

The Development of New Imaging Standards for Preoperative Ross Procedure Evaluation

John Eisenga, MD; William Brinkman,
MD; J. Michael DiMaio, MD; Zuyue
Wang, MD; Kyle McCullough, MD;
Ghadi Moubarak, MD; Sarah Hale,
BS; Justin Schaffer, MD; Katherine
Harrington, MD; William Ryan, MD;
Amro Al-said, MD

1. Background/Objective
2. Methods
3. Results
4. Conclusions

Background/Objective

- Ross procedure has been demonstrated to be a safe and effective option for aortic valve replacement
- Offers specific advantages compared to conventional aortic valve replacement
- Resurgence in popularity is being seen
- Little consensus on the most effective/accurate preoperative imaging modalities
- As a high volume Ross center we have developed a standardized imaging protocol of 4D Cardiac CTA with advanced cardiac imaging expert reconstruction of the RVOT and LVOT to assess the RVOT for adequacy as a homograft



Methods

- All patients being evaluated at our institution for the Ross procedure undergo preoperative 4D cardiac computed tomography angiography
- Optimal contrast timing is selected to allow simultaneous visualization (>220 HU) of the LVOT and RVOT.
- Contrast administration is visually inspected and the scan can be manually or auto-triggered.
- Reconstruction imaging of the aortic and pulmonic annulus, LVOT and RVOT are obtained and sized at peak systolic phases
- Right sided measurements are taken at the pulmonic annulus, the pulmonic artery pre-bifurcation, and the subpulmonic muscular cuff (3-5 mm below the pulmonic annulus)
- The same reconstructions are applied to the native aortic valve to use as a comparison for the homograft sizing suitability

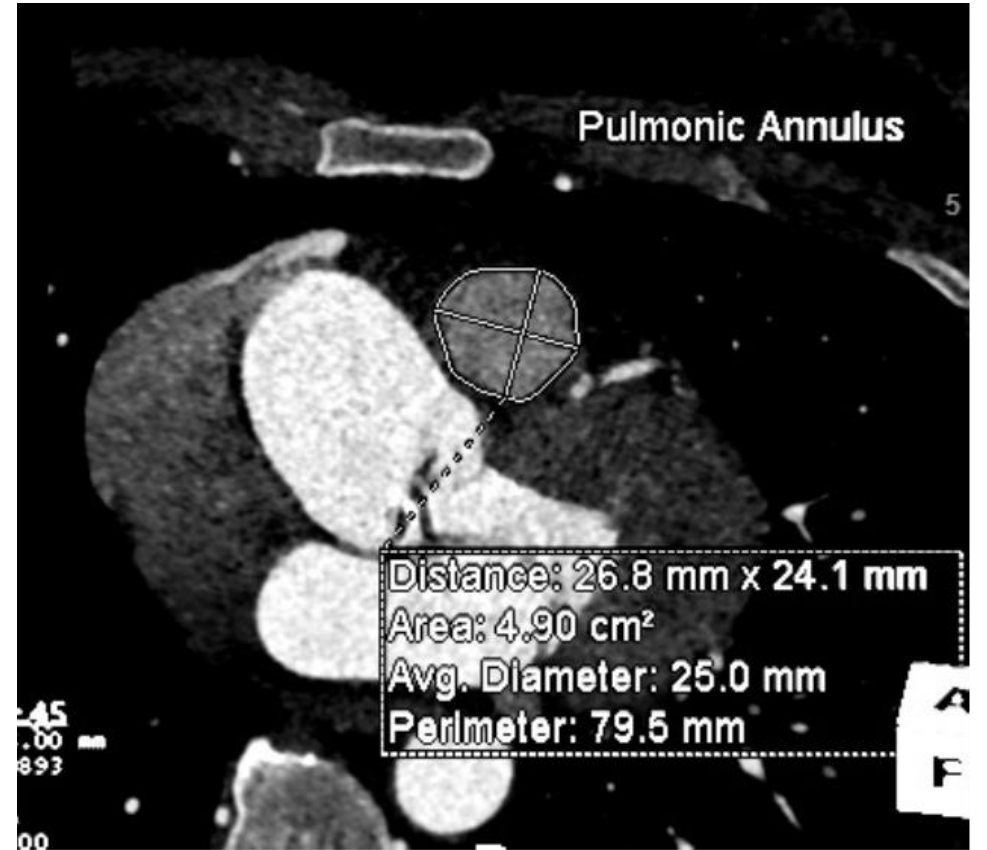
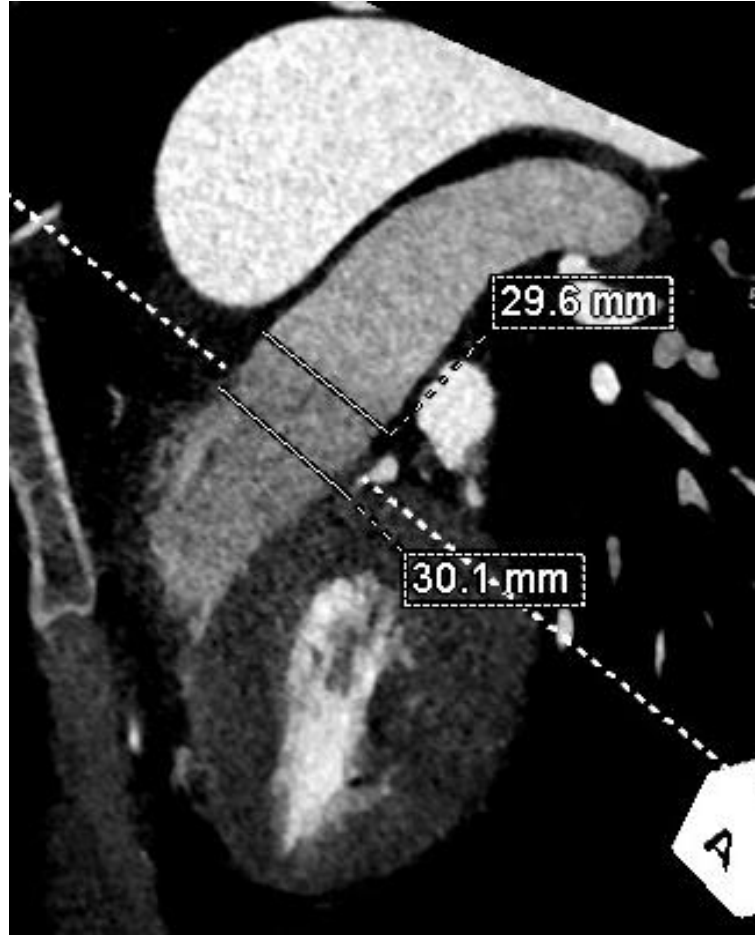


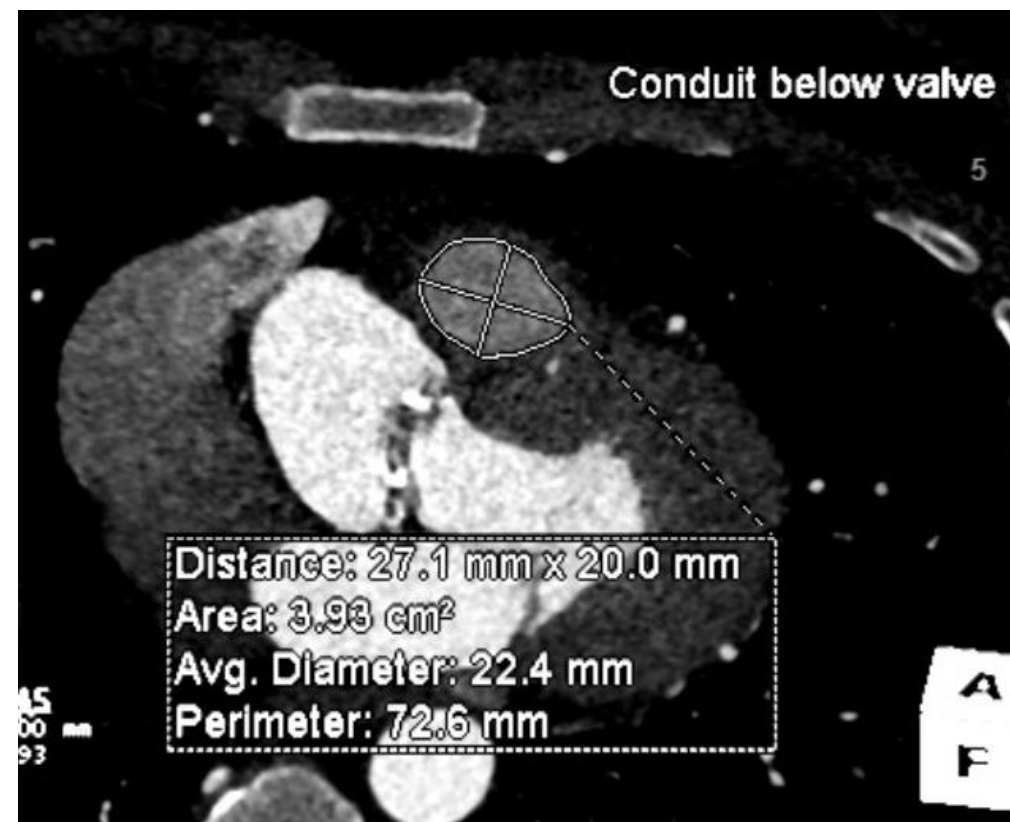
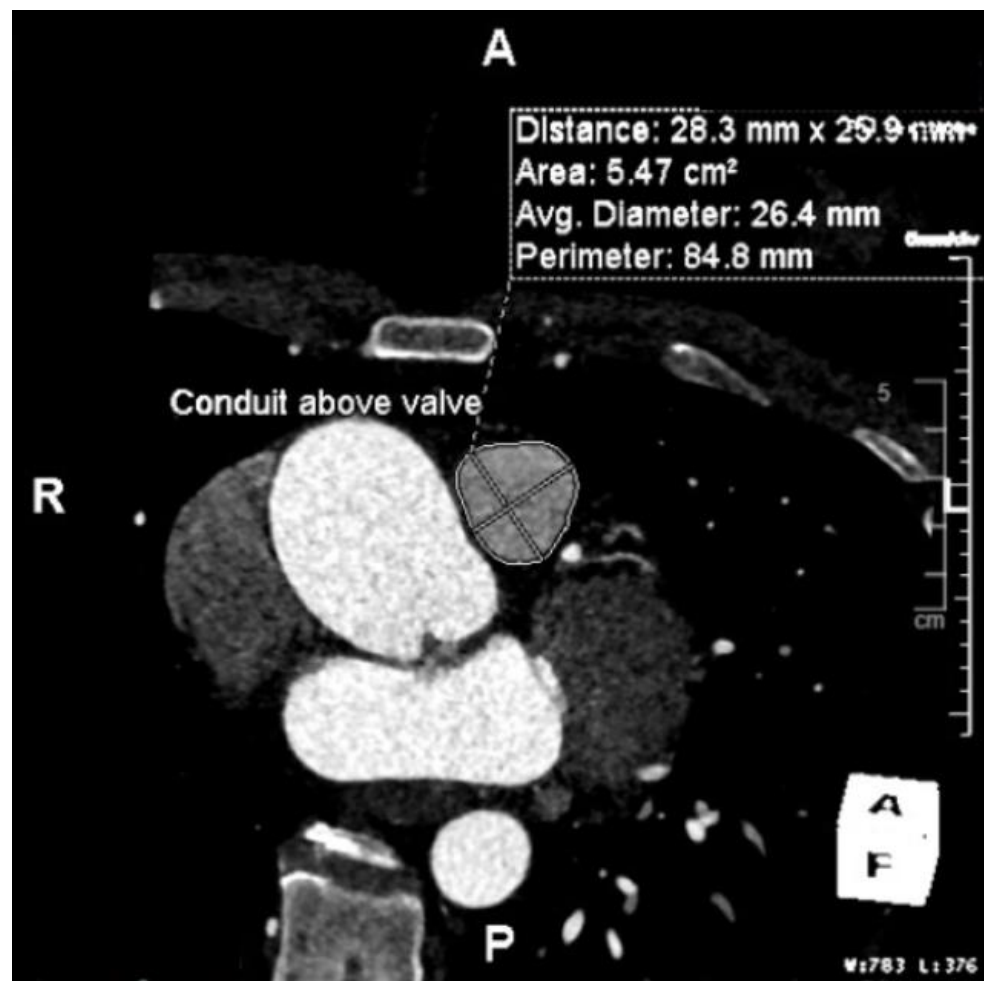
Results

- 4 patient cases
- Ages: 36, 41, 48, 61 years
- Gender: 2 male, 2 female
- Three underwent supported Ross procedure. One patient underwent unsupported Ross procedure

Preoperative 4D CTA Reconstructions of Aortic and Pulmonic Annulus and Intraoperative Measurements				
		Aortic Valve Annulus	Pulmonic Valve Annulus	Surgeon Measured Aortic Annulus Size
Patient 1	Average Diameter	23 mm	27.3 mm	27mm
	Perimeter	73.8 mm	90 mm	
Patient 2	Average Diameter	28.6 mm	28.8 mm	29 mm
	Perimeter	92.3 mm	93.1 mm	
Patient 3	Average Diameter	22.8 mm	21.4 mm	23 mm
	Perimeter	72.3 mm	69.6 mm	
Patient 4	Average Diameter	25.1 mm	25 mm	27 mm
	Perimeter	80.4 mm	79.5 mm	







Conclusions

- All patients underwent successful Ross procedure
- Pulmonary autograft was found to be a good size for AV replacement
- Accurately predicting size and usefulness of RVOT as a homograft preoperatively can impact patient care and preoperative planning
- We believe the use of 4D CTA reconstructions can improve quality of care and greatly enhance preoperative planning

