Relation of Age to Outcome
After Endoscopic Sinus Surgery in Children

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Objective: To determine whether endoscopic sinus surgery (ESS) in children has a better outcome at a certain age.

Design and Setting: Cohort study in a tertiary care children's hospital.


Main Outcome Measures: Determining ESS outcomes was based on answers to a questionnaire mailed to the caregivers at least 1 year after surgery. Outcomes were considered failures if children required revision surgery or if their symptoms were not improved.

Results: The overall ESS success rate was 82%. Univariate analysis of age and surgery outcome revealed that children older than 6 years had an 89% success rate but that children younger than 6 years had a 73% success rate (P=.04). Of the 99 patients, 11 (9%) required revision surgery. Among them, 9 were younger and 2 were older than 6 years (P=.008). Of the 4 children younger than 3 years, 3 (75%) required revision surgery.

Conclusions: Endoscopic sinus surgery in children younger than 3 years was not successful but it was beneficial in children older than 6 years. It may be beneficial at any age if a complication from chronic sinusitis occurs; however, for children younger than 6 years, revision surgery may later be necessary.

OUTCOME ASSESSMENT

Children were grouped according to age, and univariate statistical analysis was performed using a χ² test in the analysis of binary outcomes. For continuous variables a t test was performed. Multivariate analysis was performed using logistic regression analysis with SAS software (SAS Institute Inc, Cary, NC).

RESULTS

Of the 112 patients who were identified as possible study participants, 99 satisfied the criteria of having at least 12 months of follow-up and a completed questionnaire. Age range was 2 to 13 years (mean, 6.5 years).

There were 63 boys and 36 girls, and 18 of the 33 preschool children were in day care. Other characteris-

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that size is important. Adenoidectomy has been effective in reducing the symptoms of chronic sinusitis, sometimes without confirmation of sinusitis by a CT scan. The only prospective study comparing adenoidectomy and ESS showed that adenoidectomy alone was helpful in children with a low CT scan score but not in children with a high CT score and asthma.

Yet, the consensus is that surgery may be necessary in some children to improve their quality of life and prevent complications. A recent study showed that the quality of life of children with chronic sinusitis is worse than that of children with asthma. A recent meta-analysis showed that ESS was successful in 88% of children with chronic sinusitis. Although some reports suggest that surgical treatment of chronic sinusitis is not appropriate for children younger than 7 years, to our knowledge, the age at which ESS should be considered has not been addressed.

In many studies the term child refers to a person younger than 18 years and, in some studies, younger than 21 years. We believe that treatment outcomes for chronic sinusitis in children should be restricted to persons younger than 13 years because, by that age, children’s sinuses have reached adult development. Also, the role of adenoidectomy in children older than 13 years is very limited because adenoids have involuted by that age; thus, excluding from studies children older than 13 years will eliminate the adenoid factor that otherwise may affect study findings and treatment results.

This study was conducted on patients between 2 and 13 years of age, most of whom were referred to us by the pediatric allergy service of our hospital because at least 6 months of medical treatment had failed to improve their symptoms. All patients had undergone testing for allergy, immunodeficiency, and cystic fibrosis. In all, a CT scan performed at the end of at least 26 weeks of treatment showed persistent evidence of sinusitis. When children required revision surgery, ESS was considered a failure. Children who did not require further surgery were evaluated using a questionnaire at least 12 months after surgery, and ESS was successful in 82% of them. Children older than 6 years had the best success rate and required revision surgery the least. We only had 4 patients younger than 3 years because we rarely perform ESS in that age group except in the case of complications. In spite of this, 3 (75%) of 4 children required revision surgery. We believe that when children with chronic sinusitis are younger than 3 years, ESS should be reserved for those with complications of sinusitis.

This study confirms what many believe, that the results of ESS are age dependent; and we believe that there are several reasons for this. The anatomy of children make the procedure technically more difficult and limits postoperative debridement of the surgical field. Children also have an immature immune system and are prone to more frequent upper respiratory tract infections. Minimal swelling in a child’s nose causes significant obstruction of the outflow tract of the sinuses and facilitates secondary bacterial infection.

Limitations of this study include the use of a questionnaire to measure outcomes in the patients who did not require further surgery. As with all questionnaires about symptoms, responses were subjective; and other unknown factors may also have biased the parents’ responses.

Our sample population was made up of children who were referred from the allergy service of our tertiary care hospital because of the failure of at least 6 months of medical treatment. Our sample, with its high incidence of asthma and allergy, may not represent the larger population of children with chronic sinusitis seen by primary care physicians. Our results, then, should be interpreted in that context.

**CONCLUSIONS**

Endoscopic sinus surgery for chronic sinusitis in children is still in its developmental stages and its role continues to be defined. The procedure was not very successful in children younger than 3 years but it was beneficial in children who were 6 years and older. Surgery, however, may have a role at any age if a complication from chronic sinusitis occurs. Although ESS can be performed at any age if necessary, children younger than 6 years may later need revision surgery.

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**REFERENCES**