Case Report

Anaesthetic Management of Emergency Spine Surgery with Patient on Dual Antiplatelet Agents

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Abstract

Antiplatelet therapy plays an important role in the management of coronary artery disease (CAD) patients, which include the spectrum of patients with stents *in situ* and those suffering from acute coronary syndrome (ACS) on medical management. The percentage of patients with stents *in situ*, scheduled for surgery within 2 years, is approximately 5–15%. The antiplatelet therapy predisposes patients to an increased risk of bleeding in the perioperative region, which can lead to fatal outcomes in spinal or intracranial surgeries; the problem multiplies manifolds if the surgery has to be performed in an emergency situation. We report a case of a 76-year-old lady, a known case of CAD with drug eluting stent *in situ*, on dual antiplatelet agents who had presented to our hospital with progressive weakness of lower limbs and had to be operated on the spine in emergency situation.

Keywords: Drug-eluting stents, platelet aggregation inhibitors, neurosurgical procedure, thromboelastography, thrombosis

Introduction

Coronary artery stent implantation, using bare metal stents (BMS) or drug eluting stents (DES) has become a major management technique for revascularization in patients of coronary artery disease (CAD).[1,2] However, one of the most dreaded and clinically devastating complications after coronary stenting is stent thrombosis, which predisposes to myocardial infarction (MI) and increases incidence of major adverse cardiac events (MACE). Thus, patients with coronary stents are prescribed dual antiplatelet agents to reduce the incidence of thrombotic complications. With dual antiplatelet therapy after stent placement for approximately 4–6 weeks, acute thrombosis incidence is reduced to less than 1%, as opposed to a 3.8–7.1% risk without dual antiplatelet agents in patients having bare metal stents *in situ*.[3,4]

It is estimated that approximately 5–15% of patients with coronary stent implantation undergo a surgical procedure within 2 years.[3,4] Perioperatively, dual antiplatelet therapy administration can result in increased bleeding and requirement of blood transfusion. Prior to elective surgeries, discontinuation of antiplatelet agents minimizes the incidence of bleeding and transfusions, however, it also increases the risk for acute coronary syndrome (ACS) 2–3 folds with increase in mortality due to MACE. Striking a fine balance between ischemic and bleeding risk remains a challenge in these patients.[5,6]

The duration of dual antiplatelet therapy post percutaneous coronary intervention (PCI) depends on whether the PCI was balloon angioplasty, a BMS, or a DES. For scheduling elective noncardiac surgery few things need to be considered – the timing of coronary angioplasty and coronary stent implanted to avoid nonessential disruption of the dual antiplatelet therapy post-PCI.[6,7]

Antiplatelet therapy is generally discontinued for intracranial surgery, spine surgery, prostatectomy, or any of those surgical procedures where the risk of stent thrombosis or ACS resulting from discontinuation of both aspirin and thienopyridine is considered less than the risk of surgical bleeding and its catastrophic consequences by surgical and cardiology services.[8]

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Access this article online

Quick Response Code:

Website: www.karnatakaanaesthj.org

DOI: 10.4103/kaj.kaj_44_16

How to cite this article: Bhatnagar V, Dwivedi D, Jinjil K, Chakraborty S. Anaesthetic management of emergency spine surgery with patient on dual antiplatelet agents. Karnataka Anaesth J 2016;2:99-101.

The challenge arises when a patient with DES *in situ*, on dual antiplatelet therapy presents for an emergency spine surgery. We report a case of a 76-year-old lady, a known case of CAD with DES *in situ*, on dual antiplatelet agents who presented for emergency spine surgery for decompression of Pott's spine owing to sudden deterioration in the motor power in both the lower limbs. The surgery was done to prevent irreversible damage to the spinal cord due to the pressure effects of the space occupying lesion.

Case Report

A 76-year-old lady, a known case of hypertension and CAD for past 6 years, with two DES (in left anterior dominating artery and right coronary artery) *in situ* presented to our hospital with low backache and weakness in both lower limbs (Grade 4/5) and was diagnosed as a case of Pott's spine (D12). Patient was on antihypertensive medication as well as dual antiplatelet agents (aspirin and clopidogrel). Anti-tubercular therapy (ATT) was initiated, however after 5 days of admission, patient deteriorated (power in lower limbs decreased to 3/5). She was taken up for emergency decompression surgery for Pott's spine at D12 level with pedicle screw fixation.

Pre-anaesthestic evaluation revealed Q waves in chest leads V1–V4, along with global T wave inversion in electrocardiogram (ECG) and mild LV dysfunction with ejection fraction 45% on an emergency two-dimensional echocardiography. Rest of the investigations were within normal limits (WNL). Patient was accepted in American Society of Anesthesiologists grading (ASA-IIIE) with a high risk for cardiac events and informed consent was taken.

The patient was induced with fentanyl 100 μg, thiopentone 100 mg, and vecuronium 5 mg intravenously (iv). Patient was intubated orally with cuffed ETT (7.5 mm ID), and anaesthesia maintained with 50% mixture of oxygen and air and sevoflurane in minimum alveolar concentration (MAC) of 0.5. Monitoring performed were pulse oximetry (SpO_2), arterial blood pressure (ABP), heart rate (HR), ECG, endtidal carbon dioxide ($etCO_2$), hourly urine output, and temperature. A noradrenalin infusion was required – 0.05 μg per kg per minute to maintain haemodynamics intraoperatively. A total of 2000 ml of crystalloids were infused intraoperatively. Total urine output was 700 ml. Maximum allowable blood loss estimated was 800 ml. Bleeding intraoperatively was 1000 ml. RDP 8 units, FFP 2 units and PRBC 1 unit were transfused intraoperatively after completion of decompression and achieving haemostasis. Patient was extubated awake and slowly noradrenalin infusion was tapered. On assessment in the evening, patient's power in the lower limbs improved to 4/5 and the volume in the drain was around 100 ml.

Discussion

PCI, such as balloon angioplasty or implantation of BMS or DES, has evolved as a major management strategy for increasing and improving the quality of life of CAD patients. PCI increases the risk of ACS due to the dreaded complication of coronary stent thrombosis and occlusion leading to acute MI and MACE. Non-endothelialisation of stent struts due to delayed healing is considered the major culprit. Platelet aggregation plays a major role in stent thrombosis. Platelets cross linking to fibrinogen are inhibited by antagonism of platelets GIIb/IIIa receptors, thus, inhibiting platelet aggregation. Dual antiplatelet therapy with administration of aspirin and a thienopyridine class agent such as clopidogrel, ticlopidine, and prasugrel administered simultaneously has been effective in reducing the incidence of thrombotic complications and is routinely prescribed to the patients with stents *in situ*. Hence, most of the patients, with stents *in situ*, are on chronic antiplatelet therapy. Antiplatelet agents such as aspirin, clopidogrel, ticlopidine, and prasugrel, regardless of their half-lives, irreversibly inhibit platelet function, thus requiring 7–10 days for an entire platelet pool to be replaced. There is qualitative compromise in functioning of platelets.[9]

When patients on dual antiplatelet agents are to undergo surgery in closed spaces such as the spine, intracranial compartment, posterior chamber of eye, in emergent situations, as was in our case, the challenge to surgeon and anesthesiologist is to combat excessive bleeding intraoperatively and try and prevent postoperative bleeding, leading towards fatal outcomes.[8,10] The thromboelastography (TEG) platelet-mapping assay may be utilized for platelet function assay, however, it has been found to have a high negative predictive value. The maximum amplitude (MA) of conventional TEG is not sensitive enough to detect the presence of thienopyridines or salicylates, and can depict normal values despite adequate platelet inhibition by the drugs.[11] Various other coagulation parameters such as prothrombin time, activated partial thromboplastin time, and platelet number do not show any abnormality in this subgroup of patients owing to the administration of antiplatelet agents.

We tightly monitored our patient for haemodynamics and blood loss, and had blood and blood products ready before starting the case. We maintained haemodynamics and combated bleeding during the surgical decompression with intravenous fluids and vasopressor infusion. As soon as the decompression of the thoracic spine was completed, we started transfusing blood, initially RDP and then FFP followed by PRBC to help maintain haemostasis and tide over the crisis created by qualitative compromise of the platelets. The patient was under close observation in the postoperative period for any signs of surgical site bleeding. The surgical team was also well prepared to evacuate any haematoma forming due to qualitatively dysfunctional platelets postoperatively.

Conclusion

The optimal management of CAD patients with stents *in situ* in the perioperative setting remains unclear, especially in emergency situations. Best practice suggests that the risks should be jointly assessed by the neurosurgeon, anesthesiologist, and cardiologist. Patients with stents at high

risk of thrombosis on antiplatelet agents should have surgery delayed if possible. There is a role of bridging therapy with perioperative administration of tirofiban, however, larger studies are required to assess the role. In elective intracranial and spinal surgeries, it is advisable to stop antiplatelet agents preoperatively. In situations where cessation of antiplatelet agents is not possible, the risk of excessive bleeding, transfusions intraoperatively, and increased risk of hematoma formation in closed spinal canal or intracranial compartment should be specified during the informed consent. Availability of adequate blood and blood products should be ensured with an attempt to transfuse platelets after the surgical decompression is completed to improve the qualitative function of the platelets. Successful management of this case is to highlight the importance of vigilant monitoring and transfusion of correct blood products at the correct time.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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