



INFLUENCE OF RHINOPATHOLOGY AND DISTURBANCE OF CEREBRAL HEMODYNAMICS

Khasanov U.S.

Khayitov O.R.

Vokhidov U.N.

Tashkent State Medical University

<https://doi.org/10.5281/zenodo.18719243>

ARTICLE INFO

Received: 18th February 2026

Accepted: 19th February 2026

Online: 20th February 2026

KEYWORDS

According to the World Health Organization (WHO), nasal septum deviation is one of the most common causes leading to impaired airflow through the nasal cavity in 66% of cases, resulting in difficulty in nasal breathing, vasomotor rhinitis accounts for 21% of chronic rhinitis cases

ABSTRACT

The aim of the study was to develop a comprehensive examination algorithm for patients with polyetiological nasal obstruction of varying duration and severity, taking into account its effect on cerebral circulation and blood oxygen saturation.

Materials and Methods. The study included 220 patients with nasal pathologies (nasal septum deviation and vasomotor rhinitis) who were treated at the "QO'QON DUNYO JAVOHIRI" clinic between 2019 and 2021, as well as 20 healthy individuals in the control group. All patients underwent a comprehensive examination including clinical, laboratory, and instrumental investigations..

According to the World Health Organization (WHO), nasal septum deviation is one of the most common causes leading to impaired airflow through the nasal cavity in 66% of cases, resulting in difficulty in nasal breathing, vasomotor rhinitis accounts for 21% of chronic rhinitis cases.

The aim of the study was to develop a comprehensive examination algorithm for patients with polyetiological nasal obstruction of varying duration and severity, taking into account its effect on cerebral circulation and blood oxygen saturation.

Materials and Methods. The study included 220 patients with nasal pathologies (nasal septum deviation and vasomotor rhinitis) who were treated at the "QO'QON DUNYO JAVOHIRI" clinic between 2019 and 2021, as well as 20 healthy individuals in the control group. All patients underwent a comprehensive examination including clinical, laboratory, and instrumental investigations.

Results and Discussion. Patients with rhinopathy were divided into two groups depending on the presence of cerebral circulatory disorders. The main group consisted of 120 patients with both cerebral circulatory disorders and nasal pathology (nasal septum deviation and vasomotor rhinitis). The comparison group included 100 patients with nasal pathology only.

The average indices of cerebral blood flow reactivity in the vertebrobasilar basin were analyzed in both groups.

Subgroup 1A: Compared with the control group, the CI (Constriction Index) increased significantly: by 103.3% in the CCA (Common Carotid Artery) and by 72.9% in the VA

(Vertebral Artery) ($p < 0.05$). No significant changes in the DI (Dilation Index) were observed in the CCA; however, DI increased by 16% in the CCA and by 41% in the VA ($p < 0.05$). The reactivity index exceeded control values by 52% in the CCA and by 30% in the VA ($p < 0.05$).

Subgroup 1B: Compared with controls, CI increased by 15% in the CCA and by 35% in the VA ($p < 0.05$). DI in the CCA significantly decreased by 13%, whereas DI in the VA increased by 42.5% ($p < 0.05$). The reactivity index increased by 10% in the CCA and by 18% in the VA ($p < 0.05$).

Subgroup 1C: Compared with controls, CI increased by 47.5% in the CCA and by 20% in the VA ($p < 0.05$). DI increased by 55% in the CCA and by 45% in the VA ($p < 0.05$). The reactivity index rose by 9% in the CCA and by 33% in the VA ($p < 0.05$). In the comparison group, the indicators differed slightly from those of the main group.

Subgroup 2A: Compared with controls, CI increased significantly by 103.3% in the CCA and by 72.9% in the VA ($p < 0.05$). DI increased by 16% in the CCA and by 41% in the VA ($p < 0.05$). The reactivity index exceeded control values by 52% in the CCA and by 30% in the VA ($p < 0.05$).

Subgroup 2B: Compared with controls, CI increased by 15% in the CCA and by 35% in the VA ($p < 0.05$). DI in the CCA significantly decreased by 13%, while DI in the VA increased by 42.5% ($p < 0.05$). The reactivity index increased by 10% in the CCA and by 18% in the VA ($p < 0.05$).

Subgroup 2C: Compared with controls, CI increased by 47.5% in the CCA and by 20% in the VA. DI increased by 55% in the CCA and by 45% in the VA ($p < 0.05$). The reactivity index increased by 9% in the CCA and by 33% in the VA ($p < 0.05$).

Thus, in patients with rhinopathology, the effect on cerebral circulation can be assessed using ultrasound examination. Prolonged disease duration was associated with a relative decrease in cerebral blood circulation, which may manifest clinically as headaches and general weakness.

During ultrasound evaluation of cerebral blood flow, a relatively lower DI level was observed, with a markedly increased CI predominating in both the CCA and VA in all patients of subgroup 2A compared with controls. Additionally, a uniform increase in reactivity indices of the CCA and VA was observed across all subgroups.

In subgroup 2B, baseline reactivity indices of the CCA and VA were significantly lower compared with subgroup 2A: CI decreased by 40% in the CCA and by 55% in the VA; DI decreased by 25% in the CCA and by 15% in the VA.

In subgroup 2C, imbalance of vasomotor reactions between anterior and posterior circulation basins increased. The baseline CI in the CCA continued to decrease compared with subgroup 2B (–15%), while DI sharply increased (+77%). Conversely, in the VA, CI increased by 78%, while DI decreased by 34%.

In the subgroup with severe nasal obstruction, the most significant and asynchronous shifts in cerebral arterial reactivity were identified: excessive reduction of constrictor capacity in the CCA and insufficient reduction of dilatory capacity in the VA compared with controls.

Conclusion. In patients with rhinopathology, the impact on cerebral circulation can be effectively assessed by ultrasound examination. Prolonged nasal obstruction contributes to a

relative decrease in cerebral blood flow, which may clinically manifest as headaches and asthenic symptoms.

References:

1. Alwan M. M. et al. Modified technique of extracorporeal septoplasty in severe septal deviation // Oral and Maxillofacial Surgery Cases. – 2021. – T. 7. – №. 2. – C. 100217.
2. Coşkun Z. Ö. et al. Pediatric Septoplasty // All Around the Nose. – Springer, Cham, 2020. – C. 509-523.
3. Dinesh Kumar R., Rajashekar M. Comparative study of improvement of nasal symptoms following septoplasty with partial inferior Turbinectomy versus septoplasty alone in adults by NOSE scale: a prospective study // Indian Journal of Otolaryngology and Head & Neck Surgery. – 2016. – T. 68. – №. 3. – C. 275-284.
4. Haque M., Mukhopadhyay S. Objective and Subjective Analysis for Efficaciousness of Nasal Airway in Patients Undergoing Conventional and Endoscopic Septoplasty: A Comparative Study // Indian Journal of Otolaryngology and Head & Neck Surgery. – 2022. – C. 1-8.
5. Hong C. J. et al. Open versus endoscopic septoplasty techniques: A systematic review and meta-analysis // American journal of rhinology & allergy. – 2016. – T. 30. – №. 6. – C. 436-442.
6. Ibrahim S. H. Assessment of the anatomical causes of persistent nasal obstruction after primary septorhinoplasty // Scopus ijphrd citation score. – 2019. – T. 10. – №. 7. – C. 490.
7. Peyvandi A. A., Oroei M., Khoshsirat S. Comparison results of nasal septum suturing and nasal packing following septoplasty // Romanian Journal of Rhinology. – 2019. – T. 9. – №. 34. – C. 97-99.
8. Wei L. et al. A new technique of revision septoplasty using semi-penetrating straight and circular incisions of the nasal septum // The Journal of Laryngology & Otology. – 2019. – T. 133. – №. 6. – C. 494-500.