Otitis Media in Cleft Palate Children : A Prospective Survey

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Abstract : **Children with cleft palate and craniofacial anomalies are more prone to otitis media due to anatomical defect of the cranial base and the eustachian tube. This prospective study was conducted in cleft palate patients of the Craniomaxillofacial Clinic from January 2001 to April 2002. Pneumatic otoscopic examination was done monthly in every patient since they registered in the clinic for cleft palate correction. Thirty-eight children were included. Mean age was 21.4 ± 33.7 months and 89.5% of the children were under 24 months old. Mean time for follow up was 150 ± 132 days (mean ± S.D.). Twenty-six patients (68.4%) had ear diseases at least once during the study period. Otitis media with effusion (OME) was the most common ear disease found in this series. Twenty-one percent of the patients had at least one episode of OME by the age of one and 47.5% of the patients had at least one episode of OME by the age of two. The incidence of OME was 3.85 per person per year. Acute otitis media and atelectatic ear drum were found with the incidence of 0.51 and 0.30 per person per year respectively. Tympanogram type B was found in 47.4% and type C was found in 10.5%. Periodical ear examination in cleft palate children is recommended for early detection of otitis media in order to prevent irreversible middle ear damage or hearing loss in the future.**

เรื่องย่อ : **อุบัติการณ์ของโรคหูชั้นกลางอักเสบในเด็กที่เป็นเพดานโหว่**

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เด็กที่เป็นโรคเพดานโหว่หรือเด็กที่มีความผิดปกติของกะโหลกศีรษะและใบหน้า จะเป็นโรคหูชั้นกลางอักเสบได้บ่อย เนื่องจากความผิดปกติทางกายวิภาคของกะโหลกศีรษะบริเวณฐานสมองและท่อยูสเตเชียน การศึกษาวิจัยนี้ทำในผู้ป่วยเพดานโหว่ของคลินิกความผิดปกติของกะโหลกศีรษะและใบหน้าของโรงพยาบาลศิริราช ตั้งแต่เดือนมกราคม 2544 ถึงเดือนเมษายน 2545 ผู้ป่วยเพดานโหว่ที่เข้ามาในช่วงนี้จะได้รับการตรวจทุกเดือนเพื่อหาอุบัติการณ์ของความผิดปกติของหู จำนวนผู้ป่วยในการศึกษาวิจัยนี้มี 38 คน อายุเฉลี่ยคือ 21.4 ± 33.7 เดือน, 89.5% ของผู้ป่วย เป็นเด็กอายุต่ำกว่า 24 เดือน เวลาเฉลี่ยของการตรวจติดตามคือ 150 ± 132 วัน ผู้ป่วย 26 คน (68.4%) ตรวจพบความผิดปกติทางหูอย่างน้อยหนึ่งครั้งตลอดช่วงการศึกษาวิจัย โรคหูชั้นกลางอักเสบมีน้ำแบบไม่เฉียบพลันเป็นโรคที่พบบ่อยที่สุดในการศึกษาวิจัยนี้ ผู้ป่วยจำนวน 21% พบว่ามีหูชั้นกลางอักเสบอย่างน้อยหนึ่งครั้ง เมื่ออายุครบ 1 ปี และผู้ป่วยจำนวน 47.5% พบว่ามีหูชั้นกลางอักเสบอย่างน้อยหนึ่งครั้ง เมื่ออายุครบ 2 ปี อุบัติการณ์ของโรคหูชั้นกลางอักเสบมีน้ำแบบไม่เฉียบพลันคือ 3.85 ต่อคนต่อปี อุบัติการณ์ของโรคหูชั้นกลางอักเสบแบบเฉียบพลันและโรคแก้วหูแฟบคือ 0.51 และ 0.30 ต่อคนต่อปี การตรวจการเคลื่อนไหวของแก้วหู (ทิมพาโนแกรม) พบเป็นแบบบี 47.4% และแบบซี 10.5% การตรวจหูอย่างสม่ำเสมอมีความสำคัญในเด็กเพดานโหว่เพื่อการรักษาโรคหูชั้นกลางอักเสบแต่เนิ่น ๆ ป้องกันการถูกทำลายของหูชั้นกลางและป้องกันโรคหูหนวก หูตึงในอนาคต

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INTRODUCTION

Otitis media with effusion is almost universal in children with cleft palate and can delay speech, language and educational development by causing hearing loss[1]. Anatomical and functional defect of the eustachian tube and paratubal muscles in cleft palate children have been proposed to be the underlying causes that make these children more otitis-prone. The purpose of this prospective survey in cleft palate children is to find the prevalence of otitis media in this population. The patients in this study are part of the patients in the craniomaxillofacial clinic, jointly organized by a multidisciplinary team of plastic surgeons, otolaryngologists, orthodontists and other specialties involved. Doing the survey for otitis media and establishing early treatment with periodic follow up are part of the multidisciplinary team care plans for the patients with craniofacial anomalies.

MATERIALS AND METHODS

The patients in this series were recruited at the outpatient clinic of the Division of Plastic Surgery. Every patient that registered for cleft palate between January 2001 to April 2002 was included. The patients were then referred to the Department of Otolaryngology and were scheduled for monthly ear check. Otoscopic examination in every patient was done by a single otolaryngologist (K.U.: the author) throughout the whole study. The diagnosis of acute otitis media (AOM) was made when there was purulent middle ear effusion, bulging or redness of the ear drum. Otitis media with effusion (OME) was defined by the visibility of fluid behind the ear drum without clinical signs of acute inflammation. Tympanogram was done on the first visit of every patient. If ear pathology was found, the patient was treated and had extra follow up until the condition resolved and then got back into the regular check up schedule. We plan to continue our study for 1 year after each patient had the cleft palate repaired. As they had their surgery done at different points of time so we reported the data of our preliminary survey at the end of April 2002. Statistical analysis was done by the SPSS program.

RESULTS

Thirty-eight patients were included in this series. There were 21 boys and 17 girls. Age range was 2.4 to 159.6 months. Mean age was 21.4 months ($\pm$ SD 33.7). Age stratification was shown by the histogram (Figure 1). Most of the patients (89.5%) were children under 24 months old. The types of cleft palate were shown in Table 1. Associated craniofacial anomalies were found in 3 cases. One patient had craniosynostosis and two patients had Pierre Robin sequence. Mean follow up period was 150 ± 132 days.

Before otoscopic examination, ear symptoms were reviewed from the parents. Thirty-one patients (81.6%) had no previous ear symptoms. Only two cases had symptoms of otalgia (crying while pulling ear, covering the ear or putting a finger in the ear). Hearing loss was detected by the parents in 5.3%. Delayed speech was found in one case.

Otoscopic examination was done with a pneumatic otoscopy. Twenty-six patients (68.4%) had ear diseases at least once during the study period. OME was the most common ear disease found in this group (Table 2). The earliest age of onset of AOM was 7.9 months, for OME it was 8.5 months. Three cases of atelectatic ears were found, all of them were around 7 years old. Tympanogram type B was most commonly found (47.4%). The result of the Tympanogram was in Table 3.

Survival analysis of the patient with OME was done with Kaplan-Meier method (Figure 2). We found that 21% of the patients had at least one episode of OME by the age of one and 47.5% of the patients had at least one episode of OME by the age of two. Incidence of otitis media with effusion of all patients in this series was 3.85/person/year and the incidence of acute otitis media was 0.51/person/year. Survival analysis of the patient with AOM was not done because the number of the cases was too small.

DISCUSSION

There are many studies confirming the anatomical disadvantages in cleft palate patients that lead to the eustachian tube dysfunction, the main cause of otitis media in infants and children. Kemaloglu, et al[2] compared cephalometric data of

Table 1. Type of cleft palate.

Diagnosis	Number of patients (Percent)
Complete cleft palate/ cleft lip, bilaterally	12 (31.58)
Complete cleft palate/ cleft lip, left	6 (15.79)
Complete cleft palate/ cleft lip, right	8 (21.05)
Cleft soft palate	1 (2.63)
Incomplete cleft palate	3 (7.89)
Isolated cleft palate	7 (18.42)
Cleft of secondary palate	1 (2.63)
Total	38 (100.00)

Table 2. Ear diseases found during monthly visit.

Diagnosis	Number of episodes (Percent)
Acute otitis media	5 (3.23)
Atelectatic ear	3 (1.94)
Impact ear wax	11 (7.10)
Otitis media with effusion	38 (24.52)
Retraction of the ear drum (without fluid)	14 (9.03)
Within normal limit	84 (54.19)
Total	155 (100.00)

Table 3. Tympanogram results.

Tympanogram results	Number of findings (Percent)
Type A	3 (7.89)
Type B	18 (47.37)
Type C	4 (10.53)
Cannot evaluate	13 (34.21)
Total	38 (100.00)

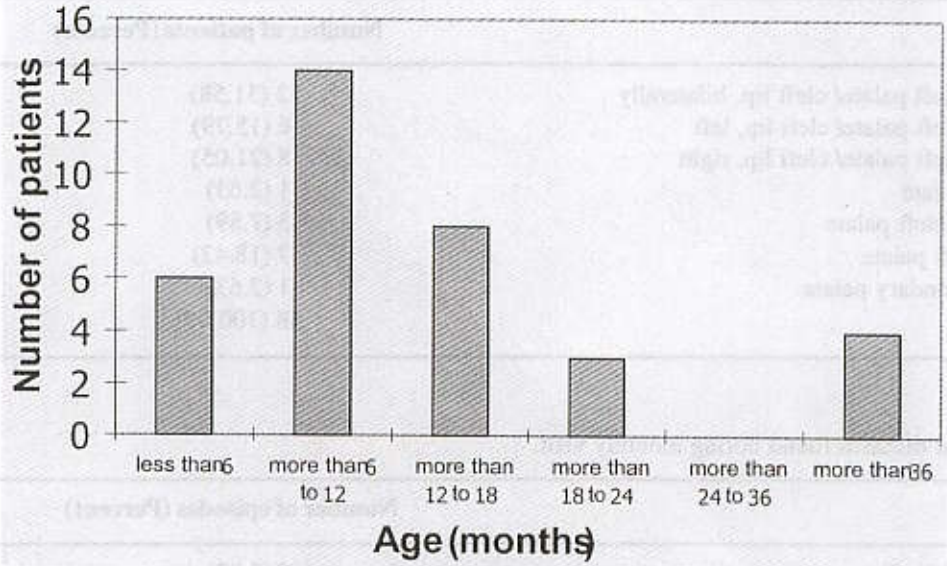

Figure 1. Age stratification of the patient.

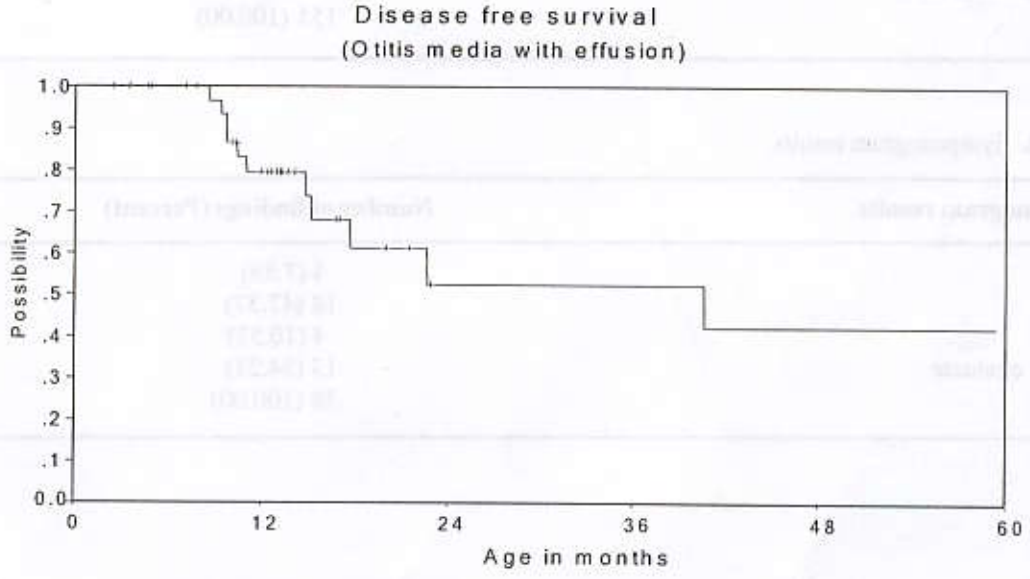

Figure 2. OME free survival.

37 cleft palate children and 40 normal, age-matched children and found that the cleft palate group had more horizontal eustachian tube in relation to the posterior cranial base. They also found that the incidence of otitis media with effusion was much higher (67-76%) in the cleft palate children than in the control group (10%). Huang, et al[3] determined the function of the paratubal muscles by dissection of 15 cadaveric heads and found that the levator veli palatini opens the Eustachian tube by displacement of the medial tubal cartilage and the tubal membrane. The tensor veli palatini opens the Eustachian tube by traction of the lateral tubal membrane and rotation of the medial tubal cartilage by traction on the lateral tubal cartilage. These two muscles insert into the velum so that their function should be affected by cleft palate.

Epidemiology of otitis media in normal children has been studied in depth in many countries. In these various studies, 19-62% of children had at least one episode of AOM by the age of one[4]. The peak incidence of AOM was found during the second half of the first year of life in most studies[4]. For otitis media with effusion (OME), it may not be possible to determine the "true" incidence as the disease is asymptomatic by definition. Anyhow, various studies have been done to identify the incidence of OME by the use of pneumatic otoscopy and tympanometry. Middle ear effusion was found at least once in 26% of 2-year-old Danish children (sample size of 278 cases) examined at 3-month interval[5]. A study done in 2 to 6-year-old children in a day care center in Pittsburgh revealed middle ear effusion at least once in 53-61% of children[6]. Casselbrant, et al[7] found middle ear effusion at least once in 22% of 111 school-age children (5-12 years old) examined monthly by otoscopy and tympanometry. Age of the child is an important factor. From the cumulative studies, children in the first 3 years of life are more likely to have frequent otitis media than older children[8].

One of the most recent studies of otitis media in cleft palate children was done by Aniansson et al[9]. They did a retrospective review of 48 cleft palate children comparing with 21 normal children. The incidence of AOM was 62% and the incidence of OME was 79% in cleft palate children by the age of 18 months. The incidence of AOM and OME were significantly higher ($p < 0.0001$) than in the control group. The children in our study were mostly under 24 months old, which is the susceptible period for otitis media. Eustachian tube dysfunction from cleft palate, by the reasons discussed above, made them more prone to progressive disease such as atelectatic ear drum. Retraction of the tympanic membrane which signified the residual negative pressure in the middle ear was found quite common in our series, secondly to OME. Periodic follow up is essential in this group in order to give early treatment or intervention to prevent middle ear damage.

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