Case 13950

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Pericardial sarcomatoid mesothelioma with right atrial involvement: Cardiac MRI findings

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Section: Cardiovascular
Area of Interest: Cardiac
Procedure: Diagnostic procedure
Imaging Technique: MR
Special Focus: Neoplasia Case Type: Clinical Cases
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Patient: 30 years, female

Clinical History:

The patient presented with attacks of syncope, elevated liver enzymes & generalized oedema associated with recurrent haemorrhagic pericardial effusion after drainage for 3 times. History of preeclampsia 4 months ago was given as well. On physical examination, the patient appeared pale.

Imaging Findings:

Echocardiographic-Doppler study: showed massive amount of pericardial effusion, decreased right ventricular function and a right atrial intraluminal echogenic mass.

CMRI study showed:
*A well-defined mass with lobulated margin measuring 6 x 7 x 6.5 cm, inseparable from the roof, inferior & lateral walls of the right atrium displaying low signal intensity with high signal areas in T1WI & high signal intensity in T2WI. It showed heterogeneous enhancement after contrast injection. The mass is attached to the overlying pericardium with infiltration of the infero-lateral wall of right atrium. It reached the right atrio-ventricular junction and minimally bulged into the IVC ostium. No extension into the right ventricle, SVC or IVC lumen was seen.
*A large amount of mixed signal pericardial fluid.
*Normal right & left ventricular functions.

Chest CT study: confirmed the presence of the right atrial intraluminal mass with bilateral pleural effusion& few enlarged mediastinal lymph nodes.

Abdominopelvic CT: showed a right hepatic lobe haemangioma.

Discussion:

Mesothelioma is a malignancy of the serous epithelial cells of the pleura, peritoneum, pericardium and the testicular vaginal epithelium. Malignant pericardial mesothelioma is very rare and highly lethal [1]. Primary cardiac tumours are very rare; metastases to the heart are more common. Most of primary heart tumours are benign. Cardiac sarcomas include angiosarcomas, rhabdomyosarcomas, malignant mesotheliomas and fibrosarcomas. Angiosarcoma is the most common type affecting adults [2].

Patients usually present clinically with shortness of breath due to pericardial effusion or heart failure [3]. Cardiac

tamponade is a frequent symptom. Imaging is needed to determine the tumour location and tumour resectability [2]. Differentiation between malignancy and reactive hyperplasia is important. Deep tissues infiltration indicate a malignancy. Metastases occur to the regional lymph nodes, lungs and kidneys [1].

Diagnostic procedures include plain chest X-ray, Echocardiography, Computed Tomography (CT) and Cardiac Magnetic Resonance Imaging (CMRI). The plain chest X-ray may show a mass lesion in the form of cardiac shadow enlargement [2].

Echocardiography is usually the initial imaging procedure as it can assess the valves, function of the ventricles and intracardiac masses but it is operator-dependent with a restricted field of view. Differentiation between thrombi, benign and malignant tumours is often difficult [2, 4].

CT can assess tumour site, extent and presence of calcification. Detection of enhanced soft tissue pericardial nodules is helpful for the diagnosis. It is an alternative procedure when CMRI cannot be performed. CT uses ionizing radiation and has inferior soft-tissue resolution compared to CMRI [3, 4].

CMRI is essential for the assessment of cardiac tumours due to its ability to characterize tissues and to view the heart and surrounding structures. It can confirm the tumour site and differentiate between the benign & malignant lesion. The CMRI features suggesting malignancy are: invasion of surrounding structures, right-sided heart lesions, heterogeneity, ill-defined borders, >5 cm diameter, and presence of pericardial or pleural effusion [5]. Pericardial mesothelioma may present as a multinodular heterogeneous mass within the pericardial space [6].

The prognosis is poor even with adjuvant chemo-radiotherapy and it is difficult to perform complete surgical resection [4]. Death occurs on average in less than 6 months [6].

CMRI is the reference technique for evaluation of tumour extent and nature. The standard CMRI protocol is usually sufficient with postcontrast and cine sequences being vital in the assessment of the vascularity, mobility and attachment of these masses. Familiarity with the characteristic radiologic features of benign and malignant lesions will influence diagnosis and treatment plan [4].
Differential Diagnosis List: Pericardial sarcomatoid mesothelioma infiltrating the right atrium, Metastasis to the pericardium either from distant malignancy or from the surrounding structures, Cardiac angiosarcoma, Pericardial fibrosarcoma

Final Diagnosis: Pericardial sarcomatoid mesothelioma infiltrating the right atrium

References:

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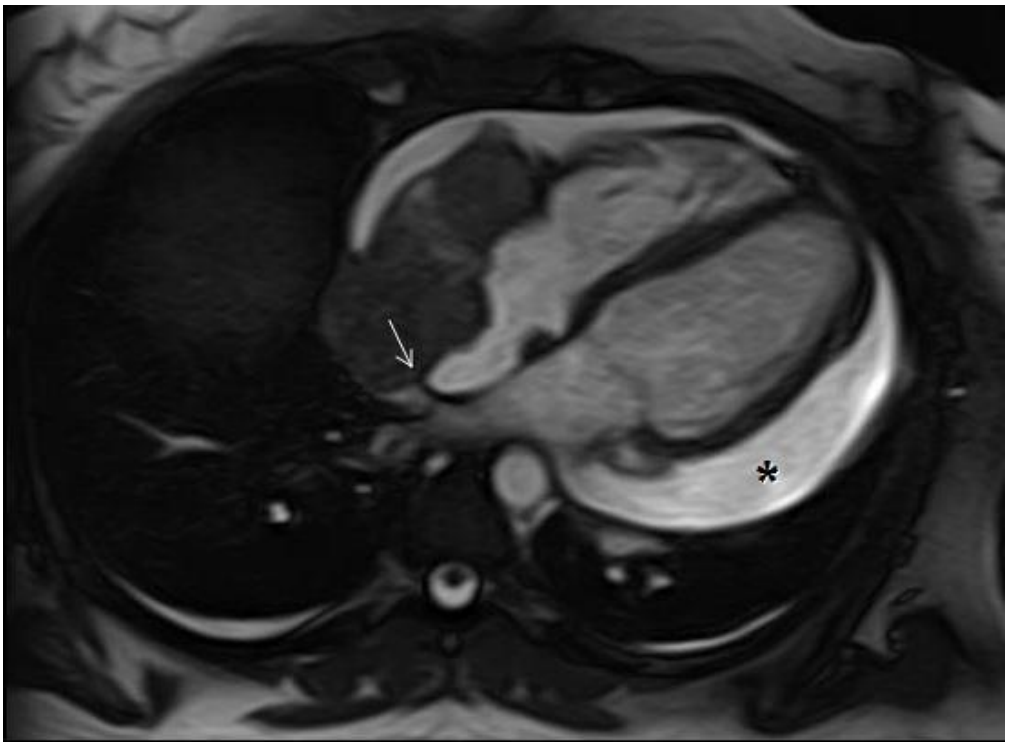
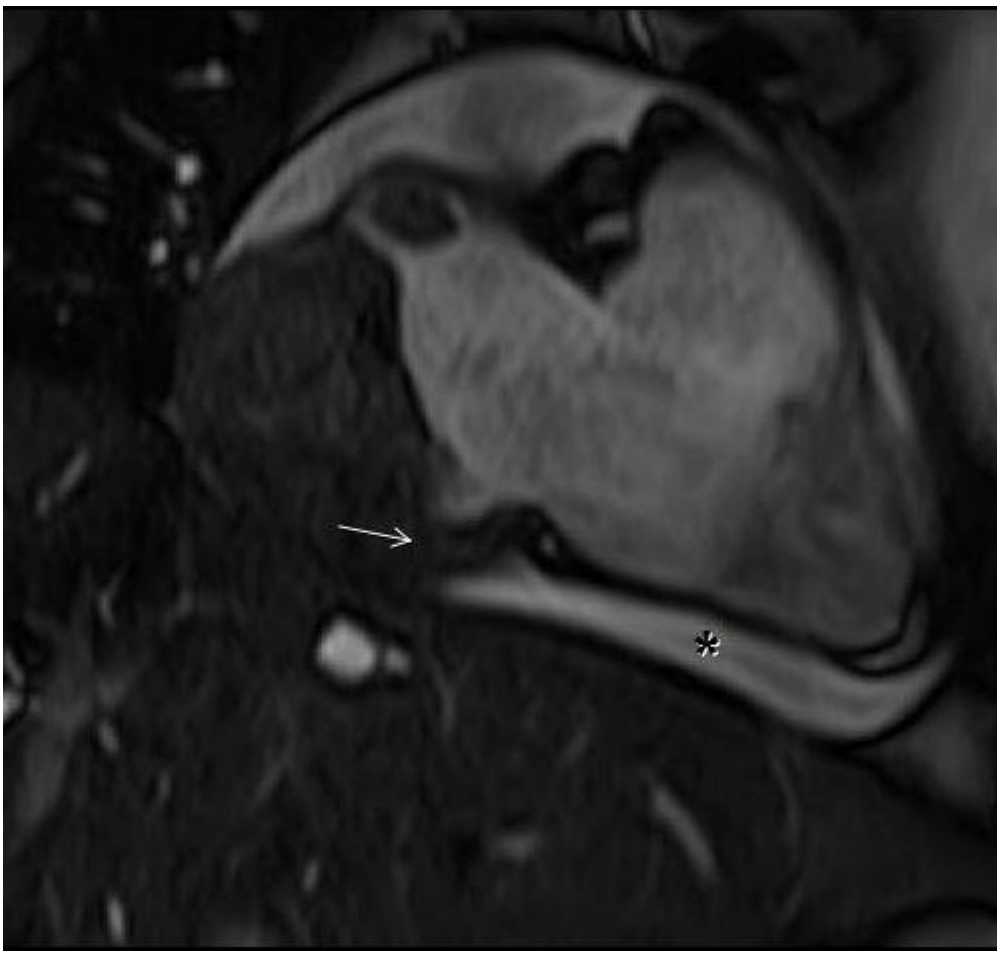
Figure 1

a



Description: CMRI axial SSFP sequence demonstrates a mass inseparable from the right atrial free wall, attached to the overlying pericardium with infiltration of the right atrial lateral wall "arrow". Marked pericardial fluid is noted (*). **Origin:** Nooman NA, Eltomey MA, Department of Diagnostic Radiology, Faculty of Medicine, Tanta University, Egypt.

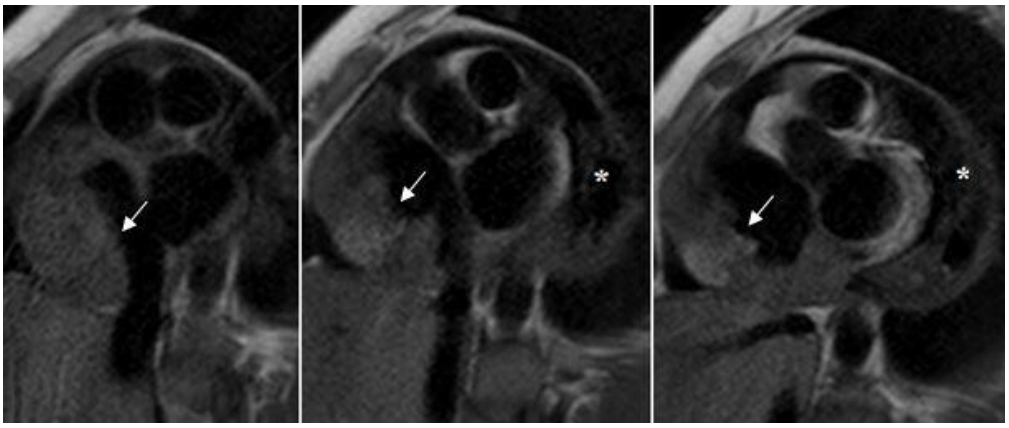
b



Description: CMRI 2-chamber SSFP sequence demonstrates a mass inseparable from the right atrial roof & inferior wall, attached to the overlying pericardium with infiltration of the inferior right atrial wall "arrow". Marked pericardial fluid is noted(*). **Origin:** Nooman NA, Eltomey MA, Department of Diagnostic Radiology, Faculty of Medicine, Tanta University, Egypt.

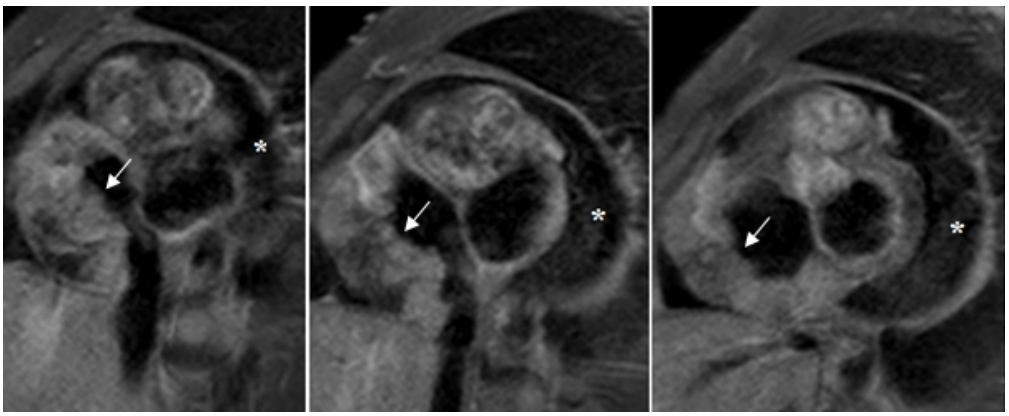
Figure 2

a



Description: CMRI serial short-axis T1W black-blood images pre-contrast injection demonstrates a mass inseparable from the right atrial infero-lateral wall showing high signal areas & filling the atrial cavity "arrow". Marked mixed signal pericardial fluid is noted(*). **Origin:** Nooman NA, Eltomey MA, Department of Diagnostic Radiology, Faculty of Medicine, Tanta University, Egypt.

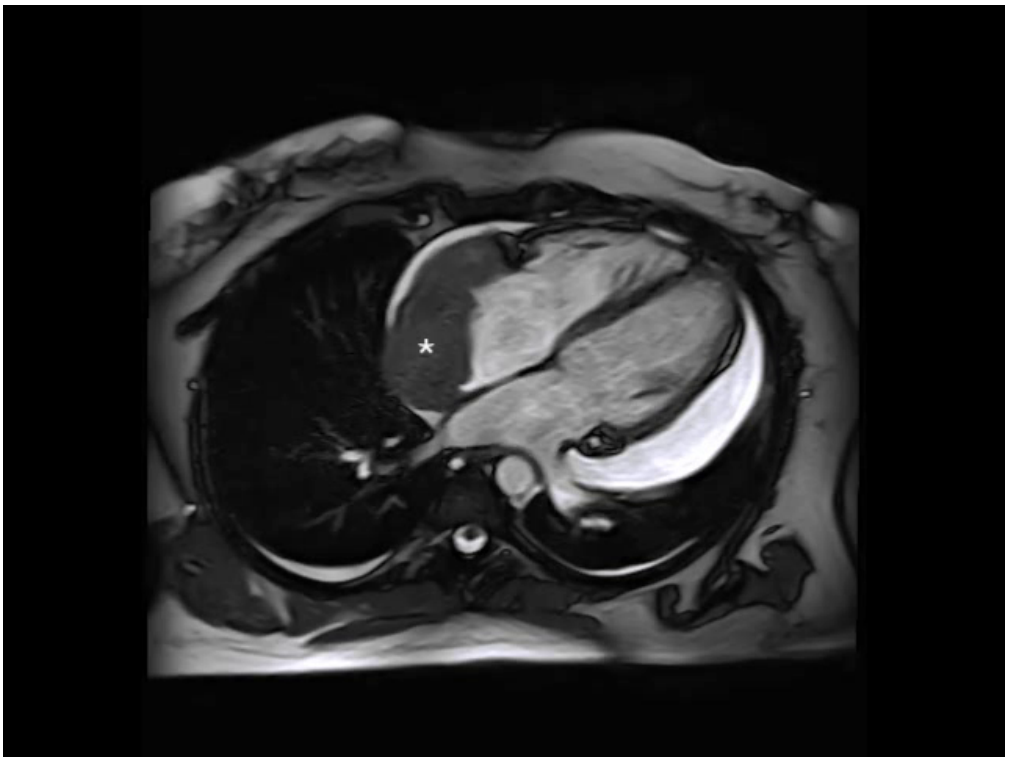
b



Description: CMRI serial short-axis T1W black-blood images post-contrast injection demonstrates a heterogeneously enhanced mass inseparable from the right atrial infero-lateral wall, filling its cavity "arrow" & mildly encroaching upon IVC ostium. Marked mixed signal pericardial fluid(*). **Origin:** Nooman NA, Eltomey MA, Department of Diagnostic Radiology, Faculty of Medicine, Tanta University, Egypt.

Figure 3

a



Description: Cine loop for cardiac MRI axial SSFP sequence demonstrates a stiff mass (*) infiltrating the free wall of the right atrium with a fixed attachment to the overlying pericardium throughout the cardiac cycle. **Origin:** Nooman NA, Eltomey MA, Department of Diagnostic Radiology, Faculty of Medicine, Tanta University, Egypt.