

Caseous mitral annular calcification mimicking a lung tumor on chest X-ray

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ABSTRACT

Mitral annular calcification (MAC) is a common condition of the mitral valve apparatus. A case involving caseous calcification, a rare variant of MAC is presented. This variant which has a benign course can present as an intracardiac mass and needs to be differentiated from more sinister causes of calcified cardiac masses such as tumor, abscess, and infective vegetation. Often, this requires multimodality imaging with echocardiography, computed tomography, and magnetic resonance imaging. Features of caseous calcification of the mitral valve on these imaging modalities are reviewed as the associations and clinical features.

Keywords: Lung mass, lung cancer, mitral annular calcification, posterior mitral annular calcification

Introduction

Caseous mitral calcification is a rare benign condition that can be mistaken for a tumor or abscess. Multimodality imaging is a key to make a correct diagnosis and avoiding unnecessary interventions.

Case Report

A 77-year-old gentleman with a history of atrial fibrillation, congestive heart failure, hypertension, and chronic renal impairment presented with shortness of breath on minimal exertion and orthopnea which had developed over a 2-day period. He denied chest pain or palpitations and gave no prior history of cough or sputum production, chills, or rigors. He claimed his appetite was normal and he had not lost any weight over the preceding weeks. He had never smoked and did not drink alcohol on a regular basis. He had no family history of note. He was on carvedilol 6.25 mg twice a day, bumetanide 1 mg twice a day, spironolactone 12.5 mg daily, and warfarin 6.5 mg daily.

On examination, he was tachypneic, with saturations of 92% off oxygen. He was hemodynamically stable with a pulse rate of 70 bpm and a blood pressure of 106/64 mmHg. On auscultation of the chest, a pansystolic murmur grading 3/6 was heard over the mitral area and radiated to the axilla, his JVP was not raised. Chest percussion revealed stony dullness over the lower one-third of the left chest associated with a decreased air entry and decreased vocal resonance. Fine end-inspiratory crepitations were audible in the right base. His trachea was shifted to the right. Abdominal examination revealed no organomegaly. He had no pitting edema and there was no lymphadenopathy.

An electrocardiogram showed atrial fibrillation at a rate of 50 bpm with no other abnormalities. The admission chest x-ray (CXR) revealed a large unilateral left pleural effusion with deviation of the trachea to the right. There was also congestion and fluid in the interlobar fissure on the right and upper lobe venous diversion.

The complete blood count was unremarkable and his erythrocyte sedimentation rate was 26 and his C-reactive protein was 45.

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He had mild renal impairment with creatinine of 113 $\mu\text{mol/L}$ and urea of 5.3 mmol/L. Electrolytes were not deranged. His international normalized ratio was 2.20. Liver function tests were unremarkable.

Therapeutic tapping of the pleural effusion was carried out, 500 mls of blood tinged fluid were drained. The fluid was exudative with a pleural fluid lactate dehydrogenase of 429 μL and fluid protein of 41 g/L. Cytology and cultures were negative.

The post-tapping CXR can be seen in Figure 1. It shows residual left pleural effusion and a lobulated, calcific dense opacity projected over the cardiac shadow, initially thought to be originating from the lung in view of the presentation with unilateral blood tinged pleural effusion.

A computed tomography (CT) scan of the thorax was performed to characterize the mass further. Figure 2 demonstrates a small residual left pleural effusion. The calcific dense opacity visible on CXR corresponds to a large homogenous tumefactive calcification located in the posterolateral aspect of the mitral annulus suggestive of caseous mitral annular calcification (MAC). Coronary artery calcification (not shown on the image) was also evident. The lung parenchyma was clear. There was no lymph node enlargement and the liver showed no abnormalities.

On echocardiography, a homogenous calcified mass measuring 3.5 cm \times 3.2 cm localized to the posterior mitral valve leaflet was visualized [Figure 3]. The mitral valve leaflets were not involved, but there was a mild degree of mitral regurgitation with dilatation of the left atrium. Left ventricular dimensions were normal and contractility was not impaired.

The patient was treated with intravenous diuretics and his carvedilol was stopped until his chest was clear. He was subsequently restarted on carvedilol and oral diuretics and discharged home.

Discussion

MAC is commonly seen in the elderly, present in 10% of patients older than 50 years of age.^[1] It was an incidental finding in 15% of CT scans performed to exclude pulmonary embolism.^[2] It usually involves the posterior mitral valve annulus. The severity can vary from focal calcific deposits to circumferential heavy calcification of the valve.^[1]

Besides age, it is commonly associated with chronic renal insufficiency and hypertension.^[1] Rarer associations include osteoporosis in women,^[3] nitrogen-containing bisphosphonate therapy in women <65 years old,^[4] rheumatoid arthritis, and systemic lupus erythematosus.^[5] The extent of MAC also correlates with the presence, extent, and vulnerability of coronary plaques.^[6]

MAC is commonly associated with mitral regurgitation, especially if the valve leaflets are involved. Alternatively, involvement of the leaflets can result in functional mitral stenosis which is not

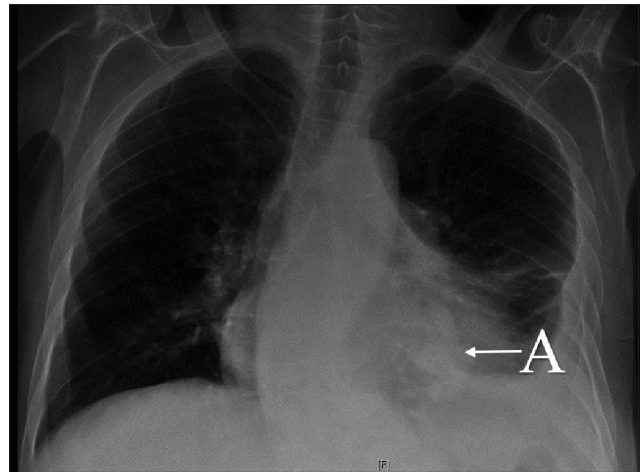


Figure 1: Posttapping chest-X-ray showing a unilateral left pleural effusion and the mass labeled (A)

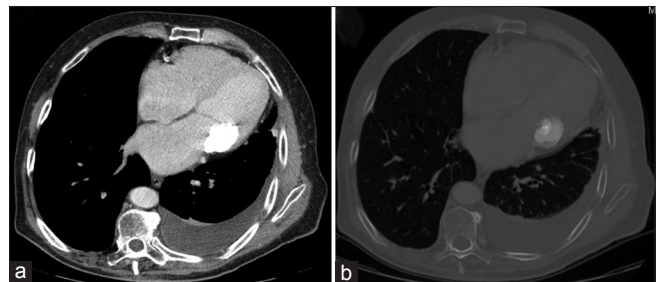


Figure 2: Computed tomography thorax showing caseous mitral annular calcification. Large tumefactive calcification located in the posterolateral aspect of the mitral annulus suggestive of caseous mitral annular calcification on thoracic window (a) but best appreciated on bone window setting (b)

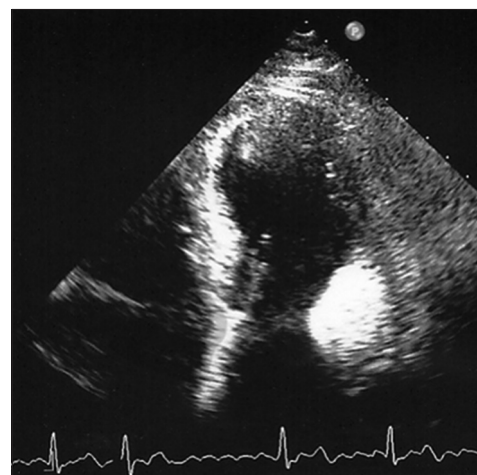


Figure 3: Echocardiographic appearance of mitral annular calcification

amenable to valvuloplasty. Its most important clinical implication is in valve placement where heavy calcification can hinder prosthetic valve placement and increase the risk of paravalvular leaks.^[1] However, in a recent series, despite the presence of MAC, mitral valve replacement was found to have favorable outcomes.^[7] MAC has also been controversially associated with

conduction abnormalities, atrial fibrillation, coronary artery disease, stroke risk.^[8]

Caseous calcification of the mitral annulus is a rare variant of MAC constituting about 0.63% of all MAC cases^[9] but was present in 2.7% of individuals in a large autopsy series.^[8] Caseous MAC is more likely to be mistaken for a cardiac mass or abscess.^[8] Unlike other cardiac masses, MAC demonstrates hyperattenuation on unenhanced CT.^[8] Non-caseous MAC usually forms a C shape around the mitral valve and are more hyperattenuating. The difference between non-caseous and caseous can be best appreciated on “bone window” setting which in the case of caseous MAC reveals a shell of calcification and an area of central homogenous hyperattenuation.^[8,10] Caseous and non-caseous MAC can also be distinguished on magnetic resonance imaging, in which caseous MAC gives a high T1 signal and a low T2 signal on noncontrast sequences and a unique peripheral enhancement of the mass with late gadolinium enhancement. Non-caseous MAC gives a low T1 signal.^[8] On echocardiography, caseous MAC usually presents as a round or semilunar echodense mass in the mitral annulus with central echolucency.^[8] Our patient was particular because on echocardiography, the mass appeared homogenous without a central lucent area.

The case described highlights the importance of considering MAC when confronted with a lesion on CXR overlying the heart. This case was particularly interesting due to the fact that the MAC was the rarer caseous variant.

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Conflicts of interest

There are no conflicts of interest.

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