Case Report

A funnel shaped pannus formation above the mitral prosthetic valve diagnosed with real time three-dimensional echocardiography

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Abstract: Prosthetic valve obstruction due to pannus formation can be a life-threatening complication. We showed that real time three dimensional echocardiography has incremental value in diagnosing pannus localization and extent.
Keywords: Mitral valve surgery, pannus, prosthetic heart valve
(Heart-Vessels and Transplantation 2017: 1; 55-7. doi: 10.24969/2017.19)

Introduction

Prosthetic valve obstruction has an incidence ranging from 0.4% to 6% per year (1). Apart from thrombus formation, prosthetic valve obstruction can also be caused by pannus formation with variable frequency (2, 3). Correct diagnosis is of paramount importance in any patient with prosthetic valve obstruction. Real time three-dimensional echocardiography (RT 3D TEE) has the capacity to provide more in-depth analysis of any pannus related mechanical valve obstruction.

Case Report

A 46-year- old woman, applied to our outpatient clinic with cough, shortness of breath and sweating. She had previous history of mitral valve replacement with bi-leaflet mechanical prosthesis (Carbomedics, No: 25) in 2015 due to rheumatic mitral stenosis. She admitted that she was fine after the operation but her complaints had started six months ago and got worse for the last fifteen days. Physical examination was unremarkable except for muffled prosthetic valve sounds. 1.07 cm2 (Fig. 1-2). Interestingly, prosthetic valve leaflet motion was almost normal. We decided to perform a TEE exam (X7-2t probe) which also showed an increase in tissue thickness at the supramitral location (Fig. 3 and Video 1-2, See video at www.hvt-journal.com). We activated RT 3D-TEE mode on the echocardiography machine and demonstrated two sequential orifices. A funnel-shaped first orifice created by pannus had a very narrow opening for blood flow coming from the pulmonary veins (Video 3. See video at www.hvt-journal.com). We calculated the first orifice area as 0.7 cm2 on RT 3D TEE (Fig. 4). The prosthetic mitral valve as a secondary orifice showed regular movements with no restrictions on opening and closing angles (Video 4. See video at www.hvt-journal.com). Surgery was recommended to the patient. A St Jude mitral valve (no: 27) was inserted and the patient was uneventfully discharged from the hospital.

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Received: 17.08.2017 **Revised:** 07.09.2017 **Accepted:** 07.09.2017

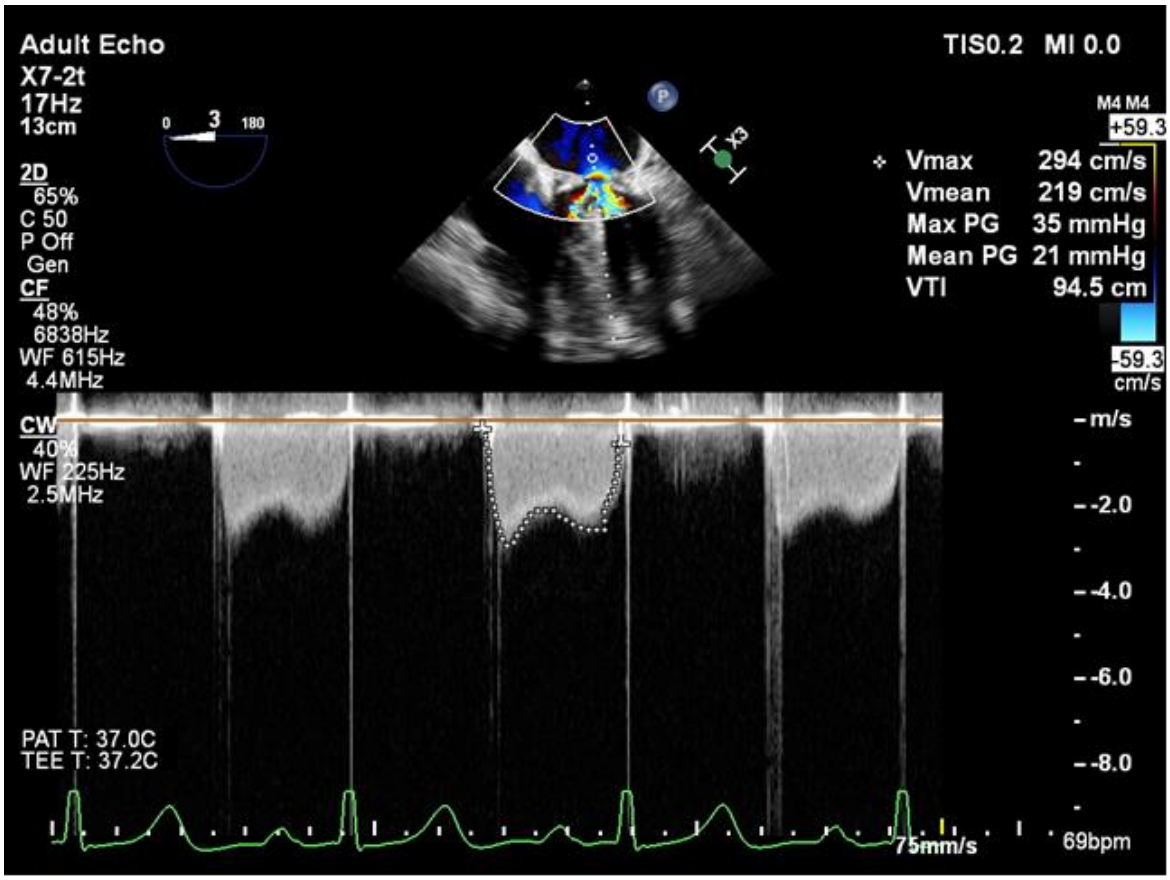

Figure 1. Transprosthetic mitral valve gradients

Discussion

Valve obstruction is one of the most serious complication associated with prosthetic heart valves (1). It is caused by thrombosis, pannus formation and patient prosthesis mismatch. Although thrombosis of the PHV remains as the most common underlying mechanism, pathological studies have suggested that pannus formation plays an important role in the mechanism of obstruction (2). Pannus formation is a more chronic process associated with ingrowth of connective and fibroelastic tissue. Surgery is the only treatment option in patients with PHV obstruction associated with pannus formation.

Both transthoracic or transesophageal echocardiography should preferentially be used for prosthetic valve evaluation (4).

Unfortunately, TTE has a limited value in assessing valve mobility and the mechanism of valve obstruction (5, 6). With the advent of TEE, improved definition of valve structure and motion could be achieved. RT-3D TEE is also a useful technique for anatomic evaluation of PHV obstruction as a result of pannus overgrowth (7). In our case both TTE and TEE suggested pannus formation causing severe obstruction because of normal leaflet mobility without visible thrombus. However, only RT 3D TEE provided a detailed anatomy of the funnel shaped pannus with resultant a narrow orifice just above the mitral prosthetic valve disk. That particular shape of the orifice suggested a circular pannus formation beginning from the sewing ring and advancing to the center.

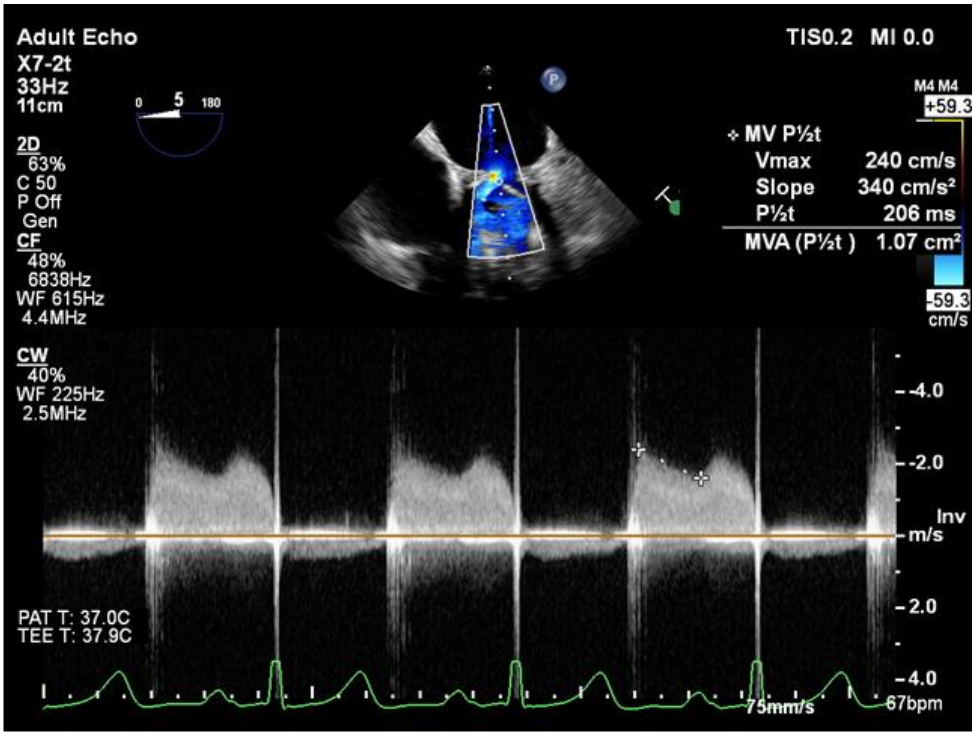

Figure 2. Pressure half- time through prosthetic mitral valve

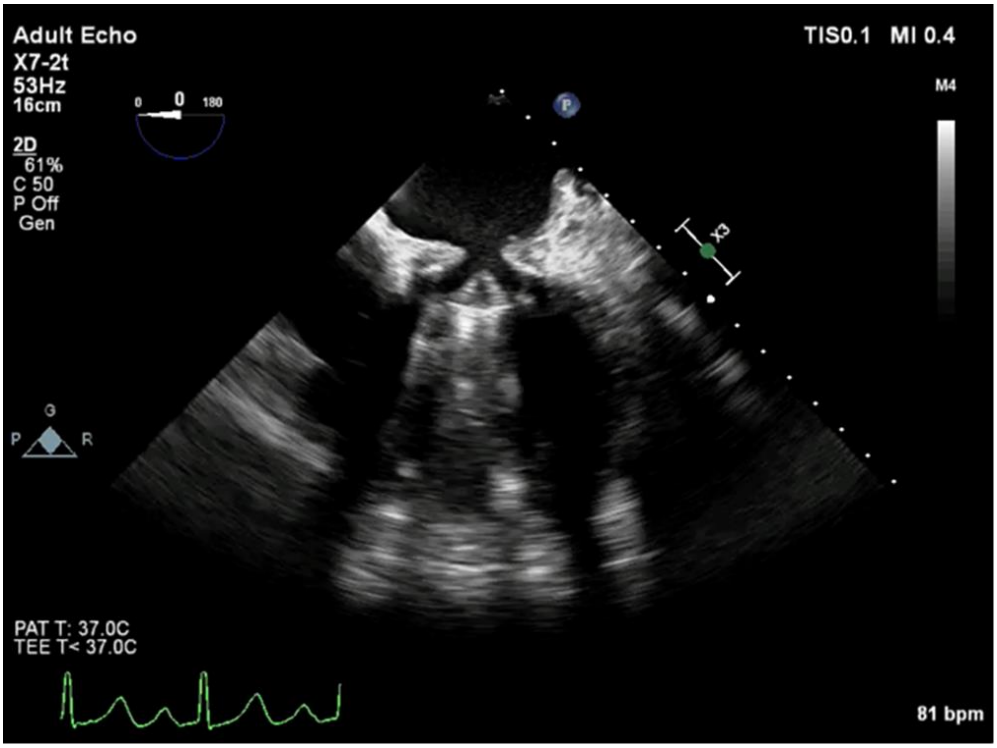

Figure 3. Mitral prosthetic valve in opened position

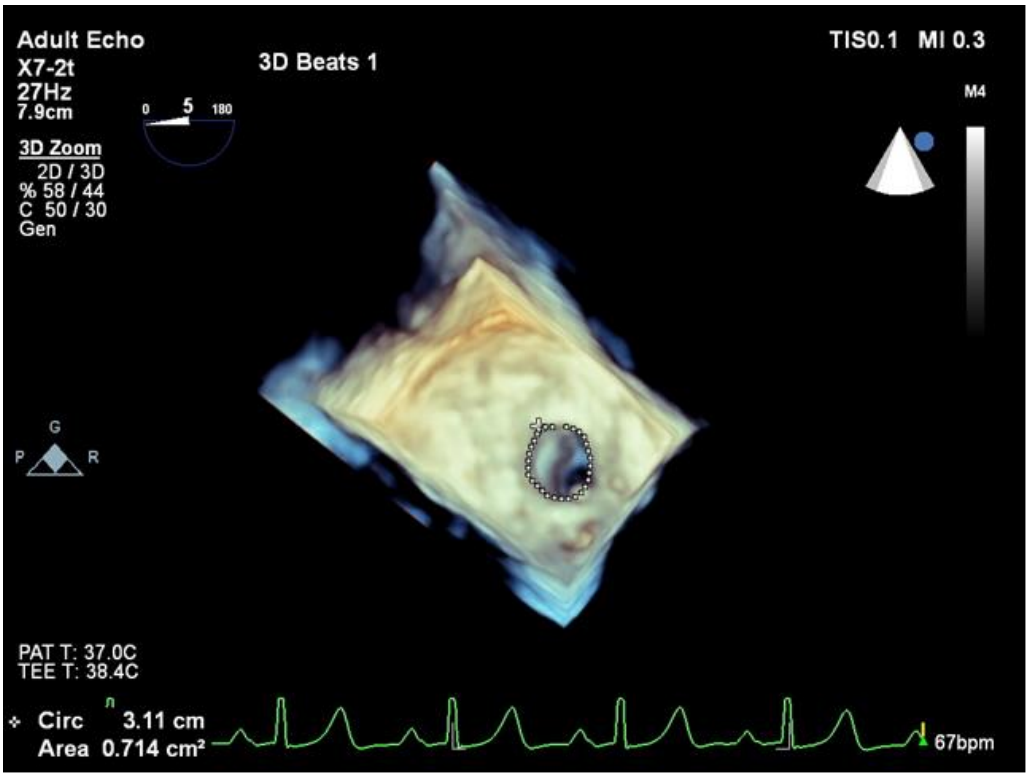

Figure 4. Real-time 3D TEE direct planimetric area of first orifice created by pannus (Left atrial view).
3D-TEE – 3-dimensional transesophageal echocardiography

Conclusion

RT 3D TEE brings new diagnostic opportunities to every day clinical practice. In suitable patients like our case, a quick and correct diagnosis can be made with this modality without applying to computed tomography or magnetic resonance imaging.

Peer-review: internal and external.

Conflict of interest: None to declare.

Authorship: E.P.O., O.B., T.K.A., S.A.K. equally contributed to management of case and preparation of case report

Acknowledgement and funding: None to declare.

Informed consent was obtained from patient for all procedures.

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