

Totally Endoscopic Mitral Valve Repair

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Since 1997, over 1000 patients have undergone totally endoscopic mitral valve repair at the Onze-Lieve-Vrouw Ziekenhuis, in Aalst, Belgium.¹⁻³ This article describes the approach to mitral valve repair using Port-Access (Edwards Lifesciences, Irvine, CA) technology to facilitate peripheral cannulation, endoballoon clamping of the ascending aorta, and access to the mitral valve through a non-rib-spreading right mini-thoracotomy. Preoperatively, patients who meet the indications for mitral valve repair are evaluated by cardiac catheterization, pulmonary function tests, and computed tomography to exclude patients with whom this procedure is not deemed appropriate. Patients with coronary artery disease, chronic obstructive pulmonary disease, which precludes single lung ventilation, Grade III-IV aortic atheromata,

severe peripheral vascular disease, a dilated ascending aorta >4 cm, or those with lung adhesions that might render the access through the right hemi-thorax are excluded.^{3,4}

The successful conduct of endoscopic mitral valve repair surgery requires the coordination of perfusionists, nurses, anesthesiologists, and surgeons. The procedure is performed under general anesthesia with a double-lumen endotracheal tube. Transesophageal echocardiography (TEE) plays a vital role in venous cannulation, in EndoClamp (Edwards Lifesciences) balloon placement, and with assessing the valve both pre- and post-cardiopulmonary bypass (post-CPB). Femoral-femoral CPB with separate drainage of the superior vena cava is utilized along with endo-aortic clamping with an EndoClamp balloon. Cold crystalloid cardioplegia is delivered in an antegrade fashion via a port on the endoballoon EndoClamp. Long shafted instruments are used to carry out the procedure, while a 5-mm endoscope is used to optimize visualization of the intrathoracic cavity and valvular apparatus. In our experience, a team approach with well-trained specialists has resulted in excellent results with mortality of <1% and a freedom from reoperation of >94% at 4 years.³

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Operative Technique

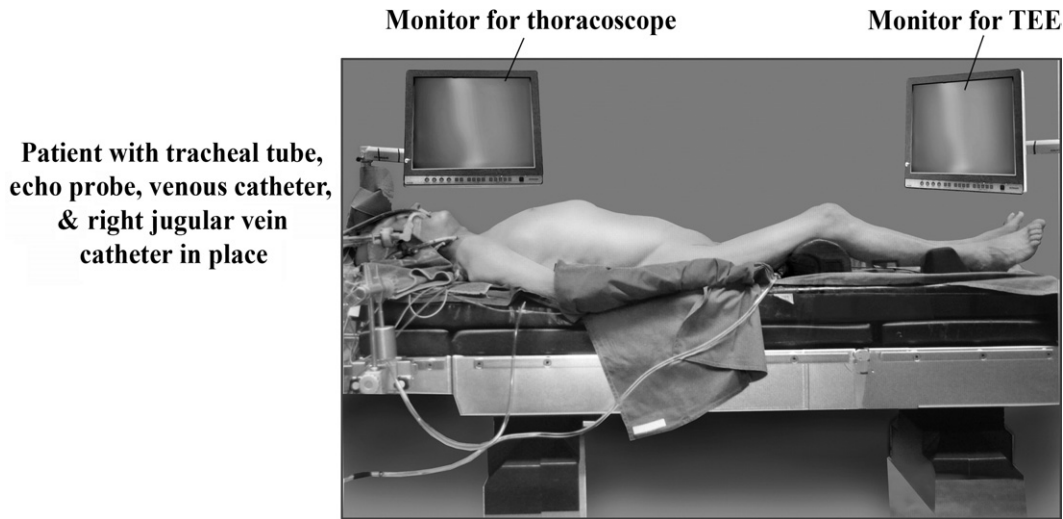
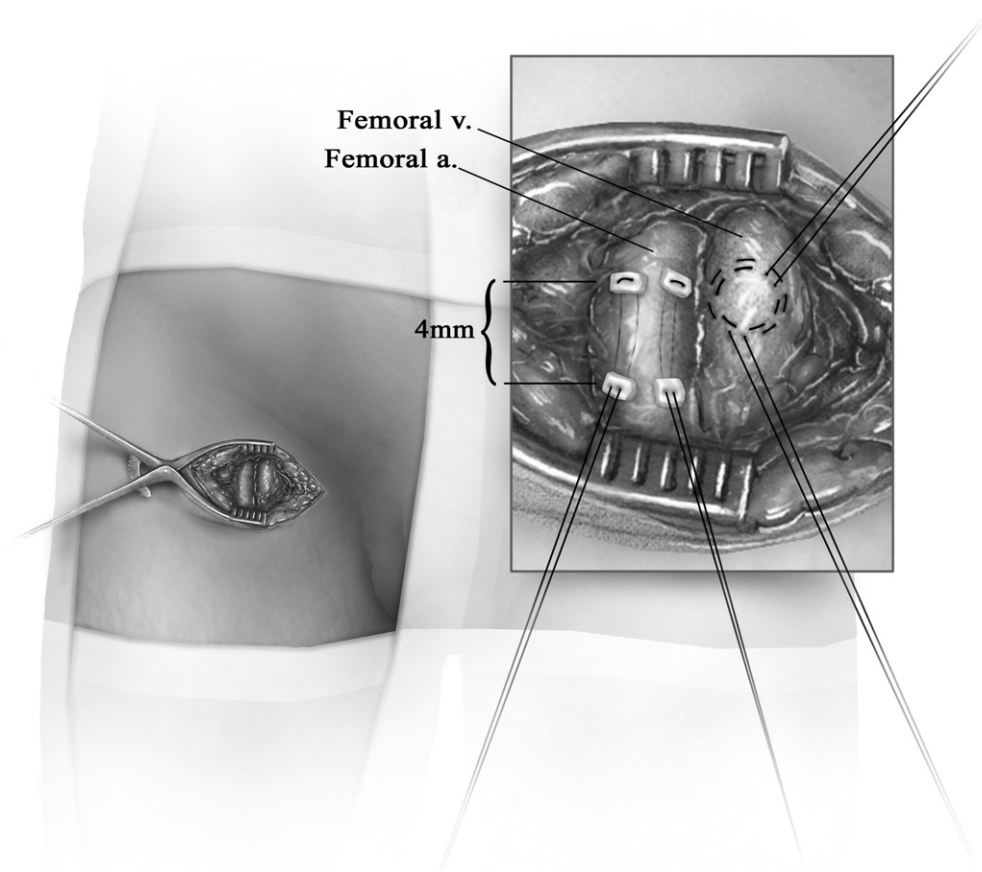


Figure 1 Patient positioning. Patients are placed supine on the operating table with an inflatable bladder to slightly elevate the right hemi-thorax. The right arm is slightly flexed. The anesthesiologist places a central venous line, a right radial arterial line, a double-lumen endotracheal tube, a temperature probe, and a transesophageal echocardiography (TEE) probe. In addition, a 14, 17 or 21 Fr venous cannula is placed in the right jugular vein before preparing the patient and initiating the operation. It will invariably ensure excellent venous drainage and allow for entering the right atrium, which cannot be achieved with a double-stage femoral cannula alone. Right radial artery pressures are monitored throughout the procedure to assess for EndoClamp balloon migration.

Figure 2 Preparation of the groin for CPB. Once the patient has been prepped and draped, a 2- to 3-cm incision is made at the level of the superior femoral triangle. Exposure of the anterior surface of the right femoral artery and vein is conducted. Transmural, longitudinal “U” stitches with 4-0 Gore-Tex (W.L. Gore & Associates, Inc, Flagstaff, AZ) with Teflon pledgets are placed on the artery and two 4-mm purse-strings on the vein are marked for easy identification. During this time, the scrub nurse and perfusionist prepare the EndoClamp and bypass cannulas. a. = artery; v. = vein.



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