

Commando procedure in a radiated chest



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Size a mitral valve so one-quarter of the circumference will be completed with the patch.

CENTRAL MESSAGE

Commando procedure for calcific valve disease is performed with lower mortality than for invasive infective endocarditis; the operation is outlined in 15 steps.

Video clip is available online.

To view the AATS Annual Meeting Webcast, see the URL next to the webcast thumbnail.

Patients with a history of mantle radiation are prone to developing calcific valve disease. In patients with concurrent aortic and mitral valve disease, calcification at the aorto-mitral curtain and mitral annulus can pose technical challenges for double valve replacement. The Commando procedure offers a simplified method to avoid placing annular suture through calcium and facilitates implantation of larger valves. Although prior publications¹ by the Cleveland Clinic describe surgical technique in the setting of endocarditis, in this report we outline a technique specifically to address calcific valve disease. The Institutional Review Board or equivalent ethics committee of the Cleveland Clinic did not approve this study because this publication is exempt due to the fact that it is a single patient case report with no identifiable patient data. The patient provided informed written consent for the publication of the study data.

SURGICAL TECHNIQUE

The Surgical Technique can be Described in 15 Steps (See [Figure 1](#) and [Video 1](#)):

1. Administer bicaval cannulation with antegrade and retrograde Buckberg cardioplegia. The retrograde cardioplegia line (8F) is placed under direct vision by opening the right atrium.
2. Crossclamp the aorta and perform the aortotomy extending toward the noncoronary cusp.
3. Perform circumferential dissection of the ascending aorta. The aorta, superior vena cava, and left pulmonary artery are isolated.
4. Debride the aortic valve and annulus.
5. Extend the aortotomy across the annulus toward the midline of the anterior mitral valve leaflet, dividing between the anterior chords, and extending the incision on to the dome of the left atrium.
6. Debride the mitral valve, preserving the anterior and posterior chordae.
7. Place pledgeted sutures at the mitral posterior annulus from trigone to trigone. Size the mitral valve, assuming sutures will cover three-quarters of the annulus. Measure the open distance—this will be the patch width later in the procedure. Mark the location of the trigone sutures on the valve cuff before seating the valve. Use

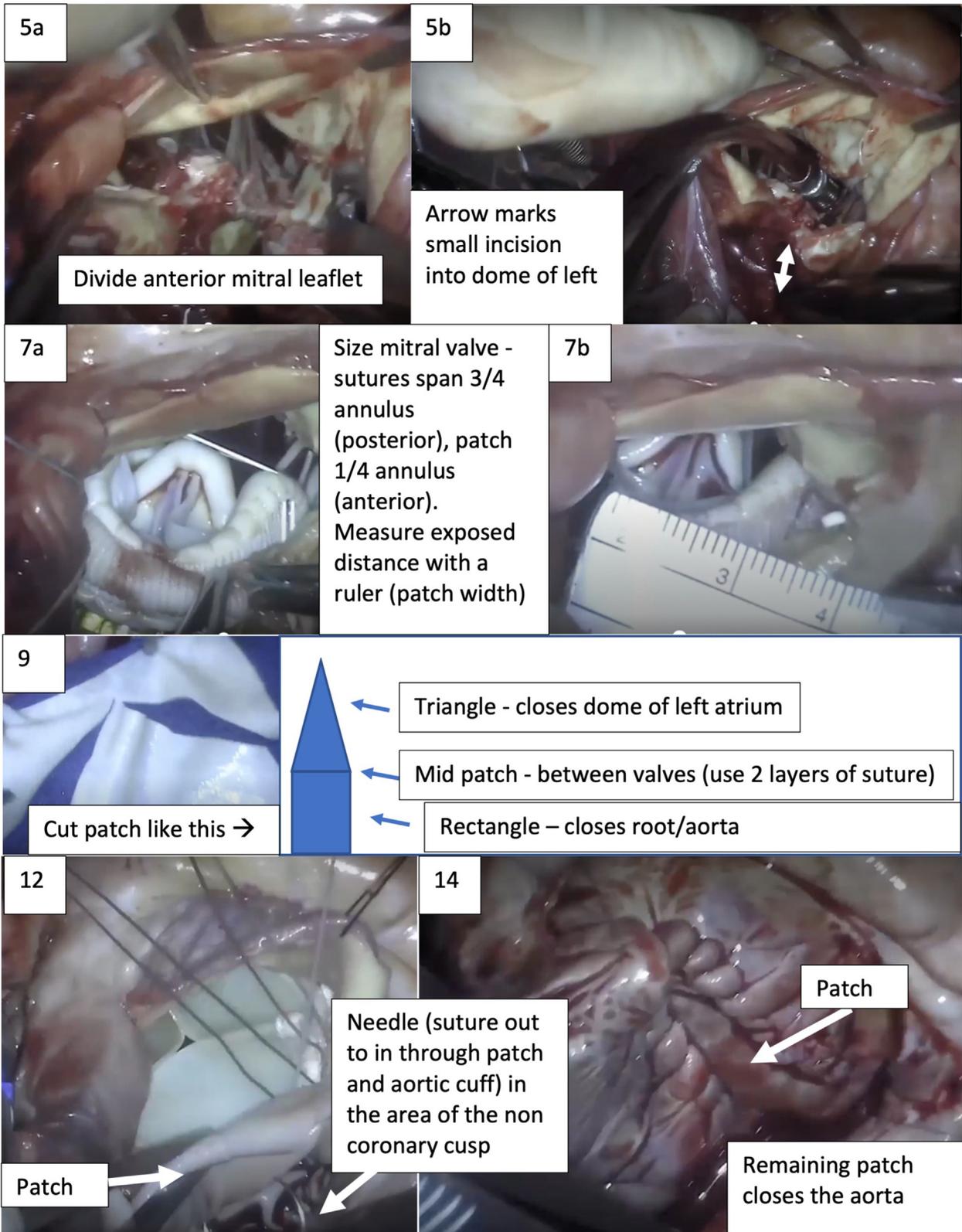
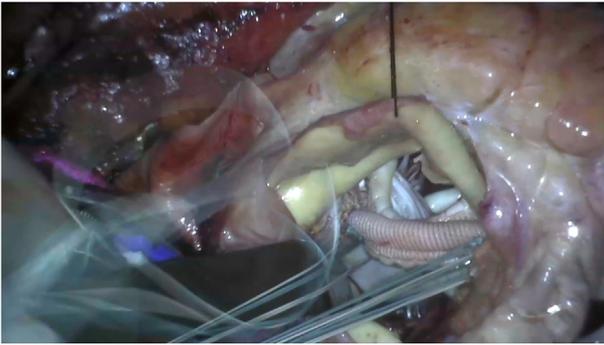


FIGURE 1. Key steps of the Commando procedure. Numerical steps correspond with the surgical steps outlined in the text. The patient provided written informed consent for the publication of the study data.



VIDEO 1. Operative video outlining the 15 surgical steps of a Commando procedure in calcific valve disease, such as that seen in a radiated chest. Video available at: [https://www.jtcvs.org/article/S2666-2507\(22\)00381-9/fulltext](https://www.jtcvs.org/article/S2666-2507(22)00381-9/fulltext).

these marks to ensure the struts do not obstruct the left ventricular outflow tract.

8. Seat the mitral valve.
9. Cut a patch from bovine pericardium with a triangle at 1 end, and fold over.
10. Sew the patch (smooth side facing the valve) with running suture beginning at the anterolateral (ie, left) trigone. Then use the triangular side of the patch to reconstruct the dome of the atrium.

11. Run the patch from the trigones up to the ascending aorta reconstructing the outflow tract.
12. Place the aortic valve sutures in native annulus. Sutures in the non coronary area will be placed into the patch instead of annulus—place these sutures outside to in. Allow 1 to 1.5 cm of patch between the valves.
13. Seat the aortic valve.
14. Utilize the remaining patch to close the ascending aorta.
15. De-air through the dome of the left atrium and the aorta and tie both suture lines. Remove the crossclamp.

DISCUSSION

This technique was used to replace the valves in a 59-year-old man who had undergone mantle radiation 20 years prior and developed dyspnea on exertion. He had severe aortic stenosis, moderate mitral stenosis and regurgitation, a heavily calcified aorto-mitral curtain, and severe posterior mitral annular calcification. A 29-mm Inspiris valve (Edwards Lifesciences) was placed in the aortic position, and a 32-mm Biocor valve (St Jude Medical) was placed in the mitral position (crossclamp time: 89 minutes). The patient was discharged to home on postoperative day 6.

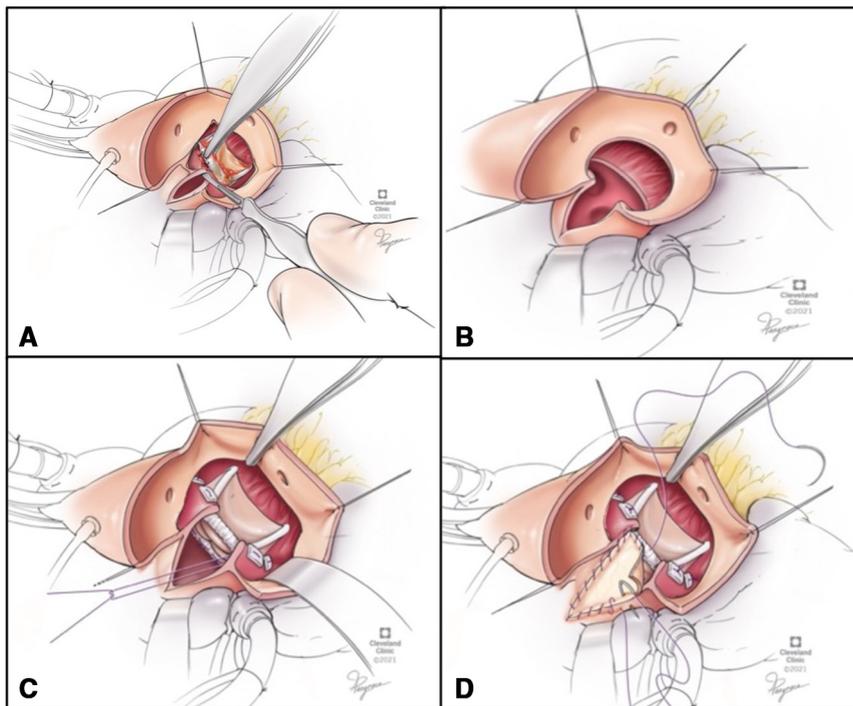


FIGURE 2. In approximately 90% of Commando procedures, extending the incision in to the dome of the left atrium allows for sufficient exposure, and the superior vena cava is not opened. A, Extend the aortotomy on to the dome of the *left* atrium. B, Creating continuity between the *left* atrium, *left* ventricle, and aorta. C, One-quarter of the circumference of the mitral annulus is *left* open and sewn to the patch. D, The triangular end of the patch is sewn to close the defect in the dome of the *left* atrium.

WE SUGGEST

- In most cases it is not necessary to divide the superior vena cava or perform an extended transseptal incision; vision is adequate opening the dome of the left atrium (Figure 2).
- Size the mitral valve so that, at most, one-quarter of the circumference will be completed with the patch. If the valve is oversized, it may distort the outflow tract.
- Size the patch to allow 1 to 1.5 cm between the mitral and aortic valves. Use 2 layers of suture to recreate the intervalvular fibrous body. Bleeding in this area is difficult to address off pump. There may be laxity, and some motion of the patch.

The Commando procedure is considered a complex, high mortality operation; however, outcomes differ based on indication. In a recent meta-analysis looking at 540 patients, mortality ranged from 7% to 28%.² In a series from University of Toronto, where 158 out of 182 cases were performed for noninfectious etiology, in-hospital mortality was 13%,³ whereas mortality for endocarditis is 24% to 28%.^{4,5} We find crossclamp time to be approximately 80 to 90 minutes for calcific valve disease, but 184 to 202 minutes for endocarditis.^{1,5}

The Commando procedure has a role in treatment of calcific valve disease such as that observed in a radiated chest, as well as in redo operations to implant larger prostheses. The mortality for these indications is less than that for endocarditis—although further data are needed. We

find the 15-step technique outlined reproducible, and technically less complex than an operation performed for invasive infective endocarditis.

Webcast

You can watch a Webcast of this AATS meeting presentation by going to: <https://www.aats.org/resources/2569>.



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