Successful Sternotomy to Remove an Enlarging Symptomatic Pericardial Cyst

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Consent Statement
Written informed consent was obtained from the patient to publish this report in accordance with the journal’s patient consent policy.

Abstract
Pericardial cysts (PCs) are rare. Most are discovered incidentally on radiographic imaging and are asymptomatic. Symptomatic patients may complain of chest pain and dyspnea. Delays in diagnosis and treatment are common. We report the case of a symptomatic 57-year-old female. CT and echocardiography confirmed the diagnosis and location, and the cyst was removed via sternotomy. A systematic approach is desired for the management of PCs.

Introduction
Congenital pericardial cysts are fluid-filled, unilocular sacs lined by mesothelial cells. They typically form due to incomplete fusion of the pericardial sac during embryonic development [1]. Acquired pericardial cysts may result from trauma or inflammation of the pericardial sac. PCs occur in 1 in 100,000 patients and comprise 7% of all mediastinal masses [2]. They are most often found in the right cardiophrenic angle (70%) [1].

Pericardial cysts were first described at autopsy in the mid-19th century [3]. Pericardial cysts are now most often diagnosed incidentally on radiographic imaging or echocardiography. Most patients are asymptomatic (75%) [2].

Symptomatic patients typically complain of chest pain, dyspnea, and other symptoms resulting from the compression of structures adjacent to the pericardial sac. These symptoms may not correlate with physical activity. Worsening of symptoms at night has been reported in some patients. Nocturnal worsening of symptoms is gravity-dependent, resulting from a shift of fluid from the pericardium back into the pericardial sac [3].
Patients presenting with symptoms typically experience delays in diagnosis and treatment. An increased awareness of this condition with respect to standardized follow-up and treatment may improve patient outcomes.

We report the case of a 57-year-old female who presented with chronic symptoms resulting from a pericardial cyst in the left cardiophrenic angle.

Case Presentation

A 57-year-old female with a history of COPD and anxiety was referred to our clinic for evaluation of a pericardial cyst that had been incidentally diagnosed nearly two decades prior. She stated that approximately 3-4 years ago she began having hypertension and shortness of breath with activity. She had been recently evaluated for carotid artery disease, which was found to be negative for hemodynamically significant stenosis. She endorsed chest pain on her left side of her chest which could occur at any time. She also endorsed fatigue as well as progressive shortness of breath. She denied having lower extremity edema, orthopnea, PND, dizziness, or palpitations.

On imaging, CT revealed a large pericardial cyst measuring 5 cm in diameter (Figure 1). The patient stated feeling as if she had an egg inside her chest. The cyst was confined to the left cardiophrenic angle and was adjacent to the fifth rib along the inner chest wall. Transthoracic echocardiogram was normal with slightly elevated BNP.

![Figure 1. Computed tomography of the pericardial cyst in the left cardiophrenic angle, coronal (A) and transverse (B) views.](image)

Operative planning was discussed with the patient. She opted for removal via sternotomy.

On the day of the procedure, the patient was brought to the operating room and a median sternotomy was performed. The left pleural space was opened close to the sternum, as for a mammary artery takedown. The pericardial cyst was then visualized. It was localized at the left cardiophrenic angle, anterior to the phrenic nerve. There were numerous adhesions between the lung and the chest wall as well as between the lung and the mediastinal pleura. These were meticulously divided, staying close to the lung as to avoid injury to the phrenic nerve. The cyst was dissected away from the pericardium and pleura using a combination of blunt dissection and low-power electrocautery. We stayed 1 cm anteromedial to the phrenic nerve, which was visualized at all times. The cyst was removed intact and sent for pathology (Figure 2).
Results on pathologic exam described a thin-walled unilocular cyst filled with yellow-tinged fluid. Histology on microscopy detailed a simple benign cyst lined by bland attenuated epithelioid cells which were lined by mesothelial cells. Immunohistochemical staining was positive for calretinin and CK5/6, highlighting the mesothelial lining of the cyst wall. The morphology and immunophenotype were found to be compatible with a congenital mesothelial cyst.

The patient’s post-operative recovery was uneventful. She was discharged on the 10th post-operative day with plans for follow-up in clinic with serial echocardiography.

Discussion

Most patients who present with a pericardial cyst are asymptomatic. Pericardial cysts are most often detected incidentally on chest x-ray, echocardiography, or computed tomography [4]. Approximately 25% of patients experience nonspecific symptoms such as chest pain, cough, dyspnea, and palpitations. These symptoms are sporadic, resulting from the compression of structures adjacent to the pericardium. In rare instances, rupture of pericardial cysts with hemorrhage has been reported to cause cardiac tamponade [4].

Pericardial cysts are usually diagnosed by echocardiography, but CT and cardiac magnetic resonance imaging (CMR) offer better tissue characterization [4]. In general, when a pericardial cyst is detected by chest x-ray or echocardiography, either CT or CMR can be performed to confirm the diagnosis [5]. Standardized patient management in the case of a symptomatic pericardial cyst has yet to be described. Follow-up with serial CT or echocardiography is recommended [5].

Management of a pericardial cyst should follow a systematic approach. Surgery is recommended in symptomatic patients, large cysts, and radiologic features of compression or potential for malignancy. Video-assisted thoracoscopic surgery (VATS) is the preferred approach [6]. VATS is associated with less blood loss and decreased length of stay. Other approaches include mediastinoscopy, sternotomy, and thoracotomy. If conservative measures are desired, imaged-guided aspiration is also a possibility with a 33% risk of recurrence [6].

Regarding the patient’s history, one must note how a rare, typically benign congenital anomaly was regarded in the case of a symptomatic patient. Initially detected on a routine chest x-ray, a dumb-bell shaped cyst surrounding the patient’s heart was documented. Approximately five years later, the cyst was diagnosed as
a pericardial cyst on chest CT. For two decades, this patient experienced episodes of substernal chest pain localized to her left side. Although the differential diagnosis for chest pain is broad, the patient reported low-grade chest pain on her left side, rib pain, and shortness of breath which were not relieved with typical pain management. This occurred over the course of multiple ED visits extending over a period of 10 years. During a period of 2 years, a doubling of size was also noted from 2 to 4 cm. Furthermore, the patient opting for sternotomy rather than VATS may reflect patient desire for definitive treatment after experiencing a prolonged symptomatic period.

Conclusion

A standardized system of symptomatic pericardial cyst management comprised of criteria pertaining to size, growth, and symptoms may improve patient outcomes by decreasing the duration between diagnosis and treatment. In this patient’s case, timely acknowledgement of a symptomatic pericardial cyst and appropriate discussion would have decreased the duration of which the patient endured symptomatic episodes but would have likely facilitated a less invasive form of surgical treatment with equal likelihood of cure.

References