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BMH Med. J. 2025;12(3):45-49. **Case Report**

Anaesthetic management of a patient with cardiac sarcoidosis for non-cardiac surgery

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Abstract

Cardiac sarcoidosis is a rare but potentially life-threatening manifestation of systemic sarcoidosis, often presenting with arrhythmias, conduction abnormalities, and impaired myocardial function. Perioperative management of patients with cardiac sarcoidosis for non-cardiac surgery poses significant challenges due to the risk of sudden cardiac events, haemodynamic instability, and altered responses to anaesthetic agents.

We present the case of a patient with diagnosed cardiac sarcoidosis who underwent laparoscopic bilateral inguinal hernia mesh repair under general anesthesia. Comprehensive preoperative evaluation included cardiac imaging and electrophysiological assessment, with multidisciplinary input from cardiology, neurology, gastroenterology and anesthesiology teams. Intraoperative management focused on maintaining hemodynamic stability, continuous cardiac monitoring, and readiness for immediate intervention in the event of arrhythmogenic complications. The anesthetic plan was tailored to minimize myocardial depression and autonomic fluctuations. Postoperative care emphasized close monitoring and early detection of arrhythmic or heart failure symptoms.

This case highlights the importance of meticulous perioperative planning and individualized anesthetic strategies to safely manage patients with cardiac sarcoidosis undergoing a non-cardiac surgery.

Keywords: Cardiac sarcoidosis, arrhythmias, Conduction abnormalities, Pulmonary hypertension, Myocardial inflammation, Sarcoidosis anaesthesia.

Introduction

Sarcoidosis is a multisystem disorder characterized by non-necrotizing granulomatous disease. It primarily affects the lungs, it can also involve the heart, gastrointestinal tract, and other organs. The condition most commonly presents in young to middle-aged adults, with over half of cases diagnosed after the age of 40 [1]. Symptomatic cardiac involvement occurs in approximately 5% of individuals with sarcoidosis. The primary clinical manifestations of cardiac sarcoidosis include conduction system abnormalities, ventricular arrhythmias - often leading to sudden cardiac death - and heart failure [2]. Cardiac sarcoidosis is a rare but potentially life-threatening manifestation of systemic sarcoidosis, characterized by the formation of noncaseating granulomas that cause inflammation, primarily in the myocardium, but also in the endocardium and pericardium. Conduction abnormalities may vary from first-degree atrioventricular block to complete heart block [3]. Pulmonary hypertension can worsen the clinical course of sarcoidosis, with granulomatous vasculopathy proposed as a potential underlying mechanism. Anaesthetic induction agents should be administered cautiously and carefully titrated to minimize the risk of haemodynamic instability [4]. Sarcoidosis is believed to have a genetic predisposition, particularly associated with certain HLA class II alleles, and individuals with a family history of the disease are at increased risk. This immune dysregulation results in the activation of macrophages and the formation of noncaseating granulomas - non-necrotic inflammatory lesions - which can occur in virtually any organ, including the heart. The disease typically progresses from an active inflammatory phase to a fibrotic phase, both of which can contribute to cardiac dysfunction [5].

The perioperative management of patients with cardiac sarcoidosis poses significant challenges to anaesthesiologists. These patients are at increased risk for arrhythmias and haemodynamic instability under anaesthesia, particularly during induction and emergence phases. Granulomatous infiltration of the cardiac conduction system can result in various degrees of atrioventricular block, ranging from first-degree block to complete heart block [4]. Furthermore, myocardial scarring and fibrosis can predispose to life-threatening ventricular tachyarrhythmias.

Anaesthetic planning for patients with cardiac sarcoidosis requires a multidisciplinary approach involving cardiologists and electrophysiologists, thorough preoperative cardiac evaluation - including ECG, echocardiography, and possibly cardiac MRI or PET scan - and careful intraoperative monitoring with readiness for advanced cardiovascular support. In patients with implantable cardioverter-defibrillators (ICDs) or pacemakers, device management and defibrillation readiness are crucial components of the anaesthetic plan [2].

With individualized risk stratification, close haemodynamic monitoring, and appropriate pharmacologic choices, patients with cardiac sarcoidosis can safely undergo a wide range of surgical procedures.

Case Report

A middle age person weighing 66 kg, known case of cardiac sarcoidosis, atrial fibrillation with slow ventricular rate, coronary artery disease, cerebrovascular accident - mechanical thrombectomy earlier, presented with complaints of bilateral inguinal swelling and pain. His vitals were stable with a pulse rate of 56 beats/min, irregular and blood pressure of 110/70 mm Hg in the right arm in lying down position. Systemic examinations were within normal limits. On assessment of airway, mouth opening was normal, with adequate neck movements and the Mallampatti grade was 2.

Lab values showed Hb - 12.4gm%, platelet count -1.73akhs/mm^3, PT was 12.8/11 with an INR value of 1.17. Other blood investigations showed S. creatinine 1.65 and serum electrolytes were within normal limits. Viral markers were negative. The electrocardiogram taken showed Atrial fibrillation, T inversion in leads II, III, aVF, V1-V6. Echocardiogram showed biatrial enlargement, regional wall abnormality, mild mitral regurgitation, moderate left ventricular systolic dysfunction,

right ventricular dysfunction, severe pulmonary arterial hypertension and LV ejection fraction of 38%. Chest X-ray showed cardiomegaly with hilar congestion. Ultrasound of abdomen and pelvis showed right inguinoscrotal hernia with omental fat and mild fluid as contents, left early inguinal hernia and mild prostatomegaly.

He was planned for laparoscopic bilateral inguinal hernia repair. After preoperative optimization including injection Vitamin K 10mg IV, he was taken up for procedure under general anaesthesia. He was premedicated with injection Metoclopramide 10mg IV and injection Pantoprazole 40 mg IV, Midazolam 1mg and Dexamethasone 8mg IV. In the operation theatre, all standard ASA monitors including pulse oximeter, 5 lead ECG (Lead II, V5) and noninvasive blood pressure was attached. Room air saturation was 98% under room air. Oxygen was initiated via Hudson's face mask at 5L/min.

He was induced with injection Etomidate 20 mg, injection Fentanyl 100mcg, Cisatracurium 8mg and intubated with 8 mm internal diameter PVC cuffed endotracheal tube under Sellicks maneuver. Cuff was inflated to a pressure of 25 cm of H_2O and fixed it at 21cm at the anterior incisor level. A suction catheter of size 14G was inserted to deflate the stomach. Patient was mechanically ventilated with pressure controlled-volume guaranteed mode using closed circuit and end tidal carbon dioxide was monitored. The ventilatory settings were adjusted as tidal volume - 400ml, RR - 14/minute, PEEP - 5 cm H_2O, FiO_2 - 55%. Maintenance was carried out using sevoflurane, oxygen, air and infusion of fentanyl 100mcg at 25ml/hour ensuring adequate depth.

Under strict aseptic precautions and USG guidance, left radial artery cannulation was performed for invasive blood pressure monitoring, and a right internal jugular vein catheter (Certofix protect 7 French size) was secured. A transdermal Fentanyl patch releasing 25mcg/hour was placed on the chest and an injection fentanyl 100 microgram slow IV was given just before skin incision. A body warmer , an inline fluid warmer and a temperature probe were also kept in place. Deep Vein Thrombosis prophylaxis during intraoperative period was by physical measures (intermittent pneumatic compression devices), which was continued in the post op period also. Arterial blood gas analysis (ABG) done following induction showed normal values. Fluid requirements were met with warm balanced crystalloid solutions such as Ringer's lactate, Sterofundin.

The surgical procedure was uneventful, with an approximate blood loss of 200ml. Intraoperatively, the patient was hemodynamically stable, with a pulse rate of 70-76/min and a systolic BP of 110-130mmHg. After the surgical procedure, patient was extubated. Post extubation he was haemodynamically stable and was shifted to medical ICU. Post operative ECG showed no fresh changes. He was started on low molecular weight heparin after 8 hours. (Clexane 0.5 mg subcutaneous once a day) On postoperative day 3 he was discharged.

Discussion

Cardiac sarcoidosis presents unique challenges during the perioperative period due to its unpredictable course and varied cardiac manifestations. Although it is a relatively rare manifestation of systemic sarcoidosis, occurring clinically in 5% of cases, it can lead to severe complications including conduction blocks, ventricular arrhythmias, heart failure, and sudden cardiac death [5]. Anesthesiologists must recognize the importance of comprehensive preoperative assessment and individualized intraoperative management in these patients.

As the disease progresses, focal myocardial inflammation can lead to fibrosis and scarring, particularly in the left ventricular free wall and papillary muscles, resulting in cardiomyopathy, arrhythmias, and, in severe cases, sudden cardiac death [3]. The condition is characterized by a dysregulated immune response, notably involving overactivation of type 1 T-helper (Th1) cells and

increased production of pro-inflammatory cytokines and chemokines such as interferon-γ, tumor necrosis factor-α, transforming growth factor-β, interleukin-2, and interleukin-12 [5].

The risk of conduction system abnormalities, including atrioventricular block, is significant in cardiac sarcoidosis due to granulomatous infiltration and subsequent fibrosis. Complete heart block is a common initial manifestation [3], and it may worsen under anesthesia due to autonomic imbalance, sedative effects, or electrolyte shifts. Preoperative ECG and echocardiography are essential, and further evaluation with cardiac MRI or PET should be considered in high-risk patients to assess myocardial inflammation and scarring [5]. Arrhythmias, particularly ventricular tachyarrhythmias, are a major perioperative concern. These can be triggered by sympathetic stimulation, hypoxia, or anesthetic agents. Patients with a history of ventricular arrhythmias or reduced ejection fraction may have an implantable cardioverter-defibrillator or cardiac resynchronization therapy device, which must be assessed and managed appropriately before surgery [2]. Electromagnetic interference during electrocautery can affect device function, so magnet application or device reprogramming may be necessary in consultation with cardiology or electrophysiology.

Anaesthetic induction should be carried out with agents that minimize myocardial depression and haemodynamic instability. Propofol, although commonly used, should be titrated carefully in patients with reduced cardiac reserve. Etomidate may be a preferable alternative due to its haemodynamic stability. Volatile anaesthetics and opioids can be safely used with appropriate monitoring, but neuromuscular blockers should be chosen with caution, particularly in patients with hyperkalemia risk or coexisting neuromuscular sarcoid involvement [4].

Intraoperative monitoring must be vigilant, with continuous ECG, invasive blood pressure monitoring, and in some cases, transesophageal echocardiography to evaluate cardiac function in real time. Postoperative monitoring in a high-dependency or intensive care setting is advisable for patients at risk of arrhythmias or conduction block. Additionally, pulmonary hypertension may coexist with sarcoidosis due to granulomatous vasculopathy, further complicating anaesthetic management. In such cases, pulmonary vasodilators, judicious fluid management, and avoidance of hypoxia and hypercarbia are critical [6].

Ultimately, the anaesthetic management of patients with cardiac sarcoidosis requires a multidisciplinary approach, careful perioperative planning, and a high index of suspicion for sudden haemodynamic or electrical instability.

Key Learning points:

1. Patients with cardiac sarcoidosis when coming for non cardiac surgery has high risk of perioperative cardiac events.
2. Close intraoperative cardiac monitoring including invasive lines may be required.
3. Anaesthesia technique and drugs should be tailored considering the extent of cardiac involvement and pulmonary hypertension.
4. Postoperative care should be in a high dependency area.

Conclusion

Patients with cardiac sarcoidosis present unique perioperative challenges due to their risk of arrhythmias, conduction disturbances, and impaired cardiac function. Safe anaesthetic management requires thorough preoperative assessment, multidisciplinary coordination, and vigilant intraoperative and postoperative monitoring - particularly with continuous ECG surveillance. Individualized anaesthetic plans that minimize myocardial depression and maintain haemodynamic stability are essential. With careful planning and monitoring, surgical procedures can be performed safely in patients with cardiac sarcoidosis.

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