Myocardial infarction: effect of beta-blockers on mortality in adults with COPD

A UK population-based cohort study has found an association between the use of beta-blockers during hospital admission and improved survival after myocardial infarction in adults with COPD over a median follow-up of 2.9 years. However, the cohort was a selected group as it did not include people for whom a beta-blocker had previously been considered to be ‘contraindicated’ (reasons unknown). The NICE Clinical Guideline on myocardial infarction: secondary prevention recommends offering a beta-blocker to all people who have had an MI.

Overview and current advice

People with chronic obstructive pulmonary disease (COPD) have been shown to be at increased risk of cardiovascular comorbidities, including myocardial infarction (MI) and have decreased short- and long-term survival after an MI compared to people without COPD. Beta-blockers are effective at reducing the risks of mortality and re-infarction after MI. However, there are historical concerns that beta-blockers could be harmful for patients with COPD (for example, by inducing bronchospasm). The NICE clinical guideline on myocardial infarction: secondary prevention recommends that all people who have had an acute MI should be offered treatment with an angiotensin-converting enzyme inhibitor, dual antiplatelet therapy (aspirin plus a second antiplatelet agent), a beta-blocker and a statin. The guideline development group acknowledged that it was important to consider medical contraindications when initiating beta-blockers in a person who has had an MI. However, the full guideline also states it is important to emphasise that new evidence may suggest that the benefits of beta-blockers in reducing re-infarction and mortality could outweigh the risk of adverse events in people with certain medical conditions such as COPD.

The British National Formulary advises that if a beta-blocker is prescribed for a person with COPD (without significant reversible airways obstruction) a cardioselective beta-blocker (for example, atenolol, bisoprolol, metoprolol) should be chosen and initiated at a low dose by a specialist, with close monitoring for adverse effects.
See the NICE Evidence topic page on myocardial infarction for a general overview of the condition. The NICE Pathway: myocardial infarction secondary prevention brings together all related NICE guidance and associated products on the condition in a set of interactive topic-based diagrams.

New evidence

A UK population-based cohort study has investigated whether the use and timing of beta-blockers after a first MI in people with COPD is associated with improved survival. The study used linked data from the Myocardial Ischaemic National Audit Project (MINAP) and the General Practice Research Database (GPRD). MINAP is a national register recording hospital admissions in England and Wales for MI and other acute coronary conditions and GPRD contains anonymised primary care medical records from practices throughout the UK.

The study included people aged 18 years and over with a recorded diagnosis of COPD in their primary care medical records, who had a first MI recorded in MINAP between 1 January 2003 and 31 December 2008 and no previous evidence of MI in their GPRD or MINAP record. People were classed as having COPD if they had a recorded diagnosis before or after their MI. Data from MINAP were used to determine whether or not study participants were prescribed a beta-blocker during their hospital admission using the Read code of ‘yes’ or ‘no’. Other coding options were available such as ‘contraindicated’, ‘not applicable’ or ‘missing’. However people with a Read code other than ‘yes’ or ‘no’ were not included in the dataset. People prescribed a beta-blocker during hospital admission for a first MI were compared with those recorded as not prescribed a beta-blocker during hospital admission for the primary outcome of all-cause mortality.

Out of the 2209 people with a recorded diagnosis of COPD and a first MI identified, 1146 (51.8%) did not have a Read code of ‘yes’ or ‘no’ for prescription of a beta-blocker during hospital admission and were not included in the analysis.

Of the 1063 people included in the analysis, 586 (55%) were not prescribed a beta-blocker during their hospital admission, 233 (22%) started a beta-blocker while in hospital and 244 (23%) were already taking a beta-blocker before their MI (although 87 out of the 244 had their beta-blocker stopped on admission). People with COPD who started a beta-blocker during hospital admission were more likely to be younger and have fewer COPD exacerbations and less likely to have cardiovascular comorbidities. They were also more likely to be prescribed other medication for secondary-prevention of MI. The beta-blockers started in hospital were predominantly cardioselective, with bisoprolol being the most commonly initiated. Of the 233 people who started a beta-blocker while in hospital, 203 (87%) and 142 (61%) were still receiving a beta-blocker after 6 months and 2 years respectively.

The median length of follow-up after MI was 2.9 years (range 0.09 to 7.2 years). In the cohort (only people who had a Read code of ‘yes’ or ‘no’ for prescribing of a beta-blocker), initiation of a beta-blocker during hospital admission was associated with better survival than never having been prescribed a beta-blocker (adjusted hazard ratio [HR] 0.50, 95% confidence interval [CI] 0.36 to 0.69; p<0.001). Taking a beta-blocker prior to the MI was also associated with better survival than having never been prescribed a beta-blocker (adjusted HR 0.59, 95% CI 0.44 to 0.79; p<0.001).

The study authors concluded that the use of beta-blockers either at the time of hospital admission for MI or prior to MI is associated with improved survival after MI in people with COPD. This study does have a number of limitations which the authors discuss. This was an observational study and as such is subject to confounding. However, the authors adjusted the HRs for a number of confounding factors such as age, history of smoking, family history, presence of comorbidities and use of other secondary-prevention medication such as antiplatelets and statins. The study only included people with a Read code of ‘yes’ or ‘no’ in the MINAP database for prescription of a beta-blocker during hospital admission; 1146 people were excluded from the analysis on this basis. Of these 1146 people, 679 (60%) were recorded as having a ‘contraindication’ to beta-blockers (reason unknown). Excluding this group may have led to selection bias in the COPD sample.
Commentary provided by the NICE Medicines and Prescribing Centre

While this study¹ may seem reassuring regarding the use of beta-blockers in people with COPD who have had an MI, about 31% of the 2209 people with a recorded diagnosis of COPD and a first MI were excluded from the analysis because they were recorded as having a ‘contraindication’ to beta-blockers. It is unknown what the reasons for these contraindications were. This makes it difficult to compare the clinical characteristics of the patients with COPD who were given beta-blockers and showed a survival benefit in the study with those who were excluded because of a documented ‘contraindication’. It is interesting to note that more than half (55%) of people with COPD were not prescribed a beta-blocker after they had an MI.

Despite the limitations of this study¹, it adds to the evidence from previous studies that have suggested that the use of beta-blockers in many people with COPD may not be detrimental and may indeed be beneficial. Most of the beta-blockers used in this study were cardioselective. A Cochrane systematic review² of 22 small studies (mostly randomised controlled trials) found that cardioselective beta-blockers given to patients with COPD (as a single dose, 11 studies, n=131; or for up to 16 weeks, 11 studies, n=185) did not produce any adverse respiratory effects. These findings did not change when the subgroups of people with severe chronic airways obstruction (6 studies, n=177), those with a reversible obstructive component (7 studies, n=227), and those with concomitant cardiovascular disease (8 studies, n=250) were considered.

The NICE Clinical Guideline on myocardial infarction: secondary prevention recommends that people who have had an MI should be offered a beta-blocker, along with other drug treatments (see ‘Overview and Current Advice’ above). It is sensible to consider the risk/benefit for each individual patient when initiating beta-blockers after an MI. If a beta-blocker is prescribed for a person with COPD, it is advisable to follow the advice in the British National Formulary: that is, use a cardioselective beta-blocker (such as atenolol, bisoprolol, metoprolol), initiated at a low dose by a specialist, with close monitoring for adverse effects.

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References


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