

Echocardiographic and radiological evaluation of an unusual aortic root mass in an asymptomatic patient: a case report

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Received 27 March 2019; first decision 18 April 2019; accepted 9 July 2019; online publish-ahead-of-print 18 September 2019

Background

Incidental echocardiographic findings in the asymptomatic patient can present a diagnostic challenge to the clinician. This case report demonstrates that both natural occurring and iatrogenic causes should be considered in the differential diagnosis of isolated aortic root masses.

Case Summary

A patient presenting for a routine transthoracic echocardiogram to evaluate worsening breathlessness on exertion is found to have an unexpected aortic root mass. Due to the unusual appearances of the aortic root mass, it is further evaluated with additional imaging modalities, including transoesophageal echocardiogram and computed tomography coronary angiography. The mass is fully characterized following the computed tomography coronary angiography as a right coronary artery stent, from a previous coronary angioplasty, protruding into the lumen of the aortic root. No further investigation or intervention is required.

Discussion

A wide differential diagnosis of focal aortic root masses is presented. The non-invasive characterization of such masses can present a challenge. This case demonstrates the value of a multimodality imaging approach, including transthoracic, transoesophageal echocardiography, and computed tomography coronary angiography, in the evaluation of such masses.

Keywords

Aortic mass • Echocardiography • Computed tomography coronary angiography • Percutaneous coronary intervention • Case report

Learning points

- Iatrogenic causes should be considered in the differential diagnosis of aortic root masses.
- Computed tomography coronary angiography can be an invaluable tool in characterizing aortic root masses.

Introduction

The diagnosis of aortic root masses can often be challenging, requiring a multimodality imaging approach to fully characterize the mass non-invasively. The differential diagnosis is wide and includes both iatrogenic and natural occurring causes. We, hereby, present the case of a 62-year-old female who was found to have an incidental aortic root mass which had not previously been noted.

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Handling Editor: Richard Alexander Brown

Peer-reviewer: Marcelo Haertel Miglioranza

Compliance Editor: Rahul Mukherjee

Supplementary Material Editor: Ross Thomson

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Timeline

Early 2011	Non-ST elevation myocardial infarction (NSTEMI), ×1 percutaneous coronary intervention (PCI) to circumflex artery
Late 2011	×3 PCI to right coronary artery (RCA)
June 2014	NSTEMI, ×1 PCI and plain-old-balloon-angioplasty to RCA
September 2014	×1 PCI to ostial RCA, no significant echocardiographic findings
January 2018	Routine transthoracic echocardiogram shows new aortic root mass
February 2018	Transoesophageal echocardiogram shows mass attached to anterior aortic wall
February 2018	CT coronary angiography identifies previous RCA stent protruding into aortic lumen

Case presentation

The patient had no history of malignancy and her past medical history included osteoarthritis, asthma, type II diabetes mellitus, dyslipidaemia (intolerant to statins), junctional tachycardia, and non-ST elevation myocardial infarction (NSTEMI) in 2011 treated with percutaneous coronary interventions (PCI). Specifically, she had undergone PCI with one drug-eluting stent (DES) to the circumflex artery (Cx) in 2011 and PCI with three DES to the right coronary artery (RCA) later in 2011. In June 2014, following the presentation with a further NSTEMI, she underwent PCI and had plain-old-balloon-angioplasty to the RCA in June 2014. In September 2014, she underwent PCI to the ostium of the RCA with a 3.0 mm × 38 mm stent ([Supplementary material online, Videos SIV and SV](#)). A previous transthoracic echocardiogram (TTE) 4 years earlier had shown no significant valvular abnormality and good left ventricular systolic function and no evidence of a mass in the aortic root.

Transthoracic echocardiogram, performed as an outpatient in 2018 to assess worsening breathlessness, revealed a new mass visible in the aortic root ([Supplementary material online, Video S1; Figure 1](#)). The mass appeared to be arising from the right coronary sinus. It appeared to be a discrete calcified round mass with no obvious mobility and measured approximately 0.9 × 0.7 cm. There was no aortic stenosis and mild central aortic regurgitation was seen. No other significant echocardiographic findings were seen. A 12-lead electrocardiogram (ECG) showed inferior Q waves which were unchanged compared with the post-procedure ECG from September 2014.

To further characterize the lesion, a transoesophageal echocardiogram (TOE) was carried out. The dimensions of the mass were similar to that found on TTE (1.0 × 0.7 cm). It appeared calcified, fixed, and attached to the anterior wall of the aorta. The mass was seen to arise from the right coronary sinus of Valsalva abutting on the sinotubular junction and was distal to the aortic valve (AV) leaflets and not interfering with valve leaflet mobility ([Supplementary material online, Videos SII and SIII](#)). Following discussion at the cardiology

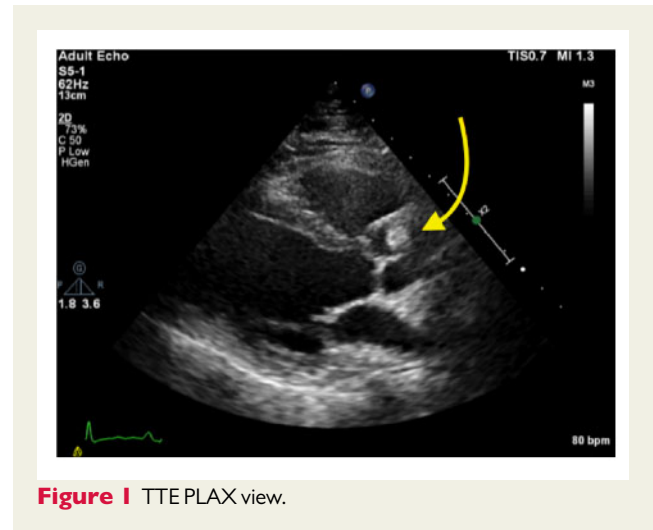


Figure 1 TTE PLAX view.

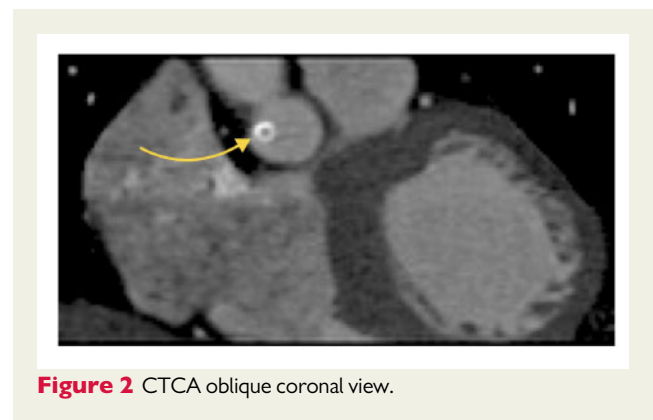


Figure 2 CTCA oblique coronal view.

multidisciplinary meeting, further evaluation with a computed tomographic coronary angiogram (CTCA) was recommended.

The CTCA demonstrated that the mass seen on echocardiography was the proximal RCA stent which was protruding 6 mm into the lumen of the aorta ([Figures 2 and 3](#)). There was no stenosis of the ostial RCA nor did there appear to be any flow limitation. The patient was reassured that no further investigation or intervention was needed for the newly identified aortic root mass. Following a brief period of follow-up as an outpatient and significant improvement of her symptoms with lifestyle changes (her symptoms were felt to be secondary to overall deconditioning), she has subsequently discharged from active follow-up.

Discussion

Focal masses arising from the aortic root wall independent of the AV are rare. The commonest would include atheromatous plaques which can be associated with thrombi. Thrombus in the aortic root would be uncommon because of the increased velocities across the AV. Sarcomas¹ have been described throughout all segments of the aorta, but least frequently in the proximal aorta. Benign tumours have been reported arising in the sinuses of Valsalva including

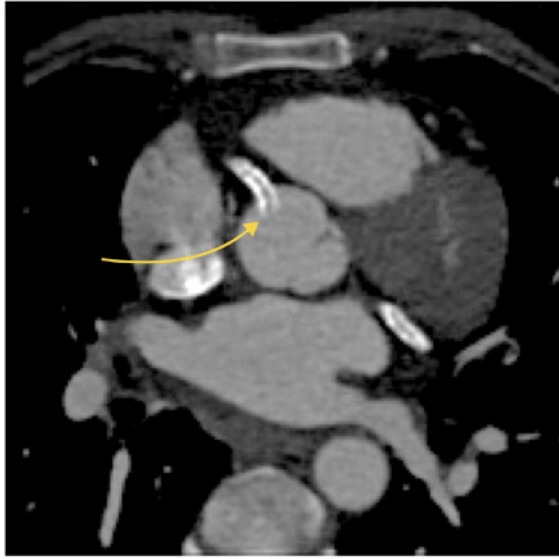


Figure 3 CTCA axial view.

fibroelastomas² causing obstruction of coronary artery flow. Other differentials include myxomas and lipomas. However, as demonstrated in our patient, iatrogenic artefacts should always be considered in appropriate patients. In such cases, CTCA can prove an invaluable tool to further characterize these lesions.

Echocardiographic evaluation of the aorta is a routine part of the standard transthoracic echocardiographic examination. However, when diagnostic ambiguity arises different imaging modalities can be exploited to reach a diagnosis, as demonstrated in this case.

Owing to the proximity of the oesophagus to the aorta, TOE is an excellent tool in the assessment of aortic root masses in real time and with higher resolution compared with TTE. Its widespread availability, the ability to obtain multi-plane images makes transoesophageal echocardiography an invaluable tool. However, its semi-invasive nature, requiring sedation, and the possibility of artefacts due to reverberations from the posterior aortic wall could potentially limit its usefulness in rare instances.

Magnetic resonance imaging is also well suited for the diagnosis of aortic disease, especially in those who require serial follow-up studies, due to the non-exposure to ionizing radiation. Its main limitations include lower spatial resolution compared with CT, longer acquisition times and limited availability compared with TOE and CT. Gadolinium induced nephrotoxicity also needs to be factored in.

The main advantages of CT compared with other imaging modalities include the ability to completely image the entire aorta, shorter image acquisition time, higher spatial resolution and the ability to simultaneously perform a CT coronary angiogram to assess for the presence of significant coronary artery disease and evaluate for stent patency. Aortic wall pathologies such as ulcers, thrombi and pseudo-

aneurysms are readily depicted on CT but published data on the diagnostic accuracy are limited, compared with the well-documented accuracy in the detection of aortic dissection and intramural haematoma (pooled sensitivity and specificity 100% and 98%, respectively). The main limitations of CT arise from the need of iodine-based contrast agents (nephrotoxicity, allergic reactions) and use of ionizing radiation, making it less suited for serial follow-up, especially in young female subjects.³ In our patient, CT confirmed the diagnosis that the mass seen in the aortic root at echocardiography was the proximal RCA stent which was protruding 6 mm into the lumen of the aorta.

Lead author biography



Following award of MBBS—with distinction—from the University of Athens, Greece, Dr Vassilios Memtsas completed his internal medicine training at the Eastern Deanery, UK. He is currently undergoing higher specialist training in Cardiology in the same region. His main interests include electrophysiology and cardiac ablation.

Supplementary material

[Supplementary material](#) is available at *European Heart Journal - Case Reports* online.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: The authors confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

References

1. Staats P, Tavora F, Burke AP. Intimal sarcomas of the aorta and iliofemoral arteries: a clinicopathological study of 26 cases. *Pathology* 2014;**46**:596–603.
2. Gowda RM, Khan IA, Nair CK, Mehta NJ, Vasavada BC, Sacchi TJ. Cardiac papillary fibroelastoma: a comprehensive analysis of 725 cases. *Am Heart J* 2003;**146**:404–410.
3. Erbel R, Aboyans V, Boileau C, Bossone E, Bartolomeo RD, Eggebrecht H, Evangelista A, Falk V, Frank H, Gaemperli O, Grabenwöger M, Haverich A, Iung B, Manolis AJ, Mejjboom F, Nienaber CA, Roffi M, Rousseau H, Sechtem U, Sirnes PA, Allmen RS, Vrints CJ; ESC Committee for Practice Guidelines. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases: document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult. The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC). *Eur Heart J* 2014;**35**:2873–2926.