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OPTIMIZATION OF COMPLICATION MANAGEMENT IN ENDOSCOPIC ENDONASAL SURGERY AT THE MODERN STAGE

Matmurotov Zukhrob Sobirjonovich
Doctoral Candidate at the Republican Specialized
Scientific and Practical Medical Center
of Neurosurgery and Skull Base Surgery (RSSPMCNSBS)

Khasanov Ulugbek Saidakromovich
Republican Specialized Scientific and Practical
Medical Center for Otorhinolaryngology and Head and Neck Diseases
Scientific Supervisor: Professor

Abstract

Endoscopic endonasal surgery is a highly effective method for treating pathology of the paranasal sinuses and skull base; however, it is associated with a risk of complications, including infectious, vascular, neurological, and anatomical adverse events. This article reviews contemporary approaches to the diagnosis, prevention, and management of such complications. Particular emphasis is placed on individualized patient management, a multidisciplinary approach, and the application of innovative technologies — including navigation systems, intraoperative monitoring, and reconstructive techniques. The necessity of early identification of risk factors and the development of comprehensive patient management protocols to minimize complications and improve functional outcomes is substantiated.

Keywords: endoscopic endonasal surgery, complications, synechiae, cerebrospinal fluid leak, anosmia, navigational surgery, hemostasis, multidisciplinary approach.

Relevance of the Topic

Endoscopic endonasal interventions are currently widely employed due to their minimal invasiveness and high effectiveness. However, despite continuous improvements in surgical techniques and equipment, the risk of complications — including infectious, vascular, neurological, and structural — persists. This work analyzes current approaches to the diagnosis, prevention, and treatment of these conditions.

Chronic sinusitis is among the most common diseases of the upper respiratory tract. It is associated with nasal obstruction, discharge, headache, olfactory dysfunction, sleep disturbances, and reduced work capacity. Over the past three decades, advances in endoscopic sinus surgery have led to the widespread adoption of this technology in both adult and pediatric populations, yielding better outcomes and lower morbidity rates.

Despite modern quality standards, surgeons report minor complications in 5% of cases and major complications in 0.5–1%. The incidence of synechiae following functional endoscopic sinus surgery (FESS) ranges from 10% to 40%. Of particular significance are cicatricial changes in the middle meatus (1–36%), which lead to obstruction of the ostiomeatal complex, impairment of mucociliary drainage, recurrence of sinusitis, and the need for revision surgery.

The duration of postoperative follow-up and methods of nasal care vary widely, from 1 to 12 months, and are often determined by the surgeon's personal experience and the availability of

materials and medications. The question of middle turbinate resection remains debatable. The close anatomical relationship between the sinuses and the orbit creates a risk of injury to orbital structures (no more than 1% according to the literature).

Endoscopic rhinosinus surgery allows for atraumatic opening of affected sinuses and restoration of drainage. However, patient recovery depends not only on the quality of the surgical intervention but also on proper postoperative management. The primary goal is the complete restoration of the nasal mucosa and its functions.

Aim of the Study

To analyze contemporary approaches to the prevention, early detection, and treatment of complications following endonasal endoscopic interventions, utilizing innovative technologies — including neuronavigation, intraoperative visualization, reconstructive techniques, and a multidisciplinary approach.

Objectives of the Study

To evaluate the frequency of complications following endonasal endoscopic interventions.

To identify the causes of unfavorable postoperative outcomes.

To assess clinical, morphological, and immunohistochemical changes in the nasal mucosa.

To compare various methods of revision surgical interventions for the treatment of complications.

To develop and implement optimal algorithms and practical recommendations for complication prevention.

Materials and Methods

The study is planned at the Republican Specialized Scientific and Practical Medical Center for Otorhinolaryngology and Head and Neck Diseases. A total of 300 patients requiring revision endonasal endoscopic surgery during 2024–2027 will be examined. A comprehensive evaluation is planned, including computed tomography, functional tests, and morphological and immunohistochemical analysis.

Scientific Novelty

Based on comprehensive examination, the frequency and causes of complications will be identified, as well as factors contributing to cicatrization. Clinical, morphological, and immunohistochemical data will allow for a detailed assessment of mucosal changes. An optimal surgical method will be proposed, and practical recommendations will be developed for widespread clinical implementation.

Modern Approaches to Prevention and Management of Complications

Prevention

Preoperative phase: CT/MRI with angiography, assessment of anatomical variants, intraoperative neuronavigation (reduces complication rates by 30–50%), neuromonitoring, controlled hypotension.

Intraoperative methods: topical hemostatic agents (epinephrine, hemostatic sponges, fibrin glues), electrocoagulation, sealing of skull base defects (autologous tissues, synthetic sealants).

Postoperative prevention: antibiotics, regular endoscopic examinations, irrigation therapy, intranasal corticosteroids, biodegradable implants/spacers

Management of Complications

Bleeding: direct coagulation, clipping, topical hemostatic agents (Surgicel, Spongostan, Floseal, Tissucol), balloon tamponade, embolization.

Cerebrospinal fluid leak: endoscopic closure of small defects, vascularized nasoseptal flap (Hadad-Bassagasteguy) for large defects, lumbar drainage.

Synechiae and stenosis: early endoscopic division, intranasal corticosteroids, stents/spacers, laser correction, revision surgery with anti-adhesive agents.

Olfactory restoration: atraumatic technique, intranasal corticosteroids, olfactory training (effective in 30–60%), systemic corticosteroids in refractory cases.

Mucociliary clearance disorders: saline irrigations, mucolytics, nebulizer therapy.

Pharmacological support: antibiotics, NSAIDs/glucocorticoids, antihistamines, microcirculation-enhancing agents.

Multidisciplinary Approach

Complication management requires collaboration among:

1. Otorhinolaryngologist — the lead surgeon.
2. Neurosurgeon — for cerebrospinal fluid leaks and intracranial complications.
3. Neuro-ophthalmologist — for assessment of ocular motor function.
4. Neurologist — for cranial nerve palsies.
5. Radiologist — for navigation and visualization.
6. Rehabilitation specialist — for olfactory training and breathing exercises.

Personalized Approach

Individualized treatment includes:

- Assessment of anatomical features based on CT/MRI.
- Evaluation of functional status (olfaction, mucociliary clearance, allergic and immunological status).
- Selection of tactics depending on the nature of the complication.
- Rehabilitation planning according to patient goals.
- Psychological support for disorders affecting quality of life.

Conclusion

Endoscopic endonasal surgery is a highly effective method; however, the persistent risk of complications necessitates continuous improvement in prevention and treatment strategies. The most frequent complications remain synechiae (10–40%), bleeding, cerebrospinal fluid leaks, orbital injuries (up to 1%), and olfactory dysfunction. Scarring in the ostiomeatal complex represents a particular problem, leading to sinusitis recurrence and the need for revision surgery.

Key directions for reducing complications include: preoperative planning using CT/MRI, intraoperative navigation and neuromonitoring, the use of modern hemostatic materials and vascularized flaps for defect sealing, as well as active postoperative therapy (irrigations, intranasal corticosteroids, olfactory training). A multidisciplinary approach involving otorhinolaryngologists, neurosurgeons, neuro-ophthalmologists, and rehabilitation specialists is an essential condition for successful patient management.

The implementation of developed diagnostic, preventive, and therapeutic algorithms will reduce the frequency of adverse outcomes, decrease the number of revision surgeries, and improve patients' quality of life. Promising directions remain the development of new anti-adhesive materials, investigation of mucosal regenerative potential, and the search for effective methods of olfactory restoration.

References

1. Castelnuovo P., Dallan I., Locatelli D. Endoscopic endonasal surgery: complications and their management. – Eur Arch Otorhinolaryngol. 2020;277(3):681-691.

2. Hadad G., Bassagasteguy L., Carrau R.L. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. – Laryngoscope. 2006;116(10):1882-1886.
3. Stammberger H., Posawetz W. Functional endoscopic sinus surgery: concept, indications and results of the Messerklinger technique. – Eur Arch Otorhinolaryngol. 1990;247(2):63-76.
4. Karkos P.D., Karagkounis G., Papadopoulos V. Complications of endoscopic sinus surgery: a systematic review and meta-analysis. – Eur Arch Otorhinolaryngol. 2021;278(11):4215-4225.
5. Ramakrishnan V.R., Kingdom T.T., Nayak J.V. Advances in endoscopic sinus surgery: navigation, hemostasis and tissue engineering. – Curr Opin Otolaryngol Head Neck Surg. 2022;30(1):1-7.