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FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS) AND PREVENTION OF RECURRENCE IN CHRONIC RHINOSINUSITIS WITH NASAL POLYPS: A LITERATURE REVIEW

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Abstract

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a long-lasting inflammatory disease of the nasal and paranasal sinus mucosa, most often accompanied by type 2 inflammation and prone to recurrence even after treatment. The aim of this article is to analyze the role of functional endoscopic sinus surgery (FESS) in the treatment of CRSwNP and the approaches to preventing postoperative recurrence, based on the international and local literature. The review included international consensus documents (EPOS 2020, ICAR-RS 2021), prospective cohort studies, randomized clinical trials and publications by authors from Uzbekistan. The analysis showed that FESS significantly improves symptoms and quality of life, but endoscopic polyp recurrence occurs in approximately 40% of patients within 18 months after surgery. The risk of recurrence is associated with previous sinus surgery, the severity of baseline polyposis and tissue eosinophilia. In preventing recurrence, the main roles are played by complete surgery, postoperative intranasal corticosteroids and nasal irrigation, monitored follow-up and, in severe cases, biologic drugs (dupilumab, omalizumab, mepolizumab). Treatment should be chosen individually, according to the disease endotype.

Keywords: chronic rhinosinusitis with nasal polyps, nasal polyps, functional endoscopic sinus surgery, FESS, recurrence, intranasal corticosteroids, biologic therapy, dupilumab.

Introduction

Chronic rhinosinusitis (CRS) is inflammation of the mucosa of the nose and paranasal sinuses lasting at least 12 weeks. According to the EPOS 2020 guideline, the diagnosis is based on the presence of at least two of the following: nasal blockage or discharge, facial pain or pressure, and reduced sense of smell (one of them must be nasal blockage or discharge), together with endoscopic or CT signs [1]. Depending on the presence of polyps, the disease is divided into forms without polyps and with polyps.

The polypous form is the most complex clinically: patients have persistent nasal blockage, a sharp decrease or loss of the sense of smell, and worsening sleep quality. Authors from Uzbekistan likewise note a sharp decline in patients' quality of life in this pathology and the disease's tendency to frequent recurrence [21]. In most cases, type 2 inflammation (eosinophils, IL-4, IL-5, IL-13) plays the leading role, which is why the disease is chronic and relapsing [1, 2]. When drug therapy (intranasal and short-course systemic corticosteroids) is ineffective, surgical treatment, primarily FESS, is recommended [1, 3].

The principles of FESS were developed in the 1970s and 1980s by Messerklinger, Kennedy and Stammberger: the method is based on restoring sinus drainage and ventilation while preserving the mucosa as far as possible [4, 5]. However, surgery does not eliminate the cause of the disease; it mechanically removes the polyps and creates conditions for subsequent local treatment. Therefore, the main problem in practice is the reappearance of polyps, that is, recurrence.

Aim of the study: to analyze, on the basis of the available scientific evidence, the effectiveness of FESS in CRSwNP, the frequency and risk factors of recurrence, and the methods of preventing recurrence after surgery.

Materials and methods

A narrative literature review method was used. The following sources were included in the analysis: (1) international consensus documents — EPOS 2020 and ICAR-RS 2021 [1, 3]; (2) prospective cohort studies and a national audit that examined postoperative outcomes in CRSwNP [6–8]; (3) randomized controlled trials and systematic reviews that assessed the effectiveness of corticosteroids and biologic drugs [9–14]; (4) publications by authors from Uzbekistan devoted to the diagnosis and treatment of CRSwNP [21–24].

The results were compared by the following indicators: endoscopic nasal polyp score (NPS) and the Lund–Kennedy endoscopic scale; CT changes by the Lund–Mackay scale; quality of life by the SNOT-22 questionnaire; olfactory status; frequency of recurrence and revision surgery [15–17]. No personal patient data were used in this review; all figures are taken from the cited sources. Because of the heterogeneity of study designs, follow-up periods and definitions of recurrence, no meta-analysis was performed, and the results were summarized descriptively.

Results

3.1. Effectiveness of FESS

The main purpose of FESS is to open the natural ostia of the sinuses, remove the polyps and the inflamed tissue that supports relapse, and improve the delivery of subsequent local medications to the mucosa. In prospective studies, FESS and postoperative drug therapy were found to significantly improve endoscopic indicators and symptoms [6]. Alt et al. recorded improvement in sleep and quality-of-life indicators after surgery [7]. The long-term results of the national audit conducted in England also showed moderate relief of symptoms after surgery, while some patients required revision surgery [8].

3.2. Frequency of recurrence

The definition of recurrence differs between studies: some take into account the reappearance of endoscopic polyps, others the return of symptoms or the need for revision surgery. In the prospective multicenter study by DeConde et al. (363 patients who underwent FESS for CRSwNP, of whom 244 had postoperative endoscopy assessed), polyp recurrence was 35% after 6 months, 38% after 12 months and 40% after 18 months [6].

Table 1. Frequency of endoscopic polyp recurrence after FESS (DeConde et al., 2017) [6]

Follow-up period	Recurrence rate
6 months	35% (68/197)
12 months	38% (48/125)
18 months	40% (52/129)

According to the authors' conclusion, despite surgery and subsequent drug therapy, polyp control is maintained for up to 18 months in approximately 60–70% of patients [6].

3.3. Risk factors for recurrence

In the above study, multivariate analysis identified two independent risk factors for recurrence: previous sinus surgery (OR 2.6; 95% CI 1.5–4.6) and higher severity of polyposis before surgery (OR 1.4; 95% CI 1.1–1.8) [6]. In the work of Bassiouni and Wormald, the extent of surgery in the frontal sinus area (Draf III frontal sinusotomy) was associated with a reduced risk of polyp recurrence [9]. In the Japanese JESREC study, it was shown that patients with a high number of eosinophils in the tissue (eosinophilic CRS) are more prone to relapse and are harder to treat [10]. Vlaminck et al. also found that tissue eosinophilia in CRSwNP is associated with a worse surgical outcome [11]. The coexistence

of asthma and aspirin-exacerbated respiratory disease (AERD) is mentioned in consensus documents among the factors associated with a severe and relapsing course [1, 3]. In her work devoted to a therapeutic-diagnostic algorithm for different phenotypes of CRSwNP, Alimova considered clinical methods of examination and FESS together [22].

3.4. Postoperative local drug therapy

Intranasal corticosteroids are the main local drug in all international guidelines on CRSwNP: they reduce polyp size and symptoms and, after surgery, help to delay recurrence [1, 3, 12]. Because the sinus cavities are open after the operation, using steroid solutions in the form of nasal irrigation may provide better delivery of the drug to the mucosa; consensus documents describe this method as an option worth considering in the postoperative period [3]. Rinsing the nose with saline removes crusts and thick mucus and makes it easier for the mucosa to recover [1].

Corticosteroid-eluting sinus implants have also been studied: in the RESOLVE II trial, a mometasone furoate-eluting implant reduced polyp size and nasal obstruction after surgery compared with placebo and reduced the proportion of patients who met the criteria for repeat surgery [13]. Short courses of systemic corticosteroids may be used, but because of their side effects, their use as a permanent means of controlling recurrence is not recommended [1, 3].

Combined therapy has also been studied in local research. Khasanov studied 120 patients with chronic rhinosinusitis with nasal polyposis in a prospective randomized design and reported that the combined use of an intranasal corticosteroid (mometasone furoate) and an antileukotriene drug (montelukast) significantly improved nasal symptoms compared with monotherapy [24]. Alimova emphasizes that the combined use of local and systemic corticosteroids has given promising results, but that standardization is needed in terms of drug selection, duration of administration and safety monitoring [22].

3.5. Biologic therapy

In severe CRSwNP that remains uncontrolled despite standard treatment (surgery and local steroids), monoclonal antibodies have become an important alternative. In the LIBERTY NP SINUS-24 and SINUS-52 trials (724 patients in total), when dupilumab (which blocks the IL-4 and IL-13 signaling pathway) was added to mometasone nasal spray, the difference from placebo at week 24 in the polyp score was −2.06 in SINUS-24 and −1.80 in SINUS-52, and the difference in the nasal congestion score was −0.89 and −0.87 ($p<0.0001$ in all cases); the difference in the Lund–Mackay CT score was −7.44 and −5.13 [14]. In the pooled analysis, dupilumab was reported to reduce the need for systemic corticosteroids by 74% and the need for sinus surgery by 83% [18]. In SINUS-52, the proportion of patients who needed systemic corticosteroids or surgery within 52 weeks was 12.5% in the group receiving dupilumab every 2 weeks and 41.8% in the placebo group [14, 18].

Omalizumab (anti-IgE) improved the polyp score and SNOT-22 in patients with CRSwNP accompanied by asthma, and the effect was observed in both allergic and non-allergic patients [19]. In the SYNAPSE trial of mepolizumab (anti-IL-5), the endoscopic polyp score and nasal obstruction decreased more than with placebo, and the need for surgery was also lower [20].

3.6. Postoperative follow-up

Consensus documents recommend regular endoscopic follow-up after surgery: this makes it possible to detect uncontrolled inflammation or the first reappearance of polyps early and to intensify drug therapy in good time [1, 3]. In assessing the effect of treatment, it is advisable to use endoscopic scores (Lund–Kennedy, NPS), the SNOT-22 questionnaire and olfactory tests together [15–17].

Discussion

The analyzed sources show that FESS is a necessary but not sufficient stage in the treatment of CRSwNP. Surgery removes polyps and improves the delivery of local treatment to the sinuses, but

it does not completely eliminate the mucosal inflammation that is the underlying cause. For this reason, after surgery endoscopic recurrence is found in a significant proportion of patients (approximately 40% at 18 months) [6].

An important point is that the frequency of recurrence depends on which definition is used. Endoscopic recurrence occurs more often than symptomatic recurrence and the need for revision surgery, so a direct comparison of figures from different studies may be incorrect. In addition, in the main cohort study cited, the share of patients whose postoperative endoscopy was assessed (244 of 363) was limited, which should be taken into account when interpreting the results [6].

The analysis of risk factors gives a practical conclusion. Patients with previous surgery and initially severe polyposis, as well as patients with high tissue eosinophilia, form the high-risk group for recurrence [6, 10, 11]. In such patients, it is particularly important to plan an adequate extent of surgery (including the frontal sinus area if necessary), and after surgery to use local steroids regularly and to follow up at short intervals [1, 3, 9]. It should not be forgotten that increasing the extent of surgery may also increase the risk of the operation, so the extent is chosen according to the patient's anatomy and the spread of the disease.

Local authors likewise emphasize the need for a pathogenetically grounded, safe and comprehensive approach to preventing recurrence: Alimova and Sagidullaeva, on the basis of domestic and foreign protocols and clinical studies, analyzed the conservative and surgical treatment of CRSwNP and paid particular attention to these aspects [23]. This is consistent with international consensus documents.

Biologic drugs have opened a new opportunity in the prevention of recurrence: they act on precisely the type 2 mechanisms of inflammation and reduce the need for surgery and systemic steroids [14, 18–20]. At the same time, these drugs are expensive, require long-term use, and the indications and criteria differ between countries. Consensus documents recommend using them in severe, uncontrolled CRSwNP in patients who meet the established criteria [1, 3]. The question of which patient should receive surgery first and which a biologic drug is still being actively studied, so long-term comparative studies are needed.

Limitations of the review: the narrative method, the heterogeneous design of the studies and definitions of recurrence, and the absence of a meta-analysis.

Conclusion

1. FESS remains the main surgical method that improves symptoms and quality of life in patients with CRSwNP who have not responded adequately to drug therapy, but polyp recurrence is common (approximately 40% at 18 months).

2. The main risk factors for recurrence are previous sinus surgery, the severity of polyposis before surgery and tissue eosinophilia; identifying the risk group before surgery is useful for planning.

3. Prevention of recurrence should be comprehensive: surgery of adequate extent, postoperative intranasal corticosteroids and nasal irrigation, and regular endoscopic follow-up.

4. In severe, uncontrolled CRSwNP with type 2 inflammation, biologic therapy (dupilumab, omalizumab, mepolizumab) reduces the need for surgery and systemic steroids and is an alternative to surgery or a complement to it.

5. Treatment tactics should be determined individually for each patient, taking into account the disease endotype, comorbid diseases (asthma, AERD) and the results of previous treatment.

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