Postoperative myocardial infarction following endoscopic sinus surgery in the absence of significant risk factors: a case report

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ABSTRACT

Background: Postoperative myocardial infarction (PMI) is a serious complication that could occur following any cardiac or noncardiac surgery. The likelihood of developing this complication is low in patients not fulfilling any of the revised cardiac risk index (RCRI) criteria. We report a case of PMI following elective noncardiac and nonvascular surgery in a patient not fulfilling any of the RCRI criteria.

Case Presentation: A 61-year-old male who had no chronic illnesses underwent elective endoscopic sinus surgery and septorhinoplasty. His preoperative assessment was unremarkable. Upon emergence from anesthesia, electrocardiogram changes were noted in the form of ST-elevations. This, along with the elevated troponin levels, indicated myocardial infarction (MI). The patient was treated with oxygen therapy, aspirin, nitroglycerin, morphine and then was shifted to the catheterization laboratory for coronary angiography and coronary artery catheterization.

Conclusion: PMI can occur in seemingly healthy patients undergoing low-risk surgeries. More studies need to be conducted to evaluate preoperative screening guidelines and tests to predict this devastating complication better. More studies should also be performed to assess the RCRI’s criteria and accuracy in risk estimation.

Keywords: Postoperative, myocardial infarction, noncardiac surgery, ischemic heart disease.

Introduction

The most prevalent cardiovascular event following noncardiac surgery is myocardial infarction (MI) [1]. MI is caused by an oxygen supply-demand mismatch to a myocardial section leading to myocardial cell necrosis [2,3]. The worldwide prevalence of myocardial injury after noncardiac surgery (MINS) was estimated to be around 8% [4]. The revised cardiac risk index (RCRI) was proposed as a scoring system to estimate the risk of MINS [5]. We report a case of postoperative MI (PMI) in a patient who does not have any of the risk factors established in the RCRI.

Case Presentation

A 61-year-old male, American society of Anesthesia class II and not known to have any chronic illnesses, was booked for bilateral endoscopic sinus surgery and functional septorhinoplasty with conchal cartilage graft. His body mass index was 26.8 kg/m² with good functional capacity and a metabolic equivalent score of more than four. He claimed to smoke two to three cigarettes a day. Preoperatively, hemoglobin was 16.1 g/dl, blood urea nitrogen was 4 mg/dl, creatinine was 0.97 mg/dl, prothrombin time was 11.2 seconds, and partial thromboplastin time was 25.2 seconds. His blood pressure (BP) and heart rate (HR) preoperatively were 136/66 mmHg and 66 beats per minute (bpm), respectively. General anesthesia was induced with

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Propofol 250 + 50 mg and remifentanil 0.1 + 0.05 mcg without a muscle relaxant and was maintained with 0.8 mac sevoflurane and remifentanil target-controlled infusion. After induction, phenylephrine 0.1 mg/ml 0.15 mg was used to treat an episode of hypotension that lasted for 1 minute where the BP dropped to 80/45. Infiltration using lidocaine with 1:100,000 adrenaline over the nasal tip was performed. Intraoperatively, the patient had a sinus rhythm with a HR of 45 to 50 bpm, and his BP did not increase nor decrease beyond 20% of his baseline. 30 minutes before extubation, tramadol 50 mg was administered. The surgery lasted for 7 hours and was free of complications. Upon emergence, electrocardiogram (ECG) changes were observed in the cardiac monitor, and the patient complained of mild heartburn. At the recovery room, 5-lead ECG showed ST-segment elevations in lead II (Figure 1). BP was 208/105 mmHg, and HR was 76 bpm. The patient was immediately started on oxygen therapy, nitroglycerin infusion at 0.25 mcg/kg/minute, 7 mg of morphine, and 325 mg of aspirin. 12-lead ECG was done (Figure 2). Serum troponin I and lipid profile were ordered. The high sensitivity troponin I test result was 5.768 ng/ml, and the lipid profile was unremarkable except for a low-density lipoprotein level of 114 mg/dl. Coronary angiography revealed nonobstructive disease in the right coronary artery and the circumflex artery and 80% stenosis of the left anterior descending artery (LAD). Echocardiography revealed a left ventricular ejection fraction of about 50%. LAD artery angioplasty with stent placement was performed. Afterward, the patient was admitted to the coronary care unit for one day and then was shifted to the regular ward for a week. His hospital stay was uneventful.

Discussion

The largest, international, prospective study investigating MINS is the Vascular Events in Noncardiac Surgery Patients Cohort Evaluation (VISION) Study. Its authors defined MINS as myocardial injury caused by ischemia that occurs during or within 30 days after surgery [4]. Myocardial injury is defined as an elevated cardiac troponin value above the 99th percentile upper reference limit [3]. The VISION study concluded that

![Figure 1. 5-lead ECG showing ST-segment elevation in lead II.](image1)

![Figure 2. 12-lead ECG showing ST-segment elevations in leads II, V2, V3, V4, and V5.](image2)
myocardial injury is considered prognostically relevant when the troponin T value is 0.03 ng/ml or greater [4]. The VISION study investigators used troponin T for their criteria of MINS, and therefore it is worth noting that only troponin I was ordered for our patient. The troponin I level of 5.768 ng/ml, along with the ST-segment elevations, indicates MINS [3,4]. The RCRI consists of six independent predictors, or risk factors, of MINS. These risk factors are high-risk surgeries, history of ischemic heart disease, heart failure, history of cerebrovascular disease, diabetes mellitus requiring insulin treatment, and preoperative serum creatinine > 2.0 mg/dl [5]. Our patient did not have any previously mentioned risk factors, and the preoperative assessment was unremarkable. The risk of MINS in patients who score zero in the RCRI was estimated to be 0.4% in the original study [5].

The use of the RCRI to predict PMI following noncardiac surgery is controversial. More recent studies reveal that the risk estimation in the original study by Lee et al. [5] may be underestimated [6,7,8]. Nonetheless, the Canadian Cardiovascular Society (CCS) recommends using the RCRI over other risk indices [6]. Furthermore, the CCS guidelines regarding elective noncardiac surgery recommend preoperatively measuring only serum brain natriuretic peptide and/or N-terminal pro BNP levels if the patient’s age is ≥ 65 years, RCRI score is ≥ 1, or the patient’s age is 45-64 years with significant cardiovascular disease. The RCRI reveals that our patient was at low risk for MINS. If the CCS guidelines were followed, no additional preoperative testing would have been recommended for postoperative monitoring. Furthermore, no preoperative testing for coronary artery disease was recommended for our patient by the American College of Cardiology/American Heart Association’s (ACC/AHA) stepwise approach to perioperative cardiac assessment [9]. Following the CCS and ACC/AHA guidelines would not have prevented nor predicted the MI that our patient suffered from. Could this event have been better predicted and potentially prevented? We believe that more studies with a superior design should be conducted on this topic to determine cost-effective methods to better predict MINS in patients above the age of 60 years undergoing low-risk surgeries.

Conclusion

MI is the most prevalent cardiovascular event following noncardiac surgery. Considering that it can occur postoperatively in low-risk noncardiac surgery patients do not have risk factors established in the RCRI, studies with superior designs should be conducted to evaluate preoperative screening guidelines and tests that can predict this event more accurately in a cost-effective manner. Patients above the age of 60 may also require close postoperative monitoring following any surgery.

List of Abbreviations

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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACC/AHA</td>
<td>American College of Cardiology/American Heart Association</td>
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<td>BP</td>
<td>Blood pressure</td>
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<td>Bpm</td>
<td>Beats per minute</td>
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<td>ECG</td>
<td>Electrocardiogram</td>
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<td>HR</td>
<td>Heart rate</td>
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<td>LAD</td>
<td>Left anterior descending artery</td>
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<td>MI</td>
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<td>MINS</td>
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<td>PMI</td>
<td>Postoperative myocardial infarction</td>
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<td>RCRI</td>
<td>Revised cardiac risk index</td>
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<td>VISION</td>
<td>Vascular events in noncardiac surgery patients cohort evaluation</td>
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Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent for publication

Written informed consent was obtained from the patient.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

Author details

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