Mitral Valve Leaflet Aneurysm—
Dynamic CT and Echocardiographic
Appearances

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Mitral valve leaflet aneurysm (MVLA) is a rarely encountered pathology with the risk of developing serious complications. We present its imaging appearances in two cases: an 89-year-old female with an incidental finding of both mitral valve leaflet and membranous septal aneurysms during workup for transcatheter aortic valve implantation, and a 48-year-old woman with MVLA secondary to infective endocarditis. As imaging techniques other than echocardiography are being more frequently utilized in the diagnosis of cardiac pathology, this entity may be encountered more often with different modalities. Early diagnosis and intervention are critical to treat this rare and potentially fatal pathology.

Key words · Aneurysm · Mitral valve · Heart diseases · Echocardiography · Tomography.

INTRODUCTION

A mitral valve leaflet aneurysm (MVLA) is a rarely encountered pathology with an estimated incidence of 0.03% and is most commonly seen as a complication of infective endocarditis [1-3]. Other causes include connective tissue disorders, rheumatic heart disease and aortic regurgitation [4-6]. Typically, an MVLA is diagnosed via echocardiography; however as technology evolves this entity may be encountered with other imaging modalities. We present two cases of mitral valve aneurysm: the first detected on dynamic cardiac CT; and the second on echocardiogram. The purpose of this case report is to review the CT and echocardiographic appearances of this rare entity, thereby improving awareness within the cardiovascular imaging community.

CASE REPORT

Case 1
An 89-year-old female, notably without any past medical history, presented with progressively worsening dyspnoea on exertion. Her clinical examination was normal apart from an ejection systolic murmur on auscultation. She was considered a candidate for transcatheter aortic valve implantation (TAVI) and underwent work-up with an echocardiogram, CT angiography, as well as multiphase acquisitions of the heart through all phases of the cardiac cycle.

Her echocardiogram reported a mitral valve prolapse (this was unavailable for review). The cardiac CT demonstrated normal cardiac function with an ejection fraction of 52%. Apart from a benign basal septal bulge, no significant myocardial hypertrophy was demonstrated. A focal outpouching of the anterior mitral leaflet extending into the left atrium, filling in systole and collapsing in diastole, was present (Fig. 1, Supplementary Video 1 and 2 in the online-only Data Supplement). No evidence of leaflet vegetations or nodules was demonstrated. Coaptation of the mitral leaflets appeared satisfactory. A membranous septal aneurysm was also present which extended into the right ventricle—this was considered a relative contraindication to the TAVI procedure. The patient was subsequently lost to follow-up and so further investigation of the cause of this aneurysm was unable to be conducted.

Case 2
A 48-year-old woman presented to her local emergency department complaining of fevers, myalgia/arthritis, right shoulder pain and headache. This was believed to represent a viral illness and she was discharged with general practitioner (GP) follow-up. Her GP referred her back to the hospital due to wors-
Fig. 1. Key CT slices of MVLA in both diastole and systole. (A) Three chamber view in diastole with collapse of the mitral leaflet aneurysmal sac (arrow). (B) Three chamber view in systole, showing the mitral leaflet aneurysm ballooning back into the left atrium (arrow). (C) Vertical long-axis view in diastole with billowing of the aneurysmal sac (arrow). (D) Vertical long-axis view in systole with ballooning into the left atrium (arrow).

The patient presented with new onset of fevers and worsening symptoms over the course of a week. She had no clinical signs of endocarditis or embolic findings. Blood cultures were positive for *Staphylococcus aureus* and CT showed discitis/osseomyelitis as well as pulmonary emboli. A trans-oesophageal echocardiogram showed a large vegetation arising from the anterior mitral valve leaflet with perforation and possible tricuspid valve vegetation (Fig. 2). Dynamic CT was not considered in this patient due to age and required radiation exposure.

She was taken to surgery for mitral valve repair and tricuspid vegetectomy. The A1 leaflet of the mitral valve had a large overlying vegetation with erosion onto the annulus and the decision was made to replace the valve. The tricuspid valve had a region of abnormal tissue at the base of the septal leaflet and this was removed. She had an unremarkable post-operative course and was discharged to complete 12 weeks of IV antibiotics.
DISCUSSION

An MVLA is a focal bulge of one of the mitral valve leaflets, with the anterior leaflet most commonly affected. When present, an MVLA balloons into the left atrium during systole and collapses in diastole [3]. MVLAs typically form when an acquired pathology such as infective endocarditis (most common), an iatrogenic injury, Libman-Sacks endocarditis or aortic regurgitation complicates a pre-disposing abnormality such as a connective tissue disorder or congenital anomaly [1-6].

An MVLA is most commonly diagnosed on an echocardiogram and most descriptions in the literature reflect this. As other imaging techniques such as cardiac magnetic resonance (CMR) and cardiac CT play a larger role in the diagnosis of cardiac disease, this entity may be encountered more often in such modalities. To the best of our knowledge, no reported cases of the appearances of an MVLA on dynamic multiphase cardiac CT exist, with all reported cases demonstrated on echocardiography except one case on CMR [7]. It is important that clinicians recognize this condition and treat it early, since, if left untreated, MVLAs may progressively dilate and ultimately perforate, which can have catastrophic consequences such as stroke and/or torrential mitral regurgitation [2,5].

Supplementary Movie Legends

Video 1. Three chamber dynamic CT.
Video 2. Vertical dynamic CT.

Supplementary Materials

The online-only Data Supplement is available with this article at https://doi.org/10.22468/cvia.2018.00234.

Conflicts of Interest

The authors declare that they have no conflict of interest.
REFERENCES


