

## The patient with a recent stent requiring major surgery

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Percutaneous coronary intervention (PCI) has revolutionized the management of ischemic heart disease with balloon angioplasty (BA) and coronary stents (CAS) whether bare metal stents (BMS) or drug-eluting stents (DES). The persistent incidence of coronary restenosis after BA prompted the introduction of BMS and ultimately DES that pharmacologically retard endothelialization with sirolimus or paclitaxel. Dual antiplatelet therapy (aspirin and clopidogrel) is recommended for at least 4 weeks after BMS placement and at least for 12 months after DES placement.

The patient with a CAS is at significant perioperative risk for stent thrombosis and death. The perioperative management of a CAS is important for the anesthesiologist, given that they are very common and that they have significant perioperative risk.

In a pooled analysis of 10 studies (1995 – 2006: N = 980), perioperative myocardial infarction and mortality associated with CAS were as high as 28% and 20% respectively. The main risk factors were discontinuation of dual antiplatelet therapy and major surgery within (6 – 12) weeks after PCI-CAS.

The surgical stress response is prothrombotic due to platelet activation and diminished fibrinolysis. The CAS presents a thrombogenic surface, particularly when stent endothelialization is incomplete. Perioperative CAS thrombosis occurs due to a thrombogenic CAS surface, a hypercoagulable perioperative stress response, and inadequate oral platelet blockade.

As per current ACC/AHA guidelines, elective surgery should be deferred until (30-45) days after BMS placement and until 365 days after DES placement. Thereafter, patients

with a BMS/DES can proceed to surgery with aspirin coverage only. Patients with CAS who require surgery within the recommended time frame of dual antiplatelet therapy should be maintained on dual antiplatelet therapy perioperatively. If the bleeding risk is judged to be excessive and likely catastrophic e.g. neurosurgery, then clopidogrel should be discontinued at least 3-5 days preoperatively. Based on expert opinion, it is reasonable to admit the patient for intravenous antiplatelet blockade with a short-acting glycoprotein IIb/IIIa agent till surgery. Although heparin is reasonable as concomitant therapy, as monotherapy it is not the best choice, given that perioperative stent thrombosis is primarily a platelet-mediated phenomenon. The clopidogrel should be commenced postoperatively as soon as possible. There is currently minimal evidence that documents safety and efficacy of this intravenous anticoagulation strategy as a bridge to surgery.

The perioperative care of a patient with a CAS mandates multidisciplinary discussion (surgeon; anesthesiologist; and, cardiologist) to address the following aspects: risk of CAS thrombosis, urgency of the procedure, current antiplatelet therapy, perioperative anticoagulation plan, and patient management, including close monitoring for myocardial ischemia. If the patient with a CAS develops perioperative myocardial ischemia, the etiology is most likely stent thrombosis. As such, early PCI has been associated with improved survival in this clinical scenario.

It is likely that future CAS will be less thrombogenic. However, current CAS mandate meticulous perioperative planning and prompt intervention for thrombosis.