



# Macroscopic findings during endoscopic sinus surgery for chronic rhinosinusitis in children



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## ABSTRACT

**Aim:** Endeavor to intraoperative macroscopic evaluation of changes in children with CRSs. Analysis of the type and incidence of pathological changes observed macroscopically during FESS was undertaken as well as an parallel attempt to correlate the level of inflammation markers with severity of disease.

**Materials and methods:** Retrospective analysis of case records of 153 patients of the Department of Pediatric Otolaryngology, Medical University of Warsaw, hospitalized between 2010 and 2013. During that time 106 patients with a diagnosis of chronic maxillary sinusitis required surgical intervention. 102 children (avg-aged 11.5 years) were qualified to functional endoscopic surgery. The youngest patient was 3 years old and the oldest 18. 26 patients presented the polypoid lesions of sinuses or nasals. At 19 confirmed the coexistence of sinus polyps with nasal polyps.

**Results:** 76 patients had oedematous-inflammatory lesions and 26 polypoid. Among the group of listed above 26 children, 19 had either sinuses or nasal polyps. 15% children with polyps were diagnosed with cystic fibrosis and 8.0% with asthma. A common deviation in the results of morphology in children with CRSs is higher level of monocytes. Inflammation markers within the population of FESS qualified children were low.

**Conclusions:** (1) Oedematous-inflammatory lesions are frequently intraoperatively identified. (2) The CRSs without polyps is the common type of chronic sinusitis in children. (3) Nasal polyps often coexist with sinus polyps. (4) If nasal polyps are found in pediatric population then diagnosis of CF, allergy and GERD should be considered. (5) Markers of inflammation in CRSs are low.

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## 1. Introduction

The chronic sinusitis issue within the pediatric population is quite popular in the literature. The wide variety of information on microbiology, diagnosis or treatment are opposite to the relatively short experience of endoscopic surgery in pediatrics. Endeavor to intraoperative macroscopic evaluation of changes in children with CRSs. Analysis of the type and incidence of pathological changes observed macroscopically during FESS was undertaken as well as an parallel attempt to correlate the level of inflammation markers with severity of disease.

## 2. Materials and methods

Retrospective analysis of case records of 106 patients of the Department of Pediatric Otolaryngology, Medical University of Warsaw, hospitalized between 2010 and 2013. During that time 106 patients with a diagnosis of chronic maxillary sinusitis required surgical intervention. 102 children (avg-aged 10.4 years) were qualified to functional endoscopic surgery (Fig. 1). The youngest patient was 3 years old and the oldest 18. 26 patients presented the polypoid lesions of sinuses or nasals. At 19 confirmed the coexistence of sinus with nasal polyps. There was one choanal polyp and onefold change of maxillary sinus. Every patient had CT diagnosis done (Figs. 2 and 3). Furthermore the results of a patient's blood test (morphology, CRP and ESR) were analyzed searching for statistically significant deviations. Samples were taken not later than 7 days prior to a surgery.

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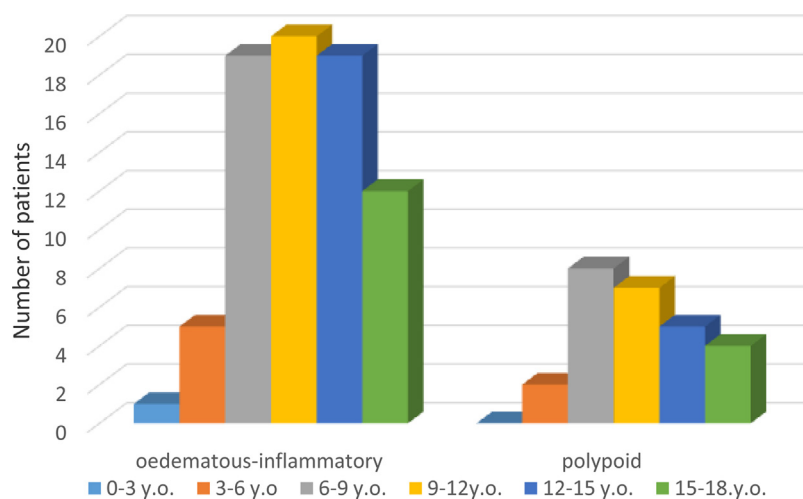


Figure 1. Patient's age.

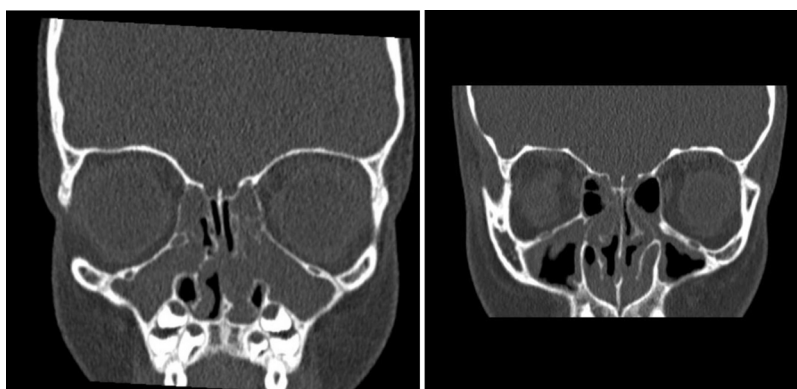


Figure 2. CT scans of patients with chronic sinusitis.

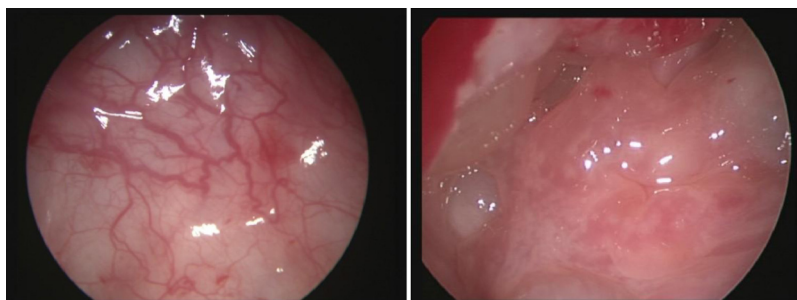


Figure 3. Oedematous-inflammatory lesion of the maxillary sinus.

### 3. Results

76 patients had oedematous-inflammatory lesions (Fig. 4) and 26 polypoid (Figs. 5 and 6). Among the group of listed above

26 children, 19 had either sinuses or nasal polyps. 15% children with polyps were diagnosed with cystic fibrosis (Fig. 7). They were the youngest in that group of patients (4, 4, 7, 8 years). Parallel – 8.0% children with polypoid changes had diagnosed asthma

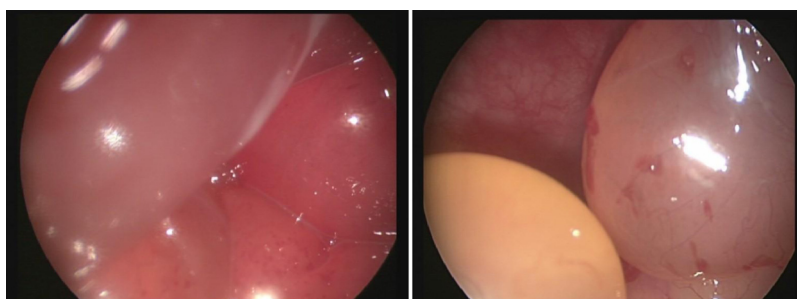


Figure 4. Polypoid changes of the maxillary sinus.



Figure 5. Antrochoanal polyp. CT scan and clinical view.



Figure 6. Right nasal cavity polyps.

(Table 1). A common deviation in the results of morphology in children with CRSs (but statistically insignificant) is higher level of monocytes, decreased number of RBC and lower level of Hgb. Inflammation markers within the population of FESS qualified children were low.

In children with chronic sinusitis, we observed;

- nasal obstruction disorders in 92 (90.19%),
- chronic infections in 95 (93.13%),
- nasal secretions in 95 (93.13%),
- headache in 68 (66.66%).

#### 4. Discussion

Chronic rhinosinusitis (CRS) in children is very common but challenging to diagnose and treat because the symptoms depend on age [1–3]. Its etiology is still a subject of much debate and ongoing research with final conclusion that the pathogenesis is multifactorial. According to the European Position Paper on Rhinosinusitis and Nasal Polyps 2012 (EPOS 2012) [4], CRS is defined by 2 or more symptoms lasting beyond 12 weeks. The symptoms are: facial pain/pressure, nasal blockage or nasal discharge (anterior/posterior), reduction or loss of smell. It is important to remember that in pediatric population cough is sole presenting symptom more often raised than loss of smell. Other authors agreed that CRS in children is characterized by symptoms persisting beyond 8 weeks [5].

Chronic illness has a negative impact on a child's quality of life. It is connected with complications such as chronic antibiotic therapy, school absences, poor sleep patterns, impaired school performance, or irritability [6].

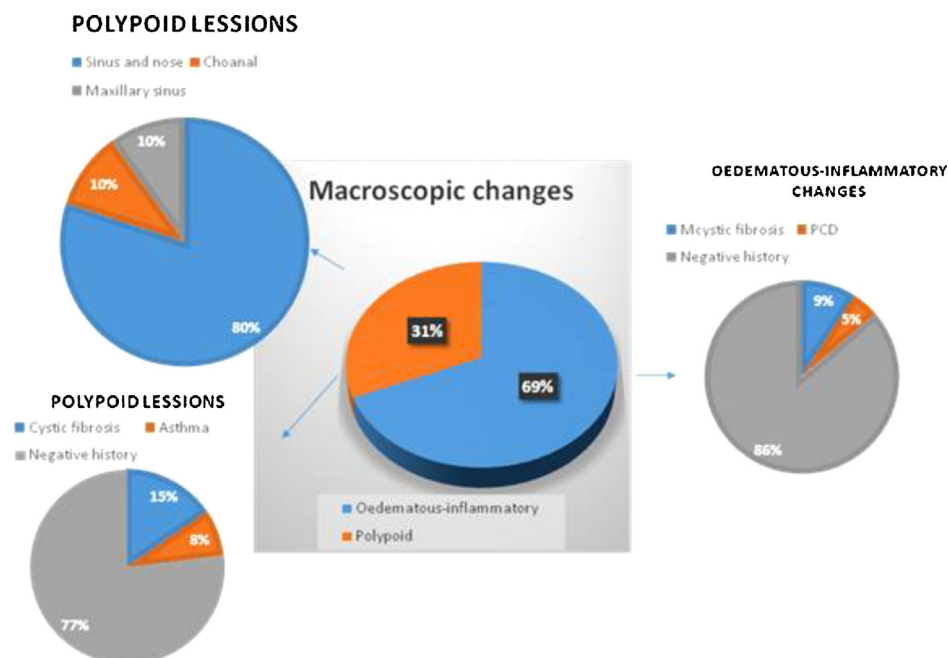


Figure 7. Results.

**Table 1**

Patients with nasal polyps.

| Age | Sinus | Nasal cavity | Combined | Cystic fibrosis | Asthma | Other |
|-----|-------|--------------|----------|-----------------|--------|-------|
| 4   | +     |              |          | +               |        |       |
| 4   |       |              | +        | +               |        |       |
| 7   |       |              | +        |                 | +      |       |
| 7   |       |              | +        |                 |        | +     |
| 7   |       |              | +        | +               |        |       |
| 8   | +     |              |          | +               |        |       |
| 8   |       |              | +        |                 |        | +     |
| 8   |       | +            |          |                 |        | +     |
| 9   |       |              | +        |                 |        | +     |
| 9   |       |              | +        |                 |        | +     |
| 10  |       |              | +        |                 |        | +     |
| 10  |       |              | +        |                 |        | +     |
| 11  |       |              | +        |                 | +      |       |
| 11  |       |              | +        |                 |        | +     |
| 12  |       |              | +        |                 |        | +     |
| 12  |       |              | +        |                 |        | +     |
| 12  | +     |              |          |                 |        | +     |
| 13  | +     |              |          |                 |        | +     |
| 14  | +     |              |          |                 |        | +     |
| 14  |       | +            |          |                 |        | +     |
| 15  |       |              | +        |                 |        | +     |
| 15  | +     |              |          |                 |        | +     |
| 16  |       |              | +        |                 |        | +     |
| 17  |       |              | +        |                 |        | +     |
| 17  |       |              | +        |                 |        | +     |
| 18  |       |              | +        |                 |        | +     |

Asthma -  Cystic fibrosis - 

Analogous to CRS the pathogenesis of nasal polyposis is unknown. It has been discussed with chronic inflammation, autonomic nervous system dysfunction, and genetic predisposition. Most theories consider polyps to be the ultimate manifestation of chronic inflammation. Polyposis in children may develop due to chronic inflammation of the mucous membrane caused by allergic rhinitis, chronic sinusitis, asthma, or aspirin allergy. Polyps, if present, should prompt an evaluation for cystic fibrosis, an allergy or asthma, GERD and drug's intolerance syndroms [7,8].

Medical therapy should always be prior to surgical one and it continues to be prolonged courses of antibiotics. The vast majority of patients require longterm conservative treatment: nasal saline irrigations, intranasal corticosteroids, antibiotics. Staged surgical intervention with initial adenoidectomy (with or without sinus lavage) followed by partial or anterior ethmoidectomy should be considered only when medical therapy failed [9,10].

Functional endoscopic sinus surgery (FESS) was elaborated by Messerklinger together with his assistant Stamberger (in 1960–1970) and Wigand in Europe and performed via the ostiomeatal complex [10,11]. FESS has become the standard surgical treatment for chronic sinusitis. The external approaches are adjunct and used in tumor or foreign body management [12].

Conscious of the international guidelines, in The Department of Pediatric Otolaryngology Medical University of Warsaw, we perform endoscopic surgery after adenoidectomy secondary to conservative treatment. In children with hypertrophic tonsils and

chronic sinusitis after tonsil surgery, 61.2% will not require further surgery.

## 5. Conclusions

1. Oedematous-inflammatory lesions are frequently intraoperatively identified.
2. The CRSs without polyps is the most common type of chronic sinusitis in children.
3. Nasal polyps often coexist with sinus polyps.
4. If nasal polyps are found in pediatric population then diagnosis of CF, allergy and GERD should be considered.
5. Markers of inflammation in CRSs are low.

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