

Statistical Evaluation of The Effect of Endoscopic Sinus Surgery on Clinical Manifestations of Chronic Rhinosinusitis

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Abstract

Background: Rhinosinusitis is a common problem that leads to a significant amount of health care expenditure due to direct costs of physician visits and antibiotics as well as indirect costs related to reduced productivity and a decrease in quality of life .

Aim: The study evaluated the prevalence and severity of various symptom manifestations of chronic rhinosinusitis as well as to analyze the positive effects of endoscopic sinus surgery on the symptoms and quality of life of patients with chronic rhinosinusitis.

Patients and Methods: This is a prospective study done in Al-Sader medical city in Najaf during eighteen months period from 1-1-2012 to 30-6-2013. The patients underwent endoscopic sinus surgery for medically refractory chronic rhinosinusitis and were assessed prospectively regarding the symptoms changes after this surgical intervention.

Results: A total of 52 patients underwent endoscopic sinus surgery for chronic rhinosinusitis. The most common symptoms of chronic rhinosinusitis before endoscopic sinus surgery in this study were postnasal drip (94.3%), facial pain (90.4%), purulent rhinorrhoea (90.4%) , nasal blockage (86.5%) and headache (69.3%) . Postoperatively 72.4 % of the patients had subjective improvement in their symptoms with a statistically significant effect in the symptoms of nasal obstruction (88.9% success rate) postnasal drip(85.7%), facial pain(80.8%), and purulent rhinorrhea(78.7%). The p value was <0.05. On the other hand the symptom of headache improved in only 27.8% of the patients complained of it with p value = 0.07

Conclusion: Endoscopic sinus surgery results in significant improvement in the symptoms of patients with chronic rhinosinusitis and it is an effective treatment for those who fail to respond to medical treatment.

Recommendations : it is recommended that endoscopic sinus surgery should be done in those patients with symptomatic chronic rhinosinusitis and not responding to full course of medical treatments.

Key words: Endoscopic sinus surgery, chronic rhinosinusitis.

تقييم تأثيرات استخدام جراحة الجيوب الأنفية بالمنظار على الأعراض السريرية للمرضى المصابين بالتهاب الأنف والجيوب الأنفية المزمن

الخلاصة

المقدمة : التهاب الأنف والجيوب الأنفية هو مشكلة شائعة تؤدي إلى كمية كبيرة من الإنفاق بسبب التكاليف المباشرة لزيارة الطبيب واستخدام المضادات الحيوية وكذلك التكاليف غير المباشرة المرتبطة بانخفاض الإنتاجية وعدم الانتظام في نوعية الحياة.

الهدف: تقييم انتشار و شدة الأعراض الناتجة عن التهاب الأنف والجيوب الأنفية المزمن وكذلك تحليل الآثار الإيجابية لجراحة الجيوب الأنفية بالمنظار على الأعراض و نوعية حياة المرضى الذين يعانون من هذا المرض بعد إجراء التدخل الجراحي.

المنهجية: دراسة استطلاعية أجريت في المدينة الصدر الطبية في النجف خلال فترة ثمانية عشر شهرا من ٢٠١٢-١-١ إلى ٢٠١٣-٦-٣٠ خضع خلالها المرضى المصابين بالتهاب الأنف والجيوب الأنفية المزمن والذين لم يظهروا استجابة للعلاج الدوائي لجراحة الجيوب الأنفية بالمنظار و جرى خلال هذه الدراسة تقييم مستقبلي بشأن التغييرات الحاصلة على الأعراض المرضية التي يعانون منها بعد هذا التدخل الجراحي.

النتائج : خضع ما مجموعه ٥٢ مريضا لجراحة الجيوب الأنفية بالمنظار. كانت الأعراض الأكثر شيوعا والناجمة من التهاب الأنف و الجيوب

الأنفية المزمن قبل إجراء العملية كالاتي: إفرازات خلف الأنف (٩٤.٣ %) ، آلام الوجه (٩٠.٤ %) ، إفراز الأنف القيحي (٩٠.٤ %) ، انسداد الأنف (٨٦.٥ %) و الصداع (٦٩.٣ %) . بعد العمل الجراحي ٧٢.٤ % من المرضى اظهروا تحسن في الأعراض مع وجود تأثير ذات دلالة إحصائية في أعراض انسداد الأنف (٨٨.٩ % نسبة النجاح) إفرازات خلف الأنف (٨٥.٧ %) ، آلام الوجه (٨٠.٨ %) ، و إفراز الأنف القيحي (٧٨.٧ %) . من ناحية أخرى أعراض الصداع تحسنت في ٢٧.٨ % فقط من المرضى اللذين يعانون منها. **الاستنتاج :** أظهرت جراحة الجيوب الأنفية بالمنظار نتائج تحسن ملحوظ في أعراض المرضى المصابين بالتهاب الأنف و الجيوب الأنفية المزمن ويعتبر هذا العلاج علاجاً فعالاً لأولئك الذين لا تستجيب أعراضهم للعلاج الدوائي. **التوصيات:** توصي هذه الدراسة باعتبار جراحة الجيوب الأنفية باستخدام المنظار خطوة مهمة في علاج المرضى المصابين بالتهاب الأنف والجيوب الأنفية المزمن والذين لم يظهروا استجابة جيدة للعلاج الدوائي . **مفردات البحث:** جراحة الجيوب الأنفية بالمنظار , التهاب الجيوب الأنفية المزمن.

Introduction

Chronic rhinosinusitis is a group of disorders characterized by inflammation of the mucosa of the nose and paranasal sinuses of at least 12 consecutive weeks' duration. Patients with chronic rhinosinusitis may have intermittent acute flare-ups; in such cases, the disorder is called acute exacerbation of chronic rhinosinusitis⁽¹⁾. This problem leads to a significant amount of health care expenditure due to direct costs of physician visits and antibiotics as well as indirect costs related to reduced productivity and a decrease in quality of life^{(2),(3)}. The pathophysiology of chronic rhinosinusitis remains incompletely understood, but it is clear that a number of systemic, local, and environmental factors play important predisposing roles. The presence or absence of nasal polyps may represent different pathophysiologic mechanisms⁽⁴⁾. Inflammation in the nose and sinuses from a variety of causes can result in sinus ostia obstruction and can predispose to the development of further inflammation or an infection. There are many potential causes of inflammation, and current medical treatment options have been designed to treat the inciting factor, reduce the subsequent inflammatory reaction, or both. Although bacteria, fungi, and viruses can be primary causes of sinus inflammation, they may also occur as secondary infections or even as colonizers of the mucus⁽⁵⁾. The cornerstone of accurate diagnosis and treatment of chronic rhinosinusitis is a thorough history, complete physical examination including

nasal endoscopy and computed tomographic (CT) analysis⁽⁶⁾. Functional surgical treatment by endoscopic sinus surgery is presently the most preferred treatment for chronic rhinosinusitis and is based on the hypothesis that diseased sinonasal mucosa can get reverted if ventilation and drainage are improved, thus restoring mucociliary clearance^{(7),(8)}. Endoscopic sinus surgery, like all minimally invasive surgery, is designed to combine an excellent outcome with minimal patient discomfort. The use of the endoscope permits a better view of the surgical field and hence lower rate of complications as compared to conventional surgery⁽⁹⁾.

The aim of the study

The objective of this study was to determine the prevalence and severity of various symptom manifestations of chronic rhinosinusitis as well as to analyze the positive effects of endoscopic sinus surgery on the symptoms and quality of life of those patients.

Material and Methods

This is a prospective study done in Al-Sader medical city in Najaf during eighteen months period from 1-1-2012 to 1-6-2013. A 52 adult patients underwent endoscopic sinus surgery for medically refractory chronic rhinosinusitis formed the study group. The established cases of chronic rhinosinusitis with confirmatory radiographic findings and unresponsiveness to medical treatment as demonstrated by persisting symptoms after a minimum of six weeks of therapy with

broad spectrum antibiotics, systemic and topical nasal steroids were included⁽²⁾⁽¹⁰⁾. The patients were clinically evaluated and followed up with endoscopic nasal examination and preoperative CT scans. Before surgery each patient completed a questionnaire, which include symptoms of chronic rhinosinusitis. The patients major symptoms (nasal obstruction, nasal discharge, headache, facial pain and posterior nasal drip) were graded before the surgery as the followings: grade 0: No symptoms, grade 1: Mild symptoms causing little or no discomfort, grade 2: Moderate symptoms that are interfering in daily activities but not affecting sleep, grade 3: Severe problems affecting daily activities and sleep. Postoperatively, each symptom was reassessed and graded as (worse, no change, or improved). Endoscopic examination was performed preoperatively and at each postoperative visit. We used endoscopic staging proposed by Lund-Kennedy to assess the presence of polyps (0 : absent, 1 : present in meatus, 2 : present in nasal cavity but not obstructing airway, 3 : nasal cavity with obstruction of airway)⁽¹¹⁾. The patients underwent endoscopic sinus surgery with a standard technique. The surgical procedures were performed along the guidelines described by Messerklinger and Stammberger. The extent of surgery

was determined by the severity of disease and extent of involvement of sinuses as assessed by the preoperative CT scan and nasal endoscopy⁽¹²⁾. The patients were followed up postoperatively for a minimum of six months to determine the effect of endoscopic sinus surgery on chronic rhinosinusitis. Statistical analysis was performed using SPSS , and chi square test was performed to compare pre and post endoscopic sinus surgery variables and p value of less than 0.05 was considered significant.

Results

The symptom complex of chronic rhinosinusitis of 52 patients were analyzed before and after endoscopic sinus surgery. The study group included 32 (61.6%) males and 20 (38.4%) females with a male-female ratio of 1.6:1. Their age ranged from 19 to 65 years with a mean of 33.7 years. The average postoperative follow up period was nine months, ranging from 6 to 15 months.

The most common symptoms of chronic rhinosinusitis before endoscopic sinus surgery in the study were postnasal drip (94.3%), facial pain (90.4%), purulent rhinorrhoea (90.4%) , nasal blockage (86.5%) and headache (69.3%). (Table 1).

Table (1): Symptoms prior to endoscopic sinus surgery					
Symptoms	No symptoms(%)	Mild (%)	Moderate (%)	Severe (%)	Total symptomatic
Postnasal drip	3(5.7)	10(19.3)	13(25)	26(50)	49(94.3)
Facial pain	5(9.6)	15(28.8)	22(42.3)	10(19.3)	47(90.4)
Purulent rhinorrhoea	5(9.6)	10(19.3)	14(26.9)	23(44.2)	47(90.4)
Nasal blockage	7(13.5)	5(9.6)	10(19.3)	30(57.6)	45(86.5)
Headache	16(30.7)	17(32.7)	11(21.2)	8(15.4)	36(69.3)

Post surgery 72.4 % of the patients had subjective improvement in their symptoms with a statistically significant effect in the symptoms of nasal obstruction (88.9%

success rate) postnasal drip (85.7%), facial pain (80.8%), and purulent rhinorrhea (78.7%). The p value = 0.00001. On the other hand the symptom of headache

improved in only 27.8% of the patients (Table 2).
complained of it with p value = 0.07.

Table (2): Post operative symptoms and success rates						
Symptoms post surgery	Failure		Improved	No symptoms	Success %	<i>p value</i>
	Worse	No change				
Nasal blockage	3	2	40	7	88.9	0.00001
Postnasal drip	1	6	42	3	85.7	0.00001
Facial pain	3	6	38	5	80.8	0.00001
Purulent Rhinorrhoea	3	7	37	5	78.7	0.00001
Headache	4	22	10	16	27.8	0.07

Of the 52 patients, endoscopic examination revealed that 18 patients had no polyps. The remaining 34 had bilateral nasal polyps. Lund-kennedy staging system of the nasal polyps preoperatively showed that nine patients had stage 1, fourteen had stage 2 and eleven had stage 3. Postoperative assessment of those patients

with bilateral nasal polyp preoperatively revealed that, 29 patients had no polyps, one patients had stage1 , two had stage 2 and two patients still in stage 3 nasal polyps at the end of nine months follow up endoscopic examination. The overall success rate was 85.3% with significant improvement. (Table3).

Table (3): Pre and postoperative nasal polyps staging					
stage	No. of pt. Preoperative	No. of pt. Postoperative	No. of pt. with stage 0	Success rate %	<i>P value</i>
1	9	1	8	88.9	
2	14	2	12	85.7	
3	11	2	9	81.8	
Total	34	5	29	85.3	

A total of 50 patients were operated under general anesthesia and two under local anesthesia. Those patients with bilateral nasal polyposis, endoscopic polypectomy was done using the microdebrider. After clearance of the nasal cavity , the commonest surgical procedure performed was uncinectomy which was a standard procedure performed in all cases. Other

common procedures included clearance of pathology from the osteomeatal complex and middle meatal antrastomy was also done in all the patients. Anterior ethmoidectomy was done in 80.7% of the patients and posterior ethmoidectomy was done in 38.5%. Septoplasty had to be performed in 10 patients. (Table 4)

Table(4): Procedure performed			
Procedure	No. of patients		Total(%)
	Unilateral	Bilateral	
Uncinectomy	2	50	52(100)
Middle meatal antrastomy	2	50	52(100)

Anterior ethmoidectomy	12	30	42(80.7)
Posterior ethmoidectomy	5	15	20(38.5)
septoplasty	10		10(19.3)

Discussion

Out of the spectrum of symptoms of chronic rhinosinusitis each patient usually has a few symptoms that are more problematic than the others. Before endoscopic sinus surgery the patient is interested in understanding the effectiveness of surgery on these specific symptoms that affect their quality of life. In our study, the impact of endoscopic sinus surgery on these common symptoms of chronic rhinosinusitis that cause impairment of daily routine of patients has been evaluated.

The study group included 52 patients with 32 (61.6%) males and 20 (38.4%) females and male to female ratio of 1.6:1. Their ages ranged from 19 to 65 years with a mean age of 33.7 years.

The most common symptoms of chronic rhinosinusitis before endoscopic sinus surgery in the study were postnasal drip (94.3%), and the least one is the headache (69.3%). In another study done by Netkovski J et al⁽¹³⁾ in 2006, they revealed that leading symptoms of chronic rhinosinusitis were nasal obstruction in 93.7%, and the least one was headache which presented in 65%. The same result obtained from Damm M et al⁽¹⁴⁾ when they found that nasal obstruction presented in 92% of the patients and headache in 64%.

Regarding the postoperative follow up, this study showed that 72.4 % of the patients had subjective improvement in their symptoms with a statistically significant effect in the symptoms of nasal obstruction (improved in 88.9%), postnasal drip (85.7%), facial pain (80.8%), and purulent rhinorrhea (78.7%), p value = 0.00001, while the symptom of headache improved in only 27.8% of the patients complained of it with non significant effect, p value = 0.07. In comparison with other studies, Damm M et al⁽¹⁴⁾ showed

that after a mean postoperative follow-up of 31.7 months, an amelioration of quality of life was achieved in 85%. Mainly responsible for this improvement was the postoperative decrease of nasal obstruction (84%), headache (82%), and postnasal drip (78%) (all p value < 0.01). Bunzen DL⁽¹⁵⁾ in 2006 showed that The best symptom relief results were in nasal obstruction (83,3% improvement) while headache improved in 62% of the patients. Poetker DM et al⁽¹⁶⁾ in 2007 showed subjective improvement in all symptoms score post endoscopic sinus surgery with a statistical significant difference. Netkovski J et al⁽¹³⁾ showed that One year postoperatively all the symptoms were significantly improved : nasal obstruction in 87%, post nasal discharge in 74.3%, anterior nasal discharge in 70.5% and headache in 59.4% of the patients. Bhattacharyya N⁽¹⁷⁾ showed that postoperatively the best improvements in order of decreasing frequency were noted in facial pain, nasal obstruction, rhinorrhea, and headache.

Regarding the patients with bilateral nasal polyp preoperatively, postoperative assessment revealed that, 85.3% of them are free of this pathology at the end of nine months follow up endoscopic examination. The difference was statistically significant, p value= 0.00001. This agrees with other studies done by Bunzen DL⁽¹⁵⁾ and Poetker DM et al⁽¹⁶⁾ who showed a significant improvement postoperatively in symptoms score of patients with polypoidal chronic rhinosinusitis.

In studying the frequency of the procedures performed during the endoscopic sinus surgery. This article showed that uncinectomy, clearance of the pathology from the osteomeatal complex and middle meatal antrastomy were done in all the patients. Anterior ethmoidectomy was done in 80.7% and posterior

ethmoidectomy was done in 38.5% . Septoplasty had to be performed in 10 (19.3%) patients. In 1985, Stammberger H⁽¹⁸⁾ showed that uncinectomy and anterior ethmoidectomy may be all that is required surgically and the decision as to whether to continue to open the maxillary antrum, explore the posterior ethmoids and sphenoid will depend upon the extent of disease as evidenced by the CT scan and operative findings. The same observation revised by Kennedy DW ⁽¹⁹⁾ in 1997.

Conclusion

Endoscopic sinus surgery results in significant improvement in the symptoms of patients with chronic rhinosinusitis and it is an effective treatment for those who fail to respond to medical treatment.

Recommendations

It is recommended that endoscopic sinus surgery should be done in those patients with symptomatic chronic rhinosinusitis and not responding to full course of medical treatments.

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