

Does the distal ascending aorta and arch grow following aortic root and ascending aorta replacement?

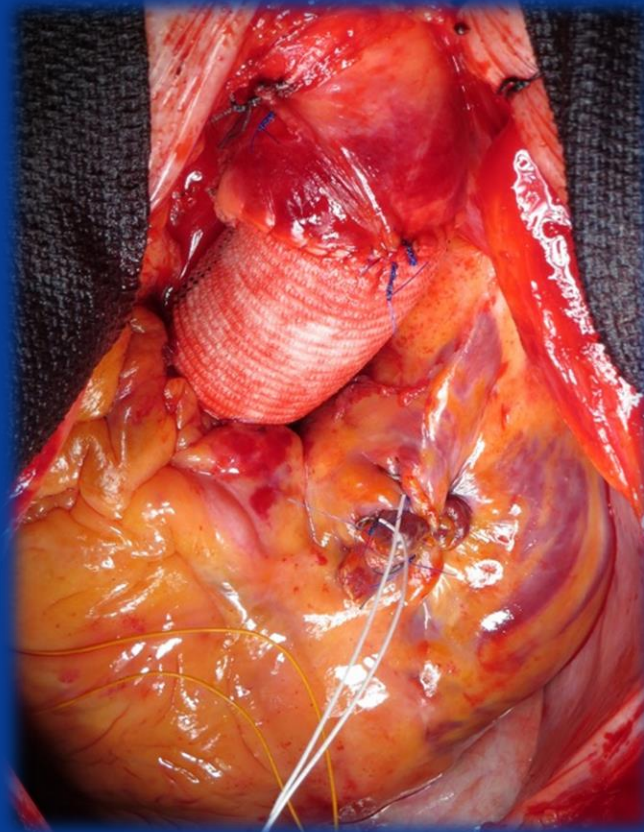
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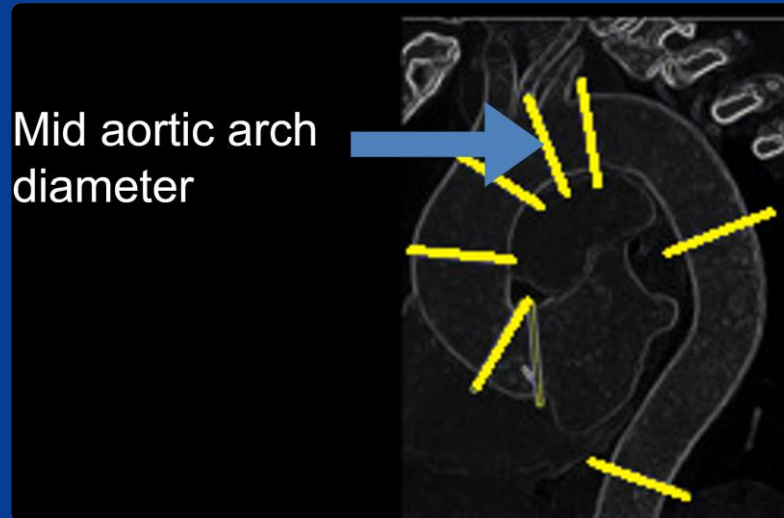
Objective

- We aim to assess the growth of distal ascending aorta and arch following aortic root replacement and ascending aorta replacement with aortic valve replacement.



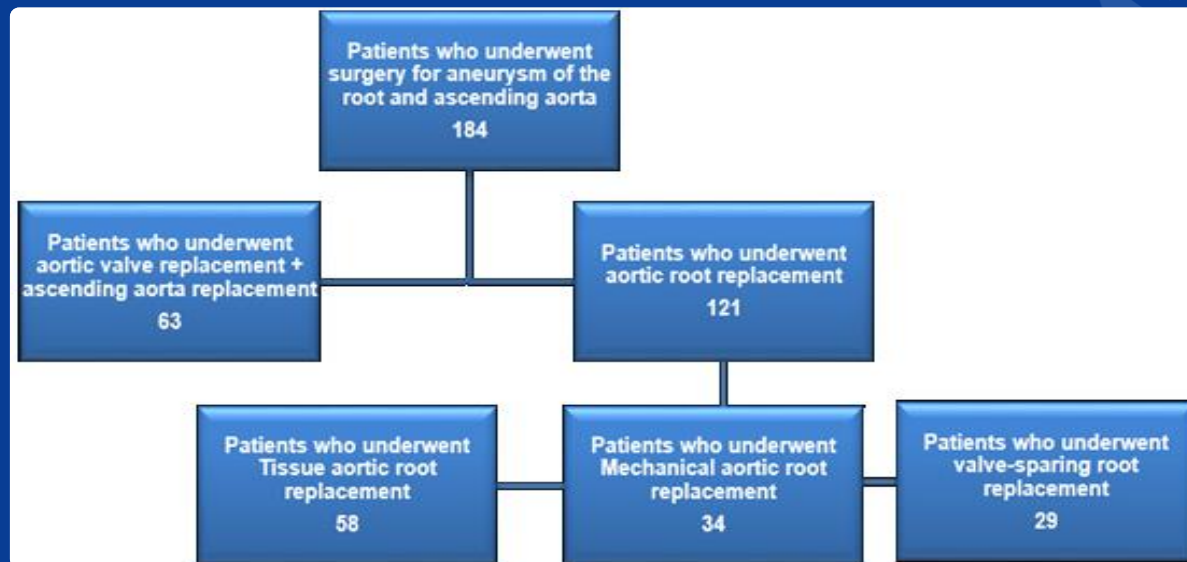
Methods

- A retrospective analysis of 184 patients who underwent aortic root replacement and ascending aorta replacement with aortic valve replacement from 2016 to 2022.
- All patients with dissection and arch surgery were excluded.
- All patients underwent pre-operative CT scanning and follow-up at 6 months, 1 year and then annually.
- The mid aortic arch was measured between the left common carotid artery and the left subclavian artery.



Methods

- In the presence of aortic valve pathology, if the aortic root or sinuses were greater than or equal to 4.5 cm, aortic root replacement was performed. If the aortic root was less than 4.5 cm, but the ascending aorta was greater than or equal to 4.5 cm, only the ascending aorta was replaced.
- Aortic valve replacement was performed based on standard indications.
- In patients with dilated sinuses, but where the valve was normal or near normal, valve sparing root replacement was performed.
- All valve sparing root replacements were performed using the remodeling technique.

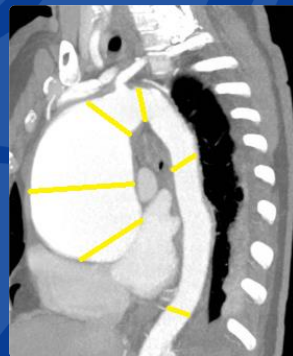


Results - Baseline Characteristics

Baseline Clinical Characteristics	n = 184 (%)
Age, years	60 +/- 15
Male sex	127 (70)
Euro score 2	3.19 +/- 3.55
Hypertension	116 (64)
Smoking	81 (44)
Diabetes Mellitus	12 (6.6)
Coronary Disease	12 (6.6)
Left Ventricular Function	
Good (>50%)	160 (87.4)
Moderate (30-50%)	16 (8.8)
Poor (<30%)	6 (3.3)
Aortic Valve Pathology	
Stenosis	37 (20)
Regurgitation	112 (61)
Normal	34 (19)

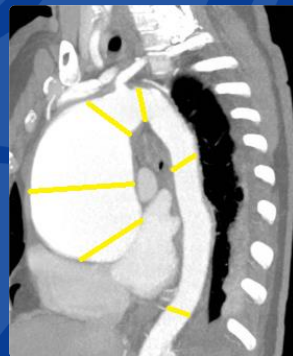
Results – Preoperative Aorta and Valve Parameters

Aortic Parameters	n = 184
Aortic sinus diameter, mm	31.2 (21 - 63)
Ascending aorta diameter, mm	48.2 (23 - 99)
Mid-arch diameter, mm	32.2 (22 - 49)
Valve Parameters	
Tricuspid (%)	123 (67)
Bicuspid (%)	60 (33)
BAV cusp fusion pattern (%)	
Left and right	51 (85)
Right and noncoronary	8 (13)
Left and noncoronary	1 (1.7)



Results – Operative Details

Operative Details	n=184 (%)
Classification of intervention	
Elective	158 (86)
Urgent	26 (14)
Redo procedure	7
Procedure type	
AAR +/- AVR	63 (34)
ARR only	121 (66)
Tissue valve	34
Mechanical	58
VSRR	29
ARR + concomitant procedures	
ARR + coronary artery bypass graft surgery	8
ARR + radiofrequency ablation	6
ARR + mitral valve replacement	1
ARR + PFO Closure	1
Cross-clamp time, minutes	79.6 (31-169)
Cardiopulmonary bypass time, minutes	97 (40-180)



AAR, ascending aorta replacement; AVR, aortic valve replacement; ARR, aortic root replacement; VSRR, valve sparing root replacement; PFO, patent foramen ovale

Results – Operative Outcomes and Complications

	n=184
Hospital mortality (%)	2 (1.1)
Transient ischemic attack/stroke (%)	3 (1.6)
Re-sternotomy for bleeding (%)	3 (1.6)
Hemofiltration (%)	3 (1.6)
Intensive care unit stay, days	2 (1 - 59)
Hospital stay, days	8 (5-94)

Results – Follow-up and Growth of the Aortic Arch and Distal Ascending Aorta

- Median follow-up : 4.3 years (1 - 82 months).
- Most recent follow-up median diameters:
 - Distal ascending aorta was 32.4 (range, 23-41) mm.
 - Mid arch was 30.8 (range, 20-54) mm.
- No patients required surgery to the residual aorta.

Results – Bicuspid Aortic Valve Subgroup

	n = 60 (%)
Age, years	56 +/- 14
Male sex	54 (90)
Preoperative diameter	
Ascending aorta diameter, mm	48.2 (26-65)
Mid-arch diameter, cm	31.2 (23-49)
Procedure type	
AAR +/- AVR	6 (10)
ARR	54 (90)
Hospital mortality (%)	1 (1.7)
Transient ischemic attack/stroke (%)	1 (1.7)
Follow-up Median Diameters	
Ascending aorta diameter, mm	32 (27-45)
Mid-arch diameter, mm	29.3 (23-43)

Conclusions

- **Our data does not support the practice of prophylactic arch replacement in patients undergoing aortic root replacement and ascending aorta replacement with aortic valve replacement.**
- **The remainder of the aorta doesn't seem to grow in non-syndromic patients at four years follow-up.**
- **With regard to follow up, we would recommend that imaging and follow up for the valve in all patients is required. However there may not be a need for prolonged surveillance for remaining native aorta.**