

Morphological Aspects of Adenotonsillar System Changes

Abdusamatova Iroda Ilkhamovna, Tastanova Gulchekhra Eshtayevna,
Shamsiev Djakhangir Fazlitdinovich

Tashkent State Dental Institute, Tashkent, Uzbekistan

Abstract The incidence rate of adenotonsillar system pathology is increasing steadily over the past decade and accounts for 61.2% of all common and primary diseases. This pathology is taking a leading place among otorhinolaryngological diseases in school-age and younger children, constituting 16-50% of upper respiratory tract diseases. It should be emphasized that the incidence rate of adenotonsillar system diseases is increasing annually. These indicators pose significant challenges for ENT specialists.

Keywords Adenotonsillar system, Nasal breathing impairment, Children, Morphology, Age

1. Introduction

Operations in the adenotonsillar system constitute the main volume of surgical interventions in pediatric otolaryngology. Operations on the palatine tonsils due to adenoid vegetations causing nasal breathing obstruction occupy a leading position in this regard.

Although the recurrence of adenoids is monitored in many cases, the need for adenoidectomy surgery, which leads to various complications, is increasing. [2,3] However, it is essential to emphasize the importance of monitoring adenotonsillar tissues as vital lymphoepithelial organs and the high incidence of complications both during and after surgery. The presence of endocrinocytes resembling those located in the anterior part of the pituitary gland in the parenchyma of the palatine tonsils, entering the Pirogov-Valdeyer ring, indicates their difference from other lymphoid organs.

Objective: To study the morphological changes of adenotonsillar glandular tissues and the significance of some factors in the development of adenoid vegetations against the background of impaired nasal breathing.

2. Materials and Methods

A total of 180 children aged 3 to 12 years were divided into two clinical groups. The first clinical group included 85 patients diagnosed with adenoid vegetations of II-III degree along with nasal septum deviations. [4,6] The second clinical group consisted of 96 children with chronic rhinosinusitis (nasal breathing impairment) at various stages of adenoid vegetation.

To conduct the planned research, patients were distributed among the main groups based on the "addition/removal"

zones.

Twenty healthy children aged 3 to 7 years, who were trained in educational institutions in Tashkent city, were selected for the control group. The selected children had no respiratory or allergic conditions in their medical history, and their perinatal period was uneventful. [5,7]

All patients underwent comprehensive clinical and anamnestic examination, including history taking, physical and instrumental examination, examination by otolaryngologists and other specialists as necessary, general laboratory, and histological examination methods. Endoscopy, MSCT, 3D X-ray, and histological examination of adenoid biopsy were performed to diagnose and identify concomitant pathologies in patients. Histological examination of adenoid tissues obtained by surgical removal was carried out using standard methods at the PUB center in Tashkent.

3. Results and Discussions

A total of 180 children aged 3 to 12 years were divided into two clinical groups. The first clinical group included 85 patients diagnosed with adenoid vegetations of 2-3 degrees along with nasal septum deviations. Of the total number of patients, 45 (57.2%) were boys, and 40 (45.1%) were girls; the average age was 4.8 ± 1.25 years. [7,8] According to age indicators, in the first group, on average, 4 years – 30 (34.4%) children, among them girls – 19 (21.7%), were observed; boys (11 children) accounted for 12.6%. The second clinical group consisted of 96 children with chronic rhinosinusitis (nasal breathing impairment) at various stages of adenoid vegetations. Of them, 60 (72%) were boys and 36 (42.3%) were girls; the average age was 4.6 ± 1.17 years. According to age indicators, in the second group, on average, 4 years – 35 (41.6%) children, among them boys – 22 (26.2%), were observed; girls (10 children) accounted for 11.4%.

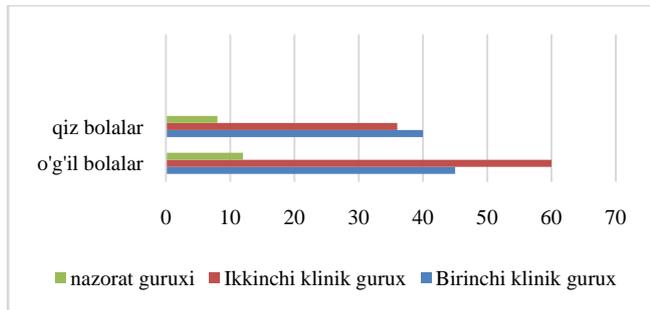


Figure 1. Grouping of Children by Gender

Of the children forming 16 (19%) at the age of 5, 10 (16%) were boys and 6 (7.1%) were girls. Among the children at the age of 6, totaling 20 (24.1%), 11 (11.9%) were girls, and 9 (10.7%) were boys. The average age of the children in both the first and second clinical groups was found to be between 4 to 6 years. [9]

Through the optical endoscopic examination of the children, the condition of the adenoids, the degree of their enlargement, their position in the nasopharynx, and the presence of chronic adenoiditis were observed. It was noted that in 40 (44.4%) of the children in the first clinical group and 43 (50.5%) in the second clinical group, there were hypertrophic adenoids of degrees II-III. In the first clinical group, 50 (61%) children and in the second clinical group, 51 (67%) children were found to have hypertrophic adenoids of grade III. Moreover, in the first clinical group, 7 (5.32%) children and in the second clinical group, 8 (9.4%) children were found to have hypertrophic adenoids of grade II-III.

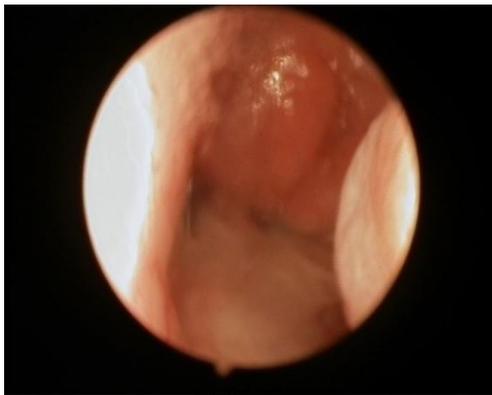


Figure 2. Nasopharynx before endoscopy. Patient aged 3, disease history № 14714/705

During the pharyngoscopic examination, it was determined that in the children of the first clinical group, 60 (68.6%), and in the children of the second clinical group, 61 (71.5%), the size of the tonsils was within normal limits. In 9 (11.5%) of the children in the first clinical group and 12 (14.1%) in the second clinical group, hypertrophy of the tonsils of grade II-III was identified. [10] Tonsil hypertrophy of grade III was found in 17 (17.6%) children in the first clinical group and 14 (16.5%) children in the second clinical group.

Histological examination revealed signs of hyperplasia of lymphoid follicles on all surfaces of the tonsillar lymphoid tissue, indicating functional enhancement of these structures.

Microvessels were filled with blood, and there was pronounced proliferation within the stroma under lymphoid infiltration. The surfaces of the adenoid vegetations exhibited various structural changes in the epithelium, with some areas showing squamous metaplasia of the epithelial layer, while in other areas signs of basal cell hyperplasia were observed. Adenoid vegetation showed the presence of aberrant secondary follicles. In patients with pronounced adenoid hypertrophy, parafollicular fibrosis was observed, accompanied by an increase in lymphoid tissue with signs of lymphocytic infiltration. [10]

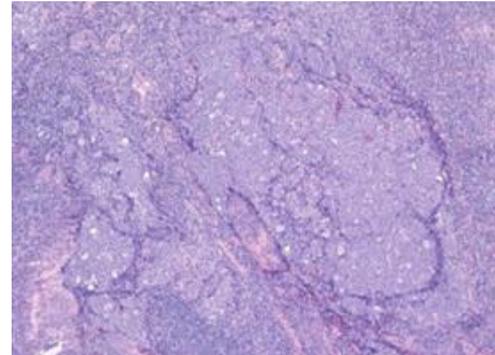


Figure 3. Bifollicular aberration of the tonsil in a 3-year-old boy. Stained with hematoxylin and eosin, magnification 1×10

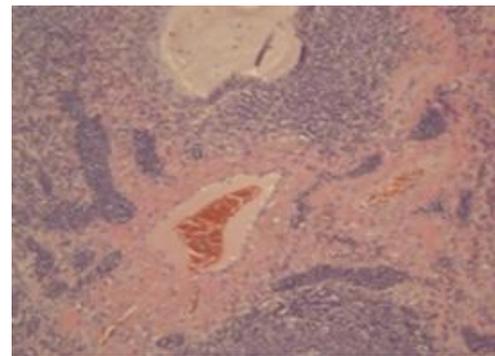


Figure 4. The patient, 7 years old, a male child, with lymphatic vessels expanded with lymphocytic stasis and proliferation of delicate collagen bundles in the stroma

4. Conclusions

Various factors influencing the hypertrophy of adenotonsillar system lymphoid tissues in the context of nasal breathing disorders were identified through the conducted research. Based on the results of questionnaires administered to parents of children with adenoid vegetation and adenoiditis, prognostic aspects of prenatal factors in the development of the disease were investigated, revealing hereditary predispositions of children to the harmful habits of their parents (smoking, alcohol consumption), as well as a hereditary predisposition of parents to rhinosinusitis and chronic tonsillitis.

It was found that 80% of parents of healthy control group children did not report allergic conditions. A significant correlation was identified between allergic conditions and pet ownership among parents in both the first and second

clinical groups ($r < 0.001$, $Z = -8.250$), which was not observed in healthy control group parents ($r = 0.041$, $Z = -2.041$).

The results of the questionnaires administered to parents provided insights into the transition of parental harmful behavior and the peculiarities of the early postnatal period in children. In the healthy control group, 80.6% of parents reported no harmful behaviors during the perinatal period. Meanwhile, among the children with nasal breathing disorders, this indicator constituted 42.3% ($r < 0.001$). The impact of harmful behaviors on the perinatal period, maternal toxemias, the risk of premature birth, and maternal susceptibility to infectious diseases during the perinatal period contributed to the prognostic significance ($r < 0.001$).

REFERENCES

- [1] Nosetti L. et al. Exploring the Intricate Links between Adenotonsillar Hypertrophy, Mouth Breathing, and Craniofacial Development in Children with Sleep-Disordered Breathing: Unraveling the Vicious Cycle // *Children*. – 2023. – Vol. 10. – No. 8. – pp. 1426.
- [2] Han C. J. et al. The pediatric indications for tonsillectomy and adenotonsillectomy: Race/ethnicity, age, and gender // *Laryngoscope Investigative Otolaryngology*. – 2023. – Vol. 8. – No. 2. – pp. 577-583.
- [3] Sagar M. et al. The concatenation of association between gastroesophageal reflux and obstructive adenotonsillar hypertrophy // *International Journal of Pediatric Otorhinolaryngology*. – 2020. – Vol. 139. – Article 110439.
- [4] Shamsiev J.F. "Functional features of the mucous membrane of the nasal cavity in chronic rhinosinusitis." *Materials of the IV Congress of Otorhinolaryngologists*. Tashkent (2015).
- [5] Abdusamatova I.I., Kuchkarova R.R. "The Influence of the Evolution and Embryogenesis of the Jaw Apparatus on the Development of Dentofacial Anomalies and Predisposition to Caries" Tashkent 2022.
- [6] Abdusamatova I.I., Tastanova G.E., Muratov M.U. "Anatomy and physiology of the lymphatic pharynx ring Maldeyer Pirogov and diagnostics of the vegetation of the adenotonsillar system" (review article) "Bulletin" Tashkent 2022.
- [7] Vokhidov U, Vokhidov N, Shamsiev D, Nuriddinov Kh, Kakhhorov A. (2021) Endoscopic diagnosis of chronic polypoid rhinosinusitis treatment results // *Stomatology*, (№1 (82)), 95-99.
- [8] Vokhidov U.N., Khasanov U.S., Shamsiev D.F. (2014) Morphological and functional characteristics of the nasal mucosa in various forms of chronic polypoid rhinosinusitis // *Stomatology*, (№3-4 (57-58)), pp. 103-109.
- [9] Abdusamatova I.I., Shamsiev D.F., Tastanova G.E. "The clinical importance of mechanoreceptors in the impairment of nasal breathing (Literature review)". *MedUnion VOLUME 2, ISSUE 1, 2023*. pp. 26-34.
- [10] Abdusamatova I.I., Tastanova G.E., Shamsiev D.F. "Morphohistological characteristics of hypertrophy of the pharyngeal tonsils in children in the age aspect" *IJORCES International journal of conference series on education and social sciences*. (Online) March 2024 Published ISSN 2717-7076 Bursa, Turkey.