Operative Techniques in Thoracic and Cardiovascular Surgery

# Intuity Elite Valve Implantation Technique

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**With the advent of transcatheter aortic valve replacement (AVR) and expanding treatment populations, there has been significant impetus to innovate the standard surgical AVR, particularly through minimally invasive approaches. Minimal invasive surgical aortic valve replacement (MIS AVR) is associated with improved cosmesis, decreased bleeding, reduced ventilation times, shorter intensive care unit and hospital lengths of stay, and improved early and long-term survival when compared with conventional full sternotomy AVR. However, MIS AVR is also associated with prolonged aortic cross-clamp and cardiopulmonary bypass times, reflecting the increased technical complexity of these operations. Using knowledge gained from the transcatheter experience, several rapid deployment and sutureless aortic valves have been developed to facilitate minimally invasive approaches and reduce operative times. These devices have been employed for several years in Europe and have recently achieved regulatory approval in the United States. Rapid deployment and sutureless valves have been associated with significantly reduced cardiopulmonary bypass times, excellent hemodynamics, and acceptable rates of pacemaker implantation and paravalvular leak. Herein, we discuss the technical details for MIS AVR using the Intuity Elite rapid deployment valve system (Edwards Lifesciences, Irvine, CA).**

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Using knowledge gained from the transcatheter experience, several rapid deployment and sutureless aortic valves have been developed to facilitate minimally invasive approaches and reduce operative times. These devices have been employed for several years in Europe and have recently achieved regulatory approval in the United States. Rapid deployment and sutureless valves have been associated with significantly reduced cardiopulmonary bypass times, excellent hemodynamics, and acceptable rates of pacemaker implantation and paravalvular leak.[2-5] Herein, we discuss the technical details for MIS AVR using the Intuity Elite rapid deployment valve system (Edwards Lifesciences, Irvine, CA).

The Edwards Intuity valve is built on the design platform of the Edwards Perimount Magna Ease pericardial valve, with the addition of a balloon-expandable stainless steel cloth-covered frame incorporated into the inflow aspect of the valve. The Intuity Elite received Conformite European Mark approval in 2012 and United States Food and Drug Administration approval in 2016. Available sizes are 19, 21, 23, 25, and 27 mm. The operative technique is described in Figures 1-13.

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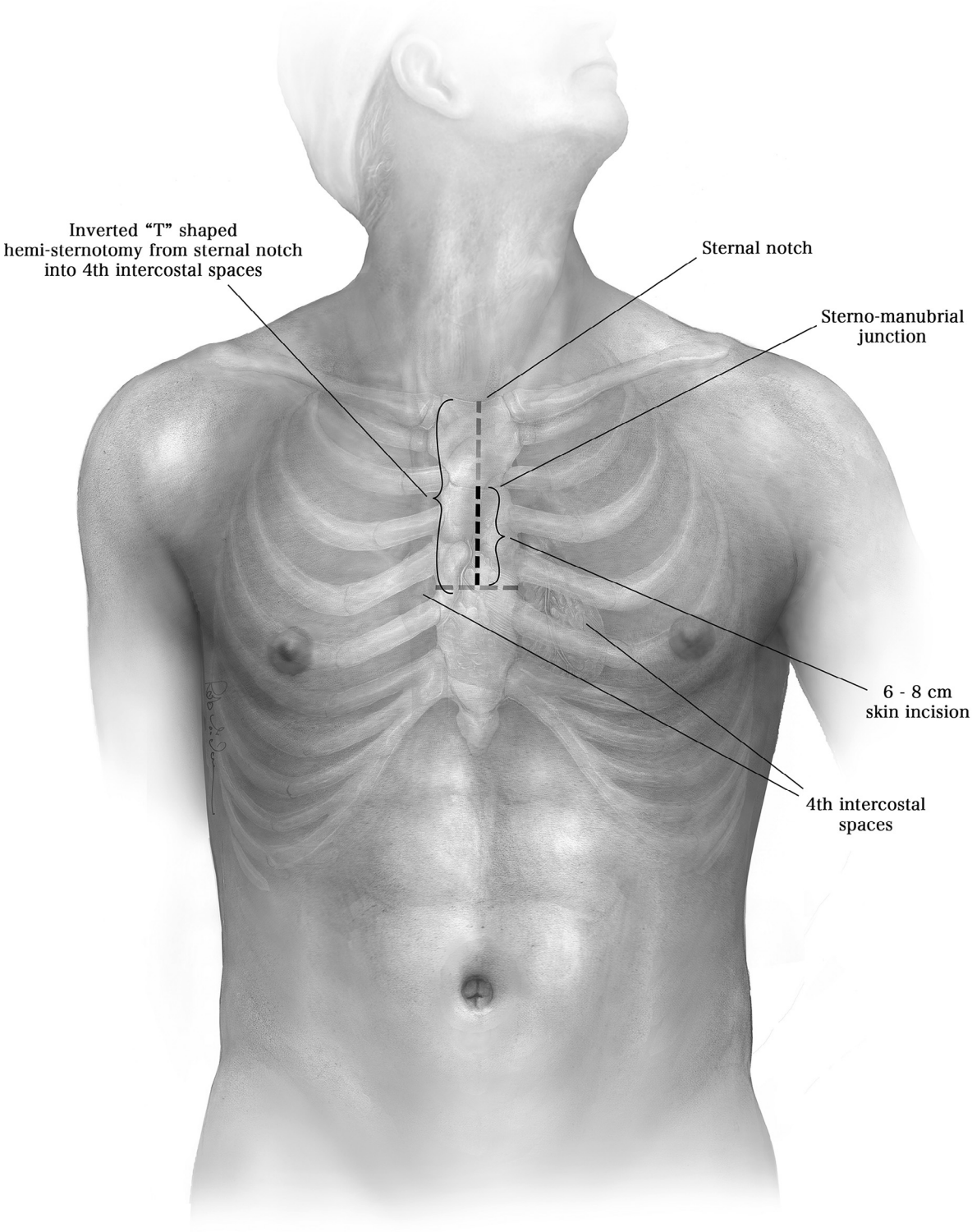


**Figure 1** A standard hemisternotomy or right lateral mini-thoracotomy approach is employed. We favor a midline skin incision starting at the sternomanubrial junction and extending 6-8 cm inferiorly. An inverted-T hemisternotomy through the fourth intercostal space is our preferred approach, as this usually provides optimal exposure for direct arterial and venous cannulation. A J-hemisternotomy or right anterolateral mini-thoracotomy approach is another commonly used technique. Six pericardial stay sutures are tied directly to the sternal periosteum or to the skin edges, and the retractor is replaced within retracted pericardium to pull the pericardial well up into the wound and maximize exposure. The pericardial well is flooded with $CO^2$ during the entire procedure. We prefer to cannulate the right atrial appendage directly through the incision. In the case of difficult right atrial exposure, the venous cannula can be tunneled under the xyphoid and inserted into the right atrial appendage, or percutaneous femoral venous cannulation can be employed. The left ventricle is vented via the right superior pulmonary vein. In cases of difficult access to the pulmonary vein, the pulmonary artery or the roof of the left atrium between the superior vena cava and the aorta can serve as alternative venting sites. The placement and method of cardioplegia is at the discretion of the surgeon. Our preference is antegrade cardioplegia via the ascending aorta or directly via the coronary ostia in patients with aortic insufficiency. We administer approximately 1 L of del Nido cardioplegia, which safely allows more than 90 minutes of myocardial ischemia. We prefer to avoid retrograde delivery via this incision, although others have successfully used this technique. In patients with severe aortic insufficiency, we fibrillate the heart before performing the aortotomy to improve visualization and ensure rapid cannulation of the coronary ostia.