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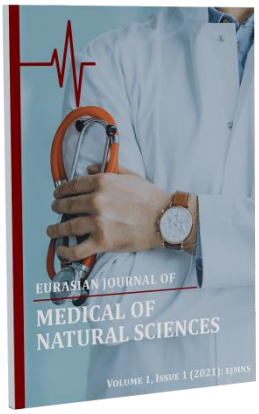

CLINICAL AND COMPUTER DIAGNOSTICS OF CONGENITAL ATRESIA OF THE EXTERNAL AUDITORY CANAL IN CHILDREN

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ABSTRACT

The results of computer studies of children with congenital atresia of the external auditory canal and an assessment of the types of hearing impairment are presented.

The studies were conducted in 67 children with congenital atresia of the external auditory canal in combination with an anomaly of the middle ear, aged from 1 to 16 years. Anomalies of the inner ear in children with atresia of the external auditory canal were identified in 4.5% cases. Among them: stenosis of the internal auditory canal - 1.5%, common cavity of the cochlea and vestibule - 1.5%, anomaly of the vestibule and semicircular canals - 1.5%.

Computer tomography of the temporal bones is a highly effective method for studying developmental anomalies of the external and middle ear in children, allowing to diagnose not only malformations of the external auditory canal, tympanic cavity, auditory ossicles, labyrinthine windows, facial nerve canal, but also structures of the inner ear.

Among all congenital malformations of hearing abnormalities, the most common is atresia of the external auditory canal (EAC), which is accompanied by defects of underdevelopment or absence of auditory ossicles, as well as “fusion” of the middle and inner ear [3, 4, 11].

Due to insufficient visualization of the structures of the tympanic cavity with some anomalies in the location of the sigmoid sinus and facial nerve during posterior tympanotomy, many anomalies in the development of the inner ear were a categorical contraindication to cochlear implantation [1, 6]. In connection with the improvement of methods for visualizing the bone and membranous structures of the inner ear, such interventions began to be carried out, but only in certain cases. Alternative approaches to inner ear structures for cochlear implantation have been developed [2, 5, 7].

Purpose of the study: to study the clinical picture and results of computer studies of congenital atresia of the external auditory canal in children.

Material and methods: under our observation in the Department of Plastic Surgery of the National Children's Medical Center of the Republic of Uzbekistan there were 67 children

with congenital atresia of the external auditory canal in combination with an anomaly of the middle ear, aged from 1 to 16 years. Of these, there were 31 boys, 36 girls. By age, the patients were distributed as follows: 1-3 years old - 26, 4-10 years old - 28 and 11-16 years old. 13 patients.

All patients or their parents filed complaints of hearing impairment, complete atresia, deformation of the auricle or its absence.

As the main research method, all patients underwent computer tomography (CT) of the temporal bones. The slice thickness was 2 mm, the table pitch was 1 mm, that is, the tomographic layers were performed with 50% overlap, which contributed to more accurate secondary image reconstruction in different planes (coronal and sagittal).

Excel MS Office functions were used as statistical analysis software.

Results and discussion: As a result of examining children with atresia of the EAC, we found that unilateral lesions were recorded in 44 children (65.7%), while bilateral lesions were registered in 23 children (34.3%). Boys were more likely to have unilateral lesions with a predominance of right-sided localization of the atresia of the EAC. In girls, the frequency of unilateral and bilateral lesions was equal, however, as in boys, the right side was more affected.

The combination of the atresia of the EAC is observed in 32 children (47.8%) with 2-3 microtia degree, and in 6 cases (8.9%) with anotia.

Analysis of CT scans of the temporal bones was carried out with an emphasis on the structural features of the outer and middle ear. Assessed: the severity of narrowing of the external auditory canal (complete or partial); the degree of depression of the temporomandibular joint into the tympanic cavity; antrum size; degree of pneumatization of the mastoid process; size of the tympanic cavity; the presence or absence of auditory ossicles, as well as the degree of their development; presence or absence of fenestra vestibule and cochlea; location of the facial nerve canal (distance from the facial nerve canal to the beginning of the cochlear window niche); location of the sigmoid sinus (distance between the sigmoid sinus and the tympanic cavity).

A more detailed analysis showed that among the examined patients, there were children dominated with bone atresia (71.6%), in which the bone part of the EAC is absent, and in its place a bone mass of a cellular or sclerotic structure is determined. Stenoses of the left joint were less common (26.9%). According to our data, soft tissue and mixed forms of atresia occurred in 1.5%.

A well-developed pneumatic system of the mastoid process was identified in 52.3%, a moderately developed one in 19.3%, and a severely depleted cellular system or its absence in 28.4% of cases.

The patency of the auditory tube is of great importance for normal auditory function. Unchanged, pneumatized bone orifice of the auditory tube was noted in 91.0% cases, absence of pneumatization - in 9.0% cases.

The usual dimensions of the pneumatized tympanic cavity were identified in 65.7% cases. Significantly reduced pneumatized tympanic cavity - 28.4%. In 7.5%, the tympanic cavity was either absent or represented by a narrow non-pneumatized slit.

In the majority of observations (86.2%), the location of the tympanic cavity was typical. In 13.8%, dystopia of the tympanic cavity was detected anteriorly and downward, with a direct location above the temporomandibular structure.

In 79.3% of observations, the antrum was developed, and in 10.4% it was absent. In 53.4%, the antrum had normal dimensions, in 25.9%, there was a decrease in the size of the antrum. In 69%, pneumatization of the antrum was not impaired, and in 10.3% it was absent.

The structures of the inner ear and the internal auditory canal during embryogenesis develop independently of the structures of the middle and outer ear, being a more ancient formation. Therefore, anomalies of the inner ear are much less common than anomalies of the outer and middle ear. We identified anomalies of the inner ear in children with the atresia of the EAC in 4.5% of cases. Among them: stenosis of the internal auditory canal 1.5%, common cavity of the cochlea and vestibule 1.5%, anomaly of the vestibule and semicircular canals 1.5%.

Conclusion: Computed tomography of the temporal bones is a highly effective method for studying developmental anomalies of the external and middle ear in children, allowing to diagnose not only malformations of the external auditory canal, tympanic cavity, auditory ossicles, labyrinthine windows, facial nerve canal, but also the structures of the inner ear.

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