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Evaluation of Quality of Life of Patients with Chronic Rhinosinusitis Before and After Endoscopic Sinus Surgery

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ABSTRACT

Chronic rhinosinusitis is a multi-factorial disease can significantly affect the patients' life,. Along with several medicinal and surgical treatments, advancement of endoscopic surgery, in the last three decades, has led to acceptable results in the improvement of the treatment of these patients. This study aims for analyzing the effect of endoscopic sinus surgery on the quality of life (QoL) of patients with chronic rhinosinusitis, using SNOT-20 questionnaire**.** This is a prospective analytical epidemiological study conducted on 44 patients diagnosed with chronic rhinosinusitis underwent functional endoscopic sinus surgery (FESS) were included. Demographic data including age, gender, clinical symptoms, and type of rhinosinusitis were obtained, using SNOT-20 questionnaire, before and six months after the surgery. Then, the findings were compared to each other to investigate the effect of endoscopic surgery on the quality of life of the patients. In addition, findings of endoscopic surveillance and CT-scan were recorded before and six months after the surgery, based on Kennedy and Lund-Mackay classification. Descriptive statistics were used to calculate the mean and standard deviation of the data. Moreover, paired t-test was used for comparing the scores of the quality of life before and after the surgery. The study sample included 28 men (62.2%) and 17 women (37.8%), who received a six month follow-up. The mean age of the patients was 39 years. Based on SNOT-20, the mean score of the quality of life improvement was 67.26 before the surgery. In addition, the post-surgery mean of overall score was 4.82. Patients obtained the improvement score of 21.84, on average, in SNOT-20, indicating a statistically significant improvement in SNOT-20 ($p<0.0000001$). The greatest improvement was achieved in nasal and facial congestion. The mean score of CT-scan was 19.65 and 8.10, before and after the surgery, respectively, indicating a statistically significant improvement ($p=0.000000536$). There was not any statistically significant difference in the score of endoscopic findings after performing FESS ($p=0.6137$). Endoscopic sinus surgery significantly improved the symptoms of patients with chronic rhinosinusitis, reducing the need for antibiotics and antihistamines. We concluded that subjective results were more significant than CT-scan and endoscopic surveillance findings, after the surgery.

Key words: Chronic Rhinosinusitis, Quality of Life, Endoscopic Sinus Surgery, SNOT-20.

INTRODUCTION

The term "rhinosinusitis" refers to a series of disorders diagnosed by the inflammation of the nasal mucosa and paranasal sinuses. Environmental elements and host-related factors are involved in the spread of rhinosinusitis[1]. The existence of major and minor criteria including facial pain or pressure, facial congestion, nasal obstruction, halitosis, headache, and hyposmia are

essential for diagnosis. None of the symptoms of the disease-specific; thus, the sign-based diagnosis alone is not reliable and endoscopic surveillance and CT-scan procedures are required for the confirmation of diagnosis[2]. Although this is not life threatening, it impairs the quality of life of many patients. There are several therapeutic options including the application of antibiotics, corticosteroids, antihistamines, nasal lavage, decongestant, immunotherapy, and surgery[3]. FESS is a treatment of choice for those who have not responded to medical treatments[4, 18]. The surgical success rate indicates better quality of life. Several studies have shown that the inflammation degree, shown in CT-scan and/or endoscopic findings, is not correlated with the extent of symptoms experienced by the patient[5,6]. The major complaints among the symptoms in patients with chronic rhinosinusitis are postnasal drip, and airway obstruction; in addition, constraints in the quality of life of the patients are mainly due to these two symptoms that are most often improvable by sinus surgery, enhancing the life quality in a long-term period[7]. Sinus surgery is a standard clinical treatment for chronic rhinosinusitis. This endoscopic process is based on the principles introduced by Messerklinger. It improves both the performance and permeability of pre-ethmoidal spaces with a precise and guided intervention, resulting in proper ventilation and drainage of facial sinuses[8]. Regarding that several studies suggest the improvement of patients who underwent FESS, this prospective study aims at investigating the role of FESS in the enhancement of the quality of life of the patients with rhinosinusitis. Several instruments have been designed to assess the quality of life, among which SNOT-20, as a newest and most valid questionnaire, has been used in this study[2].

MATERIALS AND METHODS

The statistical population of this prospective, analytical, epidemiological study included the patients, admitted to Otolaryngology Ward of Imam Khomeini Hospital of Ahvaz for diagnosis of chronic rhinosinusitis and underwent FESS from August 23, 2010 to January 21, 2012. They were included into the study after obtaining their informed consent. Diagnosis was based on the information from history, clinical examination, and results of CT-scan and endoscopy. The samples should satisfy two major criteria and/or one major and two minor criteria for more than 12 weeks to be included into the study. Patients under 18 years, and with history of sinus surgery, severe nasal septal deviation, and underlying diseases (either genetic or acquired) were excluded from the study. Demographic information including age, gender, clinical symptoms, and type of rhinosinusitis were obtained, using SNOT-20 questionnaire, before and six months after the surgery. Then, the results were compared to investigate the effect of endoscopic surgery on the quality of life of the patients. In addition, findings of endoscopic surveillance and CT-scan were recorded, before and six months after the surgery, based on Kennedy and Lund-Mackay classification. Descriptive statistics were used to provide mean and standard deviation of the data. Moreover, paired t-test was employed for comparing the score from the quality of life assessment, before and after the surgery.

RESULTS

Twenty-eight out of forty-five patients were male (62.2%) and the remaining subjects were female (37.8%). The ratio of men to women was 1.65 to 1. The age range of the patients was 22-65 years with the mean of 39.25 years, when their symptoms were diagnosed all patients underwent functional endoscopic sinus surgery, and completed SNOT-20 before and six months after the surgery. Endoscopy and CT scanning were performed on the patients before and after the surgery. The SNOT-20 questionnaire has 20 items scored on a range from 0 to 5, in which the more severe symptoms gain higher scores. In this study, the highest and lowest scores of the quality of life were 52 and 8, respectively. In addition, the mean score of the patients' quality of life was 26.67 before the surgery. The highest and lowest scores of the quality of life were, respectively, 32 and 0, after the surgery. In addition, the mean score of the quality of life of the patients was 4.82, after the surgery. The difference between the quality of life scores, before and after the surgery, was 21.84. This difference and improvement were statistically significant ($p<0.0000001$). Although the difference between the scores of CT-scan, before and after the surgery, was significant, these findings were not significant

with relation to endoscopic findings .The statistical investigation did not show any significant difference between the men and women. There were 18 chronic rhinosinusitis patients with nasal polyps and without asthma, whose mean scores of the quality of life were 28.83 and 6.44, before and after the surgery, respectively. The difference between the mean scores of their quality of life was 22.389, which was statistically significant (p=0.00000001). There were 2 chronic rhinosinusitis patients with nasal polyps and asthma, whose mean scores of the quality of life were 43 and 10, before and after the surgery, respectively. The difference between the mean scores of their quality of life was 33, which was not statistically significant (p=0.114). With respect to the patients under 40 years, the mean scores of the quality of life were 24.58 and 7.17, before and after the surgery, respectively. The difference between the mean scores of their quality of life was 17.41, which was statistically significant (p=0.0000001). With respect to the patients over 40 years, the mean scores of the quality of life were 27.38 and 4.50, before and after the surgery, respectively. The difference between the mean scores of their quality of life was 22.875, which was statistically significant (p=0.0000001).

DISCUSSION

Chronic rhinosinusitis is a common disease that affects the life of millions of people. Several studied have been done on the etiology of this multi-factorial disease. Many factors including anatomical abnormalities, biofilms, super antigens, fungi, allergies, and environmental and genetic factors have been proposed[3].

As chronic rhinosinusitis shows a variety of clinical symptoms, clinical evaluation using major and minor criteria as well as CT-scan and endoscopy surveillance are common instruments for the diagnosis and handling of the patients.

Several studies have shown that the inflammation degree shown in CT-scan and endoscopic findings are not directly related to the extent of the symptoms experienced by the patient. In that, although CT-scan and endoscopy show slight changes, the patients may have serious complaint. On the other hand, sometimes the changes are, although, large, the patients do not have much complaint[9].

Due to uncertainties in diagnostic criteria and the lack of association between the imaging and symptoms of the disease, the quality of life Inventory is today the strongest evidence for assessing the response to treatment. Quality of life assessment allows the physician to understand how a disease intervenes in everyday life of the patient, and thus improves patient/doctor relationship and treatment results. The most widely used instrument is SNOT-20[10]. However, there is another version of this questionnaire (i.e. SNOT-22), where two olfactory and nasal congestion related items are added[11]. There are several other questionnaires, like SF-36, SF12, and RSOM, used by different researchers.

This questionnaire includes 20 items scored from 0 to 5. The higher the scores are, the greater the severity of the disease and its impact on one's quality of life are, too.

There are many systems (like Lund–Kennedy endoscopic scoring system) for scoring endoscopic findings. In such systems, scoring is based on nasal polyps, clear or purulent discharge from the nose, and nasal mucosal edema and scar.

The CT staging Lund-Mackay scoring system is the most popular method used for explaining CT-scan results in sinus diseases[7]. It is based on the mucosal edema and congestion of the sinuses. Overall results from the patient's history, endoscopy, and CT-scan indicate the severity of the disease, based on which medicinal treatment and/or surgical plan is decided. Adequate drainage and appropriate ventilation of sinuses are the foundation of surgical treatment across the world. Endoscopic sinus surgery is a very safe procedure with a low incidence of complications. Hopkins et al. in a study on 3128 patients who underwent FESS concluded that the probability of minor complications like mild bleeding was only 7%. Those patients with more severe diseases were more prone to complications[9,10,11]. Several investigations have been done into the effect of endoscopic sinus surgery on the patients' quality of life, and all support this operation to different

extent. In our study performed in this medical center, patients were mostly male (62.2%) with men to women ratio of 1.56, which is in line with other research[10, 11]. Here, the age range of the patients was 22-65 years with mean of 39.25 years, which was close to the age of patients in other studies. In a prospective study conducted in 2003 by Akarcay et al. in Turkey, patients' age varied from 17 to 58 years with the mean of 36 years[8, 12]. In another prospective study conducted by Satish et al. in 2011 in India, the patients' age ranged from 16-71 years with the mean of 34 years[9,13]. In this study, SNOT-20 inventory, as one of the most comprehensive questionnaire in this area, was used. The follow-up period of one to three months was considered in different studies for the assessment of the effect of endoscopic surgery on patients' quality of life. In the present study, this period was six months[10-12]. Statistically no significant improvement was observed in this study in the scoring of endoscopic findings, whereas Satish et al. in a study on the patients with CRS, and with/without nasal polyp, before and after the surgery, achieved an improvement in Lund-Mackay scoring[13]. In the present study, the same degree of improvement was made in both genders. There was not any significant correlation between the score of this questionnaire and that of gender. In a study by Bezerra *et al*. (2012) in Brazil, the same result was obtained[14]. In a study by Macdonald *et al*. (2009), conducted in Dalhousie University, greater improvement in the quality of life was reported within the males and those below 50 years, after FESS [15]. In this study, there was not any significant correlation between the patients' quality of life and improved CT-scan results, based on the age range, which was consistent with the results of other studies.

In a retrospective clinical trial conducted in 2006 by Bunzen et al., the major improvements took place in nasal congestion, halitosis, loss of smell, and headache[16]. In a prospective study conducted by Ling *et al*. in 2007, postnasal drip, obstruction and nasal congestion had the highest prevalence, in a descending order. The major improvement was observed in nasal congestion and nasal obstruction, as well as postnasal drip[17]. In addition, in this study the greatest improvement among the patients took place for those with obstruction and nasal/facial congestion. In this study, we excluded patients with severe nasal septum deviation, as a major cause of compliant from nasal obstruction, making standard septoplasty necessary. This was done to avoid any mistake in the assessment of the effectiveness of endoscopic surgery on the quality of life of the patients with chronic rhinosinusitis, and to consider only nasal deviation that causes osteomeatal complex obstruction through modified endoscopy.

CONCLUSION

We concluded that the CT-scan and endoscopic findings were not in parallel with the patient's complains, and could be more severe or milder. Nevertheless, the satisfaction for and effectives of endoscopic nasal and sinus surgeries on the patients' quality of life should be taken into account. This result was significant in our study. Here, research weakness may be attributed to the limited sample size and the lack of a long-term follow-up. It is hoped that broader studies in different centers and for a longer duration are going to be conducted in the future.

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