1989 and January 1990. A full clinical history was taken either from the patients or their parents with special emphasis on hearing loss or in the case of children, symptoms related to hearing loss. The ears were then examined with the standard otoscope. Findings were recorded with respect to the color, mobility, retraction and presence of fluids in the middle ear. Tympanometry was done in every case using Model Welch Allyn MicroTymp with a 226-Hz probe tone. Pure tone audiometry was performed on patients above six years old.

A diagnostic myringotomy was then performed with the aid of the operating microscope when middle ear effusion was suspected using the following criteria:

1. Otosopic findings suggestive of middle ear effusion (Table II).
2. Abnormal tympanometry (Flat or shallow compliance curves or negative peak pressure value)
3. Presence of conductive deafness in Pure tone Audiometry (Air-bone gap of more than 10 dB).

In all patients, the type of cleft palate were recorded along with the type of any reconstructive palate procedure performed. Patients with associated congenital abnormality of the external ear were excluded from this study.

Results

Sixty-six patients or one hundred and thirty-two ears were examined with a male: female ratio of 1:1. The majority of the patients in this study were children below the age of 10. Patients below 2 years old made up 50% of the total patients seen.

Symptoms

Only eight of these patients (12.1%) complained of hearing loss or has associated symptoms of middle ear disease while the majority (87.9%) had no complaint at all (See Table I). Sixteen patients (24.2%) gave past history of ear discharge.

Table I
Frequency of complaints of hearing loss or associated symptoms in cleft palate patients

Complaints of hearing loss or associated symptoms	No. of Patients	%
Noted by patients	7	10.6
Noted by parents	1	1.5
No complaint	58	87.9

Otoscopic findings

On otoscopic examination, 76 out of the 132 ears (57.6%) were suspected to have middle ear effusion. The suspicion was based on abnormal findings seen at otoscopy as shown in Table II.

Only 25 of the 76 (32.9%) ears with otoscopically suspicious middle ear effusion were later proven at myringotomy.

Table II
Otosopic findings in patients with cleft palate

Otosopic findings	No. of Ears	%
Abnormal colour of tympanic membrane	42	31.8
Absence of light reflex	42	31.8
Dull tympanic membrane	46	34.8
Bulging	8	6.1
Retracted	14	10.6
Fluid level	2	1.5
Reduced mobility	45	34.1

Audiological investigations

Tympanometry were performed in all 66 patients (132 ears). Only 34 ears (25.8%) yielded normal tympanogram while 98 ears (74.2%) have abnormal tympanogram. Of these, 83 showed a flat tympanogram suggesting the presence of middle ear effusion, nine ears showed shallow curves suggesting abnormal stiffness of the middle ear system and finally six ears were found to exhibit peak pressure value within the negative region. Upon comparing the tympanometric findings with the results after myringotomy, the calculated positive predictive value for tympanometry in the diagnosis of middle ear effusion was 81.9%.

A total of 18 patients (36 ears) were subjected to Pure Tone Audiometry. Of these 33 ears (91.66%) had conductive hearing loss with an air-bone gap of more than 10 dB.

Based on otoscopic findings, tympanometry and pure tone audiometry, myringotomies were performed in 96 ears that were suspected to have middle ear effusion. Fluid was presented in 76 (79.2%) while in 20 ears (20.8%) they were dry at myringotomy. Therefore the true incidence of middle ear effusion out of the total 132 ears examined was 57.6%.

Out of 96 myringotomies performed 68 ears were those of unrepaired palate while 28 ears were from repaired palate. The findings at myringotomy is shown in Table III. Statistical analysis using 'Chi-square Test' showed that there was no significant difference between the incidence of middle ear effusion in unrepaired and repaired cleft palate ($P > 0.05$).

All patients with middle ear effusion proven during myringotomy had gromet tube inserted.

Table III
Correlation between the status of the palate and findings at myringotomy

Status of palate	Findings at myringotomy	
	Fluid present	Fluid absent
Unrepaired palate	56 (82.4%)	12 (17.6%)
Repaired palate	20 (71.4%)	08 (28.6%)

P > 0.05

Discussion

Over the years management of cleft lip and palate have been generally taken in the direction of palatal reconstruction and lip repair to achieve cosmetic acceptability and palatal function for speech and deglutation. However the concern for the above achievements must not make the surgeons ignore other problems associated with cleft palate. Conductive hearing loss as a result of middle ear effusion is a common and well known complication of cleft palate. This study reported the incidence of middle ear effusion confirmed by myringotomy to be 57.6%. The high incidence of middle ear effusion shows the importance of hearing assessment in all patients with cleft palate. Other workers have reported much higher incidence in the western population. Stool and Randall (1967) and Paradise et al (1969) quoted an incidence of 94% and 98% respectively. The incidence of middle ear effusion even in the normal children in the western population has been reported to be as high an incidence as 70% (Teele et al, 1980). Therefore it is not surprising that the incidence of middle ear effusion in their cleft palate patients was much higher than that was found in our study. However there has been no report of the incidence of middle ear effusion in normal children in Malaysia for comparison. This rather significant difference in the incidence between our population and the western population will need further investigations and confirmation.

As repair of cleft palate is usually in the hand of plastic surgeons, there should be a channel for communication between them and the otolaryngologists or audiologists. This is indeed important since we have also found that only eight out of the total sixty-six patients (12.1%) ever complained of hearing loss or had any associated symptoms of middle ear disease, while the majority (87.9%) had no complaint at all. This finding was consistent with those reported by Bluestone (1971) and Paradise (1969) where suspicion of hearing loss was found only in 10.6% and 12.0% of their patients respectively. However since almost all cleft palates seek early surgical repair, their hearing should be screened so that any impairment can be detected and treated early.

Diagnosis of middle ear effusion can be made based on otoscopic findings, tympanometry and pure tone audiometry. Since the majority of cleft palates were seen at less than 2 years of age (50.0%), pure tone audiometry is not a useful diagnostic tool for early detection. Based on otoscopic findings alone, this study has shown that only 32.9% of the ears with otoscopically suspected middle ear effusion was proven at myringotomy. Therefore, otoscopic findings alone would give an undesirably high false positive results. Tympanometry is the most useful tool in the detection of middle ear function (Too-Chung, 1984, Brooks, 1976, Bess 1976, Tos, 1981). A diagnostic predictability of 84% – 86% is achieved in the diagnosis of middle ear effusion (Richard Maq, 1987, Cantekin, Berry and Bluestone, 1977) In our study, the predictive value was 81.0%. This study has also shown that there was no significant difference between the incidence of middle ear effusion in unrepaired and repaired cleft palates. Similar results were also obtained by Gopalakrishnan et al, 1985. Therefore, hearing loss

detection should not stop once repair of the cleft palate is performed. The hearing of all cleft palate patients should be screened regularly and myringotomy with gromet tube insertion should be performed when indicated.

Conclusion

Our study indicates that the incidence of middle ear effusion and hence hearing loss in cleft palates is high. It is common below the age of 2 where these children are acquiring speech and even repair at this age period does not lower the incidence. Therefore the hearing of all cleft palate patients should be screened regularly so that this common complication is not ignored. One should also note that the speech and language skills in these patients also need a comprehensive assessment and rehabilitation as they do not improve spontaneously after surgery. The child with cleft palate is also at risk in relation to dental problem and malocclusion which will need orthodontic manoeuvres.

Therefore, the approach to the proper management of cleft palate must be multidisciplinary, preferably in a team comprising the paediatrician, plastic surgeons, orthodontist and dental specialist, audiologist, speech therapist and the otolaryngologist.

Acknowledgement

We would like to thank Dr S. Z. Maisarah and staff of the Audiology Unit, Department of Otorhinolaryngology UKM for their assistance.

References

1. Alt, A 1879. Heilung der taubstummheit erzielte durch beseitigung einer otorrhoe und einer angeborenen gaumenspalte. Arch fur Augen u Ohrenh 7:211, 1987; and Schmidt's Jahrbuecher 183 : 277.
2. Stool, S., Randall, P., 1967. Unexpected ear disease in infants with cleft palate. Cleft Palate Journal 4 : 99 – 103.
3. Paradise, J.L., Bluestone, D.C. and Herman, F., 1969. The universality of otitis media in 50 infants with cleft palate. Pediatric Vol 44 No. 1 July : 35 – 42.
4. Bluestone, C. 1971. Eustachian tube obstruction in infant with cleft palate. Ann Otol Rhinol Laryngol 80 (Suppl 2), 1 – 30.
5. Too-Chung, M.A. 1983. The assessment of middle ear function and hearing by tympanometry in children before and after cleft palate repair. Br. J Plastic Surgery 36, 295 – 9.
6. Brooks, D.N. 1976. School screening in middle ear effusions. Annals of Otol Rhinol Laryngol 85 (Suppl 2) : 233.
7. Bess, F.H., Schwartz, D.M. and Redfield, N.P. 1976. Audiometric, impedance and otoscopic finding in children with cleft palates. Arch Otolaryngol Vol 102 : 465 – 9.
8. Tos, M. 1981. Upon the relationship between secretory otitis media in childhood and chronic otitis and its sequelae in adults. J Laryngol and Otol 95 : 1011.
9. Richard Maw, a. 1987 Scott Brown's Otolaryngology, Fifth Edition Vol 6. Butterworth and Co. Ltd. p : 159 – 76.
10. Cantekin, E.I., Beery, Q.C. and Bluestone, C.D. 1977. Tympanometric pattern found in middle ear effusion. Ann Otol Rhinol Laryngol 86 (Suppl 41) : 16 – 20.
11. Gopalakrishna, A., Goleria, A.S. and Raje. A. 1984. Middle ear function in cleft palate. Br. J. Plastic Surg 37 : 558 – 65.
12. Teele, D.W., Klein, J.O., Rosner, B.A. 1980. Epidemiology of otitis media in children. Ann of Otol Rhinol Laryngol 89 (Suppl 68) : 5 – 6.