

Potential chronic abscess cavity that masqueraded as sinus of Valsalva aneurysm: is TEE a vital tool?

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A 76 year old gentleman was scheduled for elective cardiac surgery for the repair of sinus of Valsalva (SV) aneurysm. The relevant clinical history revealed a New York Heart Association (NYHA) grade 2 dyspnoea and minimal chest discomfort. Additional comorbidities comprised of controlled Type II diabetes mellitus, mild renal impairment, childhood history of rheumatic fever and present day cigarette smoking. He was operated for transitional cell carcinoma of bladder 4 years back, with no recurrence and on regular follow-up.

He had suffered from fever with rigors about 8-10 weeks before this elective admission. This episode of pyrexia was not associated with any respiratory, urinary or dental symptoms.

It was regarded flu-like and he recovered by taking paracetamol for couple of days. He had no known drug allergies and his regular medications included metformin, bisoprolol and aspirin, the last one being discontinued 5 days prior to the surgery. On examination, this gentleman was 174 cm tall and weighing 83 kg with body mass index of 27. His cardiovascular and respiratory parameters were normal and a systolic murmur was heard in aortic area on aus-

cultation, consistent with the diagnosis of aortic stenosis.

Preoperative transthoracic echocardiography (TTE) reflected severe aortic stenosis (AS), mild aortic regurgitation (AR) with left ventricular (LV) ejection fraction of 60%. TTE also interpreted abnormalities consistent with the SV aneurysm. Cardiac angiography was also performed preoperatively, which revealed SV aneurysm affecting left coronary cusp (LCC), no abscess cavity, fistula or dissection. Preoperative computer tomography (CT) scan of the chest concluded a 2 cm aneurysm adjacent to the inferior border of aortic valve (AV). This gentleman was scheduled for elective aortic valve replacement (AVR) and repair of aneurysm of SV with keeping in view possibility of interposition aortic graft or ascending aorta replacement with coronary implantation if the aneurysm appeared to involve the coronaries arteries.

A 2-dimensional (2D) transesophageal echocardiography (TEE) probe was inserted post anaesthetic induction and a comprehensive intraoperative TEE examination was performed. Our intraoperative TEE findings were different from the preoperative TTE and radiological work up. We acquired all the standard TEE views with special attention to the views that evaluate AV, SV and ascending aorta. These are mid esophageal short axis (ME SAX) and mid esophageal long axis (ME LAX) views fo-

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cussing on the structures of interest for this surgery. All images and video loops were acquired with and without colour flow doppler (CFD) with appropriate Nyquist limit. We found that the AV was bicuspid. There was severe AS with the peak gradient of 70 mmHg with mean arterial pressure of 65 mmHg. There was mild, central aortic regurgitant jet. There was no SV aneurysm. There was a cavity just above the non-coronary cusp (NCC)/left coronary cusp (LCC) commissure. CFD revealed that there was no communicating fistula among the cardiac chambers. Left and right ventricular systolic function appeared to be normal. (Figures 1-5 shows the ME SAX, LAX and CFD views showing cavity and measurement). The cavity measured 2.11 by 1.33 cm in size as shown in Figure 3. We informed our findings and also showed the TEE video and still images to the operating surgeon before commencement of the surgery. Our clear communication made surgeon aware of possibility of expecting different surgical findings to that of the preoperative TTE and imaging diagnosis.

Actual surgical findings were confirmed by the surgeon with direct examination of the AV, SV and surrounding structures. These direct examination findings were exactly the same as interpreted by our intraoperative TEE examination. The surgeon found that the AV was bicuspid with fusion of RCC and NCC. Immediate subvalvular to the NCC/LCC commissure was a blind ending cavity. This was not communicating with the left atrium (LA) and there were no other communicating fistulas. The surgeon also made a further comment that resembled an appearance of previous abscess cavity. There was no active endocarditis. This situation was suggestive of chronic cavity appearance with no active ongoing infection.

Operation performed was AVR with bio-prosthetic valve and obliterated the cavity

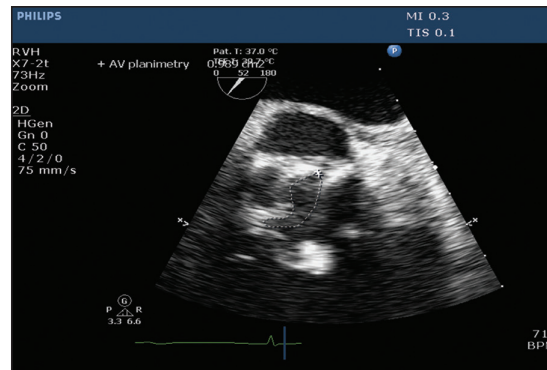


Figure 1 - ME AV SAX view showing cavity above LCC and NCC. Note AV area by planimetry. ME SAX = mid esophageal short axis; AV = aortic valve; LCC = left coronary cusp; NCC = non-coronary cusp.

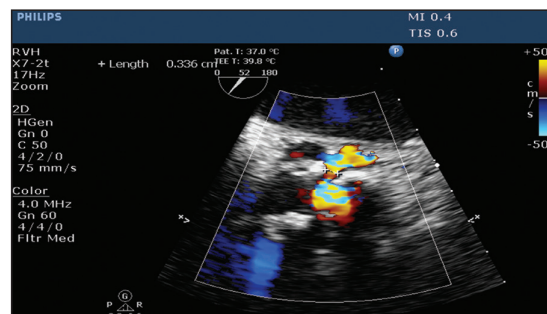


Figure 2 - ME AV SAX view with CFD showing colour flow into the cavity. ME SAX = mid esophageal short axis; AV = aortic valve; CFD = colour flow Doppler.

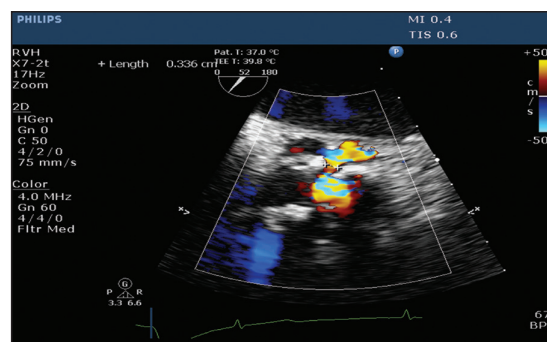


Figure 3 - Showing measurement of cavity in ME SAX view. ME SAX = mid esophageal short axis.

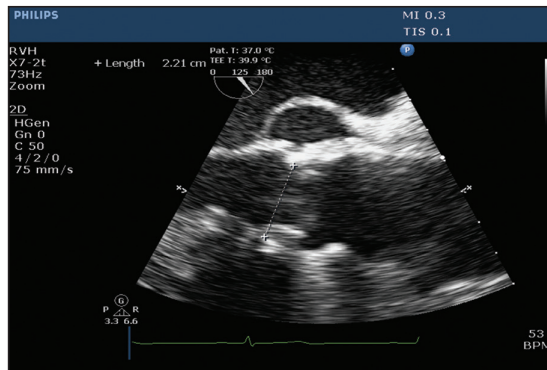


Figure 4 - ME AV LAX view showing cavity and measurement of AV annulus. Note that Zoom function is enabled.

ME LAX = mid esophageal long axis; AV = aortic valve.

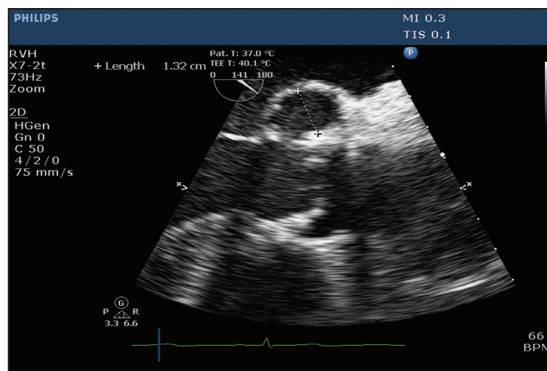


Figure 5 - ME AV LAX view showing cavity measurement. Note that Zoom function is enabled.

ME LAX = mid esophageal long axis; AV = aortic valve.

with deep pledgeted sutures and residual cavity was filled up with biogluce. This obliteration of cavity produced a fixed shelf bulging.

TEE at time of weaning from CPB demonstrated well seated bio prosthetic AV. Furthermore, the valve appeared to have normal leaflet motion with no paravalvular regurgitation and adequate deairing. A bulge was visible indicating obliterated cavity. Weaning and separation from cardiopulmonary bypass (CPB) was smooth, easy

and no difficulties encountered. At the end of surgery, the patient was transferred to cardiac surgical intensive care and extubated in 2 hours' time. He was transferred to high dependency unit (HDU) the next day and discharged to general ward 24 hours later.

During his stay in the ward, he spiked high temperature and blood profile showed rising C-reactive protein. Blood cultures were sent during his temperature spike that isolated coagulase negative staphylococcus hominis. The AV tissue sent for microbiology during surgery isolated two species of coagulase negative staphylococci: staphylococcus hominis and staphylococcus epidermidis. He was managed on the ward over next days and his temperature subsided and made good recovery. Subsequently, he was discharged from the hospital on the 9th postoperative day.

AV endocarditis is a serious infection as it destroys the native AV and its complications include severe AR, conduction disturbances and less commonly intracardiac fistula (1, 2). The quoted incidence of endocarditis after prosthetic valve replacement is in between 2-4%. Complications include periannular abscesses in about 80% and intracardiac fistula formation in 14% of patients with AV endocarditis (3). Though more common for prosthetic valve endocarditis, coagulase negative staphylococcus is responsible for 3-8% of endocarditis in native valve (4). Duke criteria merge echocardiographic, laboratory and clinical findings for establishing the diagnosis of endocarditis (5, 6).

The usual familiar communications happen to be between aorta and right atrium (RA), right ventricle (RV) or left ventricle (LV) (7). The region between mitral and aortic annulus is relatively avascular. This makes the spread of abscesses, aneurysm and fistula formation much easier (8). These authors in a small case series, found

44 % times the complication at this junction of AV and mitral valve (MV) annulus. Of these 13 % resulted in fistulae into LA and another 13 % had resulted into perforating anterior mitral valve leaflet. Aorto-LA fistulas show close association with bacterial endocarditis, abscess cavities, ruptured SV aneurysm, Bechet syndrome or aortic dissection (7, 9-16).

Differential diagnosis of SV aneurysm includes ASD, VSD, cardiomyopathy and coronary artery anomalies.

An interesting case report showed a periannular aortic valve abscess perforating the LA and produced systolic jet on CFD which had been misinterpreted as mitral regurgitation (MR) on preoperative TTE. The intraoperative TEE interpretation correlated accurately with the surgical findings and resulted in total change of surgical plan (17). Dimitriou Patsouras and et al reported a case of aorto-LA fistula post AVR in a 70 year man who progressed to severe decompensated congestive cardiac failure with express speed that resulted in death. TTE helped here in making the preliminary diagnosis; but the definitive diagnosis was achieved with TEE using 2D and CFD modes. The authors recommended TEE as the procedure of choice for establishing correct diagnosis in this situation and prompting emergency surgical intervention (18). If the AV abscess involves left ventricular outflow tract (LVOT), this may lead to fistula to RA (19). Jen-Yu-Wang et al reported a preoperative 3D TEE demonstrated precise localisation of aortocardiac fistula that penetrated the aortic annulus near NCC. It also allowed a precise assessment of extent of vegetation. The authors hence recommend 3D echocardiography as a vital diagnostic tool helping in planning surgical intervention (20).

The usual sequence of patient referral to the cardiac surgeon is by a cardiologist. If the TTE has been inconclusive, the cardi-

ologist usually proceeds to perform TEE on the outpatient basis. However, in this case, the cardiologists did not seem to feel the necessity to perform TEE preoperatively. They proceeded to perform angiography and CT chest. We feel that TEE should be performed preoperatively as a routine for the pathologies related to the SV or any situations when TTE has been inconclusive. Cardiac MRI is another option to keep in mind for confirmation of the diagnosis.

In our case, the preoperative TTE appearance was deceptive and hence misleading to the diagnosis.

Echocardiography is a vital component for assessment of cardiac structures in endocarditis.

It provides precise assessment of vegetation, valvular structures, cardiac function, AR and other complications (21). TEE is superior to visualise the aorto-left atrial fistulas because of close proximity of TEE probe transducer to this area. Hence, imaging artefacts are diminished with TEE in comparison with TTE. (22) ME AV SAX and LAX are preferred views and colour mode is optimised by adjusting Nyquist limits between 50-60 cm/s so that accuracy is achieved before making interpretations. Similarly, of crucial importance is to ensure that the colour box size and depth settings are smallest which improves the temporal resolution and hence the image quality (23).

To conclude, we highlight the following take home messages:

- Preoperative imaging by TEE for pathology involving sinus of Valsalva.
- Cardiac MRI as a possible important tool to confirm the diagnosis preoperatively.
- Preoperative history fever, as in our case, should be considered as a vital piece of information. With this in mind, further investigations should be performed to establish or rule out the possibility of endocarditis.

- Intra-operative, three-dimensional echocardiography would help in confirming the diagnosis in an event of dilemma. Of course, this requires adequate expertise and competence.
- In addition to the vigilance of anaesthetic team, it is also of crucial importance to communicate effectively with the surgical team, so that the surgeon approaches with an open mind and anticipate different findings from the pre-operative work up.

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