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**Mark I. Zeme, M.D.**  
*Ear, Nose and Throat Surgery*

*Otolaryngology • Head and Neck Surgery  
Advanced Sinus Care*

20410 Lake Chabot Road, Suite 4  
Castro Valley, CA 94546  
510.889.6673 • Fax 510.889.0913



## Secondhand Tobacco Smoke and Chronic Rhinosinusitis

**C**hronic rhinosinusitis (CRS), a broad category encompassing a number of etiologies, is one of the most common self-reported chronic health conditions in the United States—affecting 1 in 7 adults, or an estimated 31 million people. One potential contributing cause and environmental factor is cigarette smoke. While active smokers exhibit a 20% increase in the likelihood of having acute or chronic sinusitis, the impact of secondhand smoke (SHS) is less clear. SHS' effects on the nasal mucosa may have an impact on the entire airway, so that patients exposed to SHS experience increased symptoms of rhinorrhea, and ear and throat irritation. A community-based, case-controlled study of adult patients was carried out by Reh et al from Johns Hopkins School of Medicine, Maryland.

The study population, based in Washington County, Maryland, had been followed for health status yearly

since 1996. In 2007, 7386 recruitment letters were mailed to cohort participants asking them to volunteer for this study. A total of 2568 individuals (35%) responded; 173 individuals reported a previous physician diagnosis of CRS. One hundred cases with a confirmed diagnosis of CRS were recruited if they had been nonsmokers for the past 2 years and met the criteria for CRS developed by the Rhinosinusitis Task Force.

Forty-three cases were evaluated by rhinoscopy or nasal endoscopy, 5 by CT scan and 52 by both parameters. Physician confirmation was obtained for 78% of cases. A total of 100 controls matched by age, gender and former smoking status and who had had no diagnosis of CRS were also contacted. A questionnaire was used

to assess past and present SHS exposure, as well as disease-specific quality of life (Figure 1).

The mean age of the participants was 60 years; 69% were women and 42% were former smokers. There were no significant case vs control differences in demography. CRS patients had a higher likelihood

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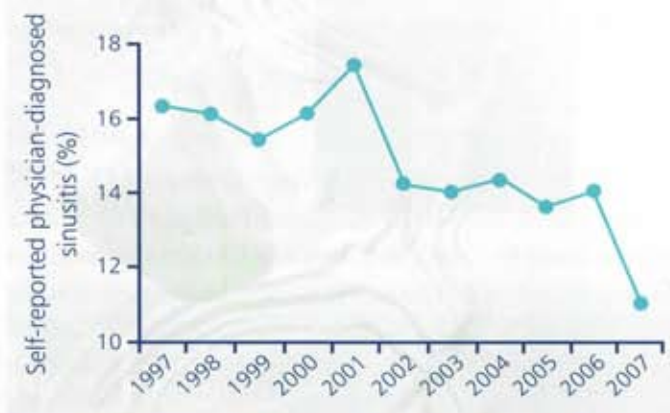
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of reporting allergies, asthma, chronic bronchitis and emphysema compared with controls. CRS patients reported worse scores in all major and minor symptoms over the prior 12-week period, except for the presence of fever. They also reported an increased use of medication and a higher rate of prior sinonasal surgery. At the time of the study, 9% of CRS cases and 8% of controls lived with a current smoker. Compared with those who reported no SHS exposure, current or childhood, SHS exposure was associated with a significant increased risk of CRS. The CRS cases exposed to SHS also had worse mean scores in nasal obstruction and blockage, nasal discharge and cough compared with those who had had no SHS exposure. Exposed patients were also more likely to use topical nasal decongestants.

### Conclusions and Clinical Implications

In this first population-based, case-control study, the authors noted a significantly increased risk of CRS after controlling for a number of parameters. Although the study's sample size was small, statistical power was sufficient in most of the parameters. Patient recall, which could have resulted in an overassessment of SHS exposure or inflated symptom scores in the CRS participants, was another factor. Lastly, physician confirmation of CRS was obtained in 78% of the cases, rather



**Figure 1.** Prevalence of self-reported physician-diagnosis of sinusitis in U.S. adults based on the National Health Interview Survey ([www.cdc.gov/nchs/products/series.htm#sr10](http://www.cdc.gov/nchs/products/series.htm#sr10)).

than all. Despite these issues, this is a compelling study that supports the hypothesis that childhood and current exposures to SHS are risk factors for developing CRS, with current exposure related to more severe sinonasal symptoms in the CRS patients. The clinician can advise CRS patients regarding the impact of environmental exposure to SHS so that modifications to lifestyle can be implemented.

*Reh DD, Lin SY, Clipp SL, et al. Secondhand tobacco smoke exposure and chronic rhinosinusitis: a population-based case-control study. Am J Rhinol Allergy 2009;23:562-567.*

## Endoscopic Sinus Surgery In Children With Recurrent Or Chronic Rhinosinusitis

Children with recurrent or chronic rhinosinusitis (CRS) are usually treated medically over a prolonged course, with surgery reserved for patients who have failed intense medical

management. The first line of surgical treatment is often adenoidectomy to remove obstructing nasopharyngeal tissue, a potential source of infection.

Endoscopic sinus surgery (ESS) is performed after other options have not been successful. In children, this pro-

cedure tends to involve opening up individual diseased sinuses for drainage and aeration, followed postoperatively by conservative management, such as moisturization using saline spray or irrigation. Debridement is often limited. Despite these conservative measures, ESS can still fail in 12%–13% of children. Ramadan from West Virginia University conducted a retrospective review of children who had undergone ESS at a tertiary referral center over a 12-year period.

ESS had been performed in 243 children. Individuals with cystic fibrosis, immunodeficiency or suppression, and ciliary abnormalities, as well as those who had previously undergone ESS or any other sinus surgery, were excluded from the study, leaving data available for 176 children who had had at least 1 year of follow-up.

## Long-term Follow-up of Endoscopic Closure and CSF Rhinorrhea

**C**erebrospinal fluid (CSF) rhinorrhea, a serious condition with multiple etiologies, can result spontaneously or as a result of surgery, head trauma,

intracranial tumor invasion, congenital malformations or inflammation and subsequent erosion of the cranial base. Most often these leaks do not heal spontaneously and require surgery to prevent serious complications. Banks et al from the University of Pennsylvania reviewed 21 years of endoscopic closure of CSF rhinorrhea with long-term follow-up.

A retrospective chart review encompassing 1987–2008 was performed in patients with a diagnosis of CSF rhinorrhea. Multiple parameters were assessed, including gender, age, body mass index, leak etiology, method of diagnosis, location and size of defect, type of graft used for repair, presence of an encephalocele, use of lumbar drain, history of meningitis and length of follow-up in months. Evidence of increased intracranial pressure (ICP) was also assessed. Of the 193 patients identified, CSF was spontaneous in 77 patients (40%), traumatic in 109 (56%) and congenital in 7 (4%). A minimum of 1-month follow-up was available, with a range of

1 month to 9 years (mean, 21 months) in 166 patients. The most common traumatic etiology was secondary to endoscopic sinus surgery, occurring in 46% of the patients, with 22 patients undergoing revision sinus surgery. Of those patients having prior tumor resections, the most common was pituitary tumor surgery. The most common defect was located in the sphenoid sinus and the ethmoid roof. A variety of grafts were used for the repair. A meningocele or meningoencephalocele was present in 91% of the 77 spontaneous CSF leak patients, 29/109 traumatic cases and all the congenital cases. A lumbar drain was used therapeutically and diagnostically in 140 of the 193 cases.

To diminish the increased ICP associated with a spontaneous CSF leak, acetazolamide was used in 31% of patients. A ventriculoperitoneal shunt was placed in 12

**Table 1. Site of defect in recurrent CSF leaks**

Etiology	Site of defect			
	Sphenoid n (%)	Ethmoid n (%)	Cribiform n (%)	Frontal n (%)
Spontaneous	4 (12.9)	2 (12.5)	1 (6.2)	0
FESS	0	3 (9.7)	1 (11.1)	0
Trauma	1 (16.7)	1 (50.0)*	1 (100)	1 (20.0)*
Tumor	2 (10.0)	1 (11.1)	0	0

Table shows the site of the original defect in recurrent CSF leaks according to etiology. \*Patient had a leak in the ethmoid and frontal sinuses. FESS, functional endoscopic sinus surgery.

Twenty-three (13%) of the 176 children required a revision of ESS, which closely reflects the figure reported in the literature.

In the 23 patients who required revision surgery, the causes of failure included 47 different surgical findings, with 18 patients having >1 cause of failure. The most frequent surgical finding was adhesions narrowing the sinus outflow tract in 57% of the cases. Maxillary sinus ostium stenosis or failure to identify the natural maxillary sinus ostium was the second most common event, noted in 52% of cases. In 39% of the cases, recurrent disease was observed in those sinuses initially operated on. Patients with asthma had a significantly higher revision rate, as did children ≤6 years of age.

### Conclusions and Clinical Implications

Because many children respond to medical management or adenoidectomy, ESS is less frequently performed, proportionally, in children than in adults. However, when ESS is necessary, one can anticipate excellent results, with a failure rate of approximately 13%. Because scarring and adhesions represent the primary causes of ESS failure, careful adherence to surgical technique and post-operative management may further improve the success rate of this procedure. Despite this, there will be a small subset of children who continue to have infections in sinuses, even when treated surgically.

*Ramadan HH. Revision endoscopic sinus surgery in children: surgical causes of failure. Laryngoscope 2009;119:1214-1217.*



patients with spontaneous and 6 with traumatic etiology. A total of 9%, or 17 of 193 patients, failed initial repair (Table 1). The high success rate is apparent (91% for initial repair; 98% after revision surgery). Failures were often associated with increased ICP where a leak may occur at the graft site or at a secondary anatomic position. In this series, 46 patients (24%) had a history of meningitis before surgical closure, indicating the need for repair.

### Conclusions and Clinical Implications

The diagnosis of CSF leak is critical to subsequent management. Patients who present with unilateral clear rhinorrhea may be misdiagnosed. Unilateral rhinorrhea should prompt the clinician to consider a CSF leak and begin the process of the appropriate diagnosis and surgical therapy.

*Banks CA, Palmer JN, Chiu AG, et al. Endoscopic closure of CSF rhinorrhea: 193 cases over 21 years. Otolaryngol Head Neck Surg 2009;140:826-833.*

## Topical Steroids In Chronic Rhinosinusitis Without Polyps

Topical medications routinely used to treat patients with chronic rhinosinusitis (CRS) are effective in patients with

nasal polyps. Because CRS has multiple etiologies and pathogenesis, evidence suggests that their use in CRS patients may be limited. Kalish et al from the Concord Repatriation General Hospital, Australia, performed a review and meta-analysis of the use of topical steroids in CRS without polyps.

The investigators used MEDLINE, EMBASE and Cochrane databases to assess the literature. Two independent reviewers analyzed all randomized controlled trials that evaluated intranasal steroids in patients with CRS without polyps. They assessed the quality of the studies, and the results were synthesized using standard random-effects meta-analytical methods. Primary outcome measures were the overall response to treatment in terms of overall improvement in symptoms

and signs defined by each of the study authors. Other reported outcome measures included nasal resistance, radiologic findings, endoscopic findings and adverse effects.

Of the 424 studies identified, a total of 9 trials representing 657 randomly assigned participants met the inclusion criteria. All the patients were >18 years of age, and all studies had been published in English. Eight trials compared topical steroids with placebo, and 1 trial compared beclomethasone once daily to a 2×/day dosing schedule. Various topical steroids were included. In 6 of 8 studies, topical steroids demonstrated overall symptomatic benefit compared with control groups. The study that compared a single dose with 2×/day dosing of beclomethasone did not demonstrate improvement on the 2×/day dosing schedule. Reporting of adverse effects was inconsistent and limited. Epistaxis was the most common serious adverse effect, with no difference shown between topical steroid and placebo.

### Conclusions and Clinical Implications

The authors concluded that topical steroids should remain a part of any “comprehensive” management treatment program for CRS patients without polyps because there was little evidence noted for steroids to be harmful. The steroid budesonide showed a clear benefit in a population with clearly defined CRS and should be considered the drug of choice.

*Kalish LH, Arendts G, Sacks R, Craig JC. Topical steroids in chronic rhinosinusitis without polyps: a systematic review and meta-analysis. Otolaryngol Head Neck Surg 2009;141:674-683.*

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- Bacterial and fungal biofilms in chronic rhinosinusitis
- Self-rated olfactory dysfunction
- Sinonasal Wegener's granulomatosis

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