EARLY REPAIR OF CLEFT PALATE IN CHILDREN USING IMPEDANCE AUDIOMETRY: A BENEFICIAL EFFECT

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ABSTRACT

The present study was undertaken to asses the incidence of middle ear disorder in children having cleft palate and the effect of repair on the middle ear functions using tympanometry.[1]

Impedance audiometry was performed after cleaning the external auditory canal. The probe of the impedance audiometer was inserted and made air tight into external auditory meatus. The external auditory canal pressure was increased to +200 mm of water to stiffen the tympanic membrane and the compliance value was recorded.

Among the total of 29 (male 20, female 9) subjects studied, unilateral cleft lip and cleft palate was the most common type present in males, observed in 16 cases (44 %) while only 4 cases (8 %) were found among the females. Ear symptoms were present in 8 cases (20 %). Otoscopy revealed retraction of tympanic membrane and scarring in 39 ears (78 %). Pre-operative ear compliance studies revealed the values of 0.15±0.26 (range 0.01-1.15 cc) and post-operative values of 0.18±0.28 (range 0.01-1.21 cc) ($p>0.05$). Better compliance was observed in comparatively older group of children.

Key Words: Cleft palate, Hearing loss, Impedance Audiometry

INTRODUCTION

Cleft lip and palate are common congenital disorder. These are associated with deficient facial growth, dental problems, velopharyngeal incompetence, articulation defect and otologic problems like eustachian tube dysfunction,[2] chronic ear disease and hearing loss. Middle ear is normally well ventilated through the eustachian tube; however in cleft palate middle ear ventilation is affected due to eustachian tube dysfunction. This coupled with delayed speech leads to the impairment in the cognitive, linguistic and emotional development in the children.[3] Early repair of cleft palate is therefore needed to prevent hearing loss.

The cleft palate is related to eustachian tube dysfunction, middle ear effusions and infections and hearing loss. Impedance Audiometry provides an accurate screening tool for such patients. Early

repair of cleft palate between the ages of 10-20 months helps to improve the tube functions and prevents potential complications.

MATERIALS AND METHOD

This study was conducted among 29 (male 20, female 9) children with cleft palate, aged 1-12 years, attending the ENT OPD, Nepal Medical College Teaching Hospital (Table 1). The patients with cleft-lip alone and the patients having tympanic membrane perforation were excluded from the study.

Impedance audiometry was performed after cleaning the external auditory canal.[4] Small uncooperative children were sedated with syrup phenargan. The probe of the impedance audiometer was inserted and made air-tight into the external auditory meatus. The external auditory canal pressure was increased to +200 mm of water to stiffen the tympanic membrane and the compliance value was recorded.[5] The corresponding compliance values were recorded at every 50 mm change in water pressure to obtain the tympanogram. These patients were regularly followed up and after 3 months of surgery otoscopic examination and impedance recording were repeated.

Table 1 Descriptive statistics of the subjects with respect to age and sex

Age	Total No.	Male	Female
< 6	3	1	2
6-10	11	7	4
10-12	15	12	3
Total	**29**	**20**	**9**

OBSERVATIONS

Among the patients, male to female ratio was 2.2:1; and 20 patients (76 %) were below the age of 8 years. Unilateral cleft lip with cleft palate was present in 16 patients (52 %), complete cleft palate was present in 8 patients (40 %), bilateral cleft lip and palate was present in 3 patients (4 %) and incomplete cleft palate was present in 2 patients (4 %). Unilateral cleft lip and cleft palate was the most common type of cleft deformity present among males[6], observed in 16 cases (44 %) while only 4 cases were found among the females (8 %). Ear symptoms were present in 8 cases (20 %).

Otoscopy revealed the retraction of tympanic membrane and scarring in 39 ears (78 %). Pre-operative ear compliance studies revealed the values of 0.15±0.26 (range 0.01-1.15 cc) and post-operative values of 0.18±0.28 (range 0.01-01.21 cc) ($p>0.05$). Better compliance was observed in comparatively older children. An improvement in middle ear pressure was observed after the repair of palate[7] ($p<0.05$). No change was noted in the stapedial reflex of patients after palatal closure.

DISCUSSION

Impedance audiometry; a sensitive, objective and reproducible procedure[8] was performed in the present study to assess the middle ear pressures in post-operative cases. We observed better middle ear pressure in older children with complete cleft palate as compared to the younger ones after the surgery. There was a definite tendency for the eustachian tube to behave like those in normal subjects following the surgery. No statistically significant difference in the pre- and post-closure values of the ear compliance was noted.

Cleft palate patients should be managed aggressively with respect to ear disease because the already delayed speech development is likely to be compounded by the associated hearing loss during the critical stage of speech development. A neutral plasticity for speech and articulation exists. An excellent speech articulation can only be accomplished if the speech sounds are learned before the age of 6-8 years.[9] Breast milk appears to provide some protection against the development of otitis media in cleft palate infants. Since they have difficulty in suckling, expressed breast milk fed with modified teats for bottle feeding may be required.[7] The age of surgical closure is controversial. The early repair of the palate is associated with good cosmesis, better feeding, adequate velopharyngeal competence and good speech and hearing development. However, it may increase the abnormalities of the facial growth, increase maxillary dental arch collapse and exacerbate orthodontic problems. At present the emphasis is to repair the cleft by 12 months of age; although most centers are completing the repair by 18 months.[10] However, many of our patients in the present study were more than 18 months of age as they reported late for the surgery.

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