

Case Report

Anesthetic Management of a Patient With Transplanted Heart for Inguinal Hernia Repair: Case Report

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Abstract

The number of patients receiving organ transplants is increasing around the world. So, anesthesiologists are often have to manage transplant recipients in hospitals for procedures that are not related to transplantation. There are many possible problems that anesthesiologists have to deal with such as the physiological and pharmacological problems of allograft denervation, the side effects of immunosuppression, the risk of infection and rejection.

ABBREVIATIONS

HR: Heart Rate; TAP: Transversus Abdominis Plane; NYHA: New York Heart Association; ECG: Electrocardiogram; ETCO_2 : End Tidal Carbon dioxide; LMA: Laryngeal Mask Airway

INTRODUCTION

The number of patients receiving organ transplants is increasing around the world [1]. According to The Registry of the International Society of Heart and Lung Transplantation data the number of heart transplants being performed world-wide exceeds 5000/year [1]. With better graft function and survival, many non-cardiac procedures applied on these patients [2].

The information regarding the physiological and pharmacological interactions in a denervated allograft heart, the side effects of immunosuppression, the risk of infection and rejection are essential to the anaesthetist managing such patients in hospitals that are not otherwise involved in transplantation procedures [2]. Better immunosuppression, improvement in surgical technique and advancement in organ preservation, the lifespan of these patients is constantly improving. With increasing longevity, cardiac transplant recipients are more likely to be operated for incidental non cardiac or transplant related surgery. These patients present a unique challenge to non-transplant anesthesiologists [1].

We aimed to present anesthetic and postoperative pain management of a patient with transplanted heart for inguinal hernia repair in the presence of literature.

CASE PRESENTATION

43-year old male patient 180 cm height and weighing 85 kg, scheduled for elective inguinal hernia repair. He has regulated hypertension disease. He had undergone orthotopic heart transplant 13 years ago. He was evaluated as he was New York Heart Association (NYHA) class 1 state and immunosuppressive treatment with mycophenolate and azathiopurine was ongoing. He has additional diltiazem, atorvastatine, acetylsalicylate, hyosaminesulphate treatment. Complete blood count, biochemical parameters including renal functions, hepatic function tests, electrolytes was evaluated, no abnormal parameters found. According to cardiologist assesment his ejection fraction was % 60, he has normal sinus rhythm. No valvular, systolic or diastolic pathology was defined. No infection sign detected. He was checked regularly by the clinic that transplanted the heart, there were no obstacle for operation as the clinic mentioned. His medical treatment vent on the day of surgery as it was. Cephazolin 1 gr was administered intravenously for prophylaxis. Standard monitoring with electrocardiogram (ECG), pulse oxymeter and end tidal carbon dioxide (ETCO_2), non-invasive blood pressure monitoring was established. Before anesthesia induction, heart rate (HR) was 80/min and arterial blood pressure was 140/83 mmHg. Due to refusal of patient and lack of sympatetic innervation in transplanted heart, general anesthesia was preferred. General anesthesia was induced with propofol 2 mg/kg and fentanyl 2 mcg/kg. Laryngeal mask was applied and volume controlled mechanical ventilation was put on and no neuromuscular blocker agent was administered. Endotracheal intubation was avoided due to pulmonary infection risk. After induction of anesthesia

HR was 73/min and arterial blood pressure was 120/75 mmHg. Sevoflurane %2 and remifentanyl infusion was used for maintainance of anesthesia. Remifentanyl dosage was regulated to keep arterial blood pressure below 140/90 mmHg. To reduce analgesic requirement and provide postoperative analgesia ultrasound guided ipsilateral transversus abdominis plane (TAP) block was applied, total 40 ml solution (bupivacaine % 0.25 and prilocaine % 0.5) was used. Procedure was done with open anterior approach. No hypotensive, hipertensive, bradycardic or tachycardic episode was occurred. Operation duration was 85 minutes. At the end of the surgery when the Aldrete score was \geq 9, patient was transferred to recovery room. After 60 minutes of stabil vital signs conscious patient was discharged from recovery room. There was no need of analgesic in first 24 h. Patient was checked via telephone 6 days after the surgery, patient reported that he had no need for analgesics.

DISCUSSION

Pre-operative evaluation of heart transplant recipient undergoing non-cardiac surgery should focus on graft function and rejection, risks of infection, function of other organs, immunosuppressive therapy and drug interactions [2]. The patient was assessed for any evidence of graft rejection. According to cardiologist assesment his ejection fraction was % 60, he has normal sinus rhythm. No valvular ,systolic or diastolic pathology was defined. No infection sign detected. He was checked regularly by the center that tranplanted the heart, there were no obstacle for operation as the center mentioned. Complete blood count, biochemical parameters including renal functions, hepatic function tests, electrolytes was evaluated, no abnormal parameters found. Antibiotic prophylaxis and strict aseptic conditions was used.

It was reported that general, neurolept and spinal anaesthesia do not affect haemodynamic function or postoperative outcome in heart-transplanted recipients undergoing subsequent non-cardiac surgery. Due to refusal of patient and lack of sympatetic innervation in transplanted heart, general anesthesia was preferred in our case. However antibiotic prophylaxis was administered, any invasive interventions including endotracheal entubation and arterial cannulation was avoided due to infection risk. Dysrhythmias, probably due to a lack of vagal tone, rejection and increased endogenous catecholamine concentrations, can occur in over 50% of the patients [3]. According to this data general anesthesia was applied, propofol, fentanyl, sevoflurane and remifentanyl was used safely. We did not have any hypotension, bradycardia or tachycardia due to anesthesia induction or maintainance, as it is expected in heart tranplant recipient patients. Titration of drug may be effective on this state because both propofol and fentanyl was administered by small increments. However sevoflurane was used in %2 concentration remifentanyl infusion regulated due to arterial blood pressure. It can be criticized that the lack of arterial cannulation is a gap fort this patient but, we preferred to avoid invasive monitorisation techniques for both antiagregant usage and there was a little blood loss prediction for the surgery. The high incidence of fatal infections with invasive lines outweighs the benefits derived

from invasive monitoring [2]. So with the stabil hemodynamic measurements central venous line was not applied. Appropriate perioperative antibiotic prophylaxis should be used [2], as we did. Also urinary catheterisation may be helpful for monitoring kidney function but the surgery time was not so long and a little blood loss was expected. Due to these reasons, prevention of infection was benefical for the patient.

Unlike the normal heart, which increases cardiac output via neural stimuli causing increased HR and contractility, the denervated heart lacks the ability to respond acutely to hypovolaemia or hypotension with reflex tachycardia but responds to stress primarily by an increase in stroke volume by circulating catecholamines [2]. The transplanted heart has no sympathetic, parasympathetic or sensory innervation, and the loss of vagal influence results in a higher than normal resting HR [4]. So bispectral index monitoring may be helpful to predict bradycardia is based on deep anesthesia or denervated heart. This state is one of our deficiencies. We did not have any bradycardia episode but if we had it would be benefical for us.

Our patient has mycophenolate, azathiopurine treatment for immunsupression and diltiazem, atorvastatine, acetylsalisilate treatment for hypertension and hyosamine sulphate treatment for heart rate. As seen above, many different drugs was used so no need for an other. Ultrasound guided transversus abdominis (TAP) block was performed and 6 days later patient was checked for analgesic requirement. TAP block was planned to reduce analgesic requirement but more than expected he had no analgesic need. Although acetylsalisilate treatment must be considered as an analgesic so we must express like that 'there was no more analgesic need'. With all these data it was clear that acetylsalisilate and TAP block together was enough for postoperative inguinal hernia repair pain in our case as analgesic.

CONCLUSION

Basicly a transplated heart with normal functions may probably tolerate general anesthesia in elective non-cardiac surgery but anesthesiologists have to understand the pathophysiology of transplated heart and manage the anesthesia according to patients status. Regional anesthetic techniques may not be appropriate for these patients because of antiagregant treatment, patient refusal and risk of vasodilatation that may not be tolerated by transplanted heart. LMA can be applied to avoid endotracheal entubation. The other advantage of LMA is less or no neuromuscular blocker agent need. So if general anesthesia is preferred in transplant recipient patients, LMA must be considered. Postoperative analgesic choice is widespread but transplant recipient patients are treated with many other drugs so regional techniques such as TAP block may be used to reduce analgesic requirement.

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