

Cleft Palates and Middle Ear Effusions in Babies.

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Introduction

In 1878, nearly a century ago, Alt (1) was the first who mentioned a case of otorrhoea in a deaf-mute patient with a cleft. He closed the cleft and the otorrhoea healed. The patient was able to hear again and he learned to speak. A great many papers have been published on the relationship between otitis media and palatoschisis. The recurrent or chronic character of otitis media has been ascribed by different authors to various causes. This pathological condition usually occurs bilaterally and the loss of hearing is of the conduction type. To reduce occurrence of disturbed hearing Nassy (9) advised closing the cleft at the age of four. Skolnik (14) examined 401 patients with a cleft palate, of which 45 % obviously had an otological pathology, in 39 % accompanied by loss of hearing. In babies under the age of 12 months he observed otological pathology in only 6 % of the cases. Loeb (8) established a positive correlation between lack of ability to close the pharyngeal cavity properly and the occurrence of hearing loss. Chalat (6) observed improvement of hearing after tonsillectomy and adenotomy (T and A) in 75 % of the cases. Whitfield (17) claimed that the position of the head in bottle-feeding might be of influence and he advised holding the babies in a semi-erect position, when bottle-feeding them.

All authors point out the possible relationship between disfunction of the Eustachian tube and the aetiology of otitis media. Stool and Randall (15) were the first to mention the extremely high percentage of glue ears in very young children with cleft palates. They observed a glue ear 47 times in 25 children under the age of one year.

Since then Paradise et al. (10) and Bluestone et al. (3, 4, 5) performed extensive investigations, the result of which are in accordance with Stool and Randall's observations (15). Among other methods Bluestone et al. (3, 4, 5) were able to prove, with the aid of radiography of the nasopharynx,

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A preliminary report on the subject when 100 patients were examined, has been presented at the meeting of the Dutch Society for Oto-Rhino-Laryngology (see *Nederlands Tijdschrift voor Geneeskunde* 118, p. 983, 1974).

that contrast medium could not be made to enter the Eustachian tube. They assumed that the middle ear in children, that had not yet been operated on for their cleft, always contained fluid.

Occlusion of the nasopharynx cavity and opening of the Eustachian tube are very complicated processes, in which various muscles are involved. The main muscles for opening the Eustachian tube are the M. tensor and levator veli palatini (12). In cases of cleft of the soft palate there is probably a disturbed function of the described mechanisms.

In our opinion the Eustachian tube in babies with a cleft has never been opened and therefore air has never entered the tympanic cavity. The fluid in the middle ear was present before the child was born and because of the malfunction of the Eustachian tube this fluid cannot be discharged into the rhinopharynx. The fact that the fetal middle ear contains a jelly-like substance has already been extensively recorded in the literature i.e. by Preyer (11) and Schmaltz (13). This substance will be referred to as "glue".

Method

During the period from April 1972 to March 1974, 132 children suffering from some form of cheilognatopalatoschisis have been examined. In some of them cheiloplasty or posterior palatoplasty had already been performed. Babies showing only a submucous cleft or a bifid uvula have been excluded from the investigation.

The age of our patients varied from 2½ to 19 months. The examination of the patient took place immediately preceding surgical closing of cleft of lip or palate and was performed by an otologist, who would be unaware of the possible presence of some form of a cleft, in order to obtain an unbiased judgement of the condition of the eardrums. The auditory canal is inspected via a speculum by a Zeiss binocular operation microscope and cleaned if necessary. For this purpose aspirators and grasping forceps from a micro-ear-surgical set of instruments are used. The eardrum may then be inspected properly. External meatus and eardrum are not disinfected. With the aid of a Luer's lock-syringe for aspiration and a special needle the eardrum is perforated in the anterior or posterior lower quarter. Any aspirated fluid is sent to the laboratory for culture. The total procedure lasts 8 to 10 minutes for both ears.

In our center the closure of cleft lips is usually performed at the age of three months. The closure of palatal clefts usually takes place in two phases, the posterior part of the cleft at the age of ten months and the anterior part at about eighteen months. Closing of a solitary median palatoschisis is performed at the same age. The techniques of various surgical procedures used in the treatment of these abnormalities have been standardized. The operations are always performed under intubation anaesthesia.

In order to evaluate the results of the examination, identical investigations were performed on a group of children who had been operated on for entirely different anomalies, e.g. hypospadia.

Results

In 132 patients we observed fluid 195 times in the middle ear (90 times bilaterally and 15 times unilaterally). The picture presented by the eardrums was not always the same in cases of fluid filled middle ears. Mostly it showed a grey-pink color with radial, vascular injection. Sometimes a light reflex is present. The eardrum appears to be thickened and often bulges in the upper-posterior quarter. We have observed never once a retracted or adhesive eardrum in our patients. In punctating the tympanic cavity, fluid sometimes appeared previous to suction. When the middle ear contained air, the eardrum seemed to be thinner, greyer and more transparent.

Out of 195 cases tympanic cavities containing fluid, 168 middle ears held viscous glue (86 %), 22 serous fluid (11 %) and 5 purulent secretion (3 %). In 165 out of 195 positive cases the aspirated fluid was examined by culture. In 152 cases the result proved to be negative, the culture remaining sterile, although no attempt had been made to disinfect the external meatus or eardrum. Of the remaining 13 cultures 8 proved to have been polluted and in 5 instances a proper otitis media existed. *Haemophilus influenzae* and *Diplococcus pneumoniae* could be cultured from the fluid obtained in these 5 cases.

The total number of cleft patients encompassed by our study, may be divided into three groups:

- patients with a cleft palate
- patients with a cleft palate who had been operated on
- patients with a normal palate, having a cleft lip only

The distribution, according to the presence of fluid or air in the tympanic cavity into three groups, was recorded as follows (Figure 1):

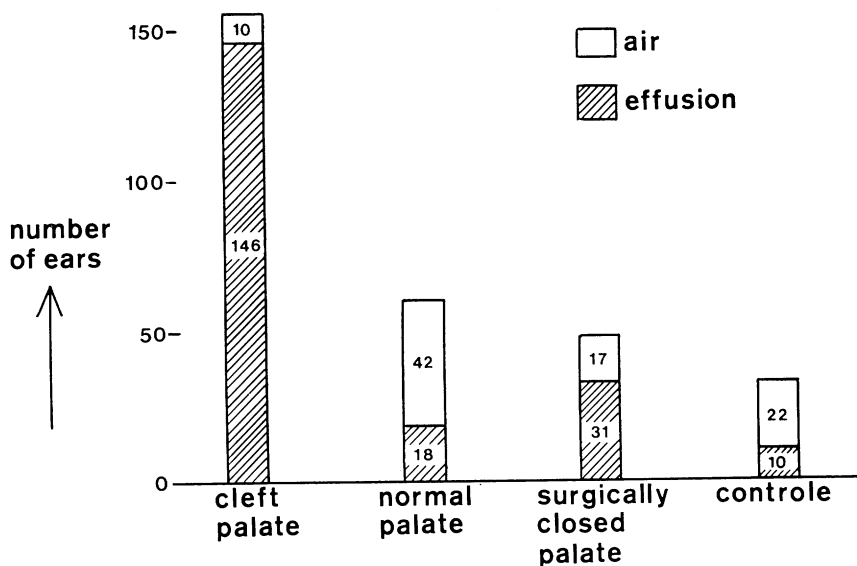


FIGURE 1. This diagram shows the distribution of fluid or air in all the middle ear examined cavities.

In the case of cleft palate the middle ear contains fluid in 94 %. This fluid is mostly glue. Ten ears (6 %) contained only air. It may be assumed that in patients with a normal soft palate the Eustachian tube functions normally. We found, however, glue in 18 out of 60 ears. This is about 30 %. In the control group encompassing 16 patients 10 out of 32 ears contained glue. This also works out to about 30 %. In the group of patients whose cleft had been closed by surgery the percentage of glue ears appeared to be considerably higher: 65 %.

Discussion

It is well known that in small children with a cleft soft palate a very high percentage (94 %) of glue ears occurs (3, 4, 5, 10, 15). From the results of our studies similar percentages appeared. The presence of glue entails loss of hearing. This means an additional handicap for a small patient that in growing up will already have to face serious problems. Moreover it seems likely that the chance of developing otitis media is higher in cases of glue ears.

Six months after the closing of the soft palate, the percentage of glue ears appeared to have already been reduced to 65. There is of course a tendency for decrease of aural pathology with advancing years, but this does not occur until after the age of four according to Graham (7). In our patients the highest age was only 19 months.

The most interesting aspect of our study however is the relatively high percentage (30 %) of glue ears in children with cleft lips and in children of the control group. Assuming that glue is already present before birth in any baby (11, 13), the disturbances we observed, could well be explained. After the baby is born the Eustachian tube will be opened regularly by the action of the pharyngeal mechanism, resulting in drainage of glue. In 30 % of the babies with a normal palate it appears that a period of several months is required before the discharge of the fluid in the middle ear is completed. In babies with a cleft palate the pharyngeal mechanism appears to be so severely disturbed, that in 94 % of the cases glue cannot be drained from the aural cavity. Although the differences are significant we are well aware of the spreading in age of our patients, distributed in various groups. Therefore with reference to the above mentioned we still feel that regular inspection of the condition of the middle ear, eventually followed by myringotomy, in babies with cleft palate is definitely indicated.

Conclusions

- probably all children's middle ears contain glue at birth
- in cleft palate babies glue is present in 94 %.
- inspection of the eardrums, eventually followed by myringotomy in cleft palate babies is indicated periodically.
- closing of cleft palate by surgery leads to improvement of tubal function.

Acknowledgements: We wish to express our appreciation for the preparation of this study to Miss Doete J. Niermeyer and for the statistic evaluation to J. P. Visser, M.D.

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