A Mass at Aorto-Mitral Continuity Following Transcatheter Aortic Valve Implantation That Mimics Infective Endocarditis.

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Abstract

Abstract With the increasing number of transcatheter aortic valve implantations (TAVI) being performed comes a need to better understand TAVI-associated complications such as infective endocarditis (IE), leaflet thrombosis, and paravalvular regurgitation. An 83 year-old women, who had undergone TAVI followed by permanent pacemaker implantation 3 months before, presented to outpatient clinic with fever lasting for 5 days. History revealed that fever reached 39°C and was subsided by the initiation of amoxycillin/clavulinic acid prescribed by her family physician. Transesophageal echocardiography (TEE) revealed normal aortic leaflet thickness and motion. A mass at aorto-mitral continuity in left atrium was detected (Figure 1A, Video 1). The mass was heterogenous, 8×3 mm in size, and did not have visual characteristics of vegetation. Mitral valve seemed unaffected. There was no mitral regurgitation. No paravalvular abscess, pseudoaneurysm, or fistula was detected. We had confirmed that the mass was not present before the TAVI after reviewing preprocedural computed tomography (CT) scan (Figure 1B). There was fluorodeoxyglucose uptake around TAV and permanent pacemaker leads in positron emission computed tomography (Figure 1C). With the fever early after TAVI and a suspicious mass adjacent to TAV, we decided to treat the patient as "possible IE" according to modified Duke criteria. A 6-week therapy of vancomycine plus rifampin accompanied by 2-week therapy of gentamycine was initiated. The first set of blood cultures turned out to be negative. Second set of blood cultures were also negative at the second week of hospitalization. TEE was repeated at the 3rd and 5th weeks and showed identical findings to the first TEE (Figure 2, Video 2-3). Clinical condition of the patient was very good. She did not develop fever after hospitalization. The patient was discharged uneventfully after 6 weeks of antibiotic therapy. We had concluded that the mass could be thrombus in origin. After 6 motnhs of warfarin plus clopidogrel therapy control TEE revealed that the mass at aorto-mitral continuity had disappeared, mitral valve was normal, TAV was normal with similar valvular gradient and had trivial paravalvular regurgitation identical to initial examinations (Figure 2, Video 4). There was no finding of paravalvular abscess, pseudoaneurysm, or fistula. The patient was still asymptomatic with good functional capacity and TTE showed normal valvular function at 1-year followup of TAVI.

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Introduction

Transcatheter aortic valve implantation (TAVI) has become the mainstay of treatment of severe aortic stenosis worldwide. With the increasing number of TAVIs being performed comes a need to better understand TAVI-associated complications such as infective endocarditis (IE), leaflet thrombosis, and paravalvular regurgitation. Here, we emphasize having a high clinical suspicion for IE in a patient presenting with fever following TAVI.

Case report

An 83 year-old women, who had undergone transcatheter aortic valve implantation (TAVI) with Portico valve (Abbott Structural Heart, St. Paul, MN) followed by permanent pacemaker implantation 3 months before, presented to outpatient clinic with fever lasting for 5 days. History revealed that fever reached 39°C and was subsided by the initiation of amoxycillin/clavulinic acid prescribed by her family physician.

Her physical examination was unremarkable. Cardiac auscultation revealed normal S1 and S2, without any additional sound or murmur. Peripheral signs of infective endocarditis were absent. Transthoracic echocardiography (TTE) showed normal function of transcatheter aortic valve (TAV), valvular gradient was 13/7 mmHg. Transesophageal echocardiography (TEE) revealed normal aortic leaflet thickness and motion. There was trivial paravalvular aortic regurgitation, which was also present at the final aortography of TAVI procedure. A mass at aorto-mitral continuity in left atrium was detected (Figure 1A, Video 1). The mass was heterogenous, 8×3 mm in size, and did not have visual characteristics of vegetation. Mitral valve seemed unaffected. There was no mitral regurgitation. No paravalvular abscess, pseudoaneurysm, or fistula was detected. We had confirmed that the mass was not present before the TAVI after reviewing preprocedural computed tomography (CT) scan (Figure 1B).

There was fluorodeoxyglucose (FDG) uptake around TAV and permanent pacemaker leads in positron emission tomography (PET) (Figure 1C). FDG uptake was mild and involved >270° of the TAV circumference. With the fever early after TAVI and a suspicious mass adjacent to TAV, we decided to treat the patient as "possible IE" according to modified Duke criteria. A 6-week therapy of vancomycine plus rifampin accompanied by 2-week therapy of gentamycine was initiated as per ESC guidelines[1]. The first set of blood cultures turned out to be negative.

Second set of blood cultures were also negative at the second week of hospitalization. TEE was repeated at the 3rd week and showed identical findings to the first TEE (Figure 2, Video 2). Clinical condition of the patient was very good. She did not develop fever after hospitalization. TEE was repeated at 5th week (Figure 2, Video 3). The mass had not got smaller. Aortic and mitral valves were still unaffected. No other abnormality was detected. The diagnosis of IE was in doubt, however since no side effect of antibiotics developed during 4 weeks, we decided to complete the 6-week treatment plan.

The patient was discharged uneventfully after 6 weeks. As the patient stayed asymptomatic throughout her hospital stay, two set of blood cultures were negative, and there was no change in the mass in response to antibiotics, we had concluded that the mass could be thrombus in origin. Dual antiplatelet therapy was changed to warfarin plus clopidogrel at the discharge and continued for 6 months. Control TEE at 6 months revealed that the mass at aorto-mitral continuity had disappeared, mitral valve was normal, TAV was normal with similar valvular gradient and had trivial paravalvular regurgitation identical to initial examinations (Figure 2, Video 4-5). There was no finding of paravalvular abscess, pseudoaneurysm, or fistula. The patient was still asymptomatic with good functional capacity and TTE showed normal valvular function at 1-year followup of TAVI.

Discussion

Aorto-mitral continuity is an important common structure between aortic root (left- and non-coronary cusps) and left atrium. It is closely related to anterior mitral valve. IE aortic valve may extend to this region and cause paravalvular abscess, pseudoaneurysm or fistula formation. Alternatively mitral valve endocarditis may extend to aortic valve through continuity. Presentation of IE with a paravalvular complication without valvular involvement is very rare, and to our knowledge it has not been documented with prosthetic valve endocarditis[2].

This case may provide clinical lessons on the importance of multimodality imaging and clinical followup in the diagnosis of IE[3]. Initial presentation of the patient was considered as possible endocarditis: 1 major (imaging evidence of vegetation) and 2 minor criteria (predisposing condition and fever>38°C). However, what looked like a possible vegetation turned out to be thrombus in origin during clinical followup. That being said, diagnosis of thrombus was established clinically after 6 weeks of antibiotic therapy and 6 months of followup with anticoagulation.

FDG PET/CT is suggested as a major criteria for IE diagnosis besides microbiologic and imaging evidence in recent guidelines, however it is also suggested not to be used within first 3 months due to false positive results as a result of early inflammation[1]. In addition, FDG uptake may persist even up to 1 year of prosthetic heart valve implantation[4]. However that the pattern of uptake in this patient was mild and almost circumferential is consistent with early postoperative inflammation[5].

Aorto-mitral continuity is a very rare place for thrombus formation in left atrium. And this patient had normal sinus rhythm throughout the followup. Although it has not been documented in this case, a possible mechanism of thrombosis may be a hypersensitivity reaction to any composition of TAV material. Metal intracardiac devices that are usually alloys containing nickel is known to constitute allergic reactions with possible mast cell activation similar to the Kounis hypersensitivity syndrome[6]. The Portico valve is a self-expandable prosthesis that consists of a trifoliate bovine pericardial valve and a porcine pericardial sealing cuff attached to a nitinol (nickel-titanium) frame.

Conclusion

Clinical suspicion of IE should be high in patients with fever following prosthetic valve implantation, particularly when a mass in the vicinity of prosthetic valve is visualized. However, the use of multimodality imaging and clinical judgement are as important as implementing suggested diagnostic criteria in IE.

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Figures

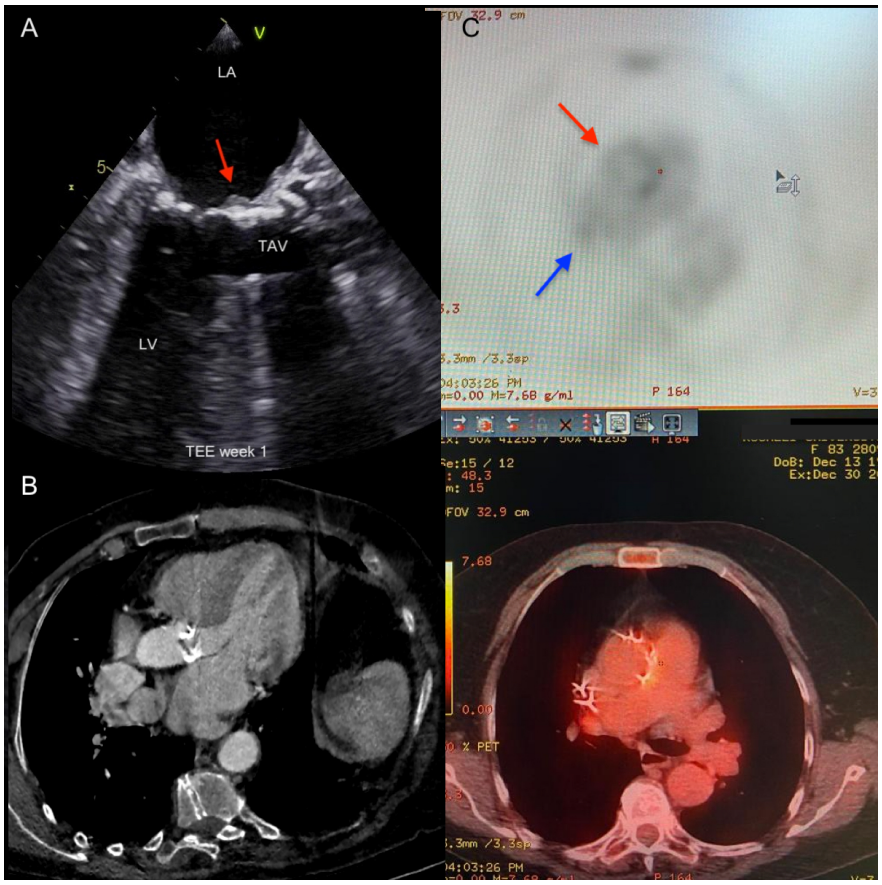

Figure 1. **(A)** TEE image showing the mass at aorto-mitral continuity. **(B)** Image from preprocedural CT that shows the absence of the mass before TAVI. **(C)** PET-CT image showing almost circumferential FDG uptake around transcatheter aortic valve and permanent pacemaker lead.

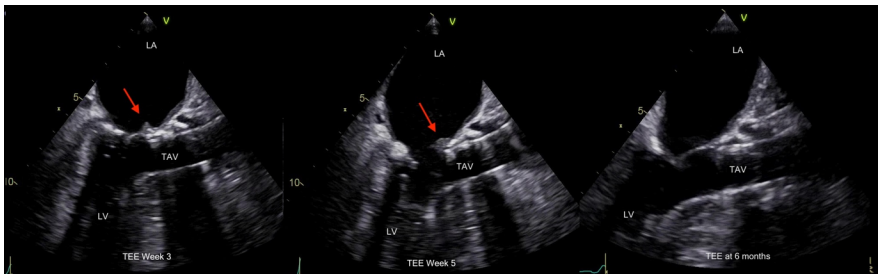

Figure 2. Followup TEE images. The mass persisted despite antibiotic therapy in the third and the fifth weeks (left and middle). Complete resolution of the mass (thrombus) after 6 months of warfarin and clopidogrel therapy (right).

Video Legends

Video 1. First TEE examination. A heterogenous mass, 8×3 mm in size, at aorto-mitral continuity.

Video 2. TEE followup at third week. Persistence of the mass despite antibiotic therapy.

Video 3. TEE followup at fifth week. Persistence of the mass despite antibiotic therapy.

Video 4. TEE followup at six months. Complete resolution of the mass (thrombus) after 6 months of warfarin and clopidogrel therapy.