

The Prognosis of Endoscopic Surgery in Children with Chronic Sinusitis

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DOI: <http://dx.doi.org/10.13005/bbra/1612>

(Received: 05 February 2015; accepted: 10 March 2015)

Pediatric sinusitis is a common disease that Due to its considerable influence in children's quality of life, the disease, especially in its chronic or recurrent form, is of particular importance. The purpose of this study was to investigate the causes of endoscopic sinus surgery in children, the outcome of surgery, complication and relapse. This descriptive epidemiological study was conducted on under 18 year children who underwent endoscopic sinus surgery. In this study, children who have undergone surgery in the interval, have been investigated, and data such as age, sex, and diagnosis, were recorded. Improvement or relapse is determined using a follow-up of patients with in six months to seven and a half years of after endoscopy surgery. After collecting data, statistical analysis was done using SPSS and Chi-square test with $P < 0.05$. A total of 83 children (including 43 males and 40 females) have undergone endoscopic sinus surgery. Patients were in an age range from 3.5 to 18 years and the average age was 12.47 years. Most of surgeries were related for chronic sinusitis without polyps (37 cases) and 44.6% of cases. 84.3% of children who underwent nasal and sinus endoscopy had been no recurrence after surgery. In an evaluation of relationship between cause and prognosis, a significant association was found between sinusitis with polyposis and worse prognosis compared with other groups ($P < 0.001$). In this study no significant correlation was found between age and gender with the etiology of disease or prognosis. Overall, the study found that endoscopic sinus surgery can be an effective proceeding with minimal side effects in children who have long suffered from sinusitis and the most prognostic factor in recurrence is type of chronic sinusitis. Identifying the correct candidates for surgery and surgeon expertise can make a significant help to these children.

Key words: Sinusitis, Pediatric, Endoscopy Sinus Surgery, Outcome.

Pediatric sinusitis is a common disease that due to the similarity of the symptoms with viral infections of upper respiratory system the precise determination of its prevalence is difficult. Due to its considerable influence in children's quality of life, the disease, especially in

its chronic or recurrent form, is of particular importance¹.

Pathophysiology of pediatric sinusitis is similar to the adult population, and most common of its cause is the osteomeatal complex obstruction (OMC) due to factors such as upper respiratory tract infection, allergies, and anatomical variations such as concha bullosa, septal deviation and *Haller cell*. Other factors such as biofilm, gastroesophageal reflux and fungi are raised, otherwise genetic factors such as immune

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deficiency, cystic fibrosis and ciliary dyskinesia should be remind^{2,3}.

Like in adults, diagnosis of acute and chronic rhinosinusitis in children is based on the duration of symptoms: Less than four weeks and greater than the twelve weeks are considered as acute, and as a chronic, respectively. In the pediatric acute sinusitis the common cold that prolongs, more than seven to ten days or severe upper respiratory infection appears along with high fever and purulent rhinorrhea and facial pain, and in chronic form is four predominant complaint of Posterior nasal drip (PND), cough, rhinorrhea, and nasal congestion^{4,5}.

Treatment of Sinusitis in children has essentially been a medical that contains antibiotics, saline spray and corticosteroids spray that is performed along with controlling the underlying factors like allergy and if necessary adenoidectomy, with the likelihood of obstructive effects induced by large size or the presence of biofilms in its bed⁶. But, in some cases sinusitis is resistant to treatment or associated with other pathologies such as fungi or polyps or complications that surgery indicates their position⁷.

CT scan is the best para clinical method for assessing sinus and generally patients must receive it during at least a ten-day course of treatment and it is requested for, if patients do not give a response to the treatment or when complication are probable^{7,8}.

The previous conventional methods such as sinus washing, Caldwell and intra and extra nasal ethmoidectomy have been replaced by non-invasive and physiological endoscopic methods. According to the results, and no serious side effects the idea that is due to the small size of the nose and the technical difficulty of this method is not proper for children, further more rejected^{9,24}. The purpose of this study was to investigate the causes of endoscopic sinus surgery in children, the outcome of surgery, complication and relapse.

MATERIALS AND METHODS

This descriptive epidemiological study was conducted on under 18 year children who underwent endoscopic sinus surgery from April 2007 to 2014 at the teaching hospitals of Ahvaz Jundi Shapur University of Medical Sciences. In

this study, children who have undergone surgery in the interval, have been investigated, and data such as age, sex, and diagnosis, were recorded. Improvement or relapse is determined using a follow-up of patients with in six months to seven and a half years of after endoscopy surgery. After collecting data, statistical analysis was done using Spss and Chi-square test with $P < 0.05$.

RESULTS

A total of 83 children (including 43 males and 40 females) have undergone endoscopic sinus surgery. Patients were in an age range from 3.5 to 18 years and the average age was 12.47 years. With seven diagnosis, children underwent endoscopic sinus and nasal surgery, including chronic sinusitis with out polyps, chronic sinusitis with nasal polyposis, antrochoanal polyps, ocular complications of sinusitis, fungal sinusitis (*Mycetoma*), allergic fungal sinusitis and mucocele.

Most of surgeries were related for chronic sinus it is without polyps (37 cases) and 44.6% of cases, then 22.9%, including 19 cases of sinusitis with polyposis, 10 cases of antrochoanal polyp (12%), seven cases with allergic fungal sinusitis (8.4%), five cases of fungal sinusitis (*Mycetoma*) (6%), four ocular complications of sinusitis (4.8%) and one case of mucocele (1.2%).

In addition, 84.3% of children who underwent nasal and sinus endoscopy had been no recurrence after surgery and 13 (15.7%) children were relapsed after surgery of the nose and sinus endoscopy, which are separated by 8 sinusitis with polyposis, one case of chronic sinusitis, one case of antrochoanal polyp two cases of allergic fungal sinusitis and one case of fungal sinusitis (*Myctoma*).

In an evaluation of relationship between cause and prognosis, a significant association was found between sinusitis with polypoid and worse prognosis compared with other groups ($P < 0.001$); so that, the recurrence of polypoid sinusitis alone was 61.5% and 38.5% for other reasons of surgery. A total of 42.1% of patients with sinus polyposis had relapsed after surgery, whereas in chronic sinusitis relapse rate was only 2.7%. In this study no significant correlation was found between age and gender with the etiology of disease or prognosis.

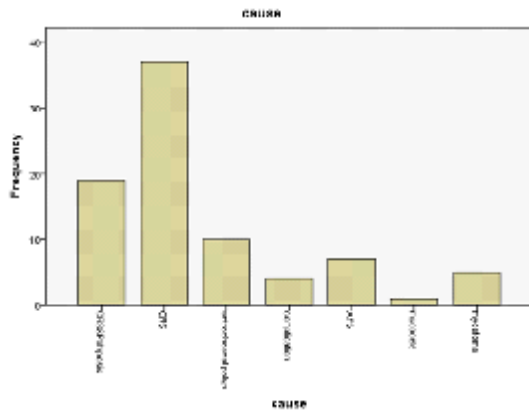


Fig. 1. Causes of endoscopic surgery in pediatric group between 2006-2013 in Imam hospital

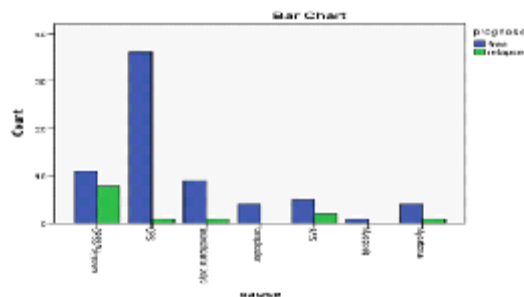


Fig. 2. Diagram for frequency of recurrence in pediatric group at the Imam hospital

DISCUSSION

Endoscopic sinus surgery is a surgical procedure to restore psychological function of para nasal sinuses to drain them^{6,7,8,9}. Nasal endoscopic surgery extensively been used in adults for the treatment of recurrent or chronic rhinosinusitis and according to studies, it has high reliability and efficacy^{10,11}.

Over the past two decades endoscopy Sinus Surgery has been introduced as an effective and safe method for the treatment of refractory rhinosinusitis in children.

Considering the fine and thin intranasal bone anatomy in children, selection of procedures for children is more stringent than adults¹².

Endoscopic sinus surgery is used for children who completely elapsed period of drug treatment and control or resolve the underlying factors such as allergies and hypertrophy of the adenoids.

Actually adenoidectomy is a first surgical

step for children with chronic or relapsing rhinosinusitis, especially in under six years children and fess just being used for unresponsiveness cases^{13,14}.

Another indication for fess in pediatrics includes: complete nasal obstruction in cystic fibrosis caused by nasal polyposis or closure of the nose by medialization of the lateral nasal wall, antrochoanal polyps, and intracranial complications of sinus disease, mucocoeles and mucopyocoeles, orbital abscesses, traumatic injury to the optic canal, dacrocystorhinitis secondary to sinusitis, fungal sinusitis, and some meningoencephaloceles^{15,16,17}.

The extent of the surgery depends on the extent of the conflict, due to the attention to over 90% of sinus pathology are limited to OMC, ethmoidectomy and antrostomy approach in most cases is adequate¹⁸. Generally, extensive surgery is indicated in an extensive polyposis or fungal sinusitis.

Because the surgeon works in a smaller space, uses more subtle instruments and needs higher precision and experience technically, there is no difference between children and adults in endoscopic surgery.

An investigation on the outcome of Fess on pediatric has shown that this technique can reduce symptoms with an 88.4% success rate¹⁹. In the present study, the success rate for children under the procedure was 84.3%, which is acceptable.

It has been shown that the presence of nasal polyposis with chronic sinusitis in children affects the severity of the symptoms associated and less improvement has been after surgical procedures.

The justification for this event is because it is accompanied by underlying conditions such as allergies and cystic fibrosis that patient is prone to recurrent disease²⁰.

In examining the relationship between the surgery and the prognosis, a significant association was obtained between chronic sinusitis with nasal polyposis with a worse prognosis and chronic sinusitis with out polyposis with a better prognosis.

As polyposis recurrence rate was 42.1% and chronic sinusitis without polyps was 2.7% that shows a negative impact on the prognosis after

surgery for nasal polyposis in children.

Surgical endoscopy of the nose and sinuses was introduced as safe and with very low risk of complications. Skill of the physician performing the procedure is one of the factors in the absence of complications.

Rate of major complications associated with endoscopic sinusitis 0.44% that has been reported in 0.6% in Hebert's study on children^{19,20}.

Possible complications associated with endoscopic surgery include minor complications such as bleeding, adhesion and periorbital ecchymosis and major complications such as hematoma of the orbit, blindness, intracranial bleeding and CSF leakage and epiphora²¹. Fortunately, none of the 83 children in our study were considered with complications.

Ramadan determined the relationship of age to outcome after FESS in children. This study revealed that children with age of six years and older had 89% success, whereas children under six years had 73%²² and Sharkawy found same results²³. In our study no relationship found between age, sex and prognosis.

CONCLUSION

The study found that endoscopic sinus surgery can be an effective proceeding with minimal side effects in children who have long suffered from and identifying the correct candidates for surgery and surgeon expertise can make a significant help to these children.

ACKNOWLEDGMENTS

This study is an extraction of an MD thesis (U-92069). Hereby, the Research Deputy and Ethical Committee are appreciated.

REFERENCES

1. Cunningham JM, Chiu EJ, Gliklich RE. The health impact of chronic recurrent rhinosinusitis in children. *Arch Otolaryngol Head Neck Surg* 2000; **126**(11):1363-1368
2. Sobol SE, Fukakusa M, Christodouloupoulos P. Inflammation and remodeling of the sinus mucosa in children and adults with chronic sinusitis. *Laryngoscope* 2003; **113**:410-14.
3. Wald ER. Epidemiology, pathophysiology and

etiology of sinusitis. *Pediatr Infect Dis J* 4(Suppl 6) 1985; 551-554.

4. Lusk RP, Stankiewicz JA. Paediatric rhinosinusitis. *Otolaryngology- Head and Neck Surgery* 1997; **117** (3):S53-7.
5. Rachelefsky GS, Goldberg M, Katz RM. Sinus disease in children with respiratory allergy. *J Allergy Clin Immunol* 1978; **61**(5):310-314
6. Wald ER. Diagnosis and management of acute sinusitis. *Pediatr Ann* 1988; **17**: 629-638.
7. Kennedy DW, Zeinreich SJ. Functional Endoscopic Surgery: Advances in Otolaryngology Head and Neck Surgery. Chicago: Year Book 1989; 1-26.
8. Ramadan HH. Surgical management of chronic sinusitis in children. *Laryngoscope* 2004; **114**(12): 2103-2109.
9. Clement PA, Bluestone CD, Gordts F. Management of rhinosinusitis in children: consensus meeting. *Arch Otolaryngol Head and Neck Surg* 1998 ; **124**: 31-34.
10. Wald ER. Management of sinusitis in infants and children. *Pediatr Infect Dis J* 1988; **7**:449-452
11. Fokkens WJ, Lund VJ, Mullol J, Bachert C, Alobid I, Baroody F, et al. European position paper on rhinosinusitis and nasal polyps 2012. *Rhinol*, suppl: 1-298.
12. Tan BK, Schleimer R, Kern R. Perspectives on the aetiology of chronic rhinosinusitis. *Current Otolaryngol Head and Neck Surg*. 2010; **18**(1): 21-26.
13. Friedman RL, Hockman M. chronic rhinosinusitis. *South Afr Epidemiol infect* 2010; **25**(1): 7-10.
14. Kennedy DW. Functional endoscopic sinus surgery, *Technique. Arch otolaryngol*; 1985; **111**(10): 643-9.
15. Gross CW, Gurucharri MJ, Lazar RH, Long TE. Functional endonasal sinus surgery (FESS) in the pediatric age group. *Laryngoscope* 1989; **99**(3) : 272-275.
16. Nikakhlagh S, Rahim F, Saki N, Mohammadi H, Maliheh YM. Antrochoanal polyps: report of 94 cases and review the literature. *Niger J Med*. 2012; **21**(2):156-9
17. Michael Joseph CD, Gil MV, Antonio HC. Pediatric Endoscopic Sinus Surgery in a Tertiary Government Hospital: Patient Profile and Surgical Indications. *Philipp J Otolaryngol Head Neck Surg* 2009; **24**(1): 13-17
18. Walner D, Markey R, Jain V, Myer CM. Clinical outcome of pediatric endoscopic sinus surgery. *Am J Rhinol* 2002; **16**(3):151-154
19. Hebert RL, Bent JP. Meta-analysis of outcomes of pediatric functional endoscopic sinus surgery.

- Laryngoscope* 1998;**108**:796-799.
20. Siedek V, Stelter K, Betz CS, Berghaus A, Leunig A. Functional endoscopic sinus surgery—a retrospective analysis of 115 children and adolescents with chronic rhinosinusitis. *Int J Pediatr Otorhinolaryngol.* 2009;**73**(5):741-5
21. Cumberworth VL, Sudderick RM, Mackay IS. Major complications of functional endoscopic sinus surgery. *Clin Otolaryngol* 1994;**19**:248-53.
22. Ramadan HH. Relation of age to outcome after endoscopic sinus surgery in children. *Arch Otolaryngol Head and Neck Surg* 2003;**129**:175-177
23. SharkawAA, ElmorsySM, Eladl HM. Functional endoscopic sinus surgery in children: predictive factors of outcome. *Eur Arch Otorhinolaryngol.* 2012; **269**(1):107-111
24. Nikakhlagh S, Saki N. Functional Endoscopic Sinus Surgery for Fungal Sinusitis (three year Experience). *The Iranian Journal of Otorhinolaryngology.*2004; **16**(3) 37; 36-41. (English abstract)