

# An Incidental Thymoma Detected on Cardiac MRI

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## Abstract

We report a rare case of a thymoma discovered incidentally during a Cardiac Magnetic Resonance Imaging (CMR) performed to evaluate suspected constrictive pericarditis. A 38-year-old man with known ocular myasthenia gravis and asthma presented with dyspnoea, generalised oedema, and bilateral pleural effusions. Echocardiography showed an abnormal septal movement raising the possibility of constrictive physiology. A CMR was initially performed for suspected constrictive pericarditis but instead revealed a large anterior mediastinal mass later confirmed to be a thymoma. This case underscores the broader diagnostic utility of CMR and the clinical relevance of extracardiac findings.

**Keywords:** Incidental finding; Extra-cardiac pathology; Cardiovascular Magnetic Resonance; Thymoma

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## INTRODUCTION

Cardiac Magnetic Resonance Imaging (CMR) is widely accepted as the non-invasive gold standard for the assessment of cardiac structure and function, quantifying ventricular volumes and myocardial mass and is guideline recommended for evaluating myocardial and pericardial diseases.<sup>1,2</sup> CMR studies are increasing with trends in the United States and United Kingdom show-

ing dramatic increase in numbers of CMR performed.<sup>3,4</sup>

Beyond its primary cardiac indications, CMR can also reveal extracardiac findings which may have significant clinical implications. Studies have found a range of extracardiac findings between 8% and 81% and a range of major extracardiac findings between 2% and 31%. Extra-cardiac findings resulted in a change in management in

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up to 2% of patients undergoing CMR. This is of particular importance to large volume CMR centres.<sup>5-8</sup>

Thymomas are rare neoplasms arising from thymic epithelial cells, accounting for less than 1% of all malignancies with an estimated incidence of 1 to 3 cases per million people per year worldwide.<sup>9</sup> Thymomas are the most common primary tumour occurring in the anterior mediastinum, occur most commonly between the ages of 40 and 60 years and are associated with myasthenia gravis.<sup>10</sup> We report a case of a thymoma detected incidentally during CMR in a patient with ocular myasthenia gravis and symptoms of fluid overload.

### CASE REPORT

A 38-year-old male with a background of ocular myasthenia gravis and asthma presented with progressive dyspnoea, lower limb oedema, abdominal distension and weight gain of 20 kilogram over a period of 6-8 weeks.

Clinical examination revealed lower limb oedema up to the scrotum, ascites, and signs of bilateral pleural effusions.

Chest X-ray (CXR) confirmed bilateral moderate pleural effusions and pulmonary congestion (**Figure 1**). Electrocardiography (ECG) showed sinus rhythm with poor R wave progression and rightward axis deviation.

Blood investigations were largely unremarkable except for hypoalbuminemia of 27 g/L. (35-50 g/L). NT-proBNP was not elevated at 46 pg/mL (<125 pg/mL) and urinalysis showed no proteinuria or haematuria. Urine protein/creatinine ratio was normal at 9.7 mg/mmol (< 45 mg/mmol). A 24-hour urine collection showed urine protein of <0.068 g/l (<0.299 g/day). Anti-nuclear antibody was homogenous positive with titer 1:320 (Negative < 1:80) by immunofluorescence assay while the rest of the auto-immune screen was negative.

He was started on intravenous furosemide boluses, later transitioned to continuous furosemide infusion. Spironolactone and metolazone were then added as there was no improvement in fluid status. A departmental transthoracic echocardiograph was performed to assess the cardiac function and this revealed normal cardiac chamber size with preserved left and right ventricular systolic function, a small pericardial effusion and large left pleural effusion. There was abnormal movement of the ventricular septum raising the possibility of constrictive pericarditis. Cardiology consult was therefore sought.



**Fig. 1:** Chest X-ray showing bilateral pleural effusions.

A cardiac MRI (**Figure 2**) was performed but was poorly tolerated by the patient, resulting in suboptimal image quality. This revealed a large anterior mediastinal mass (13 x 4 cm) extending from the aortic arch to the liver dome. The mass exhibited heterogeneous signal intensity with areas of increased signal on late gadolinium enhancement, abutting but not infiltrating the pericardium or myocardium. A moderate circumferential pericardial effusion and large bilateral pleural effusions were also noted. There was a septal bounce seen on CMR.

Given the location of the mass and history of ocular myasthenia gravis, it was felt the mass was likely to represent a thymoma. The patient proceeded with a computed tomography (CT) guided biopsy of the mass. The scan further characterised the mass as a soft tissue lesion in the anterior mediastinum with specks of calcification (**Figure 3**). The adjacent fat planes and great vessels remained preserved.

Histology of the biopsy confirmed a diagnosis of thymoma.

The patient was referred to the cardiothoracic surgeons for surgical resection. The thymoma was successfully removed without any complication. The resected specimen is shown in **Figure 4**.

Histology appearances were in keeping with a Type B2 thymoma. No lymphovascular or capsular invasion was seen. The tumour was limited to the thymus with no capsular invasion. The lesion appears completely excised.

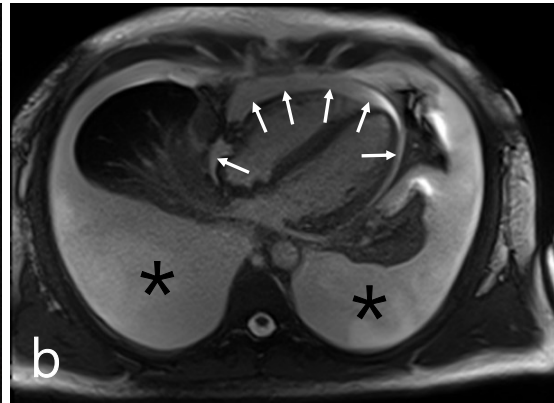
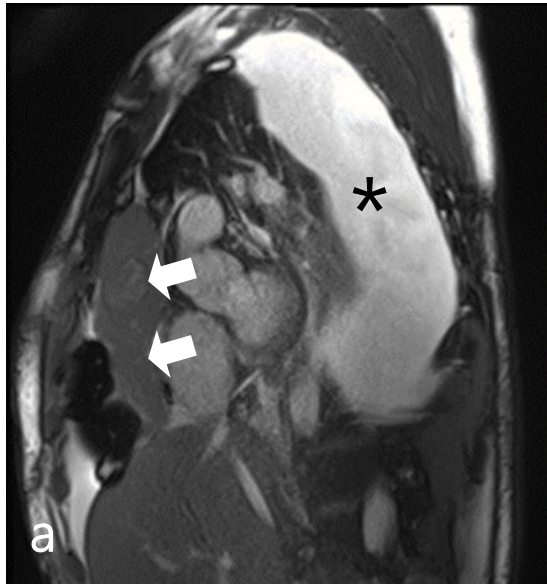


Figure 2; a) Sagittal view of the CMR showing heterogenous anterior mediastinal mass (arrow) and pleural effusion (\*), and b) Axial view showing the large effusions and pericardial effusion (small arrows).

## DISCUSSION

The notable aspect of this case is the incidental detection of a thymoma on CMR performed for evaluation of suspected constrictive pericarditis. Although the CMR was not intended to assess extracardiac pathology, it revealed a large anterior mediastinal mass that had not been fully appreciated on the initial plain CXR. The thymoma was not seen on the CXR due to its anterior location directly in front of the heart and was hidden by the cardiac silhouette. Importantly, retrospective review of the CXR did demonstrate features suggestive of a mediastinal abnormality, in addition to bilateral pleural effusions. This also highlights a key learning



Fig 4: Resected specimen.



Fig. 3: Axial CT scan image showing anterior mediastinal mass with specks of calcification (dotted circle) and bilateral pleural effusions (\*).

point: plain radiography may suggest the presence of mediastinal pathology but lacks the sensitivity and anatomical definition required for confident characterisation, particularly in the presence of large effusions or overlapping structures.

With the increasing utilisation of advanced cross-sectional imaging modalities, incidental findings unrelated to the primary indication of the test are encountered with growing frequency.<sup>12</sup> This is well described in other imaging domains, such as CT colonography, performed for colorectal cancer screening or evaluation, where extracolonic findings are commonly detected,<sup>13</sup> and cardiac CT angiography, where non-

cardiac thoracic abnormalities including pulmonary nodules, mediastinal masses, and aortic pathology are frequently identified.<sup>14</sup> These incidental findings can be clinically significant, occasionally life-threatening, but may also lead to downstream testing, patient anxiety, and complex decision-making regarding further investigation and management.<sup>15</sup> Incidental and extra-cardiac findings may affect the interpretation of the primary cardiac pathology as some cardiac conditions have multi-systemic /extra-cardiac involvement.<sup>8</sup>

CMR although primarily focused on myocardial structure, function, and pericardial disease, includes a wide field of view encompassing the lungs, mediastinum, and upper abdomen.<sup>7,8</sup> This case exemplifies that CMR can act as an opportunistic diagnostic tool, particularly in patients with multisystem disease or unexplained symptoms, even when image quality is suboptimal for the primary cardiac question.

The detection of a thymoma in this patient is especially relevant given his background of ocular myasthenia gravis, a well-recognised paraneoplastic association.<sup>10</sup> Thymomas may present with symptoms related to mass effect, autoimmune manifestations, or may be discovered incidentally during imaging performed for unrelated reasons.<sup>9</sup> In this case, the thymoma was not the initial diagnostic consideration, and its identification was dependent on careful review of extracardiac structures on CMR rather than targeted thoracic imaging.

## CONCLUSION

CMR while primarily used for cardiac assessment, can reveal clinically important extracardiac findings that may alter patient management. This case highlights the utility of CMR in detecting clinically important incidental findings. The identification of an anterior mediastinal mass in a patient with myasthenia gravis led to the timely diagnosis of thymoma and appropriate treatment. Careful evaluation of the entire field of view in CMR is essential for optimal patient care.

## Take Home Message

- Incidental findings on imaging can lead to life-altering diagnoses.
- CMR can detect significant extracardiac findings beyond its primary indications.
- Thorough assessment of the entire field of view in CMR is essential to avoid missed diagnoses.

- Thymoma should be considered in patients with myasthenia gravis presenting with mediastinal masses.

## Abbreviations

|     |                            |
|-----|----------------------------|
| CMR | Cardiac magnetic resonance |
| ECG | Electrocardiography        |
| CT  | Computed tomography        |
| CXR | Chest X-ray                |

## Declarations

All the authors declared no competing interests.

## Patient Consent

Written consent was obtained from all patients for publications of the clinical details and accompanying images.

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