

Type of Article: CASE REPORT

Pericardial cyst compressing right atrium and ascending aorta – anesthetic management- Case Report

Vasudeo Utpat¹, Mangesh Rayban², Satish Suryvanshi²

1 Fellow Cardiac Anaesthesia, Riddhivinayak Hospital, Maharashtra, India.

2 Consultant anesthesiologist, HCG Hospital, Mumbai, Maharashtra, India.

Corresponding Author:

Dr. Vasudeo Utpat,

MD, Fellow Cardiac Anesthesia, Riddhivinayak Hospital, Maharashtra

Email Address: vasudeoutpat@gmail.com

(M)- 9913175808

Abstract:

Pericardial cysts are rare mediastinal cysts having congenital origin or develop secondary to pericarditis, trauma, or infection. Although most pericardial cysts are asymptomatic, life-threatening complications can occasionally occur. We report on a 43-year-old female with an asymptomatic 5.5x6.0x6.3 cm pericardial cyst that was incidentally found as an abnormal cardiac silhouette on routine chest radiography. Further imaging confirmed the presence of a pericardial cyst that was compressing the right atrium and ascending aorta. The patient underwent successful thoracoscopic removal of the pericardial cyst under general anesthesia. The patient's postoperative course was uneventful and he was discharged on postoperative day 4 in a stable condition. Knowledge regarding the perioperative challenges associated with the removal of pericardial cysts can prevent complications and improve patient outcomes.

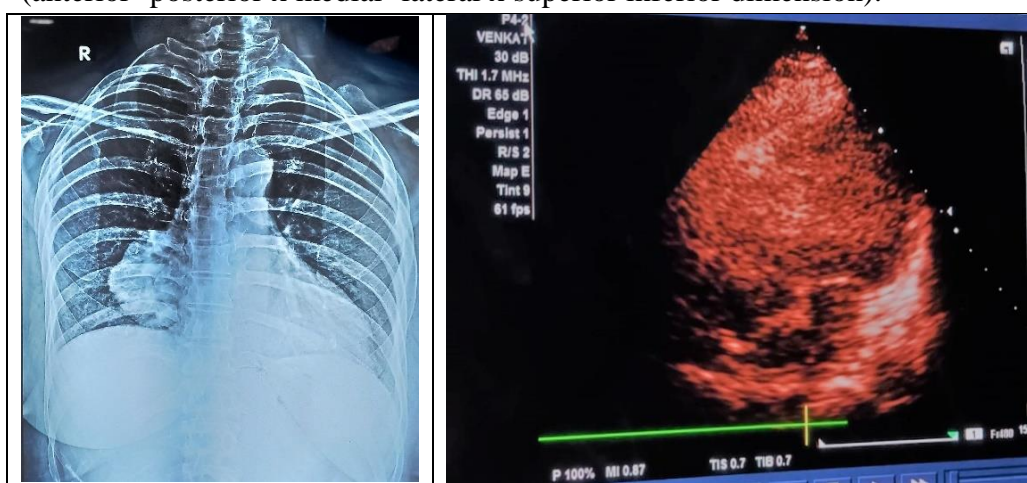
Key words: Pericardial cyst, anesthetic management, thoracoscopic surgery for cyst removal

Introduction

Pericardial cysts are uncommon benign intrathoracic lesions with incidence of around 1 in 100,000. They comprise of approximately 13-17% of all mediastinal cysts. (1, 2) They may be of varied aetiologies such as congenital, traumatic or infective. Patients with such cysts are usually asymptomatic or may present with symptoms due to compression effect to the adjacent structures like bronchus, oesophagus, left ventricle, and inferior vena-cava. Usually it is a diagnosed accidentally on radiological examination. They are presented as mediastinal opacity commonly located in right cardio-phrenic angle, less commonly left cardio-phrenic angle and rarely in the posterior or anterior superior mediastinum (1). Failure of fusion of mesenchymal lacunae forming pericardial sac in embryological stage results in development of pericardial cyst. (3) Pericardial cyst are also termed as spring water cyst due to presence of transparent thin wall with crystal clear fluid filled in it. (4) Although most patients are asymptomatic but may present with chest pain, cough, fever, and arrhythmias with localized pericardial effusion. We present here a rare incidental case of a patient diagnosed with large pericardial cyst on radiological examination and its management.

Case Presentation

A 43 year old female, presented to the emergency department due to fall from train. Her past medical history included acutely worsening breathlessness, sudden onset pleuritic chest pain, and sharp radiating pain since past two years. During presentation, the patient was afebrile with all vital parameters within the limits. There was no history of major trauma or chest infection in past. A well-defined oval opacification was observed at right cardio phrenic angle on X-ray chest which was followed by chest CT scan, echocardiography and MRI chest to further evaluate the patient. All investigations confirmed the diagnosis of cystic lesion in mediastinum - pericardial cyst (figure 1, 2). HRCT with contrast suggested a well-defined benign cystic lesion, with imperceptible wall noted in right paracardiac region which was indenting the right atrium and ascending aorta. Size of the lesion was 5.5x6.0x6.3 cm (anterior -posterior x medial -lateral x superior inferior dimension).



1a) X-ray suggesting right heart enlargement

1b) Echocardiographic findings of pericardial cyst

Figure 1: X-ray and Echo cardiograph findings of the patient

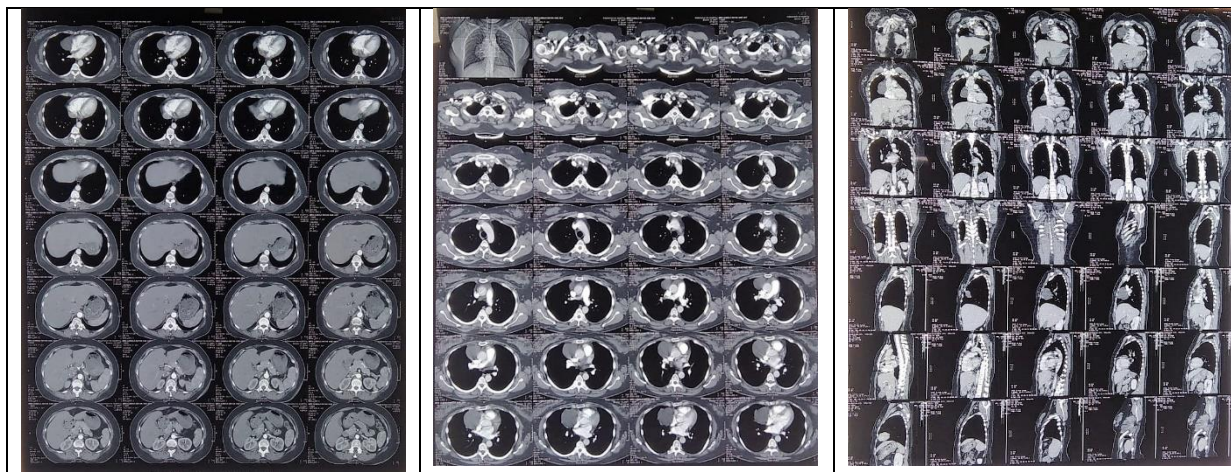


Figure 2: Radiological investigations of the patient

Patient was referred to cardiac surgery department for further evaluation due to the progressive growing characteristics indicating the possibilities of inflammation, haemorrhage or malignant transformation. Complete blood count, liver function tests, renal function tests, serum creatinine, and electrolyte levels, serum protein, liver function tests, renal function tests, coagulation profile including prothrombin time (PT with INR) were performed and all result were within the normal range.

Patient was prepared for pericardial cyst excision. Intravenous fluids were administered to patients for maintaining adequate hydration. Considering mass may compress on right atrium and right bronchus, care was taken to turn patient to opposite side if needed during the procedure. Induction of anaesthesia was done with midazolam 2 mg, fentanyl 100 mcg, propofol 100 mg, vecuronium 8 mg. Intubation done with 35 Fr left sided Double-lumen endotracheal tube (DLT) and correct placement checked with auscultation after clamping bronchial lumen. DLT is required as right lung needed to be deflated for right thoracotomy and visualization of mass with its feeding vessels and attachments. Left lateral position given and pressure points padded to prevent nerve injury. Proper eye care was given and DLT again checked to confirm its proper placement. Anaesthesia was maintained with Oxygen, sevoflurane 2%, Inj vecuronium 0.01 mg/kg and Inj fentanyl 1mcg/kg/hr. Left paravertebral block given at level of T6 to T12 before incision for intraoperative and post-operative pain relief. The fentanyl patch 25mcg/hr was applied for pain relief.

The procedure was performed by experienced cardiothoracic surgeon. The pericardial cyst measuring approximately 5.5x6.0x6.3 cm developed from the diaphragmatic surface of the right pericardium was located using thoracoscopy and excised using a mini-sternotomy incision (figure 3). During intraoperative examination it was verified that the volume of cyst fluid was 100 ml and devoid of haemorrhage or malignant cells which was carefully drained. Histopathology sample was also sent. Post-surgery, supine position was given to the patient followed by suctioning of both bronchial and tracheal lumen. Later on DLT was changed to normal endotracheal tube No 7.5 mm. Successful reversal with intravenous neostigmine 2.5 mg/kg and glycopyrrolate 0.5 mg/kg was done and after adequate breathing efforts and power

(head lift), extubation done on the operation table. The patient's vitals were found to be stable throughout the pericardial cyst excision process with successful extubation without any complications. On second day of the surgery, the patient was shifted to general ward under constant supervision and whole post-operative period was uneventful. The patient was discharged on the fourth post-operative day.



Figure 3: Intra-operative images of the pericardial cyst

Discussion

Pericardial cyst are rare entity usually found in the third or the fourth decade of the life with equal incidence in males and females. Predominantly patients with pericardial cyst do not show any significant symptoms hence its diagnosis is incidental. However symptoms may appear due to compression and mass effect in cases where cyst impinges on the adjacent tissues or undergoes any severe complications which would serve as important indicators for differential diagnosis of pericardial cyst.(5,6)

Pericardial cysts are usually unilocular, smooth, and smaller than 3 cm in diameter. Cyst size varies from 2 to 28 cm. In our patient, the cyst size was 5.5x6.0x6.3 in diameter which can be considered as large cyst. (1)

Our patient had past history of breathlessness, sudden onset pleuritic chest since last two years which may be because of compression of right atrium or ascending aorta by the cyst. Chronic non-productive cough with right chest pain deteriorating by positioning to either side was a common symptom observed in earlier reported study by Sokouti et al. On computed tomography examination a sharply-marginated cystic mass with dimensions of 14×10×7 cm and attenuation value of 40 HU was identified for which posterolateral thoracotomy was performed. (7) Dyspnea, chest pain and feeling of retrosternal pressure were described as some common symptoms experience in a case study of a 62 year-old male with a left-sided pleuropericardial cyst along with development of cardiac tamponade due to rupture in pericardial sac by Lozano et al. (8) Severe pain in right shoulder radiating towards left shoulder accompanied by heaviness in the substernal area along with breathlessness were also reported in a case study of patient with large pericardial cyst by Abdul- Mannan Masood et

al. (9) Recurrent syncope, palpitations, pneumonia were few unusual presentations of pericardial cysts reported in previous case studies. (10, 11)

CT (computed tomography) scans, MRI, or echocardiography are presented as best modality for differential diagnosis of pericardial cyst as they provide appropriate depiction of the pericardial anatomy with an advantage of precise localization of pericardial lesions, thickening and effusions in reported literatures. (1)

Percutaneous aspiration and ethanol sclerosis are recommended as initial treatment modalities for effective treatment of congenital and inflammatory cysts suggested by European Society of Cardiology. However data pertaining to long term safety and efficacy of such treatment modalities are inadequate to practice these techniques as a first line management option (12) Video assisted thoracotomy is recommended by previous reported literature as core treatment option for effective management of pericardial cyst due to minimal incision and blood loss with shorter healing duration, early post-operative discharge and infrequent complications. (13) A well mitigated diagnostic and treatment approach should be followed for effective management of pericardial cyst based on symptoms and severity of patients. Thoracotomy is a method of choice indicated for symptomatic patients with larger pericardial cyst associated with higher risk of morbidity and mortality. It is important for anesthesiologists to understand the physiological alterations caused by the presence of a large pericardial cyst, given that they may have to anesthetize patients with this rare cyst. (14) Team of a skilled surgeon and an anaesthetist having proper knowledge of pericardial cyst can perform the curative surgery for such cysts more easily.

Conclusion:

Pericardial cyst is a rare benign condition diagnosed incidentally on radiological examinations. Management of pericardial cysts depends on their symptom. If the patient is asymptomatic, serial echocardiography is enough, but if the patient is symptomatic or reveals an increase in the size of the cyst or has solid component in the cyst cavity in the serial follow-up, a cyst resection has been the most favoured approach with either thoracotomy or sternotomy or video-assisted thoracic surgery. Aspiration of cyst can be tried in small cysts but it has chance of recurrence. Skilled surgeon and anaesthetist with knowledge regarding the perioperative challenges associated with the removal of pericardial cysts can prevent complications and improve patient outcomes.

Declaration:

Funding: No funding was received for this study.

Competing Interest: The authors have no competing interests to declare.

Ethics Approval: The study protocol was reviewed and approved by the Institutional Ethics Committee. The study was carried out following the standards of clinical study as laid down in Schedule Y and new drugs and clinical trial act, 2020.

Consent to Participate and publication: The Participant was explained clearly about the nature and purpose of the study in the language they understood and written informed consent was obtained from the participant. The participant was ensured that their identity will not be revealed at any stage of the study.

Availability of data and Material: The details of patient's and complete data can be obtained from the corresponding author if required.

Code Availability: NA

Author's Contribution: Dr. Vasudeo Utpat has designed the concept of the study, literature review and data collection and analysis. Dr. Mangesh Rayban has contribution in study concept design, and treatment of patients and manuscript writing. Dr. Satish Suryavanshi has contribution in data collection and manuscript reviewing.

References:

1. Hekmat M, Ghaderi H, Tatari H, Arjmand Shabestari A, Mirjafari SA. Giant Pericardial Cyst: A Case Report and Review of Literature. *Iran J Radiol.* 2016 Jan 1;13(1):e21921. doi: 10.5812/iranjradiol.21921. PMID: 27110336; PMCID: PMC4835740.
2. Losanoff JE, Richman BW, Curtis JJ, Jones JW. Cystic lesions of the pericardium. Review of the literature and classification. *J Cardiovasc Surg.* 2003;44:569–576.
3. Elamin W.F., Hannan K. Pericardial cyst: an unusual cause of pneumonia. *Cases J.* 2008;1(July (1)):26.
4. Greenfield L., Steinberg L., Touroff A.S.W. Spring water cyst of the mediastinum. *J Thorac Surg.* 1943;12:495–502.
5. Parmar YJ, Shah AB, Poon M, Kronzon I. Congenital Abnormalities of the Pericardium. *Cardiol Clin.* 2017 Nov;35(4):601-614.
6. Bezgin T., Elveran A., Varol S., Doğan C., Karagöz A., Esen A.M. Pericardial cyst. *Herz.* 2014;39:1005–1007
7. Sokouti M., Halimi M., Golzari S.E.J. Pericardial cyst presented as chronic cough: a rare case report. *Tanaffos.* 2012;11(4):60–62.
8. Mejía Lozano P., Pérez Ortiz E., Puchaes Manchón C. Cardiac tamponade due to a pleuropericardial cyst with invasive lung cancer. *Arch Bronconeumol.* 2010;46 (December (12)):658–659. 10.1016/j.arb Ann Thorac Surg. 1996 Jan;61(1):208-10.
9. Masood A.-M., Ali O.M., Sequeira R. A hiding in the lining: painful pericardial cyst. *BMJ Case Reports.* 2013;2013 bcr2013008618.
10. Ilhan E., Altin F., Ugur O. An unusual presentation of pericardial cyst: recurrent syncope in a young. *Cardiol J.* 2012;19(2):188–191. patient.
11. Forouzandeh F., Krim S.R., Bhatt R., Abboud L.N., Ramchandani M., Chang S.M. Giant Pericardial Cyst Presenting as Pneumonia. In: Stainback R.F., editor. *Texas Heart Institute Journal*; 2012. pp. 296–297. 39 (2)
12. Maisch B., Seferović P.M., Ristić A.D. Task Force on the diagnosis and management of pericardial diseases of the European Society of Cardiology. Guidelines on the

diagnosis and management of pericardial diseases executive summary; the task force on the diagnosis and management of pericardial diseases of the european society of cardiology. *Eur Heart J.* 2004;25(April (7)):587–610.

13. Khandaker M.H., Espinosa R.E., Nishimura R.A. Pericardial disease: diagnosis and management. *Mayo Clin Proc.* 2010;85(6):572–593.
14. Gharedaghi MH, Ahmadi S, Khorasani A, Ebrahimi F. Anesthetic Management of a Patient with a Giant Pericardial Cyst Compressing the Right Atrium. *Case Rep Anesthesiol.* 2019 May 26;2019:2320879. doi: 10.1155/2019/2320879. PMID: 31263601; PMCID: PMC6556248.