



CASE REPORT

Perioperative Cardiac Stent Thrombosis Versus Bleeding: A Clinical Dilemma in Trauma Patients

Nwokolo Omoniele O* and Wegner Robert C

Department of Anesthesiology, McGovern Medical School Houston-Texas, USA



*Corresponding author: Omoniele Nwokolo, Department of Anesthesiology, 6431 Fannin Street Houston, TX 77030, McGovern Medical School Houston-Texas, USA, Tel: 713-566-5994, E-mail: Omoniele.O.Nwokolo@uth.tmc.edu

Abstract

Heart disease is prevalent in current patient population at an increasing level. Some of these patients have had interventions such as stent placements to improve quality of life and are started on antiplatelet therapy for a definite period of time or indefinitely based on their risk factors, comorbidities or type of stents placed. When these patients present to the hospital with major trauma, the surgical and anesthetic management threads a delicate line between protection of the stents and preventing life-threatening bleeding. We present a 66-year-old patient on dual antiplatelet therapy (DAPT) admitted for femur fracture with arterial injury after an auto-pedestrian collision. He was in hemorrhagic shock. A decision was made to stop his DAPT and taken to the operating room for intramedullary nailing of the left femur the next day. He tolerated the procedure with one episode of intraoperative hypotension responsive to vasoactive agents. He received four units of packed red blood cells (PRBCs) and two units of fresh frozen plasma (FFP) but suffered a perioperative Non-ST segment elevation myocardial infarction (NSTEMI). He was taken to cardiac catheterization lab the next day and revascularized. This was a high-risk patient with significant bleeding from the accident potentially justifying the need to stop the DAPT; however, this action may have contributed to his myocardial infarction. Other considerations include a preoperative/posttrauma MI that was not diagnosed prior to surgery.

Keywords

Dual antiplatelet therapy, Drug eluting stents, Stent thrombosis, Non-ST Elevation MI, Percutaneous coronary intervention

Case Report

We present the case of a 66-year-old man who was admitted to the hospital after being struck by a car in an auto-pedestrian accident. His Injuries included a com-

minuted fracture of his left femoral shaft; with contour irregularity of his left superficial femoral and popliteal arteries. On admission, he was diagnosed with hemorrhagic shock due to acute blood loss for which he required six units of packed red blood cells and six units of fresh frozen plasma in the emergency department. He was scheduled for intramedullary nailing of the left femur the next day.

His past medical history included essential hypertension, coronary artery disease status post percutaneous coronary intervention with drug eluting stents in left anterior descending and circumflex coronary arteries three months prior to presentation on Aspirin and Clopidogrel. He also had rheumatoid arthritis, osteoarthritis, irritable bowel syndrome, gastroesophageal reflux disease, hypothyroidism, and anxiety disorder. The trauma team elected to discontinue his Plavix in the emergency room due to the hemorrhage with note to "restart in a day or so due to DES" (drug eluting stents). Patient was hemodynamically stable after resuscitation and overnight in the intensive care unit.

The following day, the patient arrived in the operating room from the intensive care unit with a right radial arterial line in place. Patient was awake, alert and oriented. He had a c-collar in place with limited mouth opening and mallampati class three. He was anxious about the possibility of an amputation. We had an in-depth conversation about his risk factors for the procedure and agreed to proceed with the case. The patient was premedicated with Midazolam 2 mg and induced with the following medications: Fentanyl 150 mcg, Lido-

caine 100 mg, Propofol 50 mg and Rocuronium 50 mg. He was easy to mask ventilate, and subsequently intubated with an 8.0 mm endotracheal tube using a McGrath video laryngoscope. The case proceeded; the patient remained hemodynamically stable on 0.7 MAC of Desflurane. There was one episode of hypotension after a bolus of Fentanyl 150 mcg. He responded to norepinephrine 0.5 mcg. An arterial blood gas results showed hematocrit of 18%. He was then transfused with a total of four units of packed red blood cells and two units of fresh frozen plasma with improvement in hemodynamics. The orthopedic surgeon achieved hemostasis and repeat labs showed a hematocrit of 27%. The case was completed and the patient was successfully extubated after meeting standard extubation criteria. He was given morphine 5 mg intravenously for post op pain control. He was transferred to Post Anesthesia Care Unit (PACU) in stable condition. On arrival to PACU, the patient was hypertensive with systolic blood pressures in the 150s. PACU orders included intravenous labetalol 5 mg as needed for hypertension.

After approximately one hour in PACU, the anesthesia team was called to evaluate the patient for somnolence. On arrival, patient was unresponsive. Vital signs showed systolic blood pressures in 110s, EKG showed sinus rhythm, 100% oxygen saturation. His pupils were equal, approximately 3 mm and reactive. A blood gas was sent with the following results: pH < 6.95; PaCO₂ > 115; PaO₂ 199; HCO₃ unknown; Base Excess unknown; O₂ saturation unknown; Glucose 164; Lactic Acid 2.1; Hematocrit 29. An oral airway was placed and patient was hyperventilated with bag-valve mask. Approximately one minute later, patient had spontaneous eye opening and started following commands. A repeat arterial blood gas at two minutes showed pH 7.29; PCO₂ 58; PaO₂ 416; HCO₃ 28; Base Excess 1; O₂ saturation 100%; Glucose 194; Lactic Acid 1.8; Hematocrit 29. More lab studies were sent including cardiac enzymes. He was monitored for another thirty minutes; he denied chest pain and then discharged to intensive care unit.

While in intensive care unit, the results of the cardiac enzymes showed an elevation in values. Patient again denied chest pain and had no EKG changes. Cardiology was consulted and patient was taken to cardiac catheterization lab the next day. They found a 95% stenosis just before the previously placed stent in the first obtuse marginal and another drug eluting stent was placed successfully. Cardiology noted to continue Clopidogrel and Aspirin indefinitely and under no circumstances stop for at least one year. He was taken back to the operating room the next day and three days later for irrigation and debridement under regional anesthesia and one week later for irrigation, debridement and skin graft under general anesthesia. The patient tolerated the rest of the anesthetics and was discharged fourteen days after admission.

Discussion

Drug-eluting stents (DES) were approved in the United States in 2004 and has now become the preferred revascularization method over bare metal stents (BMS) [1]. A review of the literature shows that non-cardiac surgery performed in patients with recent coronary artery stenting exposes them to an increased risk of major cardiac events in the perioperative period. This is particularly true with premature interruption of dual antiplatelet therapy (DAPT) [2]. It is ideal to delay elective non-cardiac surgery in these patient population in order for the stents to endothelialize. The length of this delay has been the topic of multiple studies, guidelines and difficult discussions amongst perioperative physicians and cardiologists. The type of stents placed is important when recommending the ideal wait period. Historically, the recommendation to patients with DES undergoing non-cardiac surgery was to delay elective surgery until completion of one year of DAPT [3]. However, with the newer generation of DES which are associated with a lower risk of thrombosis [4]; several recent publications have suggested a shorter wait time to interruption of DAPT [5-7] with some suggesting interruption as quickly as one month if necessary [8]. These new guidelines allow for interruption of DAPT after three months for emergent surgeries [9]. The recommendations for patients with BMS has been updated from a delay of four to six weeks from stent placement 3 to 30 days although optimal delay remains 6 months if possible [10,11]. In the event of an emergency surgery with a high bleeding risk necessitating interruption of DAPT, it is recommended that clopidogrel should be restarted with a loading dose of 300 or 600 mg (in higher risk patients) as soon as possible after surgery if postoperative bleeding has stopped [12,13]. The surgical procedure should ideally be performed in centers with 24-hour interventional cardiology coverage [14]. While platelet transfusion may be necessary for excessive bleeding after surgery, the role of prophylactic platelet transfusion has not been well studied. In very high-risk situations, i.e. first weeks after stent implantation presenting for emergent surgery, there are some studies that suggest bridging the patient from clopidogrel to a reversible antiplatelet agent with a short half-life (e.g. the i.v. GP IIb/IIIa inhibitors tirofiban or eptifibatid) and stopping the infusion four hours before surgery, however, the clinical efficacy has not been established [12,13,15,16]. The substitution of DAPT with low molecular weight heparin (LMWH) or unfractionated heparin (UFH) has not been shown to be effective [15]. In surgical procedures with a low or moderate risk of bleeding, the surgeons should be encouraged to operate while maintaining DAPT [17]. The treating physician may also consider performing platelet function testing or genetic testing in specific high-risk situations (history of stent thrombosis; compliance issue; suspicion of resistance; high bleeding risk) to evaluate the effectiveness of the treatment.

This patient was a high-risk patient who had significant bleeding from the accident therefore the need to stop the DAPT could be justified. Based on the newest class IIb recommendations, he was within the appropriate range at three months post PCI presenting for emergency non-cardiac surgery to have cessation of DAPT prior to surgery [9]. The cardiac catheterization confirmed a new stenosis beyond the previously placed stent, hence the decision to stop the DAPT may not have been the cause of the NSTEMI. Other considerations in this case include the hypotensive episode in a high-risk patient highlighting the importance of hemodynamic stability in these patient population; and a preoperative or post trauma myocardial infarction undiagnosed prior to surgery. The finding of this NSTEMI was almost incidental because the patient's only presenting symptom was postop hypercarbia which resolved quickly after assisting his ventilation. The decision to check cardiac enzymes was due to his prior history but proved to be significant in this case.

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