

QUICK GUIDE

Cardiopulmonary risk

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Chronic obstructive pulmonary disease (COPD) is a major global health issue, with an estimated prevalence of 10.3%, which corresponds to around 390 million cases in people aged 30–79 years.^{1,2}

It is recognised that COPD patients have an increased risk of cardiovascular events (including myocardial infarctions, strokes, heart failure decompensation and arrhythmias) and respiratory exacerbations that may lead to increased mortality.^{3–7}

Defining cardiopulmonary risk

Despite the clear association between COPD and cardiovascular events, there is no agreed definition of cardiopulmonary risk.

The definition is proposed as: “The risk of serious respiratory and/or cardiovascular events in patients with COPD. These include, but are not limited to, COPD exacerbations, myocardial infarction, stroke, heart failure decompensation, arrhythmia and death due to any of these events”.⁷

Cardiopulmonary risk: key findings

A growing body of evidence suggests that COPD is an independent risk factor for cardiovascular events.^{8,9}

It is well recognised that COPD exacerbations can reduce lung function and reduce the time to (and increase the frequency of) future exacerbations. In addition, exacerbations increase the risk of death.^{10,11}

The significant effect that exacerbations have on the mortality of COPD patients might not be fully appreciated. It is estimated that around 50% of patients die within 3.6 years of their first severe (hospitalised) exacerbation,¹¹ and there is an 80% increase in the risk of death in patients who have experienced two moderate (community-treated) exacerbations within the previous year.⁶

The multi-national EXACOS-CV study examined the risk of cardiovascular events following COPD exacerbations using a set of retrospective longitudinal cohort studies.¹² Data from the England cohort showed that there was a three-fold increase in cardiovascular events (defined as acute coronary syndrome, arrhythmia, heart failure, ischaemic stroke and pulmonary hypertension) within 1–14 days following an exacerbation of any severity as compared with no exacerbation. Moreover, this elevated risk remained elevated for up to a year and even beyond.¹³

The observed elevated risk was highest in the first two weeks after a severe (hospitalised) exacerbation (hospital admission adjusted hazard ratio (HR) 14.5; 95% CI 12.2–17.3) and 14–30 days after a moderate (community-treated) exacerbation (adjusted HR 1.94; 95% CI 1.63–2.31) compared to those without exacerbations.¹³

When scaling these findings to the broader COPD population, approximately 28 people experienced at least one cardiovascular event out of every 100 hospitalised (severe) exacerbations and approximately 22 people out of every 100 primary care (moderate) exacerbations experienced cardiovascular events.¹³ The England cohort showed that the increased risk two weeks after any COPD exacerbation was greatest for arrhythmias, pulmonary hypertension and heart failure.¹³



Guidelines and collaborative working: personal learning experiences from NHS Lanarkshire

Our local NHS Lanarkshire COPD guidelines emphasise the importance of non-pharmacological interventions such as smoking cessation, optimising BMI, undertaking exercise, pulmonary rehabilitation and keeping pneumococcal, influenza and Covid-19 vaccinations up to date.

In addition, due to overwhelming evidence, we re-assessed the landscape of single-inhaler triple therapy (SITT) interventions, placing them earlier in the pathway to reduce the risk of all-cause mortality/cardiopulmonary risk.¹⁴ The flexibility of inhaler types, which can deliver dual and triple therapies, allows the potential of delivering therapies to more patients (including those who might not have sufficient peak inspiratory flow rate to trigger a dry powder inhaler). It also meant patients could step-up and step-down inhaled therapy without necessarily undergoing inhaler technique education.

Implementing the guidelines: locally and beyond

An intense education programme was undertaken in the respiratory ward, ensuring patients with severe exacerbations were appropriately stepped-up to triple therapy.

Once the guidelines were used in our respiratory wards, they were implemented in non-respiratory wards. Initially, we decided to liaise with our cardiology colleagues because the COPD patients had established cardiopulmonary risk, and our colleagues are now prescribing SITTs on a regular basis that was not occurring before.

Real-world evidence suggests that prompt initiation of triple therapy (within 30 days post exacerbation) may further reduce the risk of future exacerbations compared with delayed (31–180 days) or very delayed (181–365 days) intervention,^{15,16} so we felt it important to implement our guidelines further afield in our hospitals.

Introducing appropriate inhaled therapy for those who have had an exacerbation at the 'front door', either in the emergency department or in the acute receiving ward, would be the most effective strategy to up-titrate inhaler therapy in the appropriate setting. COPD patients would then have appropriate therapy changes, following them through their healthcare journey.

Learning from our cardiology colleagues and adopting a similar model to when clopidogrel is introduced in the management of acute coronary syndrome, we are undertaking a quality improvement project to inform the junior medical staff, the acute receiving wards' nursing and prescribing pharmacy teams and to reinforce the education to the respiratory nurse specialists. This means patients seen at any point of the day (or night) will have an appropriate step-up therapy where appropriate (as per our guidelines)¹⁴

This prompt change in therapy would be in conjunction with non-pharmacological interventions and education in COPD management (which would include re-enforcing inhaler technique and the importance of adherence). By doing so, we hope to improve outcomes in patients seen at the 'front door' and discharged or moved to any of the general medical downstream wards.

We are also looking at educating registrars and pharmacists in the downstream non-respiratory wards to ensure appropriate therapy is instituted in COPD patients with exacerbations.

The ultimate aim is to ensure that high-risk COPD patients similarly commence appropriate therapy, as do our cardiology patients who are not allowed home without antiplatelets or statins after an acute coronary syndrome.

Conclusion

This educational Quick Guide highlights the importance of awareness (and inclusion within local guidance) of cardiopulmonary risk in exacerbating COPD patients and the benefits (which may include a mortality signal) of prompt initiation of triple inhaled therapy where appropriate. It shows how an exciting growing body of evidence has moulded local COPD guidelines and gives insight into our personal experiences undertaken to implement these guidelines.

Ultimately, understanding how respiratory and cardiovascular events interplay and result in increased morbidity and mortality in patients with COPD is imperative and will eventually lead to improved clinical outcomes in COPD.

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