FUNCTIONAL ASSESSMENT METHODS IN PATIENTS WITH COMBINED INJURIES OF THE NOSE AND PARANASAL SINUSES

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Abstract. Combined injuries of the nose and paranasal sinuses represent a significant clinical challenge due to their impact on both anatomical integrity and functional status. This study aims to evaluate the effectiveness of modern functional diagnostic methods in patients with such injuries. A total of 140 patients were examined using a комплекс of clinical, instrumental, and functional assessment techniques, including anterior rhinoscopy, rhinomanometry, olfactory testing, and computed tomography (CT). The results demonstrate that functional diagnostic methods provide critical information for determining the severity of impairment and guiding treatment strategies. Rhinomanometry and CT imaging were found to be the most informative tools for assessing nasal airflow and structural damage. Early functional evaluation improves treatment outcomes and reduces complications.

Keywords: nasal trauma, paranasal sinuses, functional diagnostics, rhinomanometry, olfactory dysfunction, ENT.

Introduction. Injuries to the nose and paranasal sinuses are frequently encountered in otorhinolaryngological practice and are often associated with both structural and functional disturbances. While anatomical damage can be readily identified through imaging techniques, functional impairments such as nasal obstruction and olfactory dysfunction require specialized diagnostic approaches.

Combined injuries involving both nasal structures and paranasal sinuses are particularly complex, often leading to impaired nasal breathing, mucociliary dysfunction, and decreased quality of life. Therefore, accurate functional assessment is essential for comprehensive patient management. The aim of this study was to investigate the role and diagnostic value of functional assessment methods in patients with combined injuries of the nose and paranasal sinuses.

Materials and Methods. This study included 140 patients with combined injuries of the nose and paranasal sinuses who were treated at a multidisciplinary clinical center. The age of patients ranged from 18 to 65 years, and both male and female patients were included. All patients underwent a standardized diagnostic protocol. Clinical examination included anterior rhinoscopy and palpation of nasal structures to identify deformities and obstruction. Functional assessment of nasal breathing was performed using rhinomanometry, which allowed objective measurement of nasal airflow resistance.

Olfactory function was evaluated using standardized smell identification tests to determine the degree of olfactory impairment. In addition, mucociliary clearance was assessed using the saccharin test in selected patients. Radiological evaluation was conducted using X-ray imaging in all cases, while computed tomography (CT) scans were performed in patients with suspected complex injuries or sinus involvement. CT imaging provided detailed information about bone structures and sinus pathology.

The collected data included functional parameters such as nasal airflow resistance, olfactory function scores, and mucociliary clearance time. Statistical analysis was performed using descriptive methods, and results were expressed as mean values and percentages.

Results. Functional assessment revealed that nasal breathing impairment was present in the majority of patients. Rhinomanometry demonstrated increased nasal airway resistance in 72% of cases, indicating significant obstruction. Olfactory dysfunction was observed in 38% of patients, ranging from mild hyposmia to complete anosmia. These changes were more frequently associated with injuries involving the upper nasal structures and ethmoidal region.

Mucociliary clearance was delayed in 41% of patients, suggesting impaired защитная function of the nasal mucosa. The saccharin test results showed prolonged clearance time compared to normal values.

CT imaging confirmed structural abnormalities in 78% of patients, including nasal bone fractures, septal deviation, and sinus involvement. A strong correlation was observed between CT findings and functional impairment severity. Patients who underwent early functional assessment and appropriate treatment demonstrated better recovery of nasal breathing and olfactory function compared to those with delayed diagnosis.

Discussion. The results of this study highlight the importance of functional diagnostic methods in the evaluation of patients with combined nasal and paranasal sinus injuries. While imaging techniques provide essential anatomical information, they are insufficient for assessing the functional impact of trauma.

Rhinomanometry proved to be a highly valuable tool for objectively measuring nasal airflow resistance and identifying the degree of obstruction. Similarly, olfactory testing allowed detection of sensory deficits that might otherwise be overlooked. The findings also emphasize the relationship between structural damage and functional impairment. Patients with more extensive injuries demonstrated significantly worse functional outcomes, underscoring the need for early and comprehensive assessment.

Incorporating functional diagnostics into routine clinical practice can improve treatment planning and reduce the risk of long-term complications such as chronic nasal obstruction and persistent olfactory dysfunction.

Conclusion. Functional assessment methods play a crucial role in the evaluation and management of patients with combined injuries of the nose and paranasal sinuses. Rhinomanometry, olfactory testing, and mucociliary clearance assessment provide valuable information that complements radiological findings. Early application of these methods allows accurate diagnosis of functional impairments, facilitates appropriate treatment selection, and improves clinical outcomes. Therefore, a comprehensive diagnostic approach that includes both structural and functional evaluation is strongly recommended in such patients.

References

1. Andersen I., Camner P., Jensen P.L., Philipson K. Nasal clearance in normal subjects. Acta Oto-Laryngologica. 1974;78: 178–182.
2. Brook I. Microbiology and management of sinusitis. Journal of Otolaryngology. 2017;46(1):1–8.
3. Clement P.A.R. Committee report on standardization of rhinomanometry. Rhinology. 2005;43:169–179.
4. Cummings Otolaryngology: Head and Neck Surgery. Flint P.W., Haughey B.H., Lund V.J., et al. Cummings Otolaryngology: Head and Neck Surgery. 6th ed. Elsevier; 2015.
5. Djuraev J.A., Soatov I.O. MET (Tyrosine Kinase Receptor Gene) Gene Polymorphism Among Patients with Chronic Polyposis Rhinosinusitis and Chronic Rhinosinusitis. Klinicheskaya Meditsina (Clinical Medicine), Tashkent Medical Academy Journal, 2023, № 1, pp. 113–116. ISSN 2181-7812. Tashkent Medical Academy, Tashkent, Uzbekistan.
6. Djuraev J.A., Soatov I.O., Rakhimjanova G.A., Mardonov Kh.A. Results of a Clinical-Cytomorphological Study Conducted to Identify Different Forms of Chronic Polyposis Rhinosinusitis. Eurasian Journal of Otorhinolaryngology – Head and Neck Surgery, 2024, Vol. 3, Issue 4, pp. 56–61. Tashkent Medical Academy, Tashkent, Uzbekistan. DOI: https://doi.org/10.57231/j.ejohns.2024.3.4.0010
7. Djuraev Jamolbek Abdukakhorovich, Soatov Ilyosjon Olim ugli. Comparative Analysis of the Frequency of the MMP9 Gene rs3918242 Polymorphism in a Group of Patients with Chronic Polyposis Rhinosinusitis. Problems of Biology and Medicine, 2024, No. 4 (155), pp. 73–76. Tashkent Medical Academy, Tashkent, Uzbekistan. ISSN 2181-7812.
8. Head & Neck Surgery – Otolaryngology. Bailey B.J., Johnson J.T., Newlands S.D. Head & Neck Surgery – Otolaryngology. 5th ed. Lippincott Williams & Wilkins; 2014.
9. Hummel T., Sekinger B., Wolf S.R., Pauli E., Kobal G. “Sniffin’ Sticks” olfactory test. European Archives of Oto-Rhino-Laryngology. 1997;254: 191–196.

10. Khasanov U.S., Soatov I.O., Khodjanov S.H., Axundjanov N.O., Rakhimjanova G.A. Results of an Analysis of the Prevalence of the rs20417 Polymorphism in the COX2 Gene Among Patients with Chronic Polyposis Rhinosinusitis and Chronic Rhinosinusitis and in the Control Group. American Journal of Medicine and Medical Sciences, 2024, 14(12): 3149–3153. DOI 10.5923/j.ajmms.20241412.13 Tashkent Medical Academy, Tashkent, Uzbekistan.
11. Soatov Ilyosjon Olim o‘g‘li, Djuraev Jamolbek Abdukaxarovich. Pathomorphological Structure of Polypoid Tissue of Patients with Chronic Polypoid Rhinosinusitis. Medical Journal of Uzbekistan, 2023, № 2, pp. 59–64. Tashkent Medical Academy, Tashkent, Uzbekistan.
12. Soatov Ilyosjon Olim o‘g‘li. Biomarkers and Genotyping in the Development of Chronic Polyposis Rhinosinusitis. Association of Pulmonologists of Central Asia, 2024, pp. 100–103. Tashkent Medical Academy, Tashkent, Uzbekistan. ISSN: — (article published in Pulmonologiya Markazi Bulletin, https://tbcenter.uz/)
13. World Health Organization. Global Health Estimates and Injury Reports. Geneva: WHO; 2018.