



Small Aortic Root Dilemma!

Long-term results of AVR with posterior root enlargement

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Professor of Cardiovascular Surgery

Esfand 1395, Feb. 2017

AVR



Prosthesis type

EOA,

Porcelain Aorta

Root injury

Small Root

Undesirable effects of P-P Mismatch

P-P mismatch

High TVG


Poor LV Remodeling

Heart failure

Need for Re-op


Poor QOL

Controversies



The clinical relevance of a small difference in gradient and otherwise asymptomatic patients is unclear.

Lower IEQA is predictor of poorer NYHA early after AVR, but not important during 7-year follow up.





ADULT CARDIAC SURGERY:

To participate in *The Annals of Thoracic Surgery* CME Program, please visit <http://cme.ctsnetjournals.org>.

Prosthesis-Patient Mismatch After Aortic Valve Replacement: Impact of Age and Body Size on Late Survival


Marc R. Moon, MD, Michael K. Pasque, MD, Nabil A. Munfakh, MD, Spencer J. Melby, MD, Jennifer S. Lawton, MD, Nader Moazami, MD, John E. Codd, MD, Traves D. Crabtree, MD, Hendrick B. Barner, MD, and Ralph J. Damiano Jr, MD

Division of Cardiothoracic Surgery, Washington University School of Medicine, St. Louis, Missouri


P-P mismatch defined as IEOA <0.75 has a negative impact on survival in young patients but this impact is minimal in >60 yr patients ($P<0.005$).

Prosthesis size and long-term survival after aortic valve replacement

The Journal of Thoracic and Cardiovascular Surgery • Volume 126, Number 3



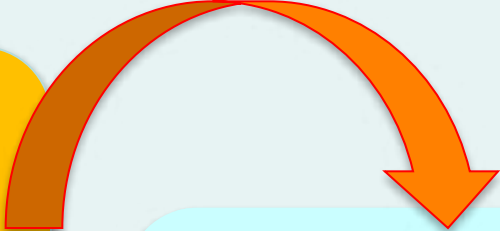
In a meta-analysis of 13258 patients undergoing AVR with small valve size showed that operative mortality increases by less than 1% in 10% of cases with small prosthesis BUT



Does not reduce midterm or long term survival.

Controversies;

Valve related mortality & morbidity are higher in P-P mismatch group.

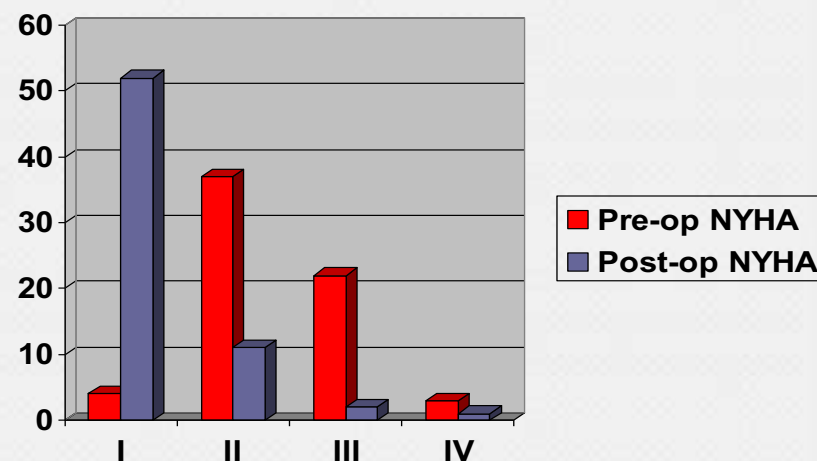


Overall survival is the same between patients with & without P-P mismatch

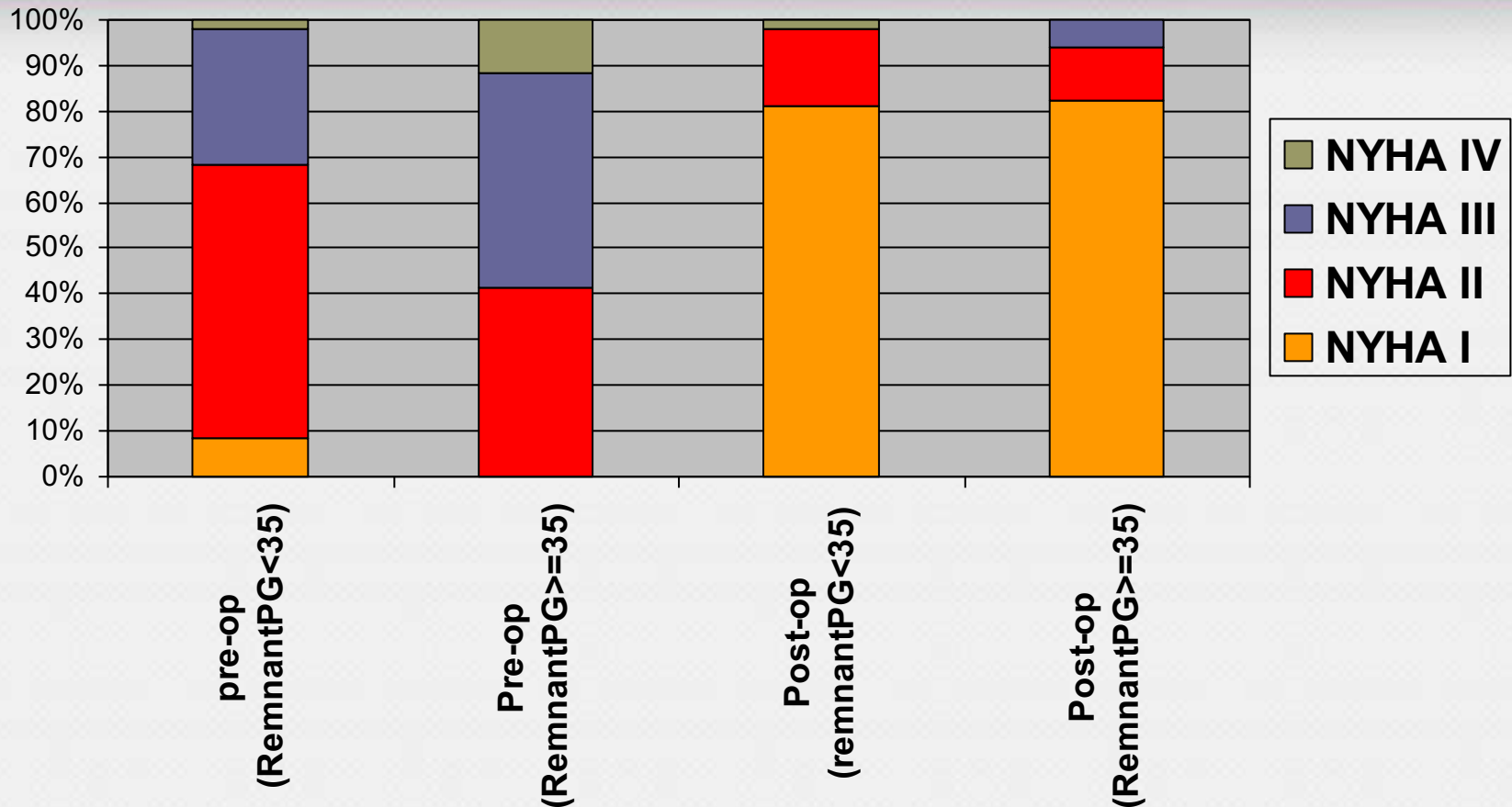
Moderate Patient-Prosthesis Mismatch Has No Negative Effect on Patients' Functional Status After Aortic Valve Replacement With CarboMedics Prosthesis

Alireza Alizadeh-Ghavidel,¹ Rasoul Azarfarin,^{1*} Azin Alizadehasl,² Ali Sadeghpour-Tabaei,¹ and Ziae Totonchi¹

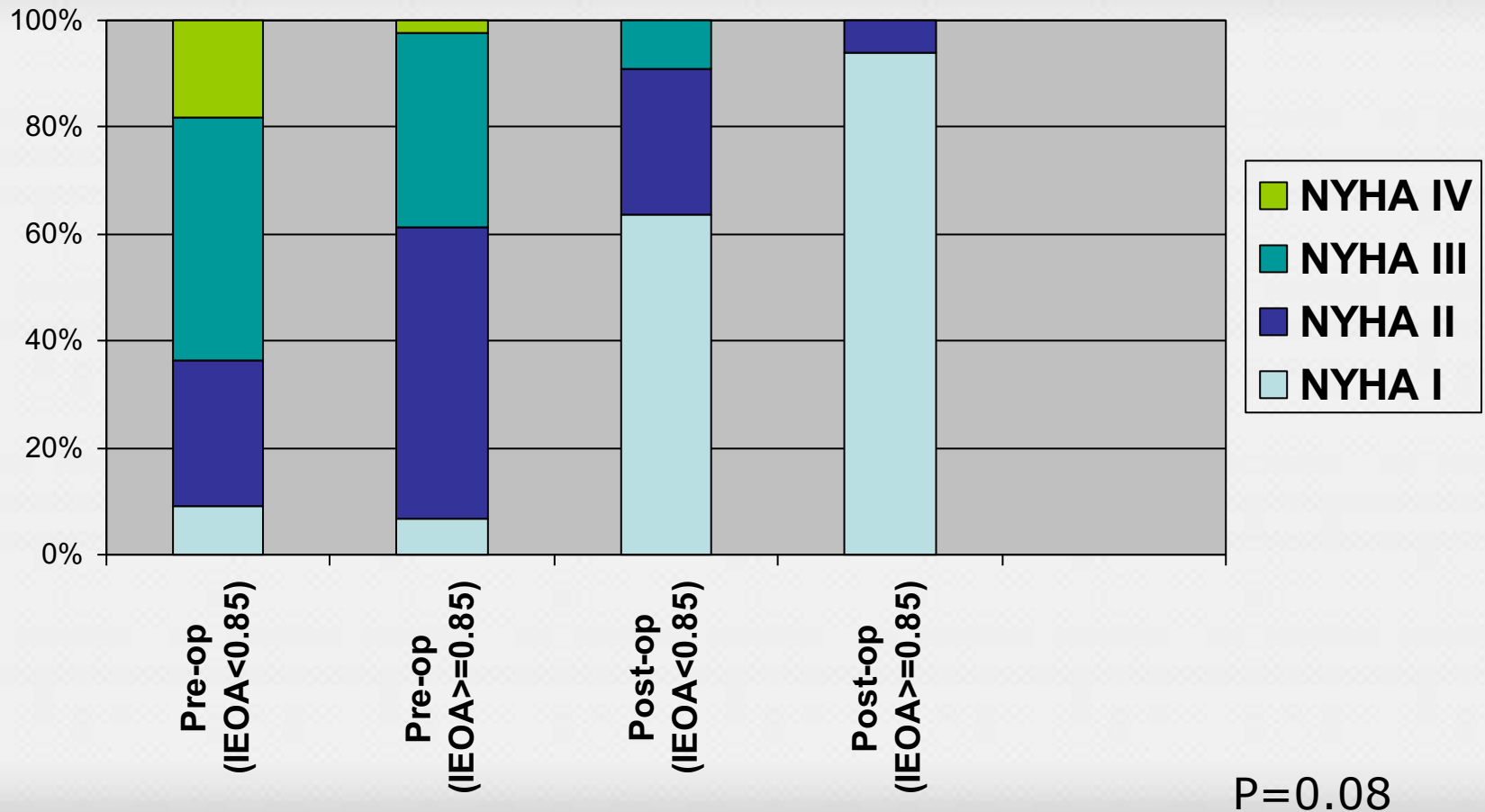
	<u>Valve Size</u>				
	19	21	23	25	
Standard Carbomedics (No.)	2	16	18	17	53
Top Hat Carbomedics (No.)	1	3	6	3	13
	3	19	24	20	66



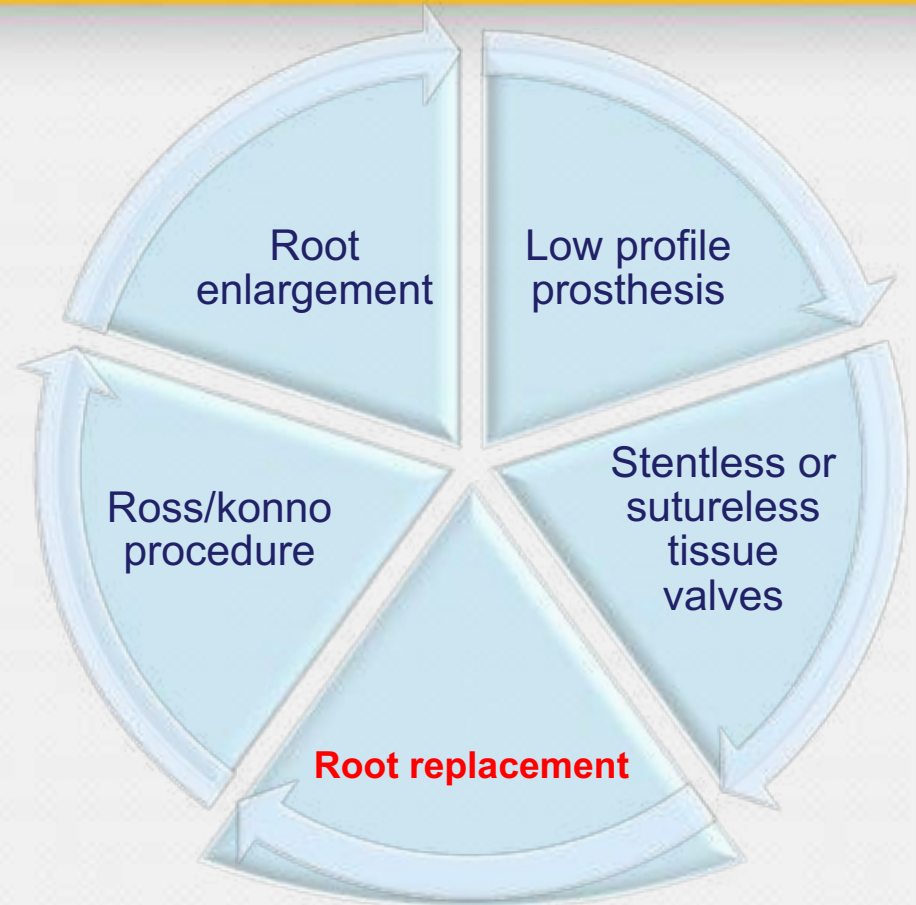
Comparison of Functional Status based on postoperative Residual Trans-aortic gradient



Comparison of Functional Status based on IEOA



Surgical options



Mortality and Morbidity After Aortic Root Replacement: 10-Year Experience

Alireza A Ghavidel, MD, Mohammad B Tabatabaei, MD,
 Mohammad A Yousefnia, MD, Gholam-Reza Omrani, MD,
 Nader Givtaj, MD, Kamal Raesi, MD



ASCVTs The Asian Society
for Cardiovascular
and Thoracic Surgery

(Asian Cardiovasc Thorac Ann 2006;14:462-6)

Table 4. Causes of Early and Late Mortality

Deaths	No. of Patients	%
Early (hospital) death	11	13.3
Cardiac failure	5	6.0
Multiorgan failure	3	3.6
Bleeding	2	2.4
Arrhythmia	1	1.2
Late death	2	2.4
Myocardial infarction	1	1.2
Unknown	1	1.2

Table 5. Postoperative Complications

Complication	No. of Patients	%
Bleeding	20	24.1
Bleeding requiring reexploration	16	19.3
Neurocognitive problems	17	20.5
Cerebrovascular accident	4	4.8
Tachyarrhythmia	14	16.9
Acute renal failure	10	12.0
Wound infection	2	2.4
Respiratory complication	9	10.8
Perioperative myocardial infarction	4	4.8
Paravalvular leak	6	7.2
Mediastinitis	0	0
Endocarditis	0	0
Prosthetic valve malfunction	0	0
Thromboembolism	0	0

Classic Konno-Rastan Procedure: Indications and Results in the Current Era

Mohammad B Tabatabaie, MD, Alireza A Ghavidel, MD,
Mohammad A Yousefnia, MD, Saeed Hoseini, MD,
Seyed H Javadpour, FETCS, Kamal Raesi, MD



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Dramatic reduction of the systolic TVG

91.3 ± 39.3 to 28.1 ± 17.7 mm Hg ($p < 0.001$)

Residual VSD 8.6%

CHB incidence 15.1%

Mortality rate 11.5%

Long-term results of aortic valve replacement with posterior root enlargement

Alireza Alizadeh Ghavidel¹, Gholamreza Omrani²,
Mitra Chitsazan³, Ziae Totonchi⁴ and Nader Givtaj²



A retrospective study 1998-2011

Mean follow up 58 Months

Method & Material

N=4140

- Aortic valve surgeries

N=3728

- AVR

N=103

2.7%

- Post. Root enlargement

Previous cardiac operations

Procedure	No. of patients
Valvotomy or valvoplasty	15 (14.6%)
Subvalvular resection	4 (3.9%)
PDA closure	1 (1.0%)
AVR	6 (5.8%)
AVR + MVR	2 (1.9%)
AVR + CoA repair	1 (1.0%)
AVR + MVR + TVR	1 (1.0%)
AVR + VSD closure	1 (1.0%)
MVR	1 (1.0%)
Closed MV commissurotomy	4 (3.9%)
Subvalvular resection + CoA repair	1 (1.0%)
Subvalvular resection + PDA closure	2 (1.9%)
Valvotomy + VSD closure	2 (1.9%)
Valvotomy + PDA closure + CoA repair	1 (1.0%)
CABG (familial hypercholesterolemia)	1 (1.0%)



Additional Operations

Procedure	No. of patients
MVR	12 (11.7%)
MVR + TV repair	5 (4.9%)
Open MV commissurotomy	4 (3.9%)
Myomectomy	16 (15.5%)
MVR + myomectomy	4 (3.9%)
MVR + TV commissurotomy	2 (1.9%)
Konno-Rastan 4 (2.9%)	
CABG	3 (2.9%)
VSD closure + MV repair	1 (1.0%)
Konno-Rastan procedure	4 (3.9%)
Ascending aorta and hemiarch replacement under TCA	1 (1.0%)
Interposition graft on ascending aorta	1 (1.0%)



AVR Indications

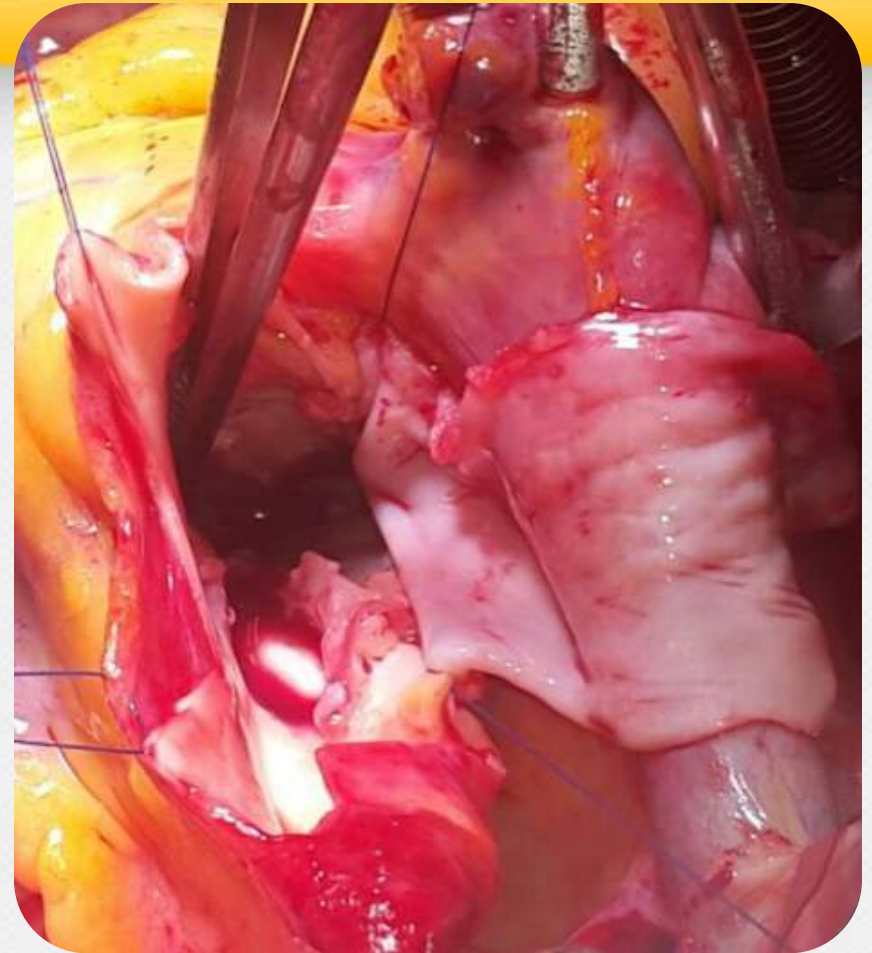
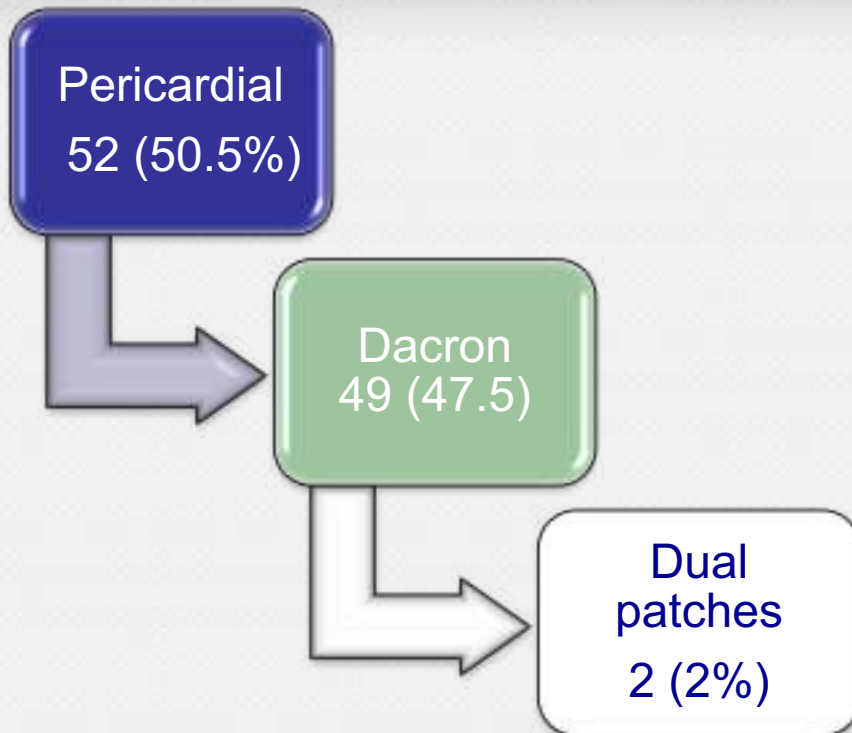
**AS dominant
(22%)**

**AI Dominant
(29%)**

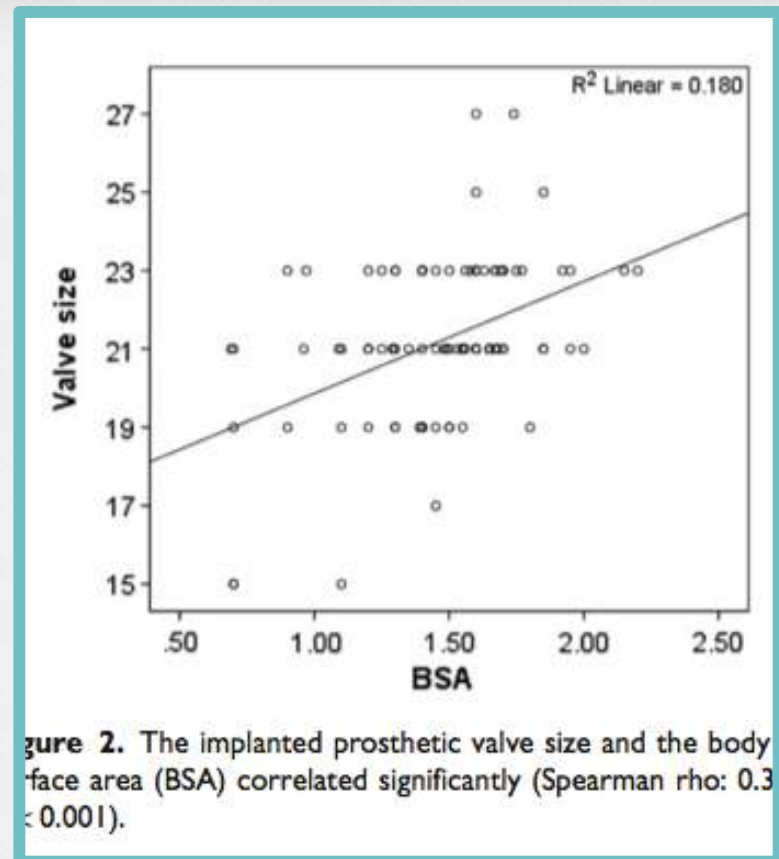
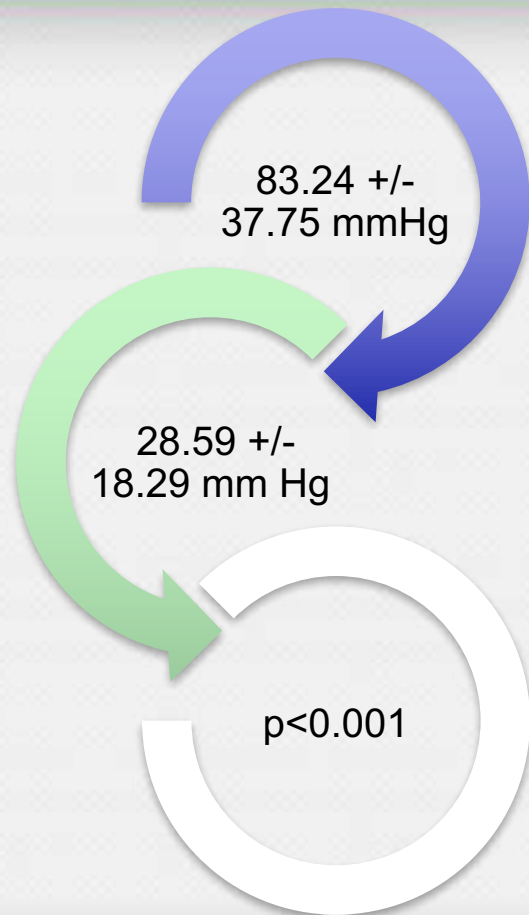
**AS+AI
(49%)**

Indication	No. of patients
AS	16 (15.5%)
AR	6 (5.8%)
AS + AR	36 (35.0%)
AS + MS	2 (1.9%)
AS + MR	5 (4.9%)
AS + AR + MS	6 (5.8%)
AS + AR + MR	1 (1.0%)
AS + AR + MS + MR	2 (1.9%)
AS + AR + MS + TR	3 (2.9%)
AS + AR + MR + MS + TS + TR	3 (2.9%)
AR + MR	1 (1.0%)
AR + MS	5 (4.9%)
AS + AR + CAD	1 (1.0%)
Supravalvar + valvar AS	1 (1.0%)
Native AV endocarditis	7 (6.8%)
Patient-prosthesis mismatch	3 (2.9%)
Prosthetic AV Malfunction	1 (1.0%)
Prosthetic AV malfunction + MS	3 (2.9%)
AS + Hypoplastic ascending and proximal arch + severe CoA	1 (1.0%)

Surgical technique



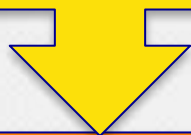
Improvement of functional class in all survivors





Surgical results

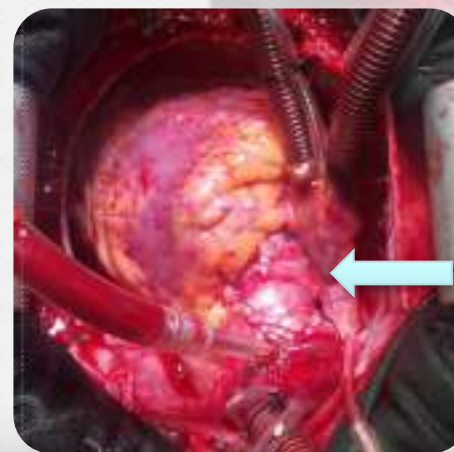
No pericardial patch-related complications (calcification, Shrinkage , patch infection)



No aortic pseudoaneurysm was seen during long-term follow-up.



Non-treated autologous pericardium can be used safely in patients undergoing posterior aortic root enlargement



Early and late morbidity

Post op bleeding/ re-exploration	8 Patients
Late PE	8
Mitral valve distortion and mild MR	5
Paravalvular leakage	3
Need for MVR	1
PPM need	1
CVA	1
Prosthetic valve endocarditis	None
Need for Re-operation	None
Root dilatation or pseudoaneurysm	None

Characteristics of patients with early and late mortality.

Variable	Early mortality (<30 days)						Late mortality					
	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10	Patient 11	Patient 12
Age (years)	28	45	75	29	20	20	46	67	74	74	14	
Sex	Male	Female	Female	Male	Female	Female	Female	Female	Female	Female	Male	
BSA (m ²)	1.85	1.50	1.60	1.85	1.30	1.30	1.65	1.45	1.55	1.20		
Previous cardiac surgery	AVR MVR	MV RAVR TVR	None	None	None	None	AVR	None	None	None		
Indication for surgery	Endocarditis	Prosthetic AV malfunction MS	AS MR	AS	AS	AS	AV malfunction MS	AS	AS AI MS	Endocarditis		
Concomitant operation	MVR	MV thrombectomy TVR	Open MV commissurotomy	None	None	None	MV thrombectomy	MVR TV commissurotomy	None	MVR	None	
Valve type	Carbomedics	Carbomedics	St. Jude	St. Jude	St. Jude	St. Jude	Carbomedics	Carbomedics	St. Jude	St. Jude	St. Jude	
Valve size	21	21	21	21	21	21	21	19	21	21		
Patch	Pericardial	Pericardial	Dacron	Dacron	Dacron	Dacron	Dacron	Dacron	Pericardial	Pericardial		
CPB time (min)	187	250	191	191	191	191	311	297	155	85		
AoX time (min)	132	110	161	161	161	161	180	219	121	70		
Complication	CVA	None	Surgical	Surgical	Surgical	Surgical	None	None	None	Pericardial effusion		
Cause of death	Sepsis	Acute perioperative MI	Unexplained	Unexplained	Unexplained	Unexplained	Unexplained	LCOS	CVA	CVA		

Female gender

AOX > 100 min

Additional Procedure

Redo

AI: Aortic insufficiency; AoX: aortic crossclamp; AS: Aortic stenosis; CVA: cerebrovascular accident; LCOS: low cardiac output syndrome; MI: myocardial infarction; MV: mitral valve; TVR: tricuspid valve repair; VSD: ventricular septal defect.

AI: Aortic insufficiency; AoX: aortic crossclamp; AS: Aortic stenosis; CVA: cerebrovascular accident; LCOS: low cardiac output syndrome; MI: myocardial infarction; MV: mitral valve; TVR: tricuspid valve repair; VSD: ventricular septal defect.

Overall Mortality rate

Early mortality 9.6%

LCOS	6
Sepsis	1
Peri-op MI	1
Excessive Bleeding	1
Arrhythmia	1

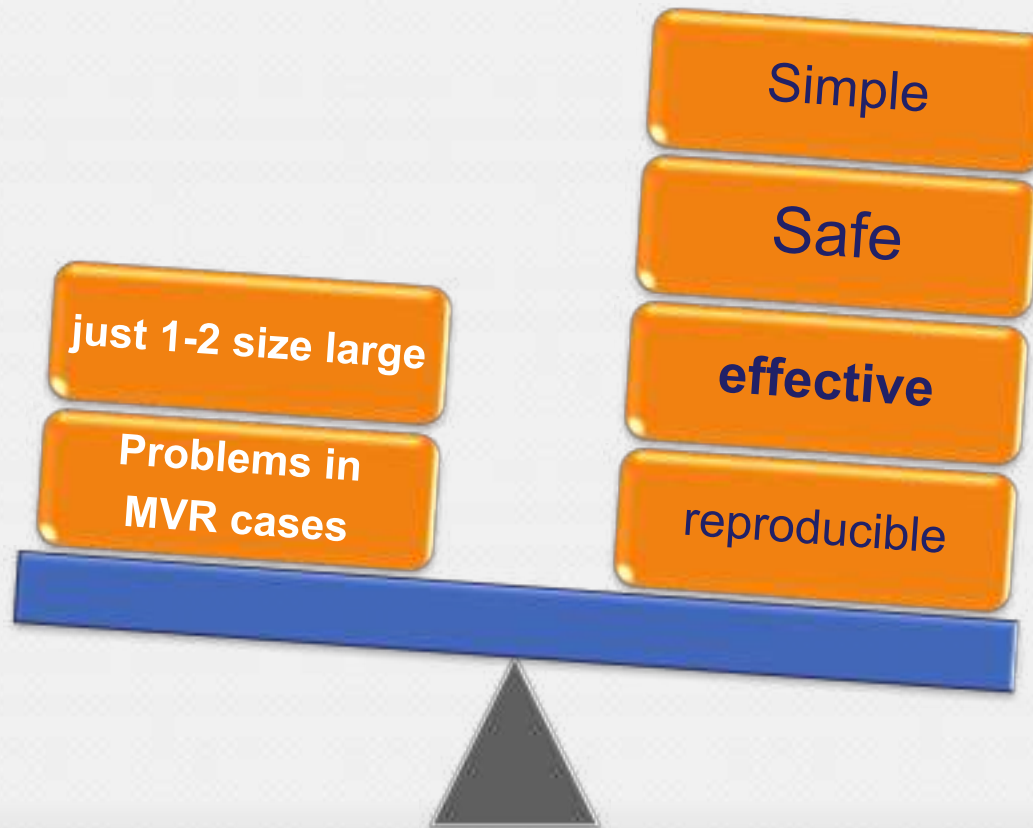
Late mortality 1.9%

CVA in 2


The Shared Responsibility of Medical Necessity

Disadvantages

Advantages




Patients

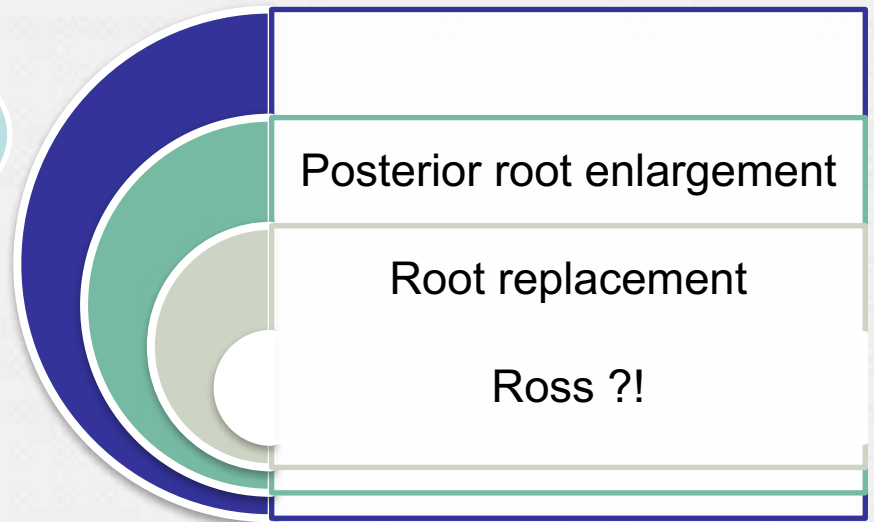
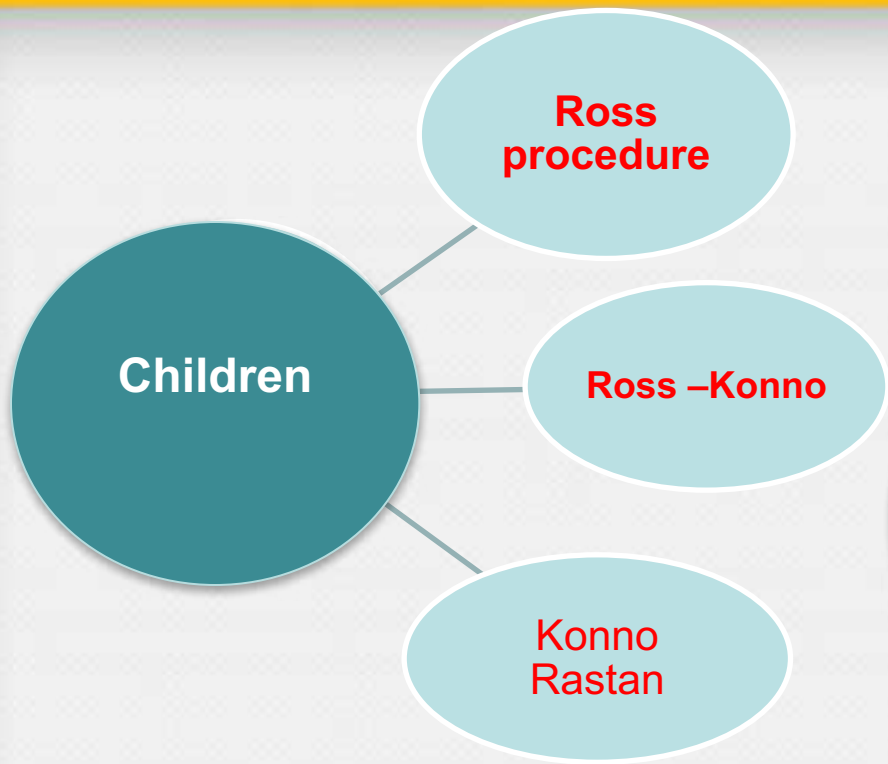


Age
BSA
lifestyle
Drug compliance
Previous cardiac surgery
underlying diseases ,

operator



Availability of devices
EOA of prosthesis
Surgeon's experience



Old Ages

**New generation
bioprosthesis**

**Stentless tissue
valves**

**Sutureless
bioprosthesis**

Manougian



Ignore

**Ignore some degrees of mismatch in
selected or high risk patients**

Thank
you



Systematic review/ meta-analysis
Papers 1964-2014

VOL: 9, NO. 8, 2016

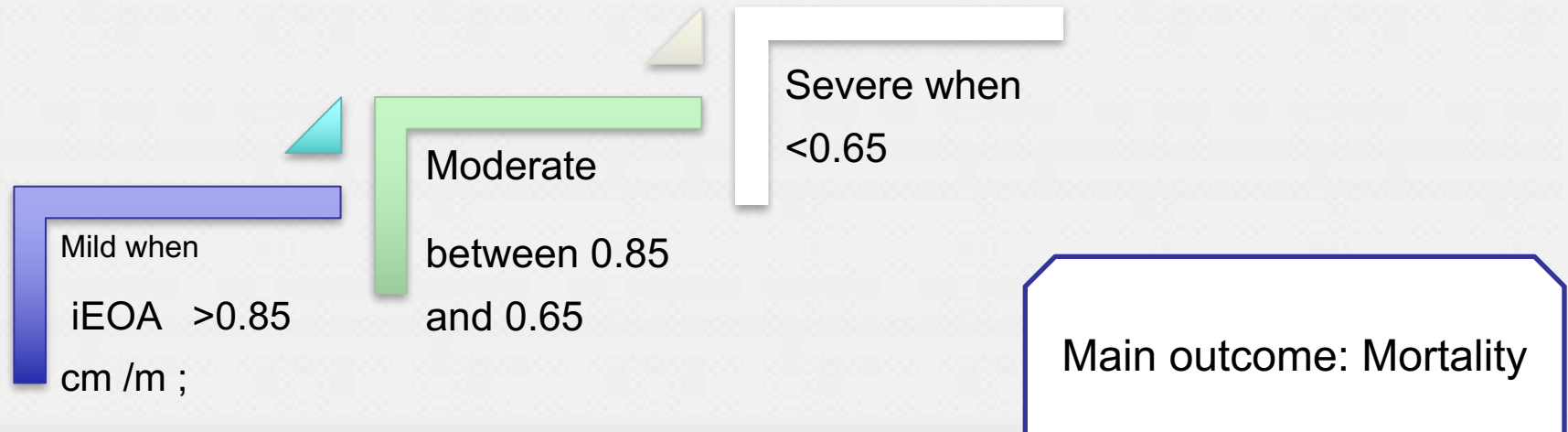
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<http://dx.doi.org/10.1016/j.jcmg.2015.10.026>



Predictors and Outcomes of Prosthesis-Patient Mismatch After Aortic Valve Replacement

Victor Dayan, MD, PhD,^a Gustavo Vignolo, MD,^a Gerardo Soca, MD,^a Juan Jose Paganini, MD,^a
Daniel Brusich, MD,^a Philippe Pibarot, DVM, PhD^b



Aortic root enlargement: What are the operative risks?

Jayesh Dhareshwar, MD,^a Thoralf M. Sundt III, MD,^a Joseph A. Dearani, MD,^a Hartzell V. Schaff, MD,^a
David J. Cook, MD,^b and Thomas A. Orszulak, MD^a



Aortic root enlargement itself does not increase operative risk, although it is most often required among high-risk patients.

Surgeons should not be reluctant to enlarge the aortic root to permit implantation of adequately sized valve prostheses.



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ORIGINAL ARTICLE

Aortic valve replacement in small patients[☆]

Y. Hisata^{a,*}, S. Yokose^b, S. Hazama^b, I. Matsumaru^c, K. Eishi^c

Small patients tended to be older and a higher proportion were women.

Favorable LV mass regression and EOAI in small patients.

Furthermore, no significant differences were found in the proportion of moderate and severe PPM.

Short- and mid-term outcomes were safe and favorable, suggesting that patients with small BSA can safely undergo AVR.

1) moderate and severe PPM are associated with a 1.5- and 2.5-fold increase in the risk of 30-day mortality following AVR

2) severe PPM is associated with a 1.4-fold increase in overall mortality, whereas moderate PPM is not significantly associated with increased risk of overall mortality

3) the impact of PPM on mortality appears to be more important in patients <70 years of age, and/or undergoing concomitant CABG

4) moderate and severe PPM are associated with lesser regression of LV hypertrophy

5) the impact of PPM on mortality was less pronounced in patients with higher BMI.