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Adherence to the Swiss Guidelines for Management of COPD: Experience of a Swiss Teaching Hospital

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Summary

Questions under study: Swiss guidelines for the management of chronic obstructive pulmonary disease (COPD) were published in 2002. We aimed at assessing adherence to the proposed guidelines by the physicians in charge for all patients referred to our hospital for acute exacerbations of COPD over a one year period.

Methods: In a prospective observational study, data from a questionnaire and from records of all patients referred to our hospital with acute exacerbation of COPD were collected. Diagnostic steps as well as therapeutic and prophylactic interventions were reviewed. Where applicable, interventions were stratified according to proposed levels of evidence A–D.

Results: 45 patients in whom the diagnosis of COPD had been made before were included. Diagnosis was established by spirometry in 71%, in the remaining diagnosis was based on clinical grounds only. Non-smoking advice was given to 69%, and 16% were offered a nicotine-replacement trial (level A). Information about a disease management plan was given in 40% of the patients (level B), 22% had done a six minute walking distance test. 27% of the patients had participated in a pulmonary rehabilitation program (level A). 93% were on regular bronchodilator therapy (level B), and 56% had regular inhaled corticosteroids (level B).

Conclusion: Confirmation of the diagnosis of COPD by spirometry is lacking in a significant number of patients. Most patients were treated with regular bronchodilators, however, relevant over-treatment with beta-adrenergic substances and overuse of inhaled corticosteroids in mild disease stages are common. Efforts for disease prevention and education as well as awareness of the potential benefits of pulmonary rehabilitation programs are still insufficient. Efforts to improve the adherence to the Swiss guidelines for the management of COPD should be intensified.

Key words: COPD; Swiss guidelines; diagnosis; treatment; prevention

Introduction

Chronic obstructive pulmonary disease (COPD) is a highly prevalent disease causing significant morbidity and mortality in the adult population. The disorder is characterised by expiratory airflow limitation that is not fully reversible [1]. Management of patients with COPD may vary between countries and change over time. Clinical practice often differs from proposed guidelines [2]. Guidelines of the Swiss Respiratory Society for the management of COPD were published one year prior to starting this study [3], based on former guidelines [4], the GOLD report [5] and an extensive review of the literature. Guidelines aim at advising on how to optimise prevention, early detection, diagnosis, and treatment of a specific disease. As has been shown in patients with asthma, they might help to improve adherence to evidence-based treatment and save costs [6, 7]. In an extensive review, Hackner et al. found that an increasing number of guidelines for different topics of pulmonary medicine have been published during the last 25 years, but only few were tested clinically in randomised controlled trials [8]. Little is known on how much guidelines improve care and outcome in COPD patients [9].

The goal of this prospective study was to assess adherence of general practitioners and hospital staff to the Swiss guidelines in a defined subgroup of patients referred to this teaching hospital for acute exacerbation of COPD (AECOPD).

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Methods

The cantonal hospital in Münsterlingen is a non-university teaching hospital caring for approximately 8000 hospital in-patients annually. From January 1 to December 31 2003, all patients referred for AECOPD were prospectively interviewed with a structured questionnaire addressing precedent management of their disease. AECOPD was defined as an increase in symptoms of dyspnoea, sputum volume and sputum purulence [10].

The questionnaire contained the following domains: Prior patient records including hospital admissions, previous stage of the disease if known according to pulmonary function tests, risk factors (smoking, alpha-1-antitrypsin deficiency, farming, dust exposure), additional diagnostic assessment, eg, previous 6 minute walking distance test (6MWT) [11], blood gases, and modified Medical Research Council (mMRC) dyspnoea score [12]. Initiative for disease prevention such as smoking cessation, vaccination and disease specific education was recorded. Pharmacotherapy and other supportive means such as long-term oxygen therapy (LTOT) were noted. Further, previous efforts for pulmonary rehabilitation and nutritional counselling were registered [13, 14].

Patient management was stratified into levels of evidence A–D according to Murray and Lopez [15] as adopted by the Swiss 2002 guidelines [3], where the highest level of evidence (A) is based on multiple randomised controlled trials with a rich body of data, level B requires evidence from randomised controlled trials with a limited body of data, level C is based on non-randomised trials and observational studies, and the lowest level (D) refers to a "panel consensus statement".

The questionnaire was completed by study physicians only. All retrievable former and actual patient records were separately reviewed by two physicians (K. F. and M-L. J.)

Results

Diagnostic assessment

53 patients were admitted to the hospital with the diagnosis of AECOPD during the study period (fig. 1). Baseline characteristics are given in table 1. One patient died before the scheduled interview. Main presenting symptoms on admission were increased dyspnoea in 52, increased sputum production in 24, and increased purulence of sputum in 18 patients. Factors leading to hospital referral were lack of success of intensified respiratory therapy in 13, significant co-morbidity in 7 and a lack of social support in 10 patients.

In 7 patients the diagnosis of COPD was made for the first time during the hospital stay in question. Thus, a total of 45 patients could be included in this evaluation. All of these had been treated by a general practitioner (GP), 17 had also been seen by a respiratory physician (RP) at some time in the course of their disease. 32 patients (71%) had had a spirometry test with a printout available from former records. Two belonged to GOLD stage I, 10 to stage II, 11 to stage III, and 9 to stage IV. In the remaining 13, the diagnosis of COPD had been based on clinical grounds only. Seven out of these 13 patients had performed pulmonary functions tests during the actual hospital stay, all confirming the presumptive clinical diagnosis of COPD. The remaining 6 claimed to have done pulmonary function testing at a certain time but no record was

Table 1

Baseline characteristics, patients with known COPD.

n = 45	median (IQR)
Gender	34m, 11f
Age [yr]	75 (16)
BMI [kg/m^2]	24.9 (7.4)
TLC [%] *	112 (20)
RV/TLC [%]*	62 (12)
FEV_1 pre [L] / [%]*	1.1 (0.54) / 49 (15)
FEV_1 post [L] / [%]*	1.2(0.58) / 51 (17)
TLCO* [%]	66 (28)

(* n = 32 for pulmonary function testing)
IQR = interquartile range; FEV_1 pre = FEV_1 before bronchodilation; FEV_1 post = FEV_1 after bronchodilation; TLCO = transfer factor of the lungs for carbon monoxide.

Figure 1

Patients available for study AECOPD: Acute exacerbation of COPD; GP: General practitioner; RP: Respiratory physician.

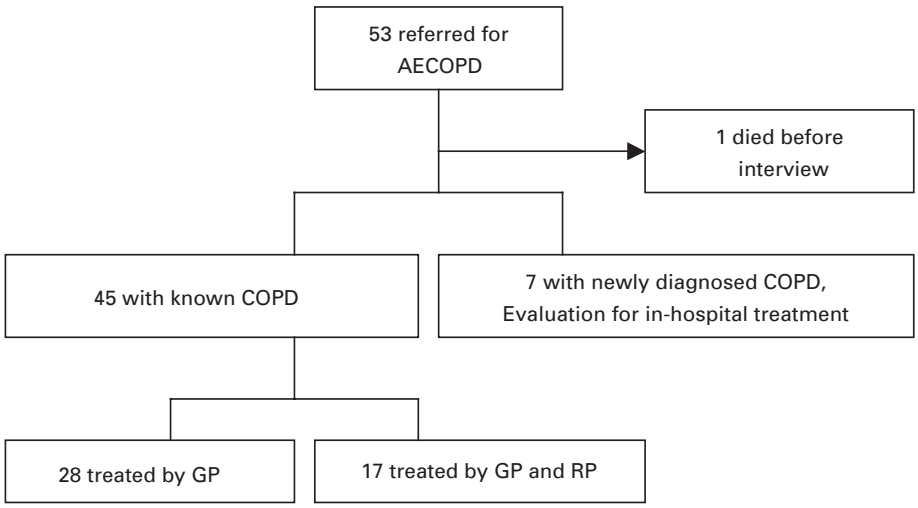

Table 2
Prevention and education (n = 45).

Evidence A	n	%
Non-smoking advice	31	69
Influenza vaccination	26	58
Pulmonary rehabilitation	8	18
Psychological support	9	20
Nicotine replacement therapy	6	13
Evidence B		
Pneumococcal vaccination	10	22
Disease management plan	18	40

Table 3
Pharmacological therapy (n = 45).

Evidence A	n	%
Short-acting anticholinergic drug	28	62
Systemic corticosteroid*	5	11
Evidence B		
Beta-adrenergic agonist	41	91
Long-acting beta-adrenergic agonist**	31	69
Short-acting beta-adrenergic agonist	28	62
Inhaled topical corticosteroid**	25	56
N-acetylcysteine	13	29

* = Evidence against use;
** 17 with fixed combination of LABA/ICS

Table 4
Pharmacological treatment by different caregivers.

	GP (n = 28)	RP (n = 17)
LABA	8	6
LABA + ICS (combined)	10	7
ICS	4	4
Nebuliser SABA + AC	18	10
Steroid trial	7	7

GP: Patients treated by general practitioners;
RP: Patients treated also by a respiratory physician;
LABA = long-acting beta-agonists;
ICS = inhaled corticosteroid;
SABA = short-acting beta-agonists,
AC = anticholinergic drug

available from their charts. Median (IQR) cumulative previous exacerbation rate in these 45 patients was 3 (2).

Thirty-one patients (69%) were former smokers, 14 (31%) were current smokers. Seven patients were farmers and also current or former smokers.

Five patients were measuring peak flow on a regular basis. Ten patients (22%) had done a 6 MWT before, no quality of life and only one mMRC dyspnoea questionnaire had been filled. In 31 patients (69%), arterial blood gas analysis was measured before this admission: 3 were normal, 19 showed hypoxaemia (pO_2 <9 kPa), 9 had combined hypoxaemia and hypercapnia (pCO_2 >6 kPa).

Interventions

Prevention and education (table 2)

The median (IQR) reported smoking history was 40 (30) pack-years. The smokers had attempted to stop their habit on a median (IQR) of 2 (5) occasions. 31 (69%) had been given non-smoking advice (Evidence A), 9 (20%) had been offered psychological support (Evidence A), in 6 (13%), treatment with nicotine replacement therapy had been prescribed (Evidence A), none had used bupropione (Evidence A). Annual influenza-vaccination was done in 26 patients (58%) (Evidence A). An additional 12 patients (27%) had irregular influenza-vaccination. Pneumococcal-vaccination had been done in 10 patients (22%) (Evidence B). Eighteen (40%) of known COPD patients reported having been advised on how to respond to acute exacerbations based on a disease management plan (Evidence B).

Pharmacological treatment (table 3)

Regarding pharmacotherapy, there were no obvious differences in compliance with the guidelines between patients who had been treated by a respiratory physician some time and those who were not, however our study was not powered to address this question (table 4).

Bronchodilators: In their exacerbation-free interval, 42 patients (93%) were on regular inhalational bronchodilator treatment (Evidence B). 41 (91%) were on beta-agonist therapy, one had ipratropiumbromide only. In patients treated with beta-agonists, 31 (69%) were on a long-acting beta-agonist (LABA) (Evidence B). 28 (62%) were on regular wet nebuliser treatment with short-acting beta-agonist (SABA) and ipratropiumbromide (Evidence A), 23 of these were also using SABA- or LABA metered-dose aerosol inhalers (MDI's) or dry powder inhalers on admission, resulting in overtreatment. Ten (22%) had SABA only (Evidence B). Two (4%) were on a long-acting anticholinergic (tiotropiumbromide).

Topical and systemic corticosteroids: 14 patients (31%) were tested for corticosteroid responsiveness, but former steroid responding was not well documented in many cases (5 negative, 3 positive, no data retrievable for the other 6 patients).
Overall, 25 (56%) had regular inhaled corticosteroids (ICS) (Evidence B), 17 of these (38%) had a combination product of LABA and ICS. Eight patients on ICS fulfilled stage GOLD III and 4 stage IV criteria, the others had moderate or mild disease. Five patients (11%) were on regular systemic corticosteroids (>1 month) on admission (Evidence A against use), one of these suffered also from polymyalgia rheumatica.

Other substances: 14 patients (31%) were on theophylline treatment (no level of evidence), 13 (29%) were treated with N-acetylcysteine (Evidence D).

Oxygen therapy

Nine patients qualified for long-term oxygen therapy (LTOT) according to the Swiss Respiratory Society guidelines, of these, 8 were on LTOT (Evidence A), one with a transtracheal catheter (SCOOP®), 1 had refused LTOT. Criteria for LTOT were: pO_2 <7.3 kPa at rest in a stable interval or pO_2 <8 kPa when signs of cor pulmonale were present [16].

Pulmonary rehabilitation, additional support

For 19 (42%) patients an in-hospital pulmonary rehabilitation program (Evidence A) had been proposed and 8 had completed one, 4 had been on an ambulatory rehabilitation program.

No specially targeted psychosocial or nutritional support had been provided.

Lung volume reduction surgery

Lung volume reduction surgery (LVRS) had been addressed in 11 patients but none had been referred to this procedure. Five patients did not fulfil pulmonary function criteria, one was still smoking, one had severe comorbidity (coronary artery disease), one declined, from the remaining 3, the reason is unknown.

In-hospital treatment

Twenty-nine patients were treated with antibiotics in-hospital, 41 had systemic corticosteroids.

Discussion

We investigated previous diagnostic approaches, treatment and additional support of all patients referred for acute exacerbation of chronic obstructive pulmonary disease (AECOPD) in a one year period to a non-university teaching hospital, focusing on compliance with the Swiss guidelines [3]. Similar studies comparing clinical practice in COPD treatment with published guidelines have been carried out in other countries before [7, 17–19]. There is little evidence for the impact of guidelines in improving care of patients with COPD [9] but limited data suggest that enhanced compliance with guideline-recommended practice will improve symptoms and disease-specific quality of life [20]. Further work needs to be done to establish the cost-effectiveness of long-term therapies for COPD.

In a little more than two thirds, COPD was diagnosed with spirometry before the current hospital stay. The remaining patients had been diagnosed with COPD on clinical grounds only. Of these, pulmonary function testing during the actual hospital stay confirmed the clinical diagnosis in more than 50%. Remarkably, patients with milder degrees of COPD (GOLD stage I and II) accounted for 37% of all AECOPD admissions. The 6-minute walking distance was tested in a limited number of patients. This is especially important as the 6MWT decreases independently of FEV_1 in the course of the disease and has been shown to be an independent predictor of survival in severe COPD [21]. Subjective assessment with quality of life questionnaires or dyspnoea scores was almost non-existent.

As expected, the majority of patients were current or former smokers. Many of these had tried to stop smoking on several previous occasions, but only a minority had been offered pharmacological support to stop smoking. Only 69% of our patients reported having been advised by their doctors not to smoke. Patients may underestimate the efforts of caregivers in advising against smoking and psychological support, but this reflects their subjective perception. It seems plausible however, that many patients were not counselled based on a structured and individually tailored strategy to stop smoking.

Annual influenza-vaccination which has been proven beneficial in reducing serious illness and death in COPD patients was done in the majority of cases, although not regularly in all of them.

Only 40% reported instruction on how to respond to an acute exacerbation. This may be meaningful as it has recently been shown that earlier recognition and treatment was associated with faster recovery and reduced risk of hospitalisation [22].

We found that most patients were treated with bronchodilators as single or combined therapy.

There was no significant difference in compliance regarding pharmacological treatment with the guidelines depending on caregivers, eg, general practitioners vs. respiratory physicians. However, our study was not powered to address this question sufficiently.

The 2003 update of the GOLD workshop report recommends the use of long-acting (LABA and tiotropiumbromide) rather than short-acting bronchodilators [23]. Out of 28 patients who were using nebulisers at home, 23 were also treated with SABA or LABA metered dose- or powder inhalers, resulting in a considerable overtreatment.

The relatively low percentage of patients on long-acting anticholinergic medication is certainly due to its new market appearance during the study year. Long-acting anticholinergics were shown to reduce lung hyperinflation associated with gas trapping, thus increasing inspiratory capacity which is highly correlated with dyspnoea [24].

More than 1/3 of the patients were treated with a combination of LABA and inhaled corticosteroids (ICS). This combination was shown to improve lung function, quality of life and prolong time to a first exacerbation [25]. ICS reduce the number of exacerbations in patients with severe COPD [26]. More than half of the patients were treated with regular ICS, despite the comparably small number of corticosteroid responsiveness trials (less than 1/3 of patients). Steroid responsiveness trials have been recommended by the Swiss guidelines, although the evidence for this practice is scant. The 2001 GOLD workshop report recommended the use of ICS in moderate to very severe disease (Stage II and higher), providing they

showed a significant response in a systemic steroid trial, or for Stage III and IV with frequent exacerbations [5]. According to the 2003 GOLD-*update* [23], ICS are recommended in stage III and IV disease and frequent exacerbations only. 13 of 25 patients in our series who were on regular ICS would not qualify for this treatment following the 2003 GOLD-update.

Increased mortality in severe COPD was shown with the use of systemic long-term corticosteroids [27], still four patients received this treatment.

For all patients with severe hypoxaemia during a stable phase who fulfilled the criteria, long-term oxygen treatment had been provided, only one patient refused. Although there are clear advantages (increased compliance and mobility and less O_2-consumption) for transtracheal catheters [28], the majority of patients continued to use nasal cannula.

Pulmonary rehabilitation is highly recommended for patients with COPD. It increases physical activity, 6MWT and health related quality of life, reduces dyspnoea, number and duration of hospital stays, thus probably reducing overall costs [29]. Apparently, pulmonary rehabilitation was proposed to 19 patients only, and only 12 completed a structured rehabilitation program, so in 58% of our patients, pulmonary rehabilitation had not even been offered. This may be due in some part to the insufficient awareness of this treatment option by the physicians in charge, but also to the lack of an ambulatory rehabilitation program in our area, refusal by patients and increasing refusal of reimbursement of pulmonary rehabilitation by the Swiss health insurance companies.

Conclusion

In this cohort of COPD patients referred for AECOPD, we identified remarkable deficits in patient assessment, patient education, therapy, pulmonary rehabilitation and smoking cessation. We propose to focus on the following measures: 1) Efforts are needed to improve awareness and enhance diagnosis of COPD using spirometry in order to recognise the disease before significant and symptomatic airflow limitation is established. 2) Use of 6-minute walking tests should be promoted as an important test to assess severity of disease. 3) Pharmacological therapy, although widely prescribed, should be improved, since still 1/3 of the patients were not treated with LABA, many patients on beta-adrenergic dry powder inhalers used additional wet nebuliser beta-adrenergic substances. ICS are given too often in mild stages of disease. 4) Efforts are needed to enhance awareness and availability of pulmonary rehabilitation. 5) Patients should be taught more intensively that avoidance of smoke exposure is the only means of slowing the COPD disease progression. This should be supported by repeated non-smoking advice, nicotine-replacement therapy, counter advertisement, increasing prices of cigarettes and the promotion of smoke free workplaces and restaurants [30].

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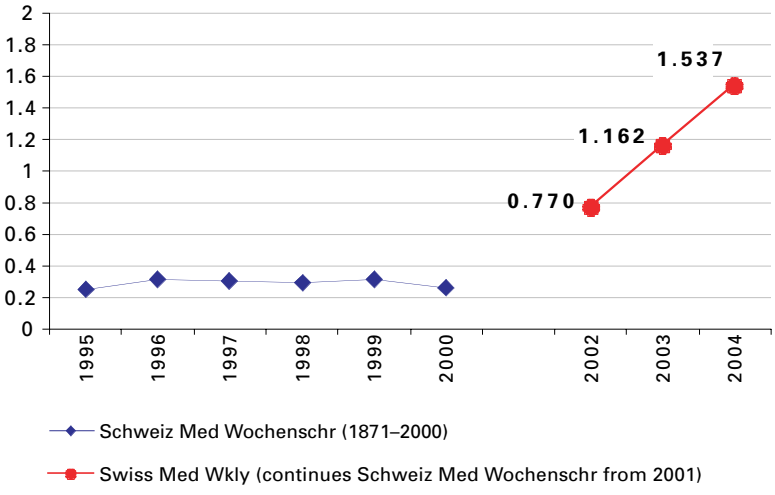

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