



Case Report

An elective total knee replacement in a patient with a recent history of cardiac arrest: A case report

Saleh S. Alazzam, MBBS, FRCSC.¹, Faisal A. Alhabrabi, MBBS.¹ , Khalid M. Al Mani, MBBS.², Mohammed M. Aljahdali, MBBS.³

¹Department of Orthopedic Surgery, King Abdulaziz Medical City, ²College of Medicine, King Saud bin Abdulaziz University for Health Sciences,

³Department of Anesthesia, King Abdulaziz Medical City, Riyadh, Saudi Arabia.

*Corresponding author:

Faisal A. Alhabrabi,
Department of Orthopedic
Surgery, King Abdulaziz
Medical City, Riyadh, Saudi
Arabia.

famh9@hotmail.com

Received: 12 July 2023

Accepted: 19 August 2023

Epub Ahead of Print: 13 September 2023

Published: 06 November 2023

DOI

10.25259/JMSR_148_2023

Quick Response Code:



ABSTRACT

Performing surgery on a patient with a previous history of a major cardiac event, such as a myocardial infarction or cardiac arrest, is inherently risky and requires specific anesthetic and surgical-related measures to avoid perioperative complications. Our patient is a 63-year-old male who is a known case of chronic knee osteoarthritis with a history of myocardial infarction leading to cardiac arrest. He was resuscitated and transferred to the catheterization laboratory and the occluded artery was stented. Within the 1st year after the cardiac arrest, he presented to the orthopedic clinic complaining of worsening knee pain and a reduced range of movement that affected his quality of life. We performed the surgery 2 months later and the patient was discharged with satisfactory results and no complications. This case reports how we prepared a patient with a recent history of cardiac arrest for a total knee replacement from an anesthetic and surgical point of view.

Keywords: Arthroplasty, Cardiac arrest, Elective surgery, Total knee replacement, Myocardial infarction

INTRODUCTION

Total knee replacement (TKR) is the most effective treatment to correct final-stage osteoarthritis to relieve the symptoms and restore joint function and range of movement.^[1] However, certain factors may affect the decision of what kind of management is suitable for every patient. One of the major factors limiting patients' eligibility for surgical procedures is previous cardiovascular events, such as myocardial infarction.^[2] Recent literature suggested that the optimal period for performing elective non-cardiac surgeries is 180 days after the drug-eluting stent implantation.^[2] High pre-operative cardiac risk is linked to an elevated risk for non-cardiac morbidity and a prolonged hospital stay in elective orthopedic surgery.^[3] The majority of perioperative cardiac arrest incidents are due to hypoxia, severe hemodynamic derangement, loss of the airway, severe bradycardia, drug-related adverse effects, and a residual neuromuscular block, which require intensive anesthetic management.^[4] Recognizing the factors associated with anesthesia-related perioperative cardiac arrest is integral to risk stratification in patients undergoing surgery.^[5] To the best of our knowledge, the literature has not reported that surgical management of final-stage osteoarthritis with TKR in a post-cardiac arrest patient has not been reported in the literature. The aim of reporting this case is to show

How to cite this article: Alazzam SS, Alhabrabi FA, Al Mani KM, Aljahdali MM. An elective total knee replacement in a patient with a recent history of cardiac arrest: A case report. J Musculoskelet Surg Res 2023;7:302-4.

how we performed a unilateral TKR in a post-cardiac arrest patient with final-stage osteoarthritis.

CASE REPORT

The patient was a 63-year-old Saudi male known to have type 2 diabetes mellitus, controlled hypertension with medication, and bilateral knee osteoarthritis. He was listed for TKR. He presented to the emergency department with anterolateral ST-elevation myocardial infarction and later developed ventricular fibrillation and cardiac arrest. After cardiopulmonary resuscitation, the patient was revived, intubated, and transferred to the catheterization laboratory, where a primary percutaneous coronary intervention (PPCI) with a stent was placed on the proximally occluded left anterior descending artery.

Before this incident, he suffered from bilateral knee pain for 10 years, with no history of any previous trauma. The patient used a walking stick to aid walking and took non-steroidal anti-inflammatory drugs intermittently for pain control. Ten months after the cardiac catheterization, he presented to the clinic complaining of progressive symptoms limiting his daily activities. He had worsening pain in joint movement and a restricted range of motion. Radiographs showed severe osteoarthritis, mainly at the medial compartment bilaterally, with moderate osteoarthritis at the patellofemoral articulation. The patient agreed to the surgical option of a TKR within 2 months, as the main purpose of this elective surgery was to relieve the patient's symptoms and to improve his quality of life.

After discussing the case with the cardiology department, we were informed that the patient's ejection fraction was $\geq 55\%$ and that the clopidogrel could be withheld 5 days before the surgery, to be resumed postoperatively with a loading dose of 300 mg. Moreover, the risk assessment and prediction tool (RAPT) was used to assess and predict the patient's discharge destination. On RAPT, our patient had a score of 11, which indicates a direct discharge to home after surgery.

In our case, several anesthetic measures were implemented to maintain the blood supply to the heart. Before performing the spinal anesthesia, an arterial line was inserted to monitor beat-to-beat blood pressure. The spinal anesthesia was done with only 2.5 cc of 5% isobaric bupivacaine to prevent hypotension instead of hyperbaric bupivacaine, which has relatively more significant hemodynamic effects. A phenylephrine infusion was initiated to maintain the patient's blood pressure, and the doses were adjusted accordingly. The anesthetic team also ensured the maintenance of normovolemia, pain control, and stress reduction to prevent the onset of tachycardia and increased cardiac demand. The duration of stress was reduced by doing the surgery as the first case in the morning. Stress and tachycardia were reduced by ensuring intraoperative

and post-operative pain control. The patient had spinal anesthesia, the modality of choice to control intraoperative pain. For the post-operative pain management, the surgeon infiltrated the posterior capsule of the knee with 150 mg of ropivacaine and did an adductor canal block with 20 cc of 0.25% bupivacaine, 100 mcg of epinephrine, and 4 mg of dexamethasone. The latter was added to ensure a longer duration of the nerve block.^[6] Before the surgery, a dose of tranexamic acid was given as a prophylaxis to reduce bleeding risk during the surgery. The patient was monitored until the next day to repeat the adductor canal block in case of pain. However, this was not required. Two months after the surgery, the patient was seen in the out-patient clinic and underwent bilateral knee radiographs, which showed no hardware-related complications, fractures, or dislocation. On physical examination, the range of motion was 0–110, which has significantly improved. As per the patient's perspective, he was satisfied with the results as he mentioned improved joint movement and pain relief. The patient also requested to do a TKR for the other knee, which we will consider doing in the near future.

DISCUSSION

Performing any elective TKR for post-cardiac arrest patients is a serious event. It is reported that perioperative myocardial infarction and bleeding are leading causes of mortality in patients who had non-cardiac surgeries soon after a major cardiac event.^[7] However, a delay in restoring an older patient to his daily activities could significantly deteriorate his health as well as his quality of life. In our case, the benefits outweighed the risks of performing the procedure as the patient was an older person whose activity had been reduced significantly due to his bilateral knee osteoarthritis. As a matter of fact, serious consequences such as heart failure could follow prolonged immobilization of older patients, especially in patients with a history of serious cardiac events.^[8] In fact, certain anesthesia and surgical-related measures need to be conducted when performing surgery on patients with cardiac risk to avoid serious perioperative complications. The primary aims of anesthetic management in this patient included maintaining the blood supply to the heart and preventing increased cardiac demand. Factors increasing cardiac demand include increased wall tension, increased myocardial contractility, tachycardia, and hypertension, which were all avoided by the measures that we followed with the anesthesia team.

CONCLUSION

Elective non-cardiac surgeries following major cardiac events can be challenging to perform due to the risk of significant perioperative complications. Despite multiple recommendations regarding elective surgeries following

PPCI, elective post-cardiac arrest surgeries' risks are still unreported adequately. We believe that performing elective surgeries that are crucial to minimizing the deterioration of the patient's well-being for post-cardiac arrest patients is a valid consideration. Therefore, we performed a TKR for our patient, who is a post-cardiac arrest patient and he restored the mobility of his knee joint with no complications reported.

AUTHORS' CONTRIBUTION

SSA, FAA, and KMA have contributed to diagnosis, evaluation, follow-up, literature review, and paper writing. MMA contributed to the literature review and had a major role in paper writing. All authors have critically reviewed and approved the final draft and are responsible for the manuscript's content and similarity index.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY FOR MANUSCRIPT PREPARATION

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

FINANCIAL SUPPORT AND SPONSORSHIP

This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CONFLICTS OF INTEREST

There are no conflicting relationships or activities.

REFERENCES

1. Tang X, Yan Z, Wang W, Liu T. Total knee arthroplasty in a patient with ipsilateral hip ankylosis: A case report. *Medicine (Baltimore)* 2019;98:e16889.
2. Wijeysondera DN, Wijeysondera HC, Yun L, Wąsowicz M, Beattie WS, Velianou JL, *et al.* Risk of elective major noncardiac surgery after coronary stent insertion: A population-based study. *Circulation* 2012;126:1355-62.
3. Ackland GL, Harris S, Ziabari Y, Grocott M, Mythen M. Revised cardiac risk index and postoperative morbidity after elective orthopaedic surgery: A prospective cohort study. *Br J Anaesth* 2010;105:744-52.
4. Chalkias A, Mongardon N, Boboshko V, Cerny V, Constant AL, De Roux Q, *et al.* Clinical practice recommendations on the management of perioperative cardiac arrest: A report from the PERIOPCA Consortium. *Crit Care* 2021;25:265.
5. Aloweidi A, Alghanem S, Bsisu I, Ababneh O, Alrabayah M, Al-Zaben K, *et al.* Perioperative cardiac arrest: A 3-year prospective study from a tertiary care university hospital. *Drug Healthc Patient Saf* 2022;10:1-8.
6. Wolff CB, Green DW. Clarification of the circulatory pathophysiology of anaesthesia-implications for high-risk surgical patients. *Int J Surg* 2014;12:1348-56.
7. Smilowitz NR, Lorin J, Berger JS. Risks of noncardiac surgery early after percutaneous coronary intervention. *Am Heart J* 2019;217:64-71.
8. Carbone L, Bůžková P, Fink HA, Lee JS, Chen Z, Ahmed A, *et al.* Hip fractures and heart failure: Findings from the Cardiovascular Health Study. *Eur Heart J* 2010;31:77-84.