Transapical Aortic Valve Implantation

Techniques and Tips

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Disclosure Statement of Financial Interest

Affiliation/Financial Relationship

Company

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Other Financial Benefit:
First Successful Transcatheter Transapical AVI

Transapical aortic valve implantation in humans

Jian Ye, MD, Anson Cheung, MD, Samuel V. Lichtenstein, MD, PhD, Ronald G. Carere, MD, Christopher R. Thompson, MD, Sanjeevan Pasupati, MD, and John G. Webb, MD, Vancouver, BC, Canada

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Edwards SAPIEN™ Transcatheter Heart Valve

Edwards SAPIEN™ THV

3 delivery options

Transfemoral  Transapical  Transaortic
Edwards Ascendra 2™ Delivery System

- SAPIEN XT™ THV
- Delivery System
- Introducer Sheath Set
- Balloon Catheter
- Crimper
- Inflation Device
Selection of Balloon-Expandable Valve Sizes

- 20 mm valve for an annulus diameter of \( \leq 18 \) mm
- 23 mm valve for an annulus diameter of 18-22 mm
- 26 mm valve for an annulus diameter of 22-25 mm
- 29 mm valve for an annulus diameter of 25-28 mm
Preparation

- CPB or ECMO system
- Cell saver (option)
- Good IV access (central line)
- Smallest size of femoral artery cannula
- One perfusionist in OR
- Packed red blood cells checked and ready for emergent transfusion
- Surgical instruments for urgent sternotomy
- Two surgeons or one surgeon with an appropriate assistant
Sizing of Aortic Annulus

Basal Ring Long Axis = 24mm
Basal Ring Short Axis = 21.6mm
Basal Ring Average = 22.8mm
Basal Ring Area = 425.8 mm²
Area Derived Diameter = 23.3 mm
Apical Suture

Two apical purse-string sutures using 2-0 Prolene with 8-10 interrupted pledgets.

Two perpendicular mattress sutures using either 2-0 or 3-0 Prolene with 4 large pledgets (1.5 – 2.0 cm in length).
Optimal Fluoroscopic View
Balloon Aortic Valvuloplasty

- 20 mm balloon
- ? necessary

Rapid V-pacing

Figure 5. ECG and femoral arterial pressure inv酬 displays. Rapid right ventricular pacing reduces transmural pulsatile flow during balloon inflation. In this case, initial V1 capture is followed by dissociated V1 capture with a greater rise in arterial pressure.
Valve Positioning

- Sinutubular junction
- Mid-sinusal level
- Anatomic ventriculo-arterial junction
- Virtual basal ring
Transapical Approach

- **Major advantages:**
  (1) no limitations on valve and delivery sheath sizes
  (2) less intra-aortic manipulation
  (3) a short straight route
  (4) better coaxial alignment /stabilization
  (5) most suitable way for valve-in-valve implantation
  (6) Antegrade approach to aortic valve
  (7) less fluoroscopic time and amount of IV contrast

- **Disadvantages:**
  (1) general anesthesia
  (2) mini-thoracotomy
  (3) relatively longer learning curve