
Endocarditis with Involvement of the Aorto-Mitral Curtain

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Endocarditis presents a treatment challenge for the physician and potential mortality for the patient. When medical therapy fails or complications arise, surgical repair may become necessary. When the endocarditis involves the valve and the aorto-mitral curtain, the complexity of surgical repair increases, often dramatically. This article describes our group's approach to endocarditis that involves the aorto-mitral curtain.

Operative Technique

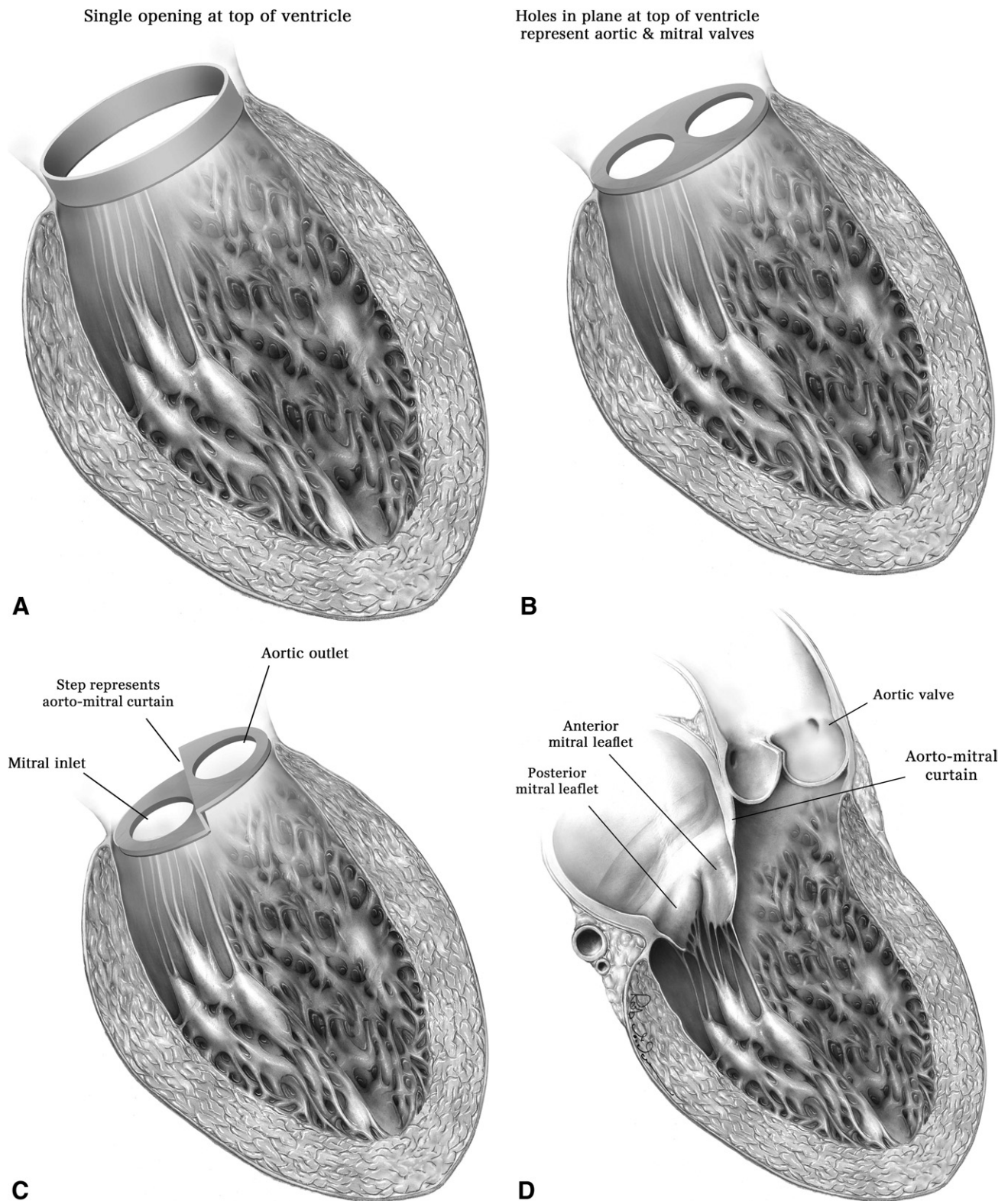


Figure 1 An understanding of the anatomy of the aorto-mitral valve complex and the intervening aorto-mitral curtain is necessary for understanding the surgical approaches and for achieving success in these difficult cases. (A) The left ventricular cavity is cone shaped with a single opening for both inflow and outflow. (B) One can visualize the top of the left ventricular cone being covered with a membrane into which holes are punched for the aortic valve and mitral valve. (C) The levels of these valves are offset, with the mitral valve being lower than the aortic valve. The intervening tissue between the levels is the aorto-mitral curtain. An anatomic drawing demonstrating these relationships is shown in (D).

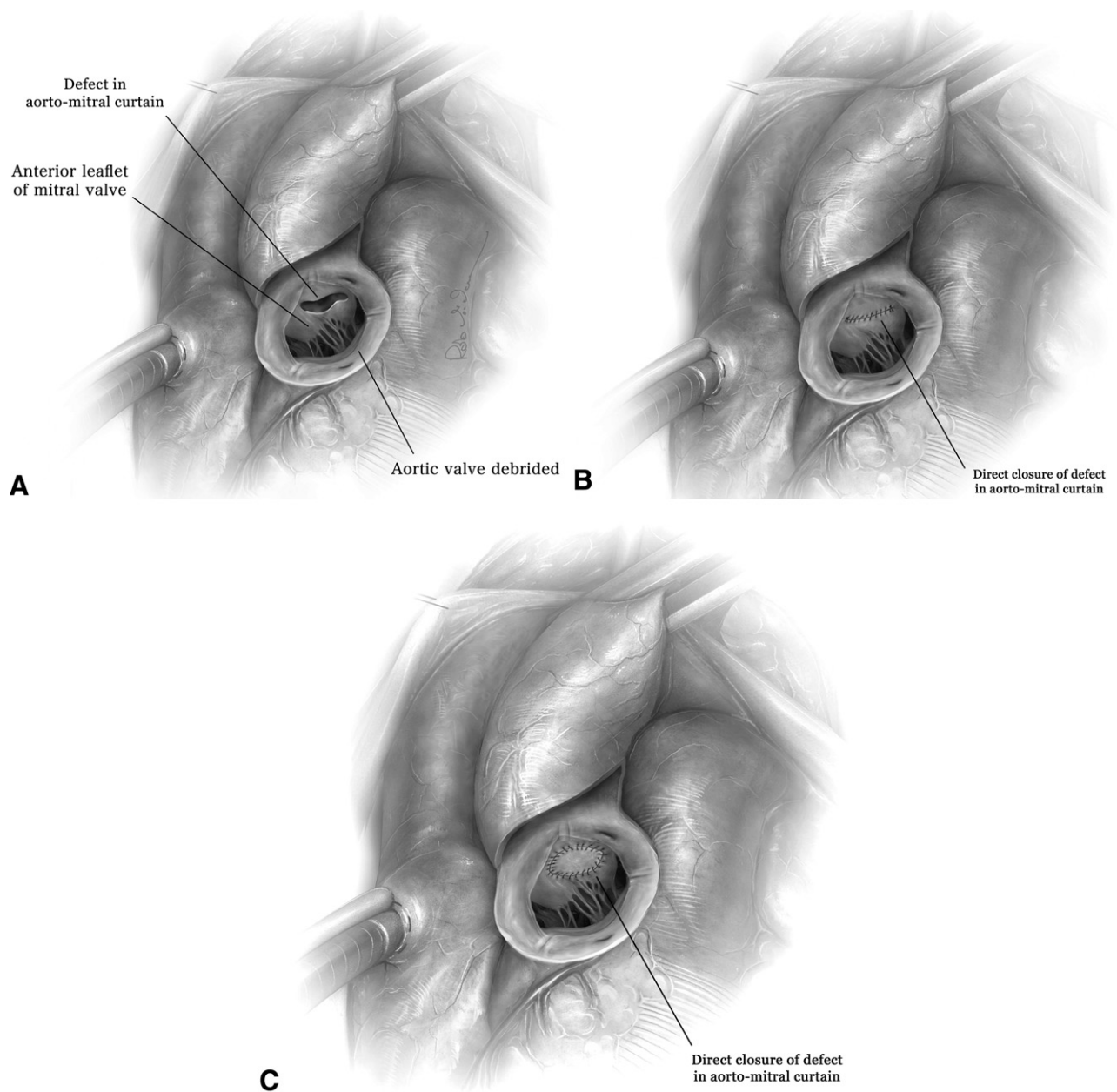


Figure 2 Aortic valve endocarditis can extend below the aortic valve into the aorto-mitral curtain. This is especially common in prosthetic aortic valve endocarditis. In (A), the infected aortic valve has been removed, revealing destruction of the aorto-mitral curtain below the aortic annulus. For smaller areas of destruction, it is sometimes possible to debride the infected area and use direct closure for repair, as shown in (B). However, one should never compromise resection of infected or devitalized tissue in hopes of using a smaller repair. (C) When resection of infected or devitalized tissue is larger, as is usually the case, a patch repair using pericardium can be done.

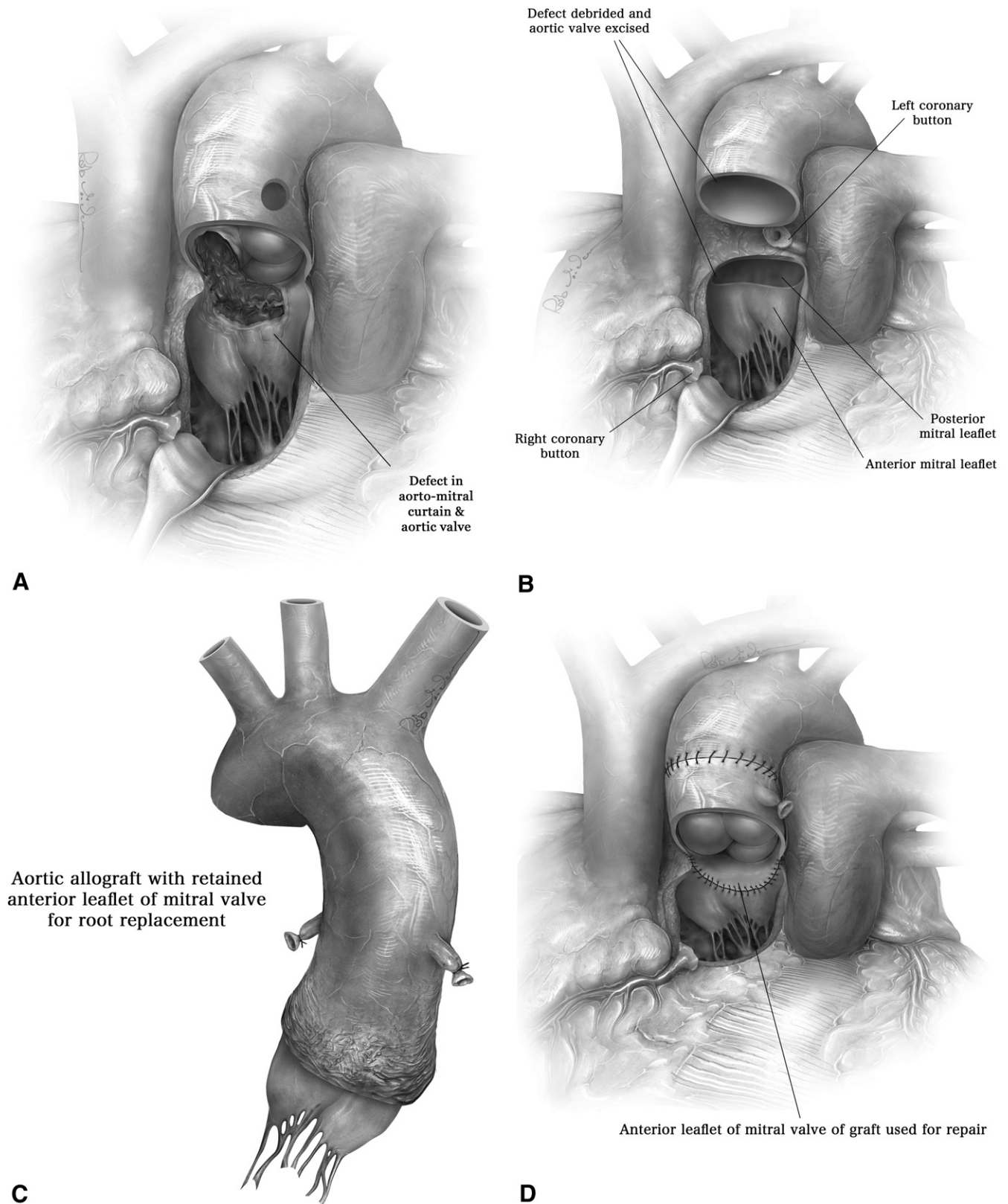


Figure 3 Removal of all infected or devitalized tissue is paramount for success. In more extensive cases, this may require removal of the entire aortic root followed by reconstruction. (A) Schematic showing extensive involvement of aortic valve, annulus, and aorto-mitral curtain best handled with complete aortic root resection and reconstruction. (B) The aortic valve and root have been removed. The coronary arteries are preserved as buttons. Destruction of the aorto-mitral curtain and part of the anterior leaflet of the mitral valve can be seen. This extensive resection allows complete and adequate removal of the infection before reconstruction. (C) An aortic allograft with retained anterior mitral valve leaflet can be used for repair. (D) The allograft is oriented in an anatomic position. The anterior leaflet of the mitral valve is trimmed to match the defect in the aorto-mitral curtain and sutured with a running polypropylene suture. The remainder of the proximal annular suture line can be interrupted or running polypropylene, at the surgeon's choice. The coronary would be sutured as button implants and the distal suture line is, again, running polypropylene.

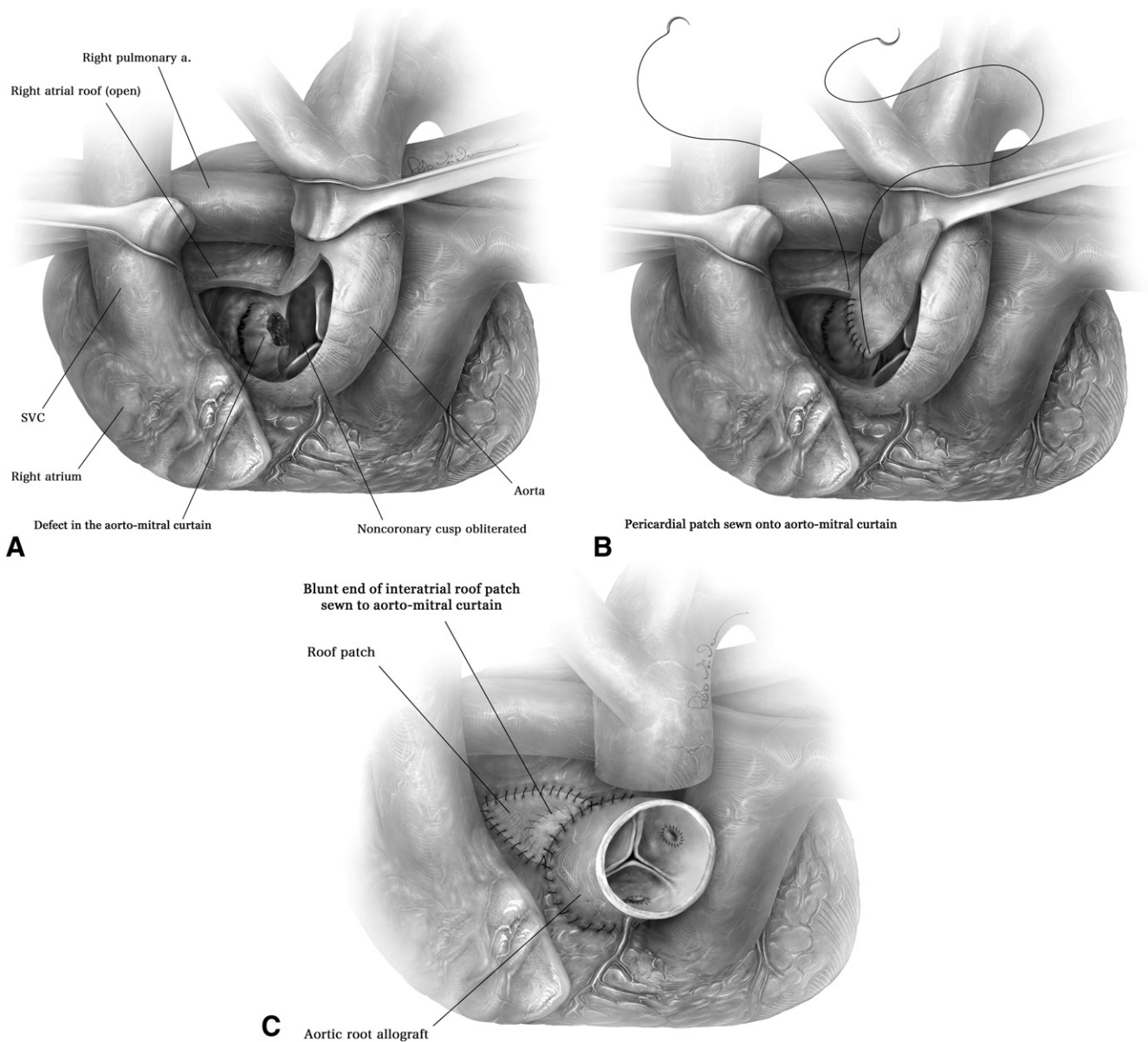


Figure 4 For extensive destruction, as described in Figure 3, an alternative approach is to open the aortic root vertically and extend this opening into the roof of the left atrium behind the aorta. (A) The vertical opening of the aortic root, which is then extended into the roof of the left atrium behind the aorta to expose both the aortic and the mitral valves, is shown. (B) Infected tissue is removed and the anterior leaflet of the mitral valve and the aorto-mitral curtain are repaired with a tailored pericardial patch. (C) The pericardial patch is folded back and used to repair the left atrial roof. The aortic root has been replaced with an allograft root. a. = artery; SVC = superior vena cava.

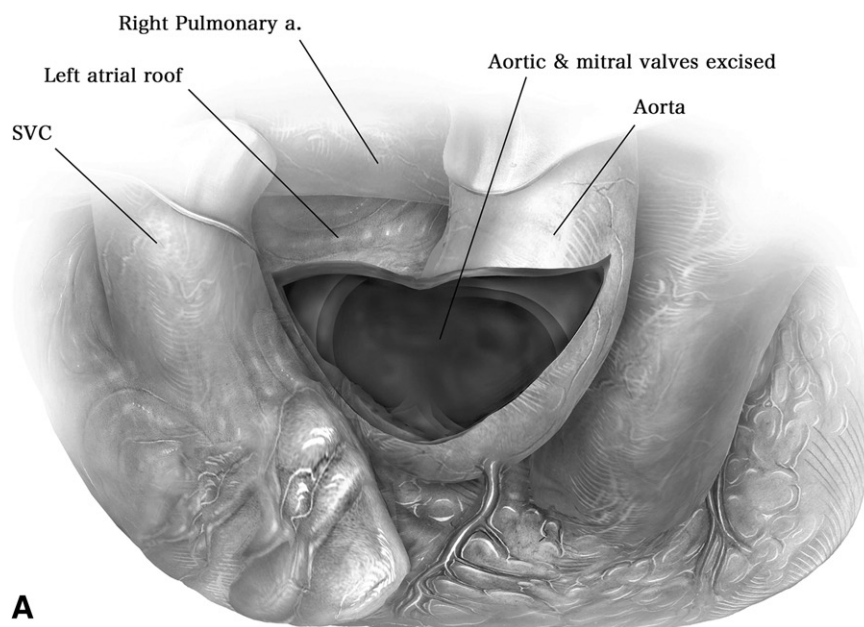
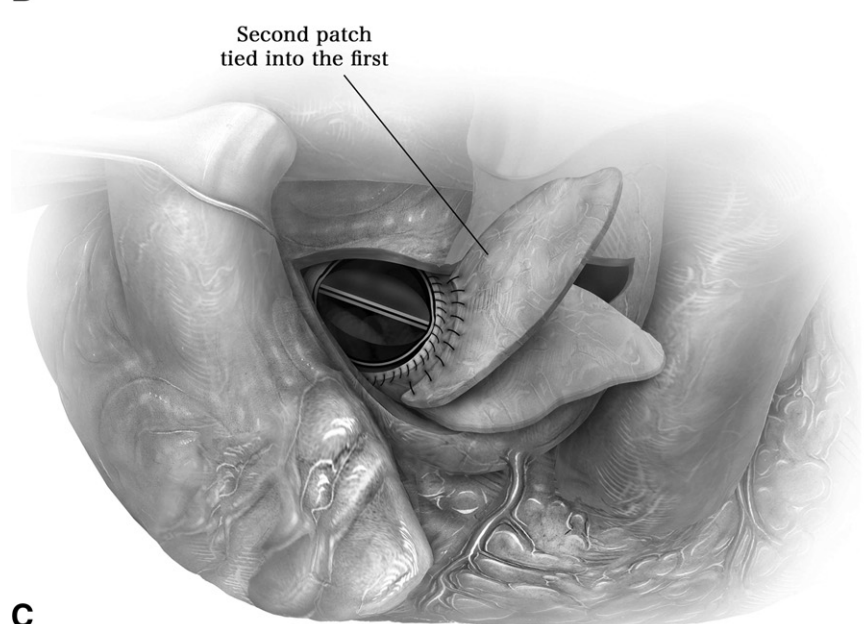
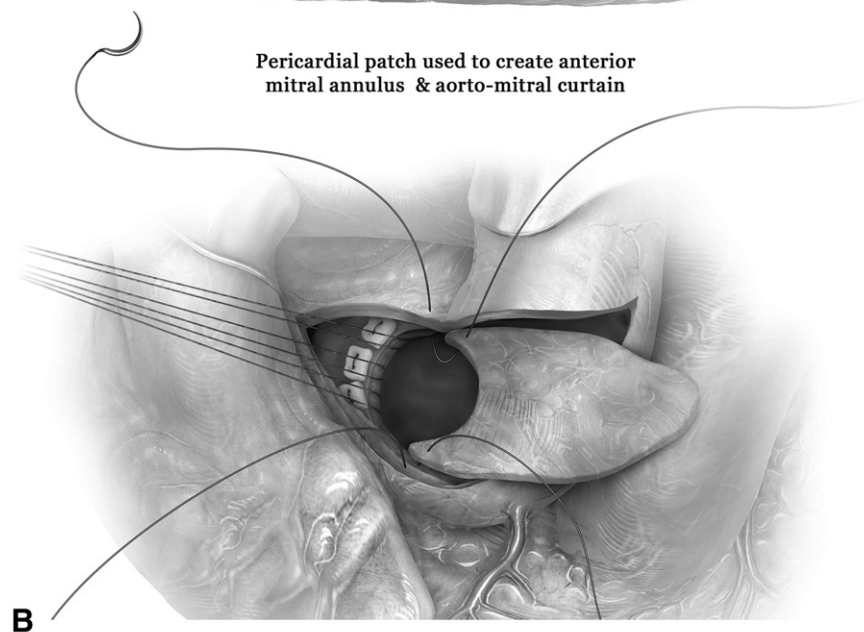


Figure 5 A vertical incision in the aorta extended into the left atrial roof behind the aorta, shown in (A), allows exposure for removal of both aortic and mitral valves when necessary. (B) A pericardial patch is tailored to replace the anterior mitral valve annulus and aorto-mitral curtain. We use interrupted, pledgeted mattress sutures for the mitral valve replacement once the pericardial patch has been anchored in place. (C) A second pericardial patch is sutured to the anterior portion of the mitral valve prosthesis. This is best done by starting with 2 patches and suturing them simultaneously. One patch will be used to repair the left atrial roof and other to close the aortotomy.



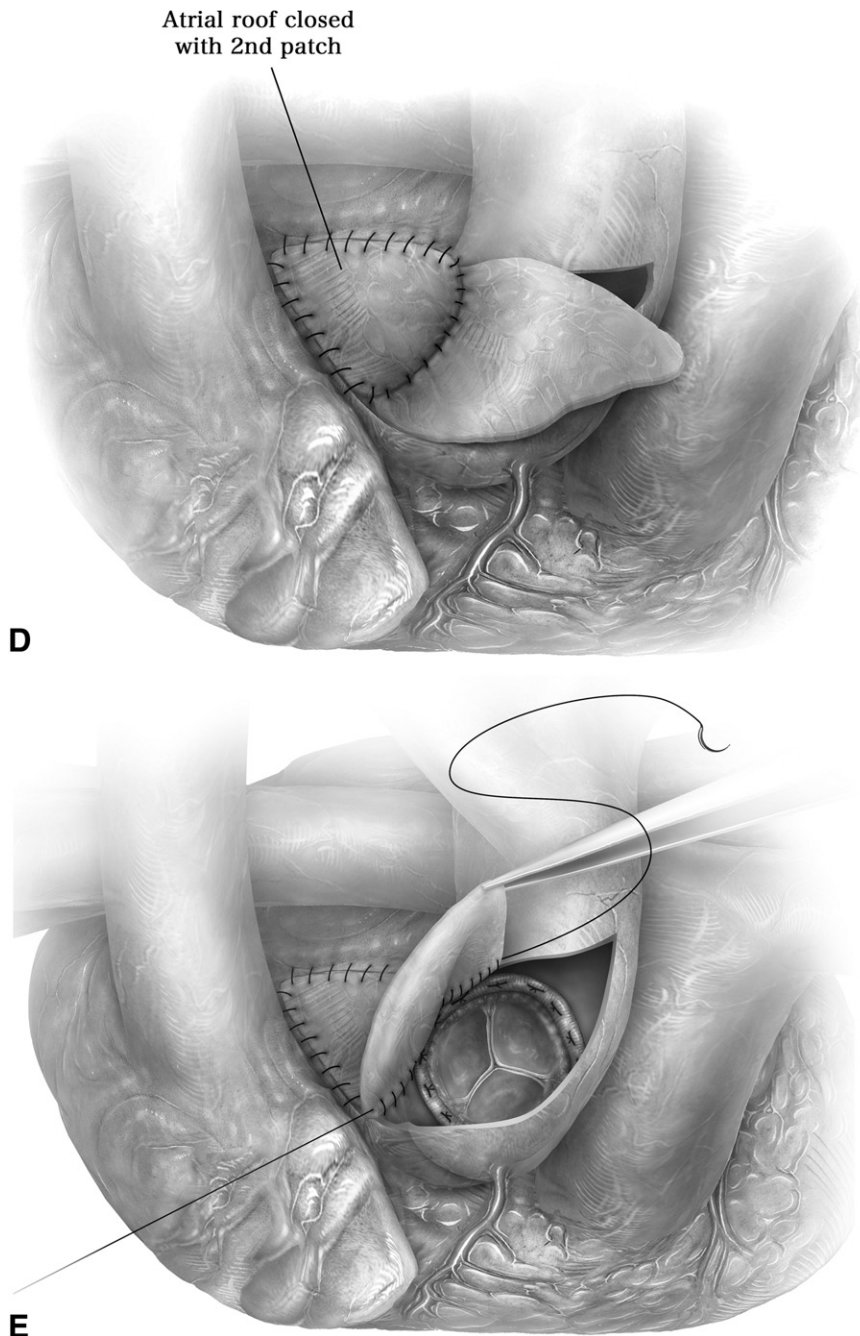
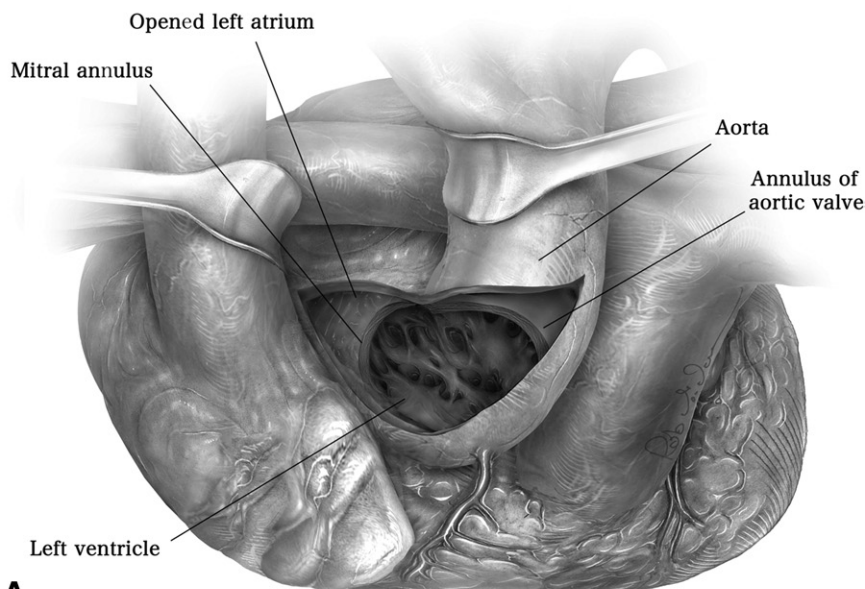
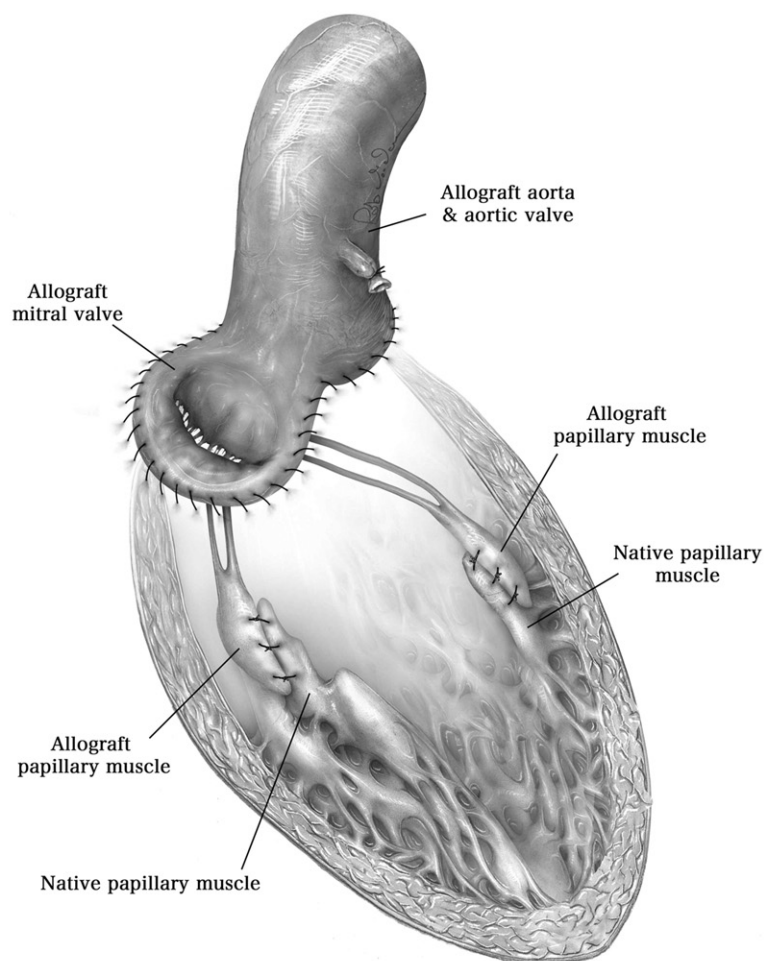


Figure 5 (Continued) (D) The first patch has been folded over and used to close the left atrial roof, leaving the second patch open for aortic valve replacement and subsequent aortotomy closure. (E) Aortic valve replacement is complete and the patch is used to close the aortotomy. a. = artery; SVC = superior vena cava.



A

Figure 6 An alternative method of double valve replacement uses an allograft that retains the entire mitral valve and papillary muscles. (A) A vertical opening with removal of both aortic and mitral valves. (B) The allograft papillary muscles are sutured into slits in the left ventricular wall next to the native papillary muscles.¹ The mitral-aortic complex is then sutured to the respective annular areas with running polypropylene suture, beginning at the posterior mitral valve and coming forward, and then around the aortic annulus. The distal suture line and coronary button implantation are done in a standard fashion.



B

Conclusions

Complex endocarditis involving the aorto-mitral curtain may require technically complex surgical repair. A complete understanding of the anatomy of this area is required for successful surgical procedures. We have attempted to provide the reader with a detailed description of the potential surgical approaches used in these cases. Most of these approaches can be accomplished by well-trained cardiothoracic surgeons.

Total allograft double valve replacement is possible, but has limited experience and unknown long-term outcomes. This procedure should only be done in institutions and by individuals with specialized interest in this complex problem.

Reference

1. Conklin LD, Reardon MJ: Technical aspects of mitral valve replacement with an allograft for acute bacterial endocarditis. *Tex Heart Inst J* 26(3): 192-194, 1999