

Introduction

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COPD is a common and progressive chronic inflammatory condition that is responsible for a large amount of morbidity and mortality globally, and affects millions of people worldwide. It is now recognised that COPD is a heterogeneous disease and that the severity of the airflow obstruction, as determined by the forced expiratory volume in 1 second (FEV₁), is not the best determinant of the severity of COPD and its impacts. Thus, severity of this disease is now determined by the combination of symptoms, future risk that is mainly related to exacerbation frequency, and FEV₁ stage.

COPD is not only associated with airway inflammation but also with considerable systemic inflammation, though the precise relationship between the airway and systemic inflammatory processes in COPD remains to be elucidated. It has been proposed that this systemic inflammation is responsible for the considerable comorbidity that is seen in COPD. Thus, COPD is a disease that reaches far outside the lung, and comorbidity is found in all stages of COPD even in patients with mild and moderate COPD by FEV₁ stage. Cigarette smoking is the main risk factor for COPD and it is also a risk factor for other major diseases, such as cancer and cardiovascular disease, which are also more common with increasing age. These comorbidities will have an influence on the severity of COPD, and need to be addressed in severity and impact scores for COPD. Management of comorbidities will also have an effect on outcome in COPD; there is, for example, emerging data that COPD patients with cardiovascular risk who are treated with beta blockers have a better outcome, particularly when admitted to hospital with COPD exacerbations. Similarly, bronchodilator and anti-inflammatory therapy in COPD may impact on the degree of comorbidity, although historically, COPD patients with comorbidities have been excluded from clinical trials.

This issue of *European Respiratory Monograph (ERM)* aims to address the inter-relationships of COPD and comorbidity, a very wide and diverse topic, as can be seen from the contents list. There has been considerable recent emphasis on the study of comorbidity in COPD and a number of new studies have been published. Thus, the chapters are up to date, well referenced and written by a team of international experts with a clinical focus.

The *ERM* starts with a description of the epidemiology of comorbidity as applied to COPD, and this is followed by a description of inflammatory mechanisms of COPD and how these relate to comorbidity. The chapters that follow discuss cardiovascular disease in COPD; there has been much interest in cardiovascular comorbidity as it accounts for a considerable amount of mortality in COPD. However, cardiovascular disease is often unrecognised in COPD and it is important to understand its impact both during exacerbations and when patients are stable. Heart failure is common in an ageing population and thus frequently coexists in COPD with overlap of symptoms. Pulmonary hypertension affects the prognosis of COPD but may often be undetected. Airway infection contributes to the mechanisms of both stable COPD and exacerbations, and it is known that airway infection may be associated with increased cardiovascular events and haematological abnormalities. Pneumonia is an important comorbidity in COPD, with recent data

suggesting that it may be precipitated by inhaled corticosteroid therapy. COPD patients are current or previous smokers and are at increased risk of lung cancer.

Metabolic conditions are also important comorbidities, and this issue of the *ERM* includes chapters that address obesity in malnutrition in COPD, obstructive sleep apnoea, and osteoporosis, which is one of the most common comorbidities in COPD and is potentiated by the effect of inactivity and corticosteroids. Diabetes affects both stable and exacerbated COPD, and improved diabetic control may benefit exacerbation outcome. Associations have been shown between exacerbation frequency and gastro-oesophageal reflux that will be discussed in this issue of the *ERM*, though the actual mechanisms of reflux in COPD are not clear and may relate to the mechanical effects of hyperinflation. Inactivity is related to prognosis in COPD and skeletal muscle dysfunction needs to be assessed and targeted. Psychological disease (anxiety and depression in particular) is often present in COPD and must be targeted; it is particularly common in patients who have a higher exacerbation risk.

Thus, clinical programmes for the management of COPD patients must not only treat airways disease but should also assess and manage the associated comorbidities. This will make COPD management a much more complex, long-term process in the future, requiring multi-disciplinary teams with relevant specialist interests. It is essential that clinical trials include and, wherever possible, specifically target patients with comorbidities, as respiratory therapies may improve comorbidities. At the same time, any adverse effect of therapies on comorbidities in an increasingly ageing population must be recognised early and where patients require multiple pharmacological approaches, optimal adherence to therapy must be ensured. Current therapies for COPD are actually relatively limited and thus it is possible that therapies targeting comorbidities may have a significant impact on health status and mortality in COPD. Further research and evidence is required to inform future guidelines on the relationship of complex comorbidity in COPD.

We hope that you will find this issue of the *ERM* a useful resource that aids understanding of the role of comorbidity in COPD and the way in which comorbidity potentially influences disease management. This book will be of benefit to a wide number of healthcare professionals, including clinicians, nurses and allied healthcare professionals, but it will also be of interest to those specialising in the management of comorbidities, such as cardiologists and gastroenterologists. The chapters are up to date and well referenced, and will stimulate novel ideas for research and inspire healthcare professionals in training. We are very grateful to all the authors who have contributed excellent chapters on such an important and yet relatively poorly understood and researched topic.