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Case Report

Anesthetic Management of a Large Pericardial Cyst in a Young Male – A case report

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ABSTRACT:
Background: Pericardial cysts are rare mediastinal abnormalities, often asymptomatic, but they can cause significant cardiovascular and respiratory compromise when they compress adjacent structures. The anesthetic management of such cases can present unique challenges, especially when surgery is required to address the cyst.

Case Presentation:
We report the case of a 19-year-old male who presented with shortness of breath, fatigue, abdominal distension, and recent flu-like symptoms. Clinical examination revealed ascites, bilateral pleural effusions, and peripheral edema. Imaging studies identified a large pericardial cyst compressing the right heart, resulting in reduced left ventricular ejection fraction (LVEF) and signs of portal hypertension. The patient was deemed a candidate for urgent surgical intervention.

Anesthetic Management:
Given the patient's compromised respiratory and cardiovascular status, anesthesia induction was performed in collaboration with the Cardiothoracic Surgery (CTS) team. An arterial line and invasive hemodynamic monitoring were established. Induction was achieved with fentanyl, etomidate, and rocuronium, followed by manual ventilation and two-lung ventilation via a single-lumen endotracheal tube. During surgery, the patient experienced repeated desaturation and hypotension due to compression of major vessels, which was managed with inotropic support and high airway pressures.

Conclusion:
This case highlights the complexities involved in anesthetic management for patients with large pericardial cysts. A multidisciplinary approach, meticulous preoperative assessment, vigilant intraoperative monitoring, and careful postoperative care are crucial for ensuring optimal outcomes in such high-risk cases.

Keywords: Pericardial cyst, cardiovascular compromise, respiratory distress, right heart compression, difficult airway, portal hypertension.

INTRODUCTION:

Pericardial cysts are rare mediastinal abnormalities that may be congenital or acquired, typically characterized by fluid-filled sacs lined with a mesothelial layer. These cysts are usually asymptomatic, but can cause significant clinical complications if they compress adjacent structures, potentially leading to complications such as arrhythmias, cardiac tamponade, or respiratory distress [1]. The estimated incidence of pericardial cysts is approximately 1 in 100,000 individuals, with most cases discovered incidentally on imaging studies [2]. While many pericardial cysts are asymptomatic, severe complications such as arrhythmias, cardiac tamponade, and respiratory distress can occur, especially in cysts that exert pressure on the heart or lungs. In this report, we discuss the anesthetic management of a 19-year-old male

presenting with severe symptoms related to a large pericardial cyst, causing significant cardiovascular and respiratory compromise.

Case Presentation:

A 19-year-old male presented to the hospital with a history of shortness of breath, fatigue, nausea, abdominal distension, and flu-like symptoms that had developed over the past week. Upon physical examination, he was found to have significant abdominal ascites, bilateral pleural effusions, peripheral edema in the lower extremities, and diminished lung airflow. His oxygen saturation ranged from 90% to 95% while receiving 2 L/min supplemental oxygen via a nasal cannula. The patient also exhibited orthopnea, tachypnea, and had a functional capacity significantly compromised, as evidenced by a metabolic equivalent of task (METS) score of less than 4.

Imaging studies, including a chest X-ray and CT scan, revealed a large pericardial cyst compressing the right side of the heart. This led to a marked reduction in left ventricular ejection fraction (LVEF), from 60-65% to 39%. The imaging also showed pericardial effusion, calcification of the cyst, ascites, and pleural effusion. Paracentesis revealed portal hypertension resulting from right heart dysfunction. A subsequent cardiac MRI confirmed acute on chronic pericarditis and cardiac restriction, indicating the need for urgent surgical intervention.

Anesthetic Management:

Given the patient's severe symptoms and the possibility of requiring emergency sternotomy, a multidisciplinary approach was undertaken for anesthetic management. The procedure was planned in close collaboration with the Cardiothoracic Surgery (CTS) team.

An arterial line was placed in the right radial artery under local anesthesia to assess hemodynamic stability. This revealed pulsus paradoxus during deep inspiration, further complicating the patient's cardiovascular status. The presence of significant respiratory distress and compromised hemodynamics led to the decision to have a difficult airway cart, including a fiberoptic bronchoscope, prepared for possible airway management challenges. Noninvasive cardiac monitoring was established to assess stroke volume variation and cardiac index, and the patient was preloaded with 500 mL of normal saline. Infusions of dobutamine (5 mcg/kg/min) and noradrenaline (0.02 mcg/kg/min) were started to support the cardiovascular system, and midazolam (2 mg IV) was administered to alleviate anxiety.

The induction of anesthesia was performed in the presence of the CTS team. Fentanyl (200 mcg) and etomidate (20 mg) were used for induction, followed by rocuronium (100 mg) to facilitate muscle relaxation. Effective ventilation was confirmed; however, post-induction desaturation was noted despite appropriate ventilation. Manual ventilation with 100% oxygen led to a gradual improvement in saturation levels to approximately 92%. Given the patient's compromised cardiovascular status, one-lung ventilation was deemed risky, so the decision was made, in consultation with the surgeon, to proceed with two-lung ventilation using a standard single-lumen endotracheal tube. Once properly positioned, oxygen saturation levels stabilized at approximately 92%.

The surgical team proceeded with a right anterolateral thoracotomy to address the large pericardial cyst. This surgical approach led to repeated compressions of major vessels and bronchi, resulting in multiple episodes of desaturation and hypotension. Oxygenation was maintained through manual ventilation, requiring high airway pressures of around 40 cmH2O. Inotropic agents and vasopressors were titrated to maintain a mean arterial pressure (MAP) above 70 mmHg.

At the conclusion of the surgery, the patient was kept electively ventilated for 24 hours to manage potential postoperative respiratory complications. Continuous monitoring in the ICU was essential, and adjustments in hemodynamic support were made to ensure Given the patient's severe symptoms and the need for emergency sternotomy, a multidisciplinary approach was adopted in collaboration with the Cardiothoracic Surgery (CTS) team.

DISCUSSION:

Pericardial cysts are rare congenital anomalies that often remain asymptomatic. When symptoms arise, they are usually caused by compression of adjacent structures such as the heart or lungs, leading to chest pain, dyspnea, and, in rare cases, arrhythmias or tamponade [3]. In this case, the patient's clinical presentation included severe cardiovascular and respiratory compromise, likely secondary to compression from the large pericardial cyst. Preoperative imaging studies were crucial in diagnosing the cyst and determining its effects on cardiac function [4].

Anesthetic management in cases of pericardial cysts requires careful consideration of airway compression, cardiovascular instability, and hemodynamic support. The patient in this case had significant respiratory distress and a compromised cardiovascular status, which required close monitoring of oxygenation and hemodynamics throughout the perioperative period. The use of a fiberoptic bronchoscope and preoperative vascular access facilitated safe induction of anesthesia [5]. Two-lung ventilation was preferred due to concerns regarding the patient's ability to tolerate one-lung ventilation.

The primary challenges in this case were the management of significant cardiovascular compromise and the need to maintain adequate oxygenation and hemodynamic stability during surgery. Fluid management, inotropic support, and careful monitoring of blood pressure were critical in preventing further deterioration of the patient's condition. Additionally, the potential for cyst-related bleeding during surgery necessitated heightened vigilance from both the surgical and anesthetic teams [6].

It is crucial to assess and manage the risks of airway compression in patients with pericardial cysts, as the cyst can cause distortion of the surrounding structures. Preoperative imaging, including CT and MRI, is invaluable for evaluating the location and size of the cyst, as well as its effects on neighboring cardiac and pulmonary structures. Anesthesiologists must be prepared for potential airway challenges, with fiberoptic bronchoscopy and other advanced airway management techniques readily available [5]. The choice of anesthetic agents is also critical, as sympathomimetic drugs may help support hemodynamics in the face of reduced preload and cardiac output [6].

CONCLUSION:

Pericardial cysts, although rare, can present with severe symptoms that require urgent surgical intervention and complex anesthetic management. Early diagnosis through imaging and careful preoperative evaluation are essential to prevent life-threatening complications. Anesthetic management requires the collaboration of a multidisciplinary team to ensure optimal patient outcomes.

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