Enliven Archive
Intensifying Thoughts

Case Report www.enlivenarchive.org Enliven: Journal of Anesthesiology and Critical Care Medicine

ISSN:2374-4448

Postoperative Myocardial Infarction following Noncardiac Surgery; A Case Report

Sule Ozbilgin MD[1*], Belkis Sasmaz MD[1], Gunes Eskidemir MD[2], Volkan Hanci MD[1], Sevda Ozkardesler MD[1], and Bahar Kuvaki MD[1]

[1]*Dokuz Eylül University, School of Medicine, Department of Anesthesiology and Reanimation, Izmir, Turkey*

[2]*Erzurum State of Hospital, Erzurum, Turkey*

[*]**Corresponding author**: Sule Ozbilgin MD, Dokuz Eylül University, Tip Fakültesi, Dokuz Eylül University, Hastanesi, Poliklinikler binasi 3. Kat, Narlıdere, İzmir, Turkey, Tel: +90 505 525 29 01, +90.232.412.28.01; E-mail: sule.ozbilgin@deu.edu.tr

Received Date: 07th April 2015
Accepted Date: 13th May 2015
Published Date: 16th May 2015

Citation: Ozbilgin S, Sasmaz B, Eskidemir G, Hanci V, Ozkardesler S, et al. (2015) Postoperative Myocardial Infarction following Noncardiac Surgery; A Case Report. Enliven: J Anesthesiol Crit Care Med 2(6): 017.

For reprints: Bahar Kuvaki MD, Dokuz Eylül University, Tip Fakültesi, Dokuz Eylül University, Hastanesi, Ameliyathane, Kat: 1, Narlidere, İzmir, Turkey, Tel: +90 532 590 86 60, +90 232 412 28 36; E-mail: bkuvaki@deu.edu.tr

Abstract

Postoperative myocardial infarction (PMI) is associated with mortality and morbidity in patients undergoing cardiac or noncardiac surgery. In this case report a patient with PMI and cardiac arrest with successful outcome is presented. Aspirin should not be routinely discontinued for elective noncardiac surgery, and the risks of stopping aspirin should be evaluated more seriously. Cardiac arrest in the postoperative care unit (PACU) may have better prognosis because diagnosis and apropriate cardiopulmonary resuscitation (CPR) can be performed immediately.

Keywords: Postoperative; Myocardial infarction; Cardiopulmonary resuscitation; Noncardiac surgery

Introduction

Postoperative myocardial infarction (PMI) is associated with mortality and morbidity in patients undergoing cardiac or noncardiac surgery. Factors that cause PMI may be different in these two groups of patients [1-3]. Most risk factors of PMI have been defined and may be helpful for early diagnosis in high risk patients. Cardiovascular assessment of the patient must be evaluated in general health frame. Accompanying pulmonary diseases, diabetes mellitus, renal failure and hematological problems frequently increase risk of anesthetic management and cardiac complications [4]. Myocardial Infarction (MI) significantly increases mortality and morbidity in pre, intra and postoperative period. Myocardial Infarction which occurred especially within 6 months preoperatively before the operation increases the risk in patients, and perioperative infarction rate is reported to be 5-86%; the morbidity rate is reported to be 23-86 % [3,5,6]. In patients at risk, platelet inhibition with aspirin is associated with a reduced cardiovascular mortality by 15% and reduced rate of nonfatal cardiovascular events by 30% [5]. Complete irreversible inhibition of platelet thromboxane A2 formation has been observed with doses as low as 100 mg, whereas inhibition of cyclooxygenase-2 to induce analgesic and anti inflammatory effects requires much higher doses and shorter dosing intervals.

In the postoperative period, symptoms of MI may start suddenly and seriously. In this case report a patient with sudden onset unconsciousness and ventricular tachycardia followed by ventricular fibrillation and the management with successful outcome is evaluated. The possible cause of MI due to cessation of aspirin is discussed.

Case Report

A 66 year–old, male patient (85 kg, 171 cm) was scheduled for complementary thyroidectomy. He had subtotal thyroidectomy 48 years ago. The patient's medical history revealed hypertension and coronary artery disease. He suffered myocardial infarction, which led to angioplasty in the right coronary artery (RCA) 7 years earlier. He had his second myocardial infarction, which needed Percutaneous Coronary Intervention (PCI) of the circumflex artery 2 years earlier. Home medications are as follows: Metoprolol (50 mg for 2 years), perindopril+indapamid (5 mg/1.25 mg for 7 years), and aspirin (100 mg for 7 years). However, the patient's operation was postponed for one month due to herpes labialis infection and the patient didn't take aspirin during that month.

Preoperative physical examination and ECG was normal. Preoperative chest X-ray and laboratory findings were within normal limits. His ASA physical status was 2. He was premedicated with 1 mg midazolam intravenously (IV) and his baseline vital signs were blood pressure of 135/85 mmHg; pulse of 58 beats per minute; and SpO_2 98%. Induction of general anesthesia and endotracheal intubation was uneventful with a bolus of 2% lidocaine100 mg, tiopentone sodium 350 mg, rocuronium 40 mg and a remifentanil infusion of 0,1-0,3 µg/kg/min. Anesthesia was maintained with 50% oxygen-air mixture, sevoflurane of 1-2% concentration and remifentanil infusion. Vital sings were maintained within 20% of the patient's baseline values throughout the case.

One hundred minutes after initiation of the surgery, the patient was reintubated with a neurostimulatory endotracheal tube without complication because of difficulty of the surgical procedure and by request of the surgeon. Blood pressure increased to 150/85 mmHg during reintubation. In the second hour of surgery 'Partial Sternotomy' was started and we decided to switch to invasive blood pressure monitoring. After the beginning of Sternotomy the arterial blood gas values were pH: 7.41, CO_2: 34, O_2:150 Sat: 99% and Hb was 13.4 g dL^{-1}. Control value after 1 hour Hb was 12.3 g dL^{-1}. Acid-base status and electrolytes were normal. Totally 2500 ml crystalloid and 500 ml colloid was given. About 500 ml haemorrhage was estimated and no blood was given. Except from the light increase in blood pressure during endotracheal tube exchange the patient had a hemodynamically stable profile during the whole procedure.

By the end of the 4.5 hour surgery, paracetamol 1 g, piroxicam 20 mg, and dexamethasone 8 mg were administered for postoperative pain and inflamation. Extubation was uneventful and the patient was transferred to the Postoperative Care Unit (PACU) with a VAS score of <4.

One hour after his arrival at PACU, the patient suddenly became unconscious and had an abnormal breathing. At that time his blood pressure was 80/50 mmHg and the ECG showed ventricular tachycardia with a palpable pulse. He was intubated promptly while defibrillator was being prepared for cardioversion.

Upon observing VT with a palpable pulse; initially 150 joule and then 200 joule and in total cardioversion was performed three times. 300 mg amiodaron was given as IV bolus. CPR was initiated immediately due to pulselessness and VF. After 2 minutes of CPR, spontaneus circulation returned and a 12 derivation ECG showed anterior ST elevation. Because of increased hemorrhagic drainage fluid in thorax tubes, his ABG was checked and it showed Hb 7.2 g/dL. Two units of erythrocyte suspension were transfused to the patient. 10 µ/kg/h dopamine and 20 µ/kg/h dobutamine infusion was begun to the patient whose blood pressure was 65/40 mmHg. His blood pressure increased to 90/50 mmHg. Amiodaron 900 mg/24 h infusion was begun. Due to another VF in 30 minutes, was defibrillated with 200 joule. CPR was performed for 6 minutes in total. (2 mg adrenalin was given via IV). His rhythm was sinus again. His ECG showed ST elevation in V_1-V_6. Cardiology consultation was made and and PCI was not found necessary.

After then, the patient was transferred to Anesthesiology Intensive Care Unit. His Glasgow Score was E1M5VE, pupils were isochoric, light reflexes were bilaterally positive IR+/+. One hour later, another VF occurred and the patient was defibrillated with 200 joules which led to SR.

Performing PCI decision was taken with anterior MI diagnosis. His Patient's LAD proximal was 80% occluded and PCI was performed. Then, intra-aortic balloon pump (IABP) was inserted for mechanical circulation support. In the patient's left apex, hematoma was observed via USG and it was resolved by a thorax tube. On the third day, IABP was taken out. Antibiotic treatment was begun upon pneumonia diagnosis. Five days after the operation he was extubated. Until this time he was sedated. On the 8th day he was conscious, cooperative with good respiratory pattern and was hemodynamically stable. He was transferred to the general surgery clinic. The case was discharged without any neurologic deficit on his 18th day in the hospital.

We have obtained informed consent for this case report.

Discussion

Every year about 8 million patients undergo non-cardiac surgery [7]. It is known that 50 000 of these patients have PMI. Patients with PMI, 20 000 are fatal [7]. Certain diseases are well known to have increased risk of PMI [5,10]. Pulmonary diseases, diabetes mellitus (DM), renal disorders and hematologic disorders are the most common [2]. Hypoxemia, hypercapnia, acidosis and increased respiratory work can even increase.

Myocardial ischemia is typically symptomatic but may also be silent. These patients with silent myocardial ischemia or with coronary disease, are taken for anesthesia without knowing their predisposition for ischemia [8,9]. Middle-aged males have a silent ischemia rate of 2-4% and 70% patients

with stable angina may have silent ischemic episodes [8,9]. There may be no evidence for the anesthetist to suspect coronary artery disease in these patients. During anesthesia, patients with silent ischemia may have repeated and prolonged ischemic episodes leading to MI causing intraoperative or postoperative death.

The American College of Cardiology/American Heart Association Task Force report separated the clinical signs of high cardiovascular risk into major, moderate and minor predictors. Major predictors require intensive treatment and at an appropriate time coronary angiography should be performed. This report described previous history of MI as a moderate predictor. Our patient had previous history of MI and advanced age, so had moderate and minor predictors. Moderate predictors are indicators of high risk and require careful preoperative evaluation [10,11]. If there is previous MI, and the next surgical intervention is to be completed within a short time, such as less than 6 months, the perioperative reinfarctus rate is 5-86% (1.5-10 times greater than for those with operations after more than 6 months) and morbidity rates are reported as 23-86%. For those who had initial infarctus perioperatively, the reinfarctus rate is increased. In the first 3 months it is 37%, from 3-6 months it is 16% and it falls to 6% after 6 months. Patients with recent history of unstable angina should definitely have cardiac specific troponin, creatine kinase, lactate dehydrogenase levels, serum digoxin or other anti-arrhythmic levels, electrolyte levels, hemogram and coagulation level, EKG, and chest X-ray evaluated preoperatively. In addition to determine preoperative risk and requirements for coronary angiography, some tests such as holter monitoring, effort electrocardiography, myocardial perfusion imaging and echocardiography should be performed and it is important that results are carefully evaluated [4].

It is possible that ischemic attacks in patients without specialized monitoring for ischemia may go unnoticed. Myocardial ischemia, while it may cause many hemodynamic changes in patients with coronary lesions, it may also, without hemodynamic changes, cause ischemic episodes in spite of good control of blood pressure and heart rate. While tachycardia increases myocardial oxygen consumption, it reduces myocardial oxygen supply and may cause ischemia. For this reason it is important that the heart rate of coronary artery patients be kept between normal values. Peroperative tachycardia may be caused by many factors including shallow anesthesia, endotracheal intubation, hypovolemia, hypotension, increased body temperature, anemia, congestive heart failure and postoperative pain [7]. Once the underlying reasons are identified and treated, tachycardia will resolve. If tachycardia persists, in spite of treatment of the cause, a beta blocker can be used to intervene in the heart rate [7].

Hypertension is another cause of myocardial ischemia. Many studies show that stage I or stage II hypertension is not an independent risk factor for perioperative cardiovascular complications [10,11]. However intraoperative ischemia is related to postoperative cardiac ischemia [11,12]. Monitoring of preoperative blood pressure checks may help reduce the tendency for preoperative ischemia [13-15] and in the population with diagnosed hypertension, antihypertensive medications should be continued in the perioperative period [16]. Hypertension is most frequently seen in surgical patients with an incidence of 20-25%. Preoperative evaluation should assess the etiology and degree of hypertension, efficacy of antihypertensive treatment, renal function, myocardial ischemia and peripheral vascular diseases. For patients with preoperative diastolic pressure continuously higher than 110 mmHg, elective surgery should not be performed. Medication choice and risks for Stage III hypertension should be evaluated on the basis of national guidelines. To optimize the effects of antihypertensive treatment, the potential advantages of delaying surgery should be debated in light of the risks in delaying surgery [2].

The relationships of certain patient groups and surgery-specific situations to PMI have been defined [2]. CAD patients take first place in these groups. Hypertension, heart failure, valvular heart diseases, arrhythmias and conduction disorders, implanted pacemakers and ICDs, pulmonary vascular diseases and congenital heart diseases are included in this group [2]. Non-cardiac surgical interventions are classified into high, moderate and minor categories of cardiac risk. While coronary disease is an overwhelming risk factor for perioperative morbidity, procedures with different stress levels are related to mortality and morbidity at different levels [2].

Our case was a planned operation which was postponed due to herpes labialis infection. The patient had stopped taking aspirin, before the scheduled operation, and because he was not informed otherwise he did not take aspirin during the period until the next operation date for nearly 20 days. Burger et al. [17] surveyed the literature for bleeding risk and risks of stopping low dose aspirin intake and found low dose aspirin may increase the frequency of procedural bleeding but the severity of bleeding complications or perioperative morbidity linked to bleeding complications were not increased. Intracranial surgery and prostatectomy are possible exceptions. If known bleeding risks are similar or cardiovascular risks due to stopping aspirin intake are more serious, it is recommended to continue aspirin intake [2]. Chest pain, newly starting in the peroperative period under regional and local anesthetic and in the postoperative recovery room, is of utmost importance for diagnosis of myocardial ischemia [18]. Myocardial ischemia without chest pain is also possible. DM patients with damaged pain pathways due to neuropathy may not have pain. Dyspnea may be the first sign of acute heart failure and hemodynamic instability indicating PMI [19]. At-risk patient groups without hemodynamic changes and chest pain, but with ECG changes, should alert clinicians to the possibility of PMI [44]. 10 % of MI's may not have any ECG changes [19].

Cardio pulmonary resuscitation (CPR) is the basis of initial treatment for cardiac arrest. Life after cardiac arrest is linked to the quality of CPR [20]. After resuscitation myocardial dysfunction is reversible. In myocardial ischemia management strategies include support with inotropic agents, or in many severe cases mechanic circulation support. Hemodynamic dysfunction should not affect the decision to continue treatment, as this situation is frequently reversible [9].

The importance of preoperative evaluation for early diagnosis of patients with perioperative and postoperative MI should not be forgotten. In addition accompanying diseases that may increase the patient's risk of MI and determination of physical capacity will indicate anesthetic management and monitoring to prevent peroperative MI. In the presence of any PMI risk factor in a patient MI diagnosis should be taken into consideration and

intervention should be as early as possible. For this reason evaluation before every anesthesia, should predict and prevent situations during peroperative monitoring and postoperative care that may increase the risk of development of cardiac and respiratory arrest [8]. Abstract of this case report was presented partly at the 47. TARK National Anaesthesiology Congress 2013, 26-30 October, Antalya, Turkey.

Informed Consent

Written informed consent was obtained from patient who participated in this case.

Financial Disclosure

The authors declared that this study has received no financial support.

References

1. Ashton CM, Petersen NJ, Wray NP, Kiefe CI, Dunn JK, et al. (1993) The incidence of perioperative myocardial infarction in men undergoing noncardiac surgery. Ann Intern Med 118: 504-510.
2. Fleisher LA, Beckman JA, Brown KA, Calkins H, Chaikof E, et al. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: Executive summary: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). Anesth Analg 106: 685-712.
3. Rao TLK, Jacobs KH, El-Etr AA (1983) Reinfarction following anesthesia in patients with myocardial infarction. Anesthesiology 59: 499-505.
4. Ozbilgin S, Hanci V (2014) Noncardiac features in cardiac patients anesthesia during surgical procedures. Anesthesiology mental notes, Sun Medical Bookstore Ankara 335-370.
5. Patrono C, Coller B, FitzGerald GA, Hirsh J, Roth G (2004) Platelet-active drugs: the relationships among dose, effectiveness, and side effects: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest 126: 234S-264S.
6. Stanley GD, Rengasamy SK (2010) Postoperative Myocardial Infarction. JM O'Donnell and FE Nácul (eds) Surgical Intensive Care Medicine 20: 199-205.
7. Mangano DT (1990) Perioperative cardiac morbidity. Anesthesiology 72: 153-184.
8. Hill RF, Kates RA, Davis D, Reves JG (1988) Anesthetic implications for the management of patients with acute myocardial infarction: a matched cohort study of patients undergoing emergency myocardial revascularization. J Cardiothorac Anesth 2: 23-29.
9. Warltier DC, Pagel PS, Kersten JR (2000) Approaches to the prevention of perioperative myocardial ischemia. Anesthesiology 92: 253-259.
10. Bougouin W, Cariou A (2013) Management of postcardiac arrest myocardial dysfunction. Curr Opin Crit Care 19: 195-201.
11. Detsky AS, Abrams HB, Forbath N, Scott JG, Hilliard JR (1986) Cardiac assessment for patients undergoing noncardiac surgery: a multifactorial clinical risk index. Arch Intern Med 146: 2131-2134.
12. Slogoff S, Keats AS (1985) Does perioperative myocardial ischemia lead to postoperative myocardial infarction? Anesthesiology 62: 107-114.
13. Stone JG, Foex P, Sear JW, Johnson LL, Khambatta HJ, et al. (1988) Risk of myocardial ischemia during anaesthesia in treated and untreated hypertensive patients. Br J Anaesth 61: 675-679.
14. Magnusson J, Thulin T, Werner O, Jarhult J, Thomson D (1986) Haemodynamic effects of pretreatment with metoprolol in hypertensive patients undergoing surgery. Br J Anaesth 58: 251-260.
15. Goldman L, Caldera DL (1979) Risks of general anesthesia and elective operation in the hypertensive patient. Anesthesiology 50: 285-292.
16. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, et al. (2003) The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA 289: 2560-2572.
17. Burger W, Chemnitius JM, Kneissl GD, Rucker G (2005) Low-dose aspirin for secondary cardiovascular prevention: cardiovascular risks after its perioperative withdrawal versus bleeding risks with its continuation: review and meta-analysis. J Intern Med 257: 399-414.
18. Charlson ME, MacKenzie CR, Ales KL, Gold JP, Fairclough GF Jr, et al. (1989) The post-operative electrocardiogram and creatine kinase: implications for diagnosis of myocardial infarction after non-cardiac surgery. J Clin Epidemiol 42: 25-34.
19. Savage RM, Wagner GS, Ideker RE, Podolsky SA, Hackel DB (1977) Correlation of postmortem anatomic findings with electrocardiographic changes in patients with myocardial infarction: retrospective study of patients with typical anterior and posterior infarcts. Circulation 55: 279-285.
20. Abella BS (2013) The importance of cardiopulmonary resuscitation Quality. Curr Opin Crit Care 19: 175-180.