Upper airway symptoms and quality of life in chronic obstructive pulmonary disease (COPD)

John R. Hurst, Tom M.A. Wilkinson, Gavin C. Donaldson, Jadwiga A. Wedzicha*

Academic Unit of Respiratory Medicine, St. Bartholomew’s and Royal London Medical School, St. Bartholomew’s Hospital, Dominion House, London EC1A 7BE, UK

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Summary

Objective: To assess the impact on quality of life from upper airway symptoms in chronic obstructive pulmonary disease (COPD).

Methods: Sixty-five patients with moderate-to-severe COPD were studied using the 20-item Sino-Nasal Outcome Test (SNOT-20) questionnaire, a validated disease-specific health-related quality of life tool for the assessment of rhinosinusitis. Patients also completed the St. George’s Respiratory Questionnaire (SGRQ).

Results: Eighty-eight percent of patients experienced nasal symptoms on most days of the week, most commonly rhinorrhoea. The mean SNOT-20 score of 1.24 demonstrates that nasal symptoms cause impairment to quality of life. The SNOT-20 score correlated with the number of chronic nasal symptoms (rho = 0.51, P < 0.01): the more daily nasal symptoms experienced, the greater the impact on health status. There was no significant correlation between SNOT-20 and SGRQ (r = 0.21, P = 0.09) suggesting that both upper and lower airway symptoms contribute to the total quality of life burden.

Conclusions: This is the first study to report on upper airway involvement in well characterised COPD patients using a previously validated assessment tool. Upper airway symptoms are frequent in these patients and cause impairment to the quality of life. These effects may not be detected using currently available quality of life tools that focus on lower respiratory tract symptoms.

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Introduction

The upper and lower airways are in anatomical continuity, function as a single unit, and respond in similar ways to noxious stimuli. In contrast to asthma where there is considerable work describing the relationship with rhinitis, little has been published on upper airway involvement in patients with chronic obstructive pulmonary disease (COPD). This is despite the high prevalence of upper airway symptoms in COPD. Montnemery and colleagues study of 392 subjects aged between 20 and 59 years who self-reported chronic bronchitis or emphysema found that 40% experienced recurrent or persistent nasal symptoms. We have subsequently shown that in a well-characterised group of patients with moderate-to-severe COPD the prevalence rate of chronic nasal symptoms is even higher at 75%.

Assessing patients objectively for upper airway involvement is difficult because the correlation between nasal symptoms, clinical and radiological

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*Corresponding author. Tel.: +44-207-601-8834; fax: +44-207-601-8616.
E-mail address: j.a.wedzicha@qmul.ac.uk (J.A. Wedzicha).

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findings is poor. A US task force on rhinosinusitis has therefore recommended the use of a symptom-based approach to assess upper airway pathology. A number of tools have been developed to quantify upper airway involvement, including the 20-item sino-nasal outcome test (SNOT-20). The SNOT-20 is a validated, disease-specific, health-related quality of life questionnaire that has widespread acceptance in the United Kingdom following the adoption of a variant for a recent national audit of otorhinolaryngology practice. Scores in normal control patients have been previously published.

The purpose of this study was to assess the impact on quality of life from upper airway symptoms in a population with COPD using the SNOT-20 questionnaire, and to relate this to health status assessed by the St. George’s Respiratory Questionnaire (SGRQ).

Method

Study subjects

Sixty-five patients were recruited at random from the East London (UK) COPD study. This rolling cohort of around 100 patients have well-characterised COPD and are followed prospectively, attending for regular review and filling in daily diary cards of peak expiratory flow rate and increase in symptoms. Patients record change in the ‘major’ symptoms of dyspnoea, sputum volume and sputum purulence, and the ‘minor’ symptoms of cough, wheeze, sore-throat, fever and those of the common cold. An exacerbation is defined, as in our previous work, as an increase in two or more symptoms, at least one of which must be a major symptom, for a minimum of two consecutive days. This allows calculation of exacerbation frequency according to our previous methodology. Patients are dichotomised at the median exacerbation frequency value into ‘frequent’ and ‘infrequent’ exacerbators. Entry criteria to the study were a forced expiratory volume in 1 s (FEV1) of less than 70% predicted for age, sex, ethnicity and height; a β2-agonist reversibility on predicted FEV1 of less than 15% and/or 200 ml; and airflow obstruction as demonstrated by a post-bronchodilator FEV1 to forced vital capacity (FVC) ratio of less than 70%. Patients with a history of asthma, clinically significant bronchiectasis, bronchogenic carcinoma or other relevant respiratory disease were excluded. None of the patients gave a history of atopy. No patients were taking regular intra-nasal therapy. Seven of the 65 (11%) patients had previously seen a specialist with a diagnosis of rhinosinusitis. All participants gave informed consent and the study has approval from the East London and The City Research Ethics Committee.

Protocol

The SNOT-20 and SGRQ were self-administered during a clinic visit between October 2002 and April 2003, at a time when clinically stable and at least 6 weeks following the last exacerbation. In addition, the presence or absence on most days of the week of the five principal upper airway symptoms rhinorrhoea, post-nasal drip, decreased sense of smell, blocked nose and sneezing were binary coded and summed to give a nasal score between 0 and 5.

SNOT-20 questionnaire

The SNOT-20 questionnaire comprises 20 items that assess both the symptoms of rhinosinusitis and the impact that these have on health status. Each item is graded on a 5-point scale from ‘no problem’ to ‘problem as bad as it can be’ and the resultant sum is divided by 20 to yield a SNOT-20 score between 0 and 5. A higher score therefore represents a worse impairment to health status due to upper airway symptoms. A control population without rhinosinusitis studied during validation of the questionnaire had a mean score of 0.6.

Statistical analysis

Data was analysed using SPSS for Windows version 10.0 (SPSS Inc, Chicago, Illinois, USA). Data with normal distribution is described by mean and standard deviation (SD), skewed data by median and interquartile range (IQR). Pearson’s correlation was used to assess the relationship between data with normal distribution; Spearman’s rank correlation was used when one or both variables were skewed.

Results

The 65 subjects in this study had a mean (SD) age of 69.1 (6.5) years, FEV1 0.93 (0.35) l and FEV1% predicted 42.6 (14.8)%; 37 were male, 23 were current smokers and all the remainder were ex-smokers. The median (IQR) exacerbation frequency was 2.7 (1.7–3.9) per year.

Fifty-seven of the 65 patients (88%) experienced at least one nasal symptom on most days of the
week. This was most commonly rhinorrhoea (34/65), blocked nose (33/65) or sneezing (33/65). Post-nasal drip (28/65) and decreased sense of smell (20/65) were less common. The relationships between nasal score, SNOT-20 and SGRQ are reported in Fig. 1.

The nasal score correlated significantly ($\rho = 0.51$, $P < 0.01$) with the SNOT-20 result as illustrated in Fig. 2. There was no significant correlation between the SNOT-20 and SGRQ total score ($r = 0.21$, $P = 0.09$), or between the SNOT-20 and individual impact, activity or symptom domains of the SGRQ. There were no significant relationships between the nasal score or SNOT-20 and the variables age, sex, FEV$_1$, current smoking status or exacerbation frequency. There was also no difference in nasal or SNOT-20 scores between patients who had and had not been previously diagnosed with rhinosinusitis. A significant relationship was demonstrated between SGRQ and exacerbation frequency with frequent exacerbators having a worse quality of life ($\rho = 0.424$, $P < 0.001$).

Discussion

This study confirms the high prevalence of chronic nasal symptoms in COPD: 88% of patients with moderate to severe COPD in this cohort were affected. The most common chronic upper airway symptom is rhinorrhoea. Nasal symptoms result in impaired quality of life as assessed by the SNOT-20 questionnaire. The more daily nasal symptoms experienced, the greater the impairment to quality of life.

The mean SNOT-20 score of 1.24 is less than that demonstrated in a population of patients with rhinosinusitis, studied during validation of the SNOT-20 questionnaire, who had a mean score of 1.9. Therefore, while nasal symptoms are highly prevalent in COPD they seem to cause less impairment to health status than in patients with rhinosinusitis alone. We postulate that because patients with COPD also have significant lower respiratory tract symptoms that are known to affect quality of life, the lower respiratory tract symptoms mask some of the effect of the upper airway symptoms. We note that the mean SNOT-20 score in COPD patients without daily nasal symptoms was 0.6, identical to that previously found in normal control patients. This suggests validity of the questionnaire to assess upper airway involvement in COPD.

The absence of a relationship between current smoking status and the nasal or SNOT-20 scores is interesting given that active smoking is known to be associated with symptoms of chronic rhinitis. The pathogenesis of upper airway symptoms in COPD is poorly understood but it is known that there is continuing lower airway inflammation in COPD even after smoking cessation. The finding of similar SNOT-20 scores in both current and ex-smokers suggests that there may also be ongoing upper airway inflammation in these patients. The mechanisms underlying upper airway involvement in COPD therefore deserve further study.

The SNOT-20 and SGRQ are both validated, disease-specific health-related quality of life questionnaires. One explanation for the poor correlation between these two scores would be that the total quality of life burden in COPD has components due independently to both upper and lower airway involvement. This has not been previously
reported. Tools such as the SGRQ that are designed to assess lower airway symptoms may therefore miss effects on quality of life due to upper airway involvement. Factors that are known to affect quality of life in COPD include FEV₁, Medical Research Council (MRC) dyspnoea scale and exacerbation frequency. This study confirms our previous finding of greater impairment to health status in patients who have higher exacerbation frequency. We suggest that upper airway symptoms also contribute to impaired health status in patients with COPD. This data raises the hypothesis that novel therapeutic strategies directed towards the upper airway may have beneficial effects on health status in these patients.

Despite the reported poor correlation between symptoms, clinical findings and radiological disease in rhinosinusitis, the simple 5-point nasal score correlated well with the more complex SNOT-20 questionnaire. We therefore believe that the nasal score gives a practical, rapid and useful indication of upper airway involvement in these patients.

This is the first study to report on upper airway involvement in a well-characterised cohort of COPD patients using a previously validated assessment tool. We have confirmed that nasal symptoms are common in COPD and gone on to demonstrate a resultant impact on health status, independent from that due to lower airway symptoms. Given the high prevalence of nasal symptoms in COPD and the subsequent effect on quality of life, upper airway involvement in COPD deserves further attention.

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References