

Prevalence of nasal septal perforation: the Skövde population-based study*

Dan Öberg¹, Anders Åkerlund², Leif Johansson¹, Mats Bende¹

¹ Department of Otorhinolaryngology, Central Hospital, Skövde, Sweden

² AstraZeneca, Lund, Sweden

SUMMARY

Background: Patients with nasal septal perforation appear from time to time in Ear, Nose, and Throat (ENT) practices, but the prevalence in a general population is not known.

Objective: The objective was to investigate the prevalence of nasal septal perforation in an adult Swedish population, and to relate septal perforation to possible risk factors, such as age, gender, diabetes mellitus, nasal polyps, and smoking.

Methods: A random sample of 1,900 inhabitants over the age of 20, stratified for age and gender, was drawn from the municipal population register in Skövde, Sweden, in December 2000. Subjects were called to clinical visits that included questions about diabetes and smoking habits. Nasal endoscopy was performed and, when a perforation was observed, the size was measured.

Results: In total, 1,387 volunteers (73% of the sample) were investigated. The sample size was adequate, with a good fit to the whole population. The prevalence of nasal septal perforation was 0.9% [95% CI 0.5–1.6%]. Nasal polyps was a possible risk factor, odds ratio of 11.5 [95% CI 3.0–43.5], but not age, gender, diabetes, or smoking.

Conclusion: The prevalence of nasal septal perforation was found to be less than 1% in an adult population.

Key words: nasal septum, epidemiology, nasal polyps, topical corticosteroids, nasal decongestants

INTRODUCTION

In the patient population of an Ear, Nose, and Throat clinic in Germany during the 1960s, nasal septal perforation was found in 1.44–2.32% of adults, but not at all in children under 17 years of age (Frey and Weinaug, 1968). In a 1983 report, the frequency of nasal septal perforation was considered to decline as a result of changed routines for septal surgery, from septal resection to septal plastic surgery (Meyer and Berghaus, 1983). In 1998, Cervin and Andersson reported on the frequency of septal perforations and clinical observations of a possible relationship to increased use of topical corticosteroids (Cervin and Andersson, 1998). Their observations were seen in the context of an increased number of septal perforations reported in pharmacovigilance to the Swedish Medical Product Agency. Whether this was a true increase or a cluster of reports due to an increased observance by physicians was not known. No reports have been found in the literature on the prevalence of nasal septal perforations in a general population, and it is difficult to speculate about changes in frequencies based on clinical materials only.

The aim of the present study was to determine the prevalence

of nasal septal perforation in a random sample from an adult Swedish population. A second aim was to relate the prevalence to possible risk factors, such as age, gender, diabetes mellitus, nasal polyps, and smoking.

MATERIAL AND METHODS

The Skövde population-based study is an all-embracing name of a cross-sectional study of an adult cohort studied regarding rhinologic disorders in Sweden. The sample size was based on an assumed prevalence of nasal polyps of approximately 1% (Johansson et al., 2002). The community of Skövde has about 49,000 inhabitants (37,000 adults). Of these, 67% live in the city, 18% in villages, and 14% in the countryside. When comparing the demographic profile of Skövde to that of Sweden as a whole, this population-based study is considered representative of the Swedish population, thus the estimated prevalence can be generalized (Johansson et al., 2002). A random sample of 1,900 individuals, aged 20 years or older, was drawn from the municipal roster in December 2000. The sample was stratified in proportion to gender and age in 7 groups: 20–29, 30–39, 40–49, 50–59, 60–69, 70–79, and 80+ years. An invitation to participate was sent by mail. The recipients were requested to

phone the clinic for a study appointment. Non-responders received up to three reminders and, when possible, were also approached by telephone. The study was carried out from January to June 2001. A signed informed consent form was obtained from each participant. The study was carried out in accordance with the Declaration of Helsinki and was approved by the Ethics Committee at the University of Gothenburg.

Medical history was gathered in a standardized manner by means of a questionnaire. Questions were designed to pick up relevant medical conditions, among them: "Do you have diabetes?" Smoking habits were identified by validated questions with high specificity (Hedman et al., 1999). These questions were: "Have you ever smoked regularly? (almost every day at least for one year)"; "For how many years have you smoked in total? (exclude periods of not smoking which lasted more than 6 months)"; "How much on average do you currently smoke or did you smoke before you stopped? (converted into cigarettes per day)"; "Do you smoke nowadays?" Smoking was expressed by "pack-year", calculated from number of packages of cigarettes ($n = 20$) per day multiplied by number of years of smoking.

Nasal septal perforation and polyps were identified by rhinoscopy, which was conducted with a rigid endoscope (2.7 mm, Storz-30°, Tuttlingen, Germany), without use of decongestion or local anesthesia. Nasal cavities on both sides were inspected, with special attention to the septum and middle meatus, respectively, as previously reported (Johansson et al., 2002). Perforation size was determined with a measuring rod (a homemade slide-caliper) in two directions, horizontal and vertical, and the mean diameter was calculated.

Individuals who were found to have septal perforation were interviewed subsequently. Specific questions were asked concerning topical medical treatment and previous trauma to the nose. The same questions were asked of controls from the study population, matched for gender and age. The questions included 5 items: 1) trauma to the nose (sports, traffic accidents, and maltreatment); 2) nasal surgery (including repeated cauterization for septal bleeding); 3) problems with nasal crust (ulcers and irritations); 4) topical corticosteroid treatment

(duration more than 2 months); 5) topical decongestants (duration more than 2 months).

Statistical analysis

To illustrate factors of importance for nasal septal perforation, a multiple logistic regression was fitted to the data. The following explanatory variables were selected in this model: age, gender, diabetes, nasal polyps, smoking (pack-years and actual smoking), and interactions between these variables. To keep this model as parsimonious and plausible as possible, stepwise selection (forward and backward) procedures were used. The significance level for entry and removal of a variable was set to 5%. Odds ratios (OR) including 95% CI (according to Wald) were presented for the dichotomous explanatory variables.

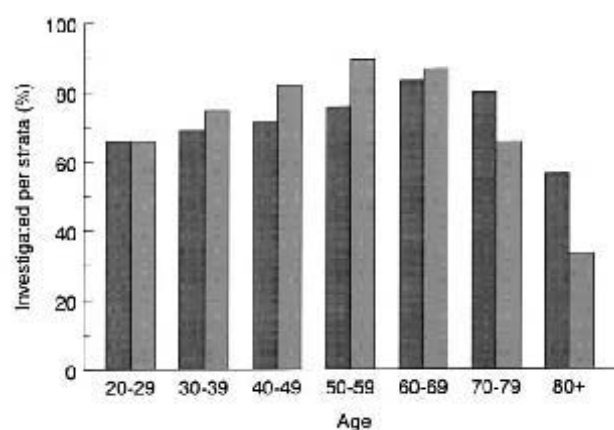


Figure 1. Demographic details of the examined subset of the study population ($n = 1,387$). The bars represent the proportion examined of men (dark) and women (light) in each age strata.

RESULTS

Of the randomly picked 1,900 individuals, 1,387 (73%) showed up for clinical investigation (Figure 1). Reasons for dropout varied; in the youngest group dropout was due mainly to relocation, while in the oldest incapacity or death dominated (Table 1).

Nasal septal perforation was found in 13 subjects (8 men and 5 women), which represents an overall prevalence in adults of

Table 1. Analysis of dropouts in different age strata.

Reason for dropout	Total	Age strata (n)						
		20-29	30-39	40-49	50-59	60-69	70-79	80+
Unwilling	204 (11%)	45	45	44	39	18	11	2
Moved from town	47 (2%)	34	6	2	4	1	-	-
Incapable	76 (4%)	-	2	2	2	6	25	39
Died	12 (1%)	-	-	1	-	1	5	5
No response and not reachable	174 (9%)	35	50	26	14	7	13	29
Percentage women	49%	49%	43%	39%	31%	45%	69%	72%
Total number	513 (27%)	114	103	75	59	33	54	75

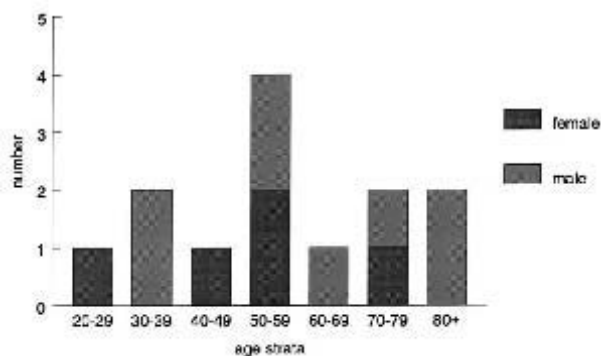


Figure 2. Septal perforations in all age strata. No obvious differences were found between men and women.

0.9% [95% CI 0.5–1.6%], without any skewness in distribution among the age strata (Figure 2). In the logistic regression analyses, nasal polyps was found to be a risk factor for septal perforation, OR of 11.5 [95% CI 3.0–43.5], but not age, gender, diabetes mellitus, or smoking. However, this relationship was based on only three individuals with nasal septal perforations and concurrent nasal polyps. The mean diameter of the perforations was 10.1 mm [95% CI 6.8–13.4 mm]. One person had two perforations.

During the few months between the end of the epidemiological study and the start of the interviews an 82-year-old man with perforation died. Thus, data were obtained from 12 individuals with perforation and 12 matched controls. No specific factor of importance for development of nasal septal perforation could be identified.

DISCUSSION

First, it can be concluded that the present investigation does not give us a reliable prevalence of nasal septal perforation in adults, since the population sample was not sufficient to yield a reliable calculation. To detect a true prevalence of 0.9%, the sample size needs to be approximately 2,000 individuals. This would not have been reached even if the examined population had been large enough to calculate a prevalence of 1.1%. Therefore, it can be concluded that the prevalence of nasal septal perforation is less than 1%. Furthermore, the calculated relationship to nasal polyps must be interpreted with caution since it was based on only 3 individuals. Of these, one had undergone septal resection; one was operated for nasal polyps on several times; and one had undergone repeated cauterization for nose bleeding and was probably a nose-picker.

In any population-based study, dropouts are expected, which in this study turned out to be 27%. The main considerations are if and how the dropouts could have influenced the validity of the assessment of prevalence of nasal septal perforation. The dropouts constituted a mixed group of which half were unwilling to participate. Nasal septal perforation is a disorder

with a relatively low if any severity of morbidity. There is no reason to believe that the disease itself, or discomfort related to the simple examination, were major reasons for subjects choosing not to participate in the investigation. In some cases, subjects were unreachable. This may have been due to the possibility that the municipal roster was not sufficiently up to date, although the random sample was drawn only 1 month before the study began. The dropouts were mostly seen among the youngest and oldest age groups. Since perforations were found in subjects of all ages, it is possible that the dropouts could have influenced the rate of prevalence, especially as there were so few individuals with perforations. The age and gender distribution in the present study was in accordance with a previous report (Diamantopoulos and Jones, 2001).

From early reports, the main cause (66%) of septal perforation was iatrogenic in connection to septal surgery, followed by other traumatic lesions (Frey and Weinaug, 1968). In the 1980s, Meyer and Berghaus reported that trauma was the most important factor, including surgery, larger facial trauma, nose-picking, cauterization of nose bleeding, intranasal tubes, and toxic substances. Other causes were infections, diabetes mellitus, tumors, and congenital defects (Meyer and Berghaus, 1983). There are also early case reports that topical corticosteroid treatment was associated with septal perforations (Miller, 1975; Soderberg-Warner, 1984; Schoelzel and Menzel, 1985; Ferguson, 1997). Furthermore, Cervin and Andersson claimed that topical corticosteroid treatment was the most important risk factor for perforation. Of the 32 patients with perforations, 11 cases were related to corticosteroid treatment, 7 to septal surgery, 6 to long-term use of topical decongestants, 4 to nose-picking, and 4 to repeated cauterization of nose bleeding (Cervin and Andersson, 1998). Corticosteroids are graded in potency by the McKenzie test, where the steroid is applied to the skin and a “vasoconstriction,” visible as a blanching phenomenon, is seen after some hours (McKenzie, 1962). Topically administered corticosteroids are potent and well known to induce atrophy of the skin even with short-term use. It is possible that this “vasoconstriction,” when directed at the septum, leads to ischemi and necrosis, similar to the pathophysiology of nasal perforations from cocaine use (Ferguson, 1997). Clinically, topical corticosteroids sometimes are accompanied by local irritation and slight bleeding of the anterior part of the septum, which in turn may stimulate increased nose-picking. However, in the nasal mucosa, short-term use does not affect the local blood flow and long-term use of corticosteroids does not induce any histopathological changes of the septum (Bende et al., 1983; Bende and Mark, 1992). Furthermore, topical nasal corticosteroids are used frequently for all kinds of nasal inflammations, so it is hard to say when the development of a perforation starts. However, it is not possible to exclude that nasal corticosteroids may be a contributor to septal perforations.

Our study indicated that nasal septal perforations are seen in less than 1 % among adults, without evident difference between gender or relation to age. Analysis of risk factors was encumbered with the low number of cases with perforations. The anamnesis gave no obvious factors seemed to be of pathogenic importance. It is probably difficult to prove a causal relationship retrospectively.

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Mats Bende, M.D., Ph.D.
 Department of Otorhinolaryngology
 Central Hospital
 SE-541 85 Skövde
 Sweden

Tel: +46-500-431 000
 Fax: +46-500-431 658
 Email: mats.bende@vgregion.se