

Cardiophrenic Angle Opacity: A Diagnostic Dilemma

Mriganka Juneja¹, Uday C. Kakodkar², Sanjivani Keny³, Durga Lawande⁴

¹ Junior Resident, Department of Pulmonary Medicine, Goa Medical College, Taleigao, Goa, India. PIN - 403002

² Associate Professor and Unit Head, Department of Pulmonary Medicine, Goa Medical College, Taleigao, Goa, India. PIN - 403002

³ Associate Professor, Department of Pulmonary Medicine, Goa Medical College, Taleigao, Goa, India. PIN - 403002

⁴ Professor and Head, Department of Pulmonary Medicine, Goa Medical College, Taleigao, Goa, India. PIN - 403002

Abstract: *Cardiophrenic angle opacity on chest radiograph has varied differential diagnoses including pericardial fat pad, pericardial fat necrosis, mediastinal tumours, pericardial cyst, diaphragmatic hernia, and lymphadenopathy. We present two cases with cardiophrenic angle opacities on chest radiograph in view of their unusual presenting features and the diagnostic dilemma they put forth. Despite the variations in their presentation and clinical course, both were diagnosed as cases of pericardial cyst.*

Keywords: Pericardial cyst, pleuropericardial cyst, cardiophrenic angle opacity

1. Introduction

Cardiophrenic angle opacity on chest radiograph has varied differential diagnoses including pericardial fat pad, pericardial fat necrosis, mediastinal tumours, pericardial cyst, diaphragmatic hernia, and lymphadenopathy [1]. Pericardial cysts are rare congenital anomalies with an incidence rate of 1 in 100,000 persons. They are usually located in the middle mediastinum, most commonly at the right cardiophrenic angle in 70% of cases, left cardiophrenic angle in 22% of cases, and in the posterior or anterior part of the mediastinum in the remaining cases.

About 75% cases of pericardial cyst are asymptomatic and diagnosed incidentally on chest radiography. However, they may seldom present with symptoms such as dyspnoea, cough, and chest pain [2],[3]. We present two cases with cardiophrenic angle opacities on chest radiograph in view of their unusual presenting features and the diagnostic dilemma they put forth. Despite the variations in their presentation and clinical course, both were diagnosed as cases of pericardial cyst.

2. Case Reports

2.1 Case 1: Right-sided cardiophrenic angle opacity

A 65 year old female presented with history of non productive cough, dyspnea on exertion and right-sided dull aching chest pain for 6 months. She did not have any co-morbid conditions or addictions or any history of previous anti-tubercular treatment. She gave history of hysterectomy done 10 years ago. She was referred as a case of right sided encysted empyema based on chest ultrasound done at sub-district hospital, where she had received a course of antibiotics and sputum smear examination for acid fast bacilli had been done which was negative. On examination, vitals were stable; general and systemic examinations were unremarkable. Blood counts, renal and liver function tests, and electrocardiogram did not show any abnormality. The chest radiograph PA view (Fig.1), revealed a homogeneous,

well demarcated opacity occupying the right cardiophrenic angle and silhouetting the right cardiac border and right dome of diaphragm. Further investigations were done keeping in mind the probable diagnosis of empyema, pleuropericardial cyst, diaphragmatic hernia or mediastinal mass. Transthoracic echocardiography showed a localised echo-free space towards the right atrium, suggestive of a pericardial cyst. To confirm the diagnosis, a contrast enhanced chest CT scan was done (Fig.2) which revealed a fluid density lesion in the right cardiophrenic space, abutting the right heart border, measuring 7 x 4 x 1.5 cm, which did not show significant enhancement on post contrast scan. These findings were consistent with pleuropericardial cyst. Incidentally, a hiatus hernia was also noted. Patient was given the option of surgery, which she refused.

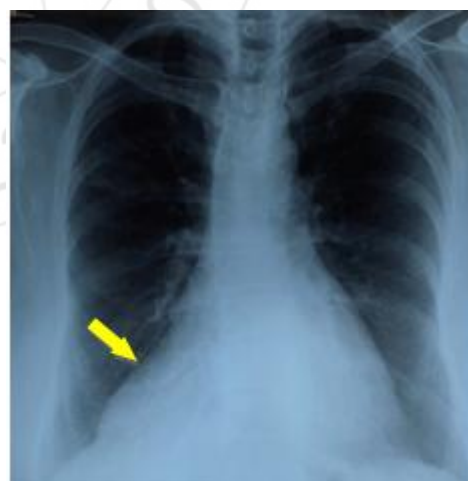


Figure 1: Chest radiograph showing right cardiophrenic angle opacity

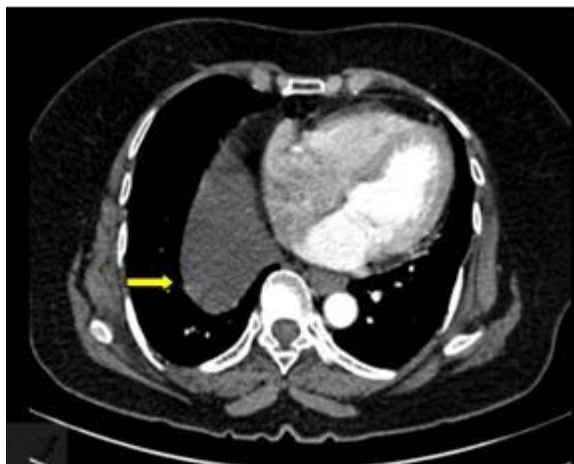


Figure 2: CT thorax showing a fluid density lesion in the right cardiophrenic space.

2.2 Case 2: Left-sided cardiophrenic angle opacity

A 65 year old female was referred as a case of persistent cough. She was a known hypertensive, controlled with regular medications. She was symptomatic with non-productive cough for one year. There was no history of addictions or previous anti-tubercular treatment. The physical examination revealed no abnormality. Respiratory system examination was normal. All her routine blood investigations were normal except for raised blood sugars and she was diagnosed as diabetic. Her ECG was normal. The PA chest radiograph (Fig. 3), revealed a homogeneous opacity in the left lower zone, causing obliteration of the left cardiophrenic and costophrenic angles, and obscuring the left cardiac border. Transthoracic echocardiography showed mild concentric LVH, grade 1 left ventricular diastolic dysfunction and pleural effusion. We proceeded further with the differential diagnosis of cardiomegaly, left pleural effusion and a left lower lobe mass. Chest ultrasound did not reveal any pleural effusion. Contrast enhanced chest CT (Fig. 4) showed a large, well defined cystic lesion in the anterior mediastinum in the left cardiophrenic recess, in close relation to the left lateral aspect of the pericardium. The lesion measured 10 x 3.4 x 5.5 cm in size with fluid attenuation levels of 9-19 HU. No significant enhancement was noted on post contrast scan. These findings were suggestive of a pleuropericardial cyst. The patient was referred to cardiothoracic surgeon for surgical cyst excision, however in view of the high risk involved, the surgery was deferred.

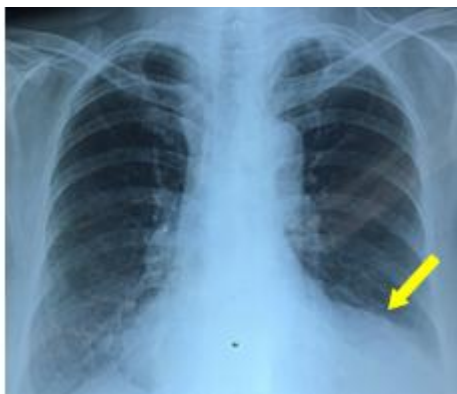


Figure 3: Chest radiograph showing left lower zone opacity silhouetting the left heart border and the dome of diaphragm

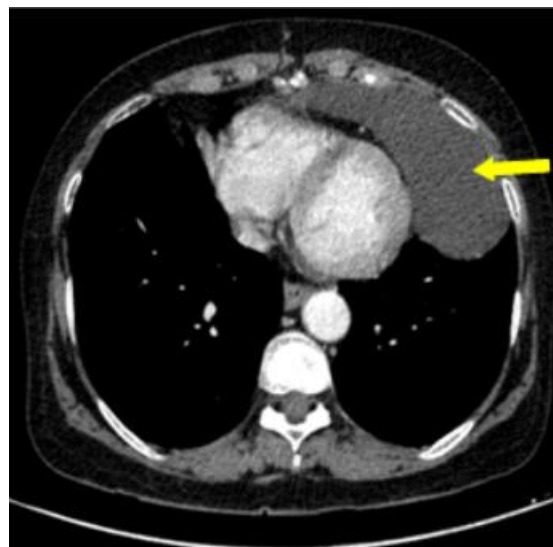


Figure 4: CECT Thorax showing a cystic lesion in the left cardiophrenic recess

3. Discussion

Pericardial cyst, also known as pleuro-pericardial cyst, pericardial coelomic cyst, mesothelial cyst, spring water cyst, is an uncommon congenital anomaly occurring in 1 in 100,000 persons. It accounts for about 6% of mediastinal masses and 33% of mediastinal cysts. Other cysts found in the mediastinum are bronchogenic cysts, enteric cysts, thymic cysts and others [2].

Pericardial cysts are benign lesions that result from an aberration in the formation of coelomic cavities, wherein there is a failure of fusion of one of the mesenchymal lacunae that form the pericardial sac. They are cyst walls are made up of connective tissue and a single layer of mesothelial cells. They usually contain clear, serous fluid (hence the term 'spring water' cyst). They are always attached to the pericardium, although a visible communication between the cyst and the pericardium is rarely found [4],[5].

They are usually located in the middle mediastinum, most commonly at the right cardiophrenic angle in 70% of cases, left cardiophrenic angle in 22% of cases, and in the posterior or anterior part of the mediastinum in the remaining cases. Mostly they are asymptomatic (50-75%) and are incidentally detected on routine chest radiography. However, they can present with chest pain, shortness of breath, or persistent cough due to compression of the cyst on the adjacent organs. Life-threatening complications like sudden death, cardiac tamponade, and obstruction of the right main bronchus have also been reported. Other reported complications include right ventricular outflow obstruction, inflammation and infection, atelectasis, pulmonary stenosis, atrial fibrillation, and congestive heart failure [3], [4], [5].

The diagnosis of pericardial cyst is suspected by the presence on chest radiograph of a homogeneous, rounded mass with well-defined borders occupying the cardiophrenic space. The differential diagnosis of cardiophrenic angle opacity on chest radiograph includes pericardial fat pad, pericardial fat necrosis, mediastinal tumours, pericardial cyst,

diaphragmatic hernia, and lymphadenopathy. Additional imaging modalities found to be useful in the diagnosis of pleuropericardial cyst are trans-thoracic echocardiography, CT scan and magnetic resonance imaging (MRI). Contrast-enhanced CT scan has been the modality of choice for diagnosis and follow-up [3]. On CT scan, the pericardial cyst is thin-walled, sharply defined, oval homogeneous mass. Due to the fluid content, their attenuation is 0-20 HU, although it may slightly higher than water density (30 - 40 HU). MRI findings are also diagnostic, showing high signal intensity on T2-weighted images and low signal intensity on T1-weighted images. They do not enhance with intravenous contrast [1], [5].

Once a diagnosis is made by contrast-enhanced CT scan or MRI study, further management depends on the symptoms of the patient. An asymptomatic patient may be monitored with radiological imaging like echocardiography, non-contrast low-dose CT scan or MRI study. The frequency of follow-up imaging has not been established. Spontaneous resolution of pericardial cyst has been described in a few cases, probably due to rupture of the cyst [6], [7]. However, there is little information about the safety and appropriate length of observation. The longest reported follow up lasted twenty five years, and yielded a 2.5L cyst at the time of resection [8]. The indications for resection of pericardial cysts include large size, symptoms, patient concern, uncertainty of malignant potential, and prevention of the life threatening emergencies. The most favoured approach is cyst resection with either a thoracotomy or video-assisted thoracoscopic surgery. Histopathological examination of the resected cyst establishes the definitive diagnosis. Echocardiography and USG-guided percutaneous aspiration of pericardial cysts has been reported, but according to one literature review, about one-third of patients showed recurrence on follow up. Sclerosis has been reported to decrease recurrence rate after aspiration [3],[4],[6].

Morbidity and mortality associated with the lesion are low and surgery is the only definitive, curative treatment.

4. Conclusion

This case series highlights the role of using different investigative modalities to arrive at a diagnosis in a patient presenting with a cardiophrenic angle opacity on chest radiograph, the differential diagnoses of which has varied treatment implications.

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