

Copd: a clinical case study



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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is the fifth leading cause of morbidity and mortality in the UK and fourth in the world (Hurd 2000; Soriano 2000). Though other causes exist, like genetics and environmental pollution, tobacco smoke is by far the leading etiology of this disease (Pride 2002).

It may seem axiomatic that if cigarette smoking is the cause of COPD, cessation (or avoidance) of smoking is the prevention. However, despite extensive public education, smoking is still common among men and women in the UK and even when people do quit, relapse within the first year is common (Lancaster et al. 2006). Therefore our attention as caregivers needs to be focused upon methods of cessation that produce lasting results.

To illustrate the diagnosis, management, both short- and long-term, and what Mike can expect from treatment as reflected in the medical literature, we present the following case.

Pathophysiology of COPD

COPD is a chronic disease in which decreased airflow is related to airway smooth muscle hyperactivity due to an abnormal inflammatory reaction. Inhalation of tobacco products causes airway remodeling, resulting ultimately in emphysema and chronic bronchitis (Srivastava, Dastidar, & Ray 2007).

COPD is a complex inflammatory disease that affects both lung airways and lung parenchyma. The modern focus of the pathophysiology of COPD is centered around this inflammation and it is now recognized that systemic inflammation is responsible for many of the extrapulmonary effects of cigarette smoke inhalation (Heaney, Lindsay, & McGarvey 2007).

The Clinical Case Study

Diagnosis

Mike is a 54 year old, self-employed grandfather who smokes 40 cigarettes daily. He was recently diagnosed with COPD based on an FEV₁ of 66% of predicted (Halpin 2004). According to Halpin (2004),

“ There are still no validated severity assessment tools that encompass the multidimensional nature of the disease, and we therefore continue to recommend using FEV₁ as a percentage of the predicted as a marker of the severity of airflow obstruction, but acknowledge that this may not reflect the impact of the disease in that individual. We have changed the FEV₁ cut off points and these now match those in the updated GOLD and new ATS/ERS guidelines, although the terminology is slightly different: an FEV₁ of 50–80% predicted constitutes mild airflow obstruction, 30–49% moderate airflow obstruction, and <30% severe airflow obstruction.”

According to these criteria, Mike has mild airflow obstruction and will be treated accordingly. But no matter what stage he is at or what pharmacologic interventions are prescribed, we are nevertheless obliged to offer this patient access to an effective nicotine cessation program while in hospital.

Treatment

Acute, the mainstays of treatment for Mike's level of disease are inhalation and possibly oral therapy along with pulmonary rehabilitation (Cote & Celli 2005; Paz-Diaz et al. 2007). Of course underlying bronchopulmonary infection is treated with appropriate antimicrobial therapy.

Inhalation and Oral Therapy

Bronchodilators

Of the three classes of bronchodilator therapy, β -agonists, anticholinergic drugs and methylxanthines, all appear to work by relaxation of the airway smooth muscles, which allows emptying of the lung and increased tidal volume, with an increase in FEV₁ with increase in the total lung volume and dyspnea, subjective air-hunger, significantly improved, especially during exercise (Celli & Macnee 2004c).

Combining short- and long-acting bronchodilators appears to improve lung function better than either alone, and so Mike will be treated with a combination of salbutamol and (albuterol)/ipratropium. There are many other agents that could be used that have shown to be effective in mild disease, such as Mike's (Celli & Macnee 2004b).

Corticosteroids

Inflammation is often part of the acute phase of COPD exacerbations and therefore part of Mike's therapy will be inhaled corticosteroids. Many studies have shown that inhaled corticosteroids produce at least some improvement in FEV₁ and ventilatory capacity. It is often necessary for a trial of medication to confirm that a given patient will respond to inhaled corticosteroid treatment (Celli & Macnee 2004a).

Ries (2007) claims that inhaled corticosteroids have become the standard of care for patients with COPD, in all phases of severity (Salman et al. 2003).

Mike will be offered inhaled corticosteroids.

Pulmonary Rehabilitation

According to a statement of the American Thoracic Society, “[Pulmonary rehabilitation is] a multidisciplinary programme of care for patients with chronic respiratory impairment that is individually tailored and designed to optimise physical and social performance and autonomy”.

The Pulmonary Rehabilitation Program

Exercise

Garrod (2007) has shown convincing evidence that exercise significantly modifies systemic inflammation, as measured by CRP and IL-6 levels, that plays such an important role in the pathogenesis of COPD. But rather than target just the pulmonary musculature, Sin et al. (2007) have suggested that the skeletal muscle dysfunction and reduced exercise tolerance, which are important extrapulmonary manifestations of COPD, could in fact be due to the systemic inflammation that is important in COPD.

Therefore, Mike will be placed on a regimen of weight training designed to improve his overall muscle strength. In addition he will be offered aerobic exercise treadmill sessions to improve his exercise tolerance, similar to cardiac rehabilitation (Leon et al. 2005).

Nutritional Support

General nutritional status is related to COPD severity (Budweiser et al. 2007; Ischaki et al. 2007) and mortality (Felbinger & Suchner 2003). The cachexia of COPD is a common sign of end-stage pulmonary disease.

Mike has mild disease and would not be expected to be suffering from malnutrition. However, an evaluation by a nutritionist and possible early correction of any deficits are part of his pulmonary rehabilitation.

Psychological Support

Depression, anxiety, and somatic symptoms are valid indicators of psychological distress in COPD (Hynninen et al. 2005) and quality of life (Arnold et al. 2006), two very important nursing issues. Much of the psychological distress is related to a sense of personal control because the illness, especially in its late stages, is so often accompanied by a feeling of loss of control in one's life.

Mike is still self-employed and with his mild impairment, he is not likely to be feeling these issues, yet. However caregivers need to be acutely aware that his quality of life may depend upon recognition and early intervention in the future (Gudmundsson et al. 2006; Oga et al. 2007). To that end he will have a psychological evaluation while in hospital to screen for depression or anxiety symptoms.

Educational Support

There are many areas that are very important to Mike as he goes through his pulmonary rehabilitation. In an initial interview, he needs to know what he can and cannot expect from treatment. He needs a person to explain that

the damage done so far is not reversible but that there are many treatments available that will allow him to live a good life, if he stops further cigarette use.

Issues of promoting a healthy lifestyle, muscle wasting and psychological adjustment are all treatable with information, when it is presented in a sympathetic, firm, supportive atmosphere. Mike needs to know what to expect in the future, if he is able to quit smoking, and if he does not quit smoking. He may not like to hear the truth, but his quality of life will benefit in the years to come from a clear, honest educational program.

In addition Mike needs to understand that he may have exacerbations from time to time and that early intervention by his generalist or pulmonologist are mandatory to avoid more serious consequences.

Education that stresses the value of a healthy lifestyle, including regular exercise according to the regimen established in hospital, is very important. Also, education can help considerably in preventing the wasting that, though probably not present now, may become important in the future.

Smoking Cessation

No subject in the COPD literature is more clear than the need for immediate cessation of exposure to all cigarette smoke; and, no subject is more frustrating to caregiver and patient alike, at least in those instances where there is poor compliance with the cigarette smoke proscription. We will explore with Mike some of the recommended strategies to accomplish this sometimes elusive, if vitally necessary goal.

Nicotine Replacement Therapy (NRT)

A recent article by West, et al. (2007) reported a prospective study of NRT that was large (2009 smokers), multicultural, involving smokers from the US, UK, Canada, France, and Spain, and of sufficient duration to render generalizable (“real world”) results. They concluded that NRT helps smokers’ cessation attempts and long-term abstinence rates. However, the 6% improvement rate was not large and this form of cessation therapy should be reserved for those who have tried and failed other methods or programmes.

There are many forms of NRT, including nasal and oral nicotine sprays, gum, and patches of varying dosages, currently on the market, but whether they have significant one-year success rates over counselling is an arguable point in the literature.

Since Mike now smokes 40 cigarettes daily, he will be offered the 15mg nicotine patch to help for the initial 20 weeks of cessation.

Bupropion Therapy

Bupropion is a dopamine agonist that has antidepressant effects but is also marketed as a smoking cessation agent. In a study comparing the nicotine patch with bupropion and controls (counselling only) by Uyar, et al. (Uyar et al. 2007), reported success of 26% for the nicotine patch, 26% for bupropion, and 16% for counselling-only at the end of 24 weeks. As an interesting aside, they reported that those who had a Beck depression inventory above 13, i. e. were depressed at the onset of the study, were

unsuccessful regardless of treatment or control group. However, because of the small numbers of smokers involved, there was no statistically significant difference between these groups. The authors conclude that counselling is as effective for cessation attempts as these pharmacologic treatments, and there are no known side effects of being in a control group.

However, other studies (Tonnesen et al. 2003) have shown a significant effect of bupropion over placebo.

Internet-Based Assistance

Various groups have tried using an interactive website to help smokers stop smoking. Unfortunately they have yet to show significant positive findings. All that can be said about them is that the more often the smoker logs on to the site, the better his chances are that he will be successful (Japuntich et al. 2006; Mermelstein & Turner 2006; Pike et al. 2007).

Nurse-Conducted Behavioral Intervention

In the UK Tonnesen et al. (Tonnesen, Mikkelsen, & Bremann 2006) found that a combination of nurse-based counselling in conjunction with NRT in patients with COPD was more effective than placebo at 6 and 12 months.

As one can readily imagine, there are a plethora of cessation strategies available to assist people in smoking cessation. However, there is no “ silver bullet”, i. e. one method that fits everybody. It comes down to proper motivation, which we believe is related to education and perhaps other factors. All we can really be sure of is of that those who try, many will be successful, and try, try, again seems to be the best advice we can offer.

But the most important lesson we can learn is to prevent use of this harmful and addictive substance in the first place. Teenage smoking prevalence is around 15% in developing countries and around 26% in the UK and US. Studies have shown that those who make it past 20 years of age are much less likely to succumb to this addiction (Grimshaw & Stanton 2006).

Conclusion

Assuming Mike ceases to smoke cigarettes, and given a regimen of exercise appropriate to his physical functioning, and with a detailed and robust COPD rehabilitation programme, his prognosis is excellent.

By far the most challenging days are yet to come as Mike begins to feel better and the educational material fades from his mind. Many smokers return to their fatal habit within a year. Many, though perhaps not all, could benefit from periodic follow-up sessions with a motivational nurse-counselor.

1902 words not counting references References

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