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Results of Computed Tomography of the Nose and Paranasal Sinuses in Children with Unilateral Congenital Cleft Lip and Palate

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Abstract This work conducted a clinical and functional study of the structures of the nasal cavity and paranasal sinuses, as well as a comparison of the healthy and affected sides in children with unilateral cleft lip and palate (CLLP). The incidence of pneumatization of the middle turbinates, or concha bullosa, is well documented in the literature. However, no studies have assessed the effect of concha bullosa on deviated septum in children with CGN. The authors sought to analyze the incidence of concha bullosa and any correlation with deviated septum and sinus disease in children with CGN.

Keywords Congenital cleft lip and palate, Children, Nose, Concha bullosa, Paranasal sinuses

1. Introduction

Diseases of the nasal cavity and paranasal sinuses in children are a leading cause of ENT morbidity, especially in children with cleft lip and palate (CLP). A characteristic feature of children with CLP is the presence of a wide communication between the nasal cavity and the mouth, which prevents the creation of negative intraoral pressure during sucking, making feeding difficult [2,3,6].

The results of studies on the morphology and development of the nose, nasal cavity, and paranasal sinuses not only expand existing ideas about the structure, development, and physiology of the nose, nasal cavity, and paranasal sinuses in children with congenital clefts of the upper lip and palate, but also have important practical implications for medicine, in particular otorhinolaryngology and pediatric surgical dentistry.

The frequency of pneumatization of the middle nasal concha, or bullous concha, is well described in the literature [1,4,5]. However, to our knowledge, no study has evaluated the effect of bullous concha on nasal septum deviation in children with CLP.

Based on the foregoing, we aimed to analyze the frequency of bullous concha and any correlation with nasal septum deviation and paranasal sinus disease in children with CLP.

2. Materials and Methods

This study was conducted on 97 children (54 boys and 43 girls) with unilateral cleft lip and palate. All children underwent computed tomography of the nose and paranasal sinuses and the following parameters were evaluated: deviation of the nasal septum from the midline, presence of hypertrophy of the inferior turbinates and bullous concha, the effect of bullous concha on hypertrophy of the inferior turbinates with nasal septum deviation in children with CLP, the density of the maxillary sinus contents, the cross-sectional area of the maxillary sinus, and the height of the maxillary sinus floor.

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3. Results

All studies were conducted to assess symptoms related to pathological processes in the nasal cavity and paranasal sinuses. The maxillary sinuses were tracked separately on each side. The height and area of the maxillary sinuses were measured on each side. There was no significant difference between the cleft and non-cleft sides in terms of mean sinus volume and height ($P > 0.05$). The mean basal area of the sinus on the cleft side was 32.77 mm2 larger than on the non-cleft side, and this difference was statistically significant ($P = 0.027$). The mean volume of the upper maxillary sinus on the cleft side was 541.62 mm3 larger than on the non-cleft side, but this difference was not statistically significant ($P = 0.075$). Considering the age groups, the mean volume of the upper sinus on the cleft side in patients under 14 years of age was 4.66 mm3 smaller than on the non-cleft side. In the age group over 14 years of age, the mean volume of the upper sinus on the cleft side was 978.66 mm3 larger than on the non-cleft side. The mean volume of the lower sinus on the cleft side was 505.92 mm3 smaller than on the non-cleft side, and this difference was statistically significant ($P = 0.010$). The mean basal area of the sinus on the cleft side was

significantly larger than on the non-cleft side. In addition, the volume of the lower sinus on the cleft side was significantly smaller than on the non-cleft side. However, there was no significant difference in upper sinus volume between the cleft and non-cleft sides. Inflammatory processes of the paranasal sinuses were also detected, which were classified as mild, moderate, or severe. The sphenoid, ethmoid, maxillary, and frontal sinuses were evaluated separately on both sides.

If a bullous concha was present, its size was assessed as small, medium, or large. If bilateral hypertrophy of the turbinates was present, the sizes were compared, and if one was larger, it was considered dominant. If a nasal septum deviation was present, it was graded as mild, moderate, or severe. The direction of nasal septum deviation was determined by the direction of the convex surface. Deviation of the nasal septum in the frontal plane was characterized by the distance from the midline (expression) and the height from the nasal floor.

Differences in measurements between sides in terms of the width of the inferior turbinate (overall and bone), medial mucosa, and distance to the lateral wall of the nose were calculated as indicators of inferior turbinate hypertrophy.

In most children with unilateral clefts, the nasal septum was deviated towards the cleft side, and there was a significant correlation between the cleft side and the direction of nasal septum deviation ($P < 0.001$). Sinusitis was more severe on the non-cleft side than on the cleft side ($P = 0.04$), and on the concave side than on the convex side ($P = 0.02$). The cross-sectional area of the maxillary sinus did not differ statistically between the cleft and non-cleft sides, nor between the concave and convex sides of the septum. The floor of the maxillary sinus was located higher on the cleft side than on the non-cleft side ($P = 0.02$).

4. Conclusions

The development of maxillary sinusitis associated with cleft lip and palate depends on both the cleft side and nasal septum deviation, but not on the size of the sinus.

The cleft side determines the direction of septal deviation and the height of the maxillary sinus floor.

The low position of the sinus floor can come into contact with the tooth root and, therefore, may be one of the etiological factors of sinusitis in children with CLP.

Bullous concha is a common anatomical variant. There is a strong association between the presence of bullous concha and contralateral nasal septum deviation.

Deviation of the nasal septum away from the dominant concha with preservation of adjacent air channels suggests that this deviation is not a direct result of mass effect from the concha. Patients with bullous concha do not have an increased incidence of paranasal sinus disease.

Hypertrophy of the inferior turbinates is directly proportional to the severity of nasal septum deviation and inversely proportional to the height of nasal septum deviation.

The influence of bullous concha on hypertrophy of the inferior turbinates is primarily mediated by the influence on the morphology of the septum, since in these patients the apex of the nasal septum deviation tends to be located higher than the nasal floor.

REFERENCES

[1] Ippolitov V.P., Helminskaya N.M. “Fundamentals of endoscopic diagnosis of the paranasal sinuses” // Current problems of dentistry: Collection of scientific works dedicated to the 40th anniversary of the institute. -M., 2002. -P. 6-11.

[2] Makhkamova N.E., Mirazizov K.D. Condition of the larynx in children with congenital cleft lip and palate. Bulletin of otorhinolaryngology. 2007; 5: 23-27.

[3] Meitel I.Yu., Karapetyan L.S. “Assessment of nasal breathing disorders after rhinoplasty” // Collection of materials of the 88th conference of the scientific student society: “Mechnikov Readings” – 2015 – P. 26.

[4] Helminskaya N.M., Rabukhina N.A., Ippolitov V.P. “Study of the paranasal sinuses in patients with various types of congenital deformities of the facial skull” // Current problems of dentistry: Collection of scientific works dedicated to the 40th anniversary of the institute. – M., 2002. -P. 113-115.

[5] Hikosaka M, Nagasao T, Ogata H, Kaneko T, Kishi K. Evaluation of maxillary sinus volume in cleft alveolus patients using 3-dimensional computed tomography. J Craniofac Surg. 2013; 24(1): 23-26.

[6] Meitel. I., Karapetyan L. “Prevalence and causes of nasal obstruction after rhinoplasty” // ISJM – 2015 -V.1 – No. 2. P. 16-19.