

Model Derivation for 1 Year Functional Survival			
Variable	Odds Ratio	95% Confidence Interval	P-Value
<b>Demographics</b>			
Age $\geq 75$ years old	2.01	1.09 - 3.72	0.03
Female gender	1.72	0.90 - 3.29	0.10
<b>Comorbidities</b>			
Peripheral Vascular Disease	2.55	1.29 - 5.00	0.01
Arrhythmia	1.88	0.96 - 3.67	0.07
<b>ICU Characteristics</b>			
Red Blood Cell Transfusions	1.21	1.11 - 1.31	<0.001
Days Intubated (up to 10 days)	1.11	1.00 - 1.24	0.05
<b>DSM Microbiology Data</b>			
Preoperative Infection	2.32	0.99 - 5.40	0.05
<b>DSM Chemistry Data</b>			
Maximum Creatinine (First 5 Days of ICU Admission)	1.00	1.00 - 1.01	0.01
*Area under the ROC Curve: 0.804 (0.747 - 0.862) Hosmer Lemeshow P-Value: p=0.21			

PrICULOS Calculator - 1 Year Functional Survival	
Variable	Value
<b>Demographics</b>	
Age $\geq 75$ years old	Yes
Female gender	No
<b>Comorbidities</b>	
Peripheral Vascular Disease	Yes
Arrhythmia	No
<b>ICU Characteristics</b>	
Number of Red Blood Cell Transfusions	2
Number of Days Intubated (up to 10 days)	7
<b>DSM Microbiology Data</b>	
Preoperative Infection	Yes
<b>DSM Chemistry Data</b>	
Maximum Creatinine umol/L (First 5 Days of ICU Admission)	100
<b>Probability of Being Alive and Not Institutionalized at 1 Year from Surgery:</b>	
54.7%	

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### WHAT HAPPENS TO THE AORTIC ROOT? A LONGITUDINAL STUDY OF AORTIC VALVE SPARING ROOT REPLACEMENTS

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**BACKGROUND:** To evaluate the natural history of aortic root graft geometry, aortic valve competency and patient prognosis following a valve sparing aortic root reconstruction.

**METHODS AND RESULTS:** Between 2008 and 2016, 65 consecutive patients (mean age  $55.8 \pm 16.7$  yrs, 18.0% females) underwent elective and emergent valve sparing aortic root reconstruction. All patients were prospectively evaluated

annually with clinical follow-up, echocardiography and CT imaging. Patients were assessed for survival, freedom from reoperation, degree of aortic regurgitation, NYHA status and graft complications over time. All echocardiograms and computed tomograms were read by single echocardiographer and radiologist, respectively. Patients were followed up to 8 years post-operatively (mean  $25.4 \pm 28.5$  months), with 100% follow-up. The largest increase of the aortic annulus observed during the surveillance period was  $6.8 \pm 15.5\%$  which occurred over the first 3 months of follow-up. Similarly, the aortic sinuses increased a maximal amount by  $10.2 \pm 21.1\%$  between the 1st and 2nd post-operative year. Afterwards, both of these components of the reconstruction remained stable through the remaining follow-up period. Both the sinotubular junction and ascending aorta remained stable, with a maximum annual increase of  $5.6 \pm 5.5\%$  and  $5.7 \pm 8.2\%$  respectively, for the first four post-operative years seen on CT imaging. The annual echocardiographic findings were similar but showed greater variability in the measurements as compared to CT. The overall survival rate was 93.4% (57 patients). Freedom from reoperation was 98.4% (60 patients). Throughout the entire duration of follow-up, aortic insufficiency was identified as 0 in 44 (67.7%), 1+ in 17 (26.2%), 2+ in 3 (4.6%), 3+ in 0 (0%) and 4+ in 1 (1.5%). Mean NYHA status was  $1.1 \pm 0.3$  at most recent follow-up for all patients. CT evidence showed 96.5% (59 patients) freedom from graft complication including; endocarditis, thrombosis, embolism, aneurysm, pseudoaneurysm, dehiscence, dissection and kinking.

**CONCLUSION:** This work demonstrates the stability of the aortic annulus and root following valve sparing aortic root reconstruction with comprehensive annual combined echocardiographic and CT imaging. We have shown that CT imaging on follow-up, more accurately demonstrated changes to the aortic root and its normal oval shaped geometry as compared to echocardiographic imaging for surveillance, whose 2D images assume a more round geometry. With the stability of the annulus and root as well as freedom from symptoms, aortic regurgitation and need for reintervention, annual surveillance of the valve reconstruction may not be necessary for all patients.

