

Perioperative myocardial infarction

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Thirty-day mortality associated with moderate- to high-risk non-cardiac surgery in recent large cohorts and population-based studies exceeds 2%, and surpasses 5% in patients at high cardiac risk. Cardiac complications constitute the most common cause of postoperative morbidity and mortality, impacting considerably on length and cost of hospitalisation.

Redefinition of postoperative myocardial infarction

Cardiac troponin assays have changed traditional definitions. The recent universal definition of myocardial infarction (MI) is based on the rise and/or fall of cardiac biomarkers (preferably troponin) in the setting of myocardial ischaemia: cardiac symptoms, ECG changes, or imaging findings.

Pathophysiology

Two distinct mechanisms may lead to postoperative MI (PMI):

- Acute coronary syndrome (Type I).
- Prolonged myocardial oxygen supply-demand imbalance in the presence of stable coronary artery disease (CAD) (Type II).

Prognosis

Early mortality after PMI ranges from 3.5-25%, and is higher among patients with marked troponin elevation compared with patients with minor troponin elevation (0-7%). PMI also affects long-term survival. Even low-level troponin elevation predicts increased long-term mortality, and higher

postoperative troponin values predict worse survival.

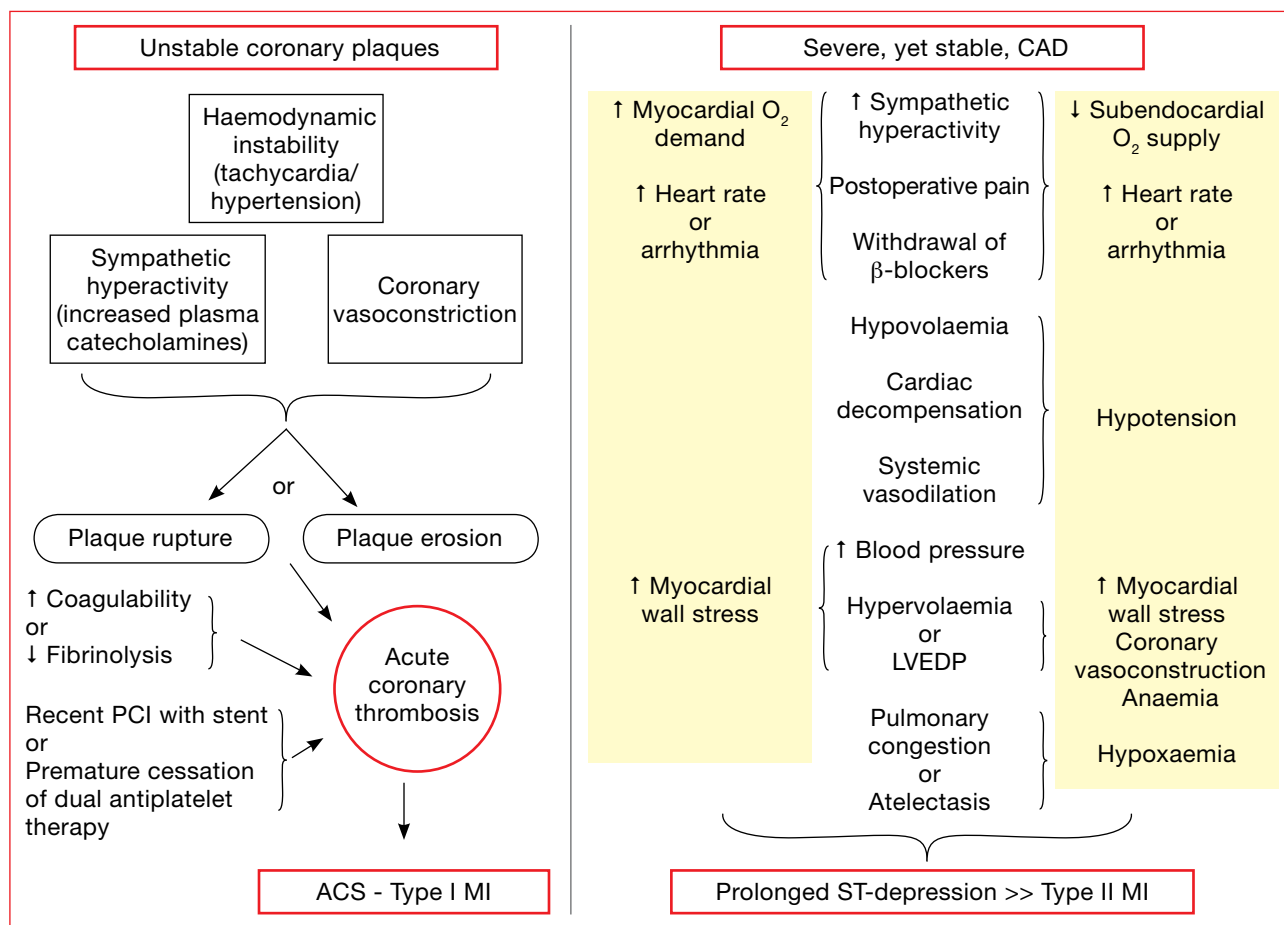
Prevention and treatment

Prophylactic therapy

β-adrenergic blockers

Prophylactic β-blockade has been advocated on the basis of two small randomised trials that showed reduced perioperative and long term MI and death. Four subsequent trials, using different dosages and types of β-blockers, failed to reproduce these benefits. The large Perioperative Ischaemic Evaluation (POISE) trial (8 351 patients) reported increased mortality (31%) and stroke (100%), mostly in association with hypotension and bleeding, in patients treated with metoprolol, despite a reduction in non-fatal PMI by 26%.

In meta-analyses, trials achieving the most effective heart rate control were associated with less PMI. However, β-blockade did not reliably decrease heart rate and was associated with more adverse events. β-blockade may aggravate hypotension (12% of POISE patients) and interfere with the ability to maintain adequate cardiac output during active bleeding, anaemia or infection. Consequently, the utilisation of β-blockade as prophylaxis is currently strongly debated. The consensus is that long-term β-blockade should not be discontinued. Intravenous β-blockers are often used to treat tachycardia, hypertension, or ischaemia, with results comparable to or better than those reported with prophylactic β-blockade. No study has compared prophylactic β-blockade with short-term, clinically indicated postoperative use.



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Statins

HMG-CoA reductase inhibitors should be continued perioperatively with the presumption that the abrupt withdrawal may cause plaque destabilisation. Several studies, mostly retrospective, have reported perioperative and long-term cardiac complications with statins. Currently, two trials have shown > 50% reduction in PMI and mortality.

Aspirin

It is accepted practice to discontinue aspirin five to seven days prior to surgery to prevent bleeding, although recent analysis suggests that there is only a mild increase in the frequency of bleeding with aspirin, and no increase in severity or mortality. Possible exceptions are intracranial and prostate surgery. Conversely, however, the effectiveness of continuing aspirin has been suggested only in coronary artery bypass graft surgery (CABG), not in non-cardiac surgery.

Dual antiplatelet therapy

Current guidelines mandate dual antiplatelet therapy for at least four weeks after bare metal

stent implantation, and for at least a year after drug-eluting coronary stenting. Elective surgery during this period is discouraged. If discontinuation of the thienopyridine is necessary, continuing aspirin and restarting the thienopyridine as soon as possible after surgery is prudent. "Bridging" stent patients with antithrombin, anticoagulants or glycoprotein IIb/IIIa agents has not been proven effective.

Coronary revascularisation

Prophylactic preoperative coronary revascularisation, mostly by CABG surgery, was associated with improved outcomes in eight studies (six retrospective), which included > 10 000 patients undergoing major vascular surgery. Two recent prospective randomised trials (CARP and DECREASE) failed to show benefit. However, 59-65% of randomised patients in those trials were treated by percutaneous coronary intervention (PCI), which provides less complete revascularisation, is associated with more perioperative complications, and has questionable efficacy for improving survival in stable coronary artery disease. In a reanalysis of CARP, CABG and complete revascularisation with PCI were associated with significantly less PMI. Until further data are available, prophylactic

preoperative coronary revascularisation is currently rarely recommended.

Perioperative management

Martinez et al have recently presented the results of a randomised trial involving 316 major vascular surgery patients. In 80 patients with prolonged (> 20 minutes) ischaemia on continuous online 12-lead ECG monitoring, β -blockers and optimisation of myocardial oxygen supply-demand balance lowered six-month mortality (8% vs 20%), and reduced troponin values. *The importance of preventing even modest increases in heart rate cannot be overemphasised.*

Emergent coronary intervention, anticoagulants, or glycoprotein IIb/IIIa antagonists are rarely indicated in the immediate postoperative course and risk of severe bleeding.

Selected bibliography

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