A Copybook Multimodal Imaging in a Case of Aortic Root Abscess—Computed Tomography, Surgical, and Intraoperative Echocardiography Imaging

A 13-year-old male child who underwent aortic valve repair for severe aortic regurgitation presented with complaints of high-grade fever with chills and rigor after 2 weeks of surgery. He was started on antibiotics as his transthoracic echocardiography showed an aortic root abscess, severe aortic regurgitation, mild mitral regurgitation, and preserved biventricular systolic function. Further imaging with contrast computed tomography (CT) showed a large aortic root abscess of size 3.5 × 1.8 cm with communication to the non-coronary sinus [Figure 1a]. He was planned for Ross procedure. In the operation room, after induction of general anesthesia, the heart was examined using a transesophageal echocardiography (TEE) probe (X72t; iE33; Philips Medical, Bothell, USA). Pre-cardiopulmonary bypass (CPB) TEE showed a well-defined abscess cavity of size 3.9 × 2.8 cm communicating to the non-coronary sinus and distorting the aortic valve leaflets [Figure 1b, c and Videos S1, S2]. Intraoperative TEE measurements showed a size disparity of 8.8 mm between the aortic annulus and pulmonary annulus [Figure 1d]. Hence, the Ross procedure was abandoned and surgical plan changed to homograft replacement of aortic root. After adequate systemic heparinization, CPB was instituted and heart was arrested in diastole using blood cardioplegia. Surgical exposure confirmed the findings of CT and TEE imaging [Figure 1e]. The abscess cavity was excised, and the aortic root was replaced with 23 size aortic homograft. Post-CPB TEE showed normal functioning homograft with mean transvalvular gradient of 8 mmHg and preserved biventricular function [Figure 1f and Video S3]. Postoperative period was uneventful without any complications.

Infective endocarditis can occur in both native and prosthetic heart valves and has an incidence of about 10 to 39%.[1] The presence of aortic root abscess in the setting of infective endocarditis is associated with high operative mortality of 8.4%.[2] The most common isolated organisms

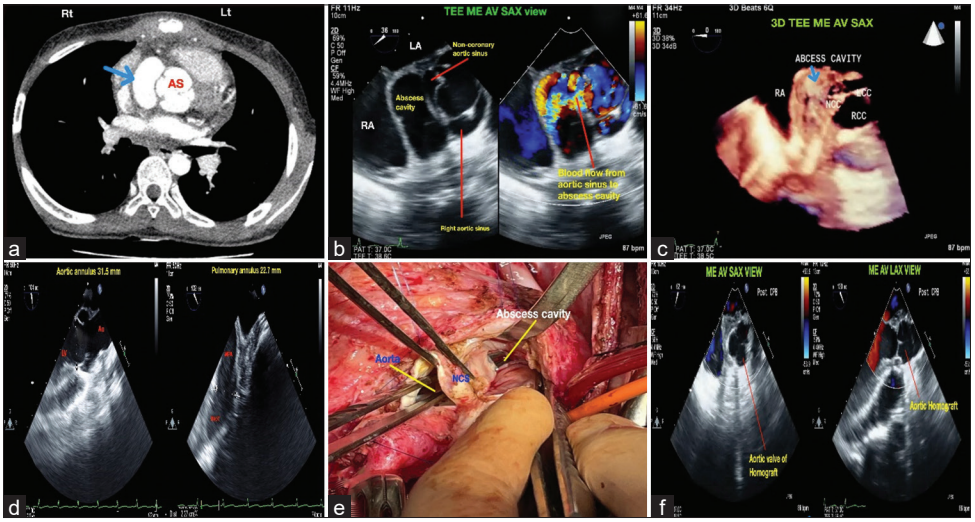

Figure 1: (a) Contrast computed tomography axial section of heart showing a large crescent-shaped contrast enhanced abscess cavity lying adjacent to the aortic sinuses (blue arrow) (b) Pre-CPB TEE ME AV short axis view (color compare) showing large abscess cavity with shunting of blood from non-coronary sinus to abscess cavity during systole (c) Three-dimensional TEE image showing the abscess cavity adjacent to the non-coronary sinus (blue arrow) (d) Pre-CPB TEE showing measurement of size of aortic annulus in ME AV LAX view and size of pulmonary annulus in UE ascending aorta LAX view (e) Surgical image showing the communication between abscess cavity and aortic root (surgical forceps passed from non-coronary aortic sinus to abscess cavity) (f) Post-CPB TEE examination of aortic homograft in ME AV SAX and LAX view. 3D = Three dimensional, AS = Aortic sinus, AV = Aortic valve, CPB = Cardiopulmonary bypass, LA = Left atrium, LAX = Long axis, LCC = Left coronary cusp, ME = Midesophageal, NCC = Non-coronary cusp, NCS = Non-coronary sinus, RA = Right atrium, RCC = Right coronary cusp, SAX = Short axis, TEE = Transesophageal echocardiography, UE = Upper esophageal

were staphylococcus, streptococcus, and enterococcus. Patients usually present with septicemia, chest pain due to acute coronary syndrome, transient ischemic attack or stroke due to systemic embolization, various degrees of heart blocks, intracardiac fistula, pseudoaneurysm formation, and heart failure.[3] Preliminary management involves the collection of sample for blood culture and initiation of antibiotics. Multimodal extensive imaging with echocardiography and radiology is needed to assess the extension of the lesion to the surrounding structures. The indication for surgical treatment depends upon the severity of the valvular lesion and the development of paravalvular leak. The postoperative complications are very high in these subsets of patients and include paravalvular leak, myocardial infarction, complete heart block, sepsis, stroke, and acute kidney injury.[4] TEE is an inevitable intraoperative imaging tool to guide the surgery by providing exact anatomical identification of the lesion as well as the demarcation of extension to other adjacent cardiac chambers.[5]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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