The double jeopardy of chronic obstructive pulmonary disease and myocardial infarction

Shashank S Sinha, Hitinder S Gurm

Despite several therapeutic advances in the last few decades, chronic obstructive pulmonary disease (COPD) is a burgeoning cause of morbidity and mortality worldwide and is the fourth leading cause of death globally. Yet a curious paradox persists. As the only common disease for which the prevalence and mortality rates continue to rise, COPD still remains as a remarkably underdiagnosed and undertreated disease. The worldwide prevalence may be remarkably underdiagnosed and undertreated, with over a twofold increased risk of MI during 25,857 patients with COPD in the Health Improvement Network database over a 2-year period. Perhaps the most compelling finding of the study was that the unadjusted 1-year mortality for patients with COPD after an MI was significantly more likely to die compared with those without COPD over the follow-up period. The impact of COPD on outcome of patients with MI has been only recently investigated.

The study by Andell et al published in this issue of Open Heart provides a compelling characterisation examining the prognostic impact of COPD in patients with acute MI. In a large Swedish cohort of 81,191 patients with MI, patients with COPD frequently manifested an atypical presentation, endorsing dyspnoea more frequently and chest pain less frequently compared with patients without COPD. Importantly, patients with COPD were less likely to present with an ST-segment elevation MI and less often underwent PCI. It is noteworthy that patients with COPD less often received guideline-based, secondary post-MI medications with proven mortality benefits, including aspirin, clopidogrel, β-blockers, ACE inhibitors and statins. Patients with COPD were significantly more likely to die compared with those without COPD over the follow-up period. The most compelling finding of the study was that the unadjusted 1-year mortality for patients with COPD after an MI (HR 1.86, 95% CI 1.76 to 1.98) was substantially reduced after adjusting for baseline characteristics and comorbidities (HR 1.32, 95% CI 1.24 to 1.40) and diminished further after adjusting for different treatment patterns.
better risk factor control and optimisation of primary and secondary medical therapy, and the same approach needs to be applied to patients with COPD. Although β-blockers have been shown to reduce mortality and the risk of reinfarction after MI, they are vastly underutilised in patients with COPD, perhaps, due to historical concerns regarding bronchospasm. Cardioselective β-blockers are less likely to induce bronchospasm and can be titrated starting at the lowest available dose (table 1). In practice, we favour the use of bisoprolol, which can be initiated at 1.25 mg daily, then titrated to 2.5 mg daily after 1–2 weeks, and increased to 5 mg daily after 4 weeks. In the recently published population-based cohort study of 1063 patients with COPD in the UK Myocardial Ischaemia National Audit Project (MINAP), treatment with β-blockers started during the hospital admission for MI was associated with a significant mortality benefit over a median follow-up of 2.9 years (fully adjusted HR 0.50, 95% CI 0.36 to 0.69). Patients already taking a β-blocker before their MI also had a significant survival benefit (HR 0.59; 95% CI 0.44 to 0.79). However, only 38.6% of patients with COPD received a β-blocker during the hospital admission for MI.

The findings published in this observational study by Andell et al.55 ideally need to be validated in a prospective, large, multicenter randomised controlled trial. However, it appears unlikely that such a trial will be performed in the near future and based on data extrapolated from patients with non-COPD, we must ensure that patients with COPD are discharged on the guideline-based regimen for standard post-MI care. This includes dual antiplatelet therapy, β-blockers as discussed above, ACE inhibitors and statins. A high index of suspicion must be employed in patients with COPD as they frequently present with dyspnoea and atypical symptoms and an MI can be easily missed. Even in the absence of MI, every hospitalisation for COPD should be an opportunity to optimise risk factor control to reduce the risk of future MI. Use of standardised check lists and discharge sheets can be highly effective in optimising uptake of preventive therapy in those with MI and those with COPD.

Finally, the role of cardiopulmonary rehabilitation merits consideration. Current guidelines recommend cardiopulmonary rehabilitation as an evidence-based, multidisciplinary and cost-effective intervention that leads to improved health in patients with COPD and MI. However, a recent national survey of hospital-based

### Table 1 Cardioselectivity of β-blockers

<table>
<thead>
<tr>
<th>Cardioselective β-blockers</th>
<th>Relative β1/β2 selectivity</th>
<th>Usual dose range (mg/day)</th>
<th>(frequency per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celiprolol</td>
<td>69</td>
<td>200–400 (1)</td>
<td></td>
</tr>
<tr>
<td>Metoprolol</td>
<td>74</td>
<td>50–200 (1–2)</td>
<td></td>
</tr>
<tr>
<td>Betaxolol</td>
<td>93</td>
<td>10–20 (1)</td>
<td></td>
</tr>
<tr>
<td>Bisoprolol</td>
<td>103</td>
<td>2.5–10 (1)</td>
<td></td>
</tr>
<tr>
<td>Nebivolol</td>
<td>321</td>
<td>5–40 (1)</td>
<td></td>
</tr>
</tbody>
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pulmonary rehabilitation in patients with COPD in Sweden demonstrated that only 0.2% of the country’s estimated COPD population participated in a hospital-based pulmonary rehabilitation programme.10 Yet pulmonary rehabilitation has been shown to improve exercise capacity, reduce dyspnoea and fatigue, improve healthcare quality of life and reduce hospitalisations with the greatest benefit derived in GOLD stages II–IV.11 Further investigations, including randomised controlled trials examining the clinical efficacy of cardiopulmonary rehabilitation in patients with COPD and MI, are warranted. This is especially pertinent since the mortality benefit of cardiac rehabilitation in patients with MI has recently been challenged in light of the negative findings of the Rehabilitation After Myocardial Infarction Trial (RAMIT).12 Nonetheless, it would be premature to abandon cardiopulmonary rehabilitation in this population and especially in those with COPD. Patients with COPD who suffer MIs represent a high-risk cohort that clearly merits closer surveillance and aggressive pharmacological and non-pharmacological intervention to alleviate the increasing burden of this global epidemic.

Competing interests HSG received research funding from the National Institute of Health and Agency for Healthcare Research and Quality.

Provenance and peer review Commissioned; internally peer reviewed.

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