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QUALITY OF LIFE OF PATIENTS WITH DISEASES OF SINUSES

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Contemporary studies provide proof of coincidence between diseases of upper and lower airways ("united airways disease"; "one-airway disease"). 184 patients from Szczecin with acute (AS) and chronic sinusitis (CS), aged between 18-78 years (mean age 45.7 ±14.7) were examined. The questionnaire used (SF-36; short form, 36 questions) allowed for a comparison of the quality of life of patients with sinuses' disease with healthy subjects. Patients from the groups studied indicated more restrictions of their daily life than did the subjects from a control group (CG). Among the CS patients the mean quality of life index was 75.5, among the AS patients-60.8 and among healthy subjects - 51.8. The differences between the groups were significant at $P<0.001$. Our study indicate that sinusitis strongly influenced functioning of patients in all eight domains of life.

Key words: *quality of life, paranasal sinuses, sinus-related health status*

INTRODUCTION

The association of upper and lower airways disease was first indicated nearly 2000 years ago by Galen, who explained it by their anatomical structure and mutual proximity of organs of the respiratory system. Paranasal sinuses together with the nasal cavity belong to the upper airways. Breathing through the nose is most physiological as it allows for proper preparation of the inhaled air. It has been established that nasal cavity contributes in 30-64% to overall resistance of airways while the larynx contribution accounts for only 5% (1). Nasal cavities contain two symmetrical ducts but the air passes mostly through one of them in the so-called "nasal cycle" present in more than 80% of the population. Proximal part of the respiratory tract, including the sinuses, warms up, moistens, and filters the inhaled air. Paranasal sinuses are attributed with various other functions including resonating, sense organ protection, anti-traumatic barrier, lowering of the overall skull's weight, and thermal insulation of the central nervous system. The role of paranasal sinuses remains disputable. Their capacity equals around 80 cm^3, which makes them twice as capacious as nasal cavities. All of them are filled with air and lined with typical ciliary epithelium. The movements of cilia direct the mucous through natural apertures. The biggest of all is maxillary sinus, the most variable in presence and shape is frontal sinus. Ethmoidal cells have a polygonal shape and each of them may have independent opening. Sphenoidal sinus is characterized by high variability and asymmetry (2).

Spread of infection from nasal cavity to one or several sinuses remains the most common cause of sinusitis. Even common cold causes sinusitis but very often it remains asymptomatic. *Streptococcus pneumoniae and Haemophilus influenzae* infections account for around 50% of all paranasal sinuses' infections. As studies indicate, nearly 52% of patients with painful sinuses attributes this ailment to ineffectively treated common cold. Data from Quality of Life Estimations among patients with sinusitis prove that this disease highly impacts everyday functioning. According to these studies 98% of patients think that their disease precludes them from any physical activity, 78% admits suffering from pain in the last 4 weeks before seeing a doctor (3). Pain of sinuses impairs intellectual efficiency, productivity at work, and the overall quality of life. Quality of Life (QoL) includes broad spectrum of physical and psychological features reflecting problems in social functioning. In the last 10 years, socio-economical burden associated with diseases of airways has been evaluated and better understood in the context of disease influence on health related quality of life (HRQL) as well as costs of medical care. In many published reports it has been clearly stated that sinusitis impairs everyday functioning of a patient at home, at work or in school (4). Questionnaires designed for assessment of impairment of QoL were used. The results obtained indicate that sinusitis related symptoms negatively affect social relations, reduce patient's activity, affect forms of spare time spending, cause sleep disorders. Among adults complaining on various symptoms of sinusitis psychomotor functioning and decision making is impaired (5). This disease highly disturbs all spheres of their existence.

MATERIAL AND METHODS

The protocol of this study was approved by the Institutional Review Board (Pomeranian Medical University, Szczecin, Poland). Two hundred and thirty one patients diagnosed with sinusitis were examined between December 2006 and March 2007. Eighty seven females (47.3%, mean age 44.7 ±14.6 years) and 97 males (52.7%, mean age 45.4 ±14.2 years) were finally included into the study. Patients were divided into two groups according to ENT examination and CT scanning: acute sinusitis (AS) and chronic sinusitis (CS) group. Eighty three (45.1%) patients were diagnosed with AS and 101 (54.9%) were diagnosed with CS. A hundred and eighty four patients who completely filled SF-36 questionnaires were included into the final study. This questionnaire consists of 11 questions containing 36 statements forming 8 categories describing 8 domains of (QoL) and health:

1. Health problems reducing the physical activity (10 questions).
2. Health problems (physical) reducing social functioning (4 questions).
3. Social activity (2 questions).
4. Problems related to pain (2 questions).
5. Overall mental health (5 questions).
6. Emotional problems reducing social activity (3 questions).
7. Vitality (energy\tiredness) (4 questions).
8. Overall health status (5 questions).

Questions 3, 4, 5, 7, and 9 are assessed according to a 6-degree scale (0-5 points), questions 1, 2, 6, 8, 10. and 11 are assessed according to 5-degree scale (0-4 points), where 0 indicates highest possible level of QoL and 5 or 4 the lowest. QoL index is a sum of points from all categories and allows for the overall assessment of the health status. Additionally, every answer was attributed with 0 to 100 points score, where 100 indicates the best possible functioning (100% healthy) and 0 - the worst (0% of health). A similar study was performed in the group of healthy subjects with the result of 100% efficiency of functioning in each domain. *t*-Student test for unrelated groups was used for comparison of sick patients with those in the control group at a P value of 0.05, taken to indicate statistically significant differences. Additionally, Wilcoxon's test was used for the assessment of dependency between the number of subjects with decreased QoL in the consecutive domains of the SF-36 and the level of a decrease in this quality ($P<0.001$).

RESULTS

Results of the first stage of the study

In the diseased group, the mean frequency of ambulatory visits was 2.6 ±3.2 per year, while in the control group it was 0.64 ±1.05 ($P<0.001$). Symptoms from other body systems and organs were reported by 68.7% of the diseased patients compared with only 4% of the control subjects ($P<0.05$). A hundred and sixty two (88.0%) persons from the diseased group were professionally active compared to 93.2% of those in the control group ($P<0.001$). Among the CS patients, especially male, physical workers predominated. The females with CS worked most often in trade and gastronomy. AS was most frequent in persons working in closed rooms, sometimes air-conditioned (47.0% out of the 83 subjects).

Results of the second stage of the study

The questionnaire was correctly filled by 184 out of the 231 tested patients aged between 18-78 years (mean age 45.7 ±14.7 years). The results obtained by means of the SF-36 questionnaire indicate that patients with sinusitis found more restrictions in their QoL than those in the control group. The mean QoL index among the CS patients was 75.5, it amounted to 68.8 among the AS patients, and

Table 1. SF-36 Questionnaire - Medical Outcome Study - 36-Item Short Form Health Survey.

	CS Group		AS Group		Control Group		
SF-36	Range	Mean ±SD	Range	Mean ±SD	Range	Mean ±SD	P
1. Physical Function	0–56	19.8 ±15.7	0-56	20.7 ±13.5	0–43	8.8 ±10.0	0.001
2. Role-Physical	0–20	10.0 ±8.1	0-20	10.0 ±8.3	0–20	6.5 ±7.8	0.001
3. Bodily Pain	0–20	3.7 ±2.9	0-20	4.1 ±3.7	1–7	3.1 ±2.0	NS
8. General Health	0–24	14.0 ±4.2	0-24	15.3 ±4.7	0–15	9.2 ±3.5	0.001
Sum of Physical Function		47.5 ±9.3		50.1 ±10.5		27.6 ±5.8	0.001
3. Social Functioning	0–11	3.1 ±2.9	0-11	2. 9 ±2.5	0–10	2.6 ±2.3	NS
5. Mental Health	0–20	9.9 ±6.0	0-20	9.1 ±5.7	1-18	8.3 ±3.7	NS
6. Role-Emotional	0–15	6.4 ±5.2	0-15	5.8 ±4.8	0–15	4.9 ±5.5	NS
7. Vitality	0–17	9.6 ±5.2	0-17	8.3 ±5.0	1–18	8.4 ±3.8	NS
Sum of Mental Health		28.0 ±4.8		26.1 ±3.8		24.2 ±3.8	NS
Quality Life Index		75.5 ±36.0		60.8 ±34.7		51.8 ±27.5	0.001

CS - Chronic sinusitis, AS - Acute sinusitis; NS - not significant at the 0.001 level.

to 51.8 among the healthy subjects (P<0.001). Differences in QoL between both diseased groups studied were not uniform. The patients with sinusitis found an impairment of their QoL mainly in the physical aspect. A reduction in physical activity (the sum of 1, 2, 4, and 8 categories) was significantly lower among the CS patients comparing with the AS and control subjects; the overall physical fitness of the patients with sinusitis was 30% lower than that of the control subjects. Detailed data are shown in *Table 1*.

The results indicate that the most significant differences were recorded in a reduction of physical activity due both to disease category (Category 1) and general health status category (Category 8). In Category 1, the result for the CS patients was 19.8 points vs. 8.8 points for the healthy subjects and 14.0 points vs. 9.2 points, respectively, in Category 8 (P<0.001 for both) (*Table 1*). A lower statistical significance was obtained in the scale assessing the influence of physical ailments on social activity (Category 2). The healthy subjects indicated more favorable QoL in this domain as well (10 points) when compared with the sinusitis patients (6.3 points). Six percent of the AS patients described their pain associated ailments as severe and causing serious impairment in their functioning, 12% as severe, 51% as average, 24% as mild and bearable (most frequent answer among the CS patients), and 7% of the patients did not indicate significant pain associated with their disease. Most frequent ailments included headache (45%), loss of taste, smell and appetite (36%), sleep disorders (17%), and eye and throat pain (2%).

There were insignificant differences in the assessment of the overall mental state (the sum of results for categories 3, 5, 6, and 7) among the groups studied, although the results for the CS and AS patients tended to be worse in each scale than those for the healthy control subjects (*Table 1*). When assessing the subjective health status, the sick subjects indicated a lower level of functioning than normal. Ten percent of the patients had suffered from fatigue and irritation in the 4 weeks before the survey was performed. Seven percent of them felt constantly fatigued and irritated, 35% felt so many times, 21% felt so few times, 17% called this state apathy, while 10% did not notice anything like that.

DISCUSSION

Etiology and clinico-pathologic changes in inflammations of various sinuses are very similar and often identical. Spread of infection from nasal cavity to one or few sinuses is the most common cause of sinusitis. Maxillary sinus is most frequently affected with ethmoidal, frontal, and sphenoidal sinuses coming up next. Ethmoidal cells are most often affected in children.

In the US, ailments of sinuses affect around 12% of the population, i.e., 35 millions Americans per year. Approximately 5% of the urban population suffer from sinusitis. According to strict diagnostic criteria, the incidence of chronic maxillary sinusitis in Sweden has been 0.02% during a 5-year period from 1978-1982 in the population of mostly rural inhabitants (6). Around 15% of the European population, 5% in Central Europe among that, suffer from CS (7). According to 2003 PBS survey for Ibuprom-sinuses more than 15% of adult Poles suffer from headaches, 9% is aware of their ailment but as many as 6% are not aware of the fact that these are not just headaches. According to National Health Fund (NHF) data for Zachodniopomorskie Voivodship (Szczecin Region), 1107 females and 1372 males have been treated for AS, and 2032 females and 1962 males were treated for CS in the 18-74 years old age group. There were 2923 CS cases and 2234 AS cases among children aged 0-16 years.

In current study, SF-36 questionnaire was used and QoL of As and CS patients was compared with that in healthy subjects. The SF-36 survey is widely used worldwide for the assessment of QoL (8, 9). Our data indicate that acute inflammation lowered the comfort of life for a short period of time. The results describing QoL in CS patients are more alarming, as these patients' function was impaired more and for an extended period of time. Similar observations have been made by Wang et al (10), Dzaman et al (11), and Juniper et al (5), who found a significant decrease of effectiveness of CS patients in 7 out of 8 domains included in the survey. In our study physical activity was 35% lower in both disease groups when compared with the normal health state. This indicates unequivocally that there is a decrease in QoL in patients with CS and AS in relation to the general population represented by the control group. Patients with chronic and acute diseases of sinuses reach 60-70% of the QoL of the healthy ones. Vitality is approximately 50% lower when compared with the normal functioning. Especially disturbing are results in patients with CS in whom the disease impairs physical fitness, mental state, everyday and social functioning, which negatively influences their QoL. Patients suffer additionally from sleep disorders, emotional problems, and reduction of everyday activity.

Patients with CS more frequently breathe through their mouth due to impaired patency of the nose (69%). Air reaching the lungs is inadequately warmed, moistened, and filtered, which results in irritation of bronchial mucosa. This in turn triggers defense reactions. A lot of patients with CS are diagnosed with bronchial mucosa hyperreactivity, which may be a first step in asthma development (11). Sinus mucosa of CS patients seems to produce less NO, a potent bronchodilator, which may be one of the factors increasing tonus of bronchial smooth muscles in those patients (12).

Our study did not include patients treated in allergology ambulatories, while some studies suggest that sinusitis is a common complication of allergic rhinitis. In one of the studies, 43% of cases of acute rhinosinusitis were seasonal, among which 25% were allergic. Forty percent of patients suffering from chronic rhinitis and sinusitis are diagnosed with allergy, a percentage increasing to 80% among patients with bilateral rhinosinusitis. The number of such patients tends to increase (13).

We conclude that chronic as well as acute sinusitis reduces markedly the quality of life, in particular having impact on physical fitness, social relations, mental state, and everyday activities of patients. The SF-36 survey is a valuable tool in the assessment of various domains of sinusitis patients' quality of life and also allows the evaluation of treatment results and for better planning of therapy and long-term individual care.

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