Aortic Valve Repair
Why & When?

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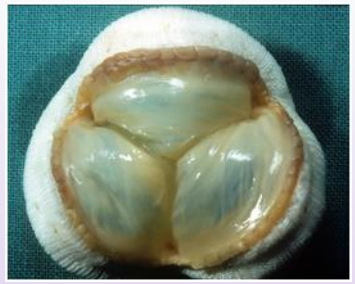
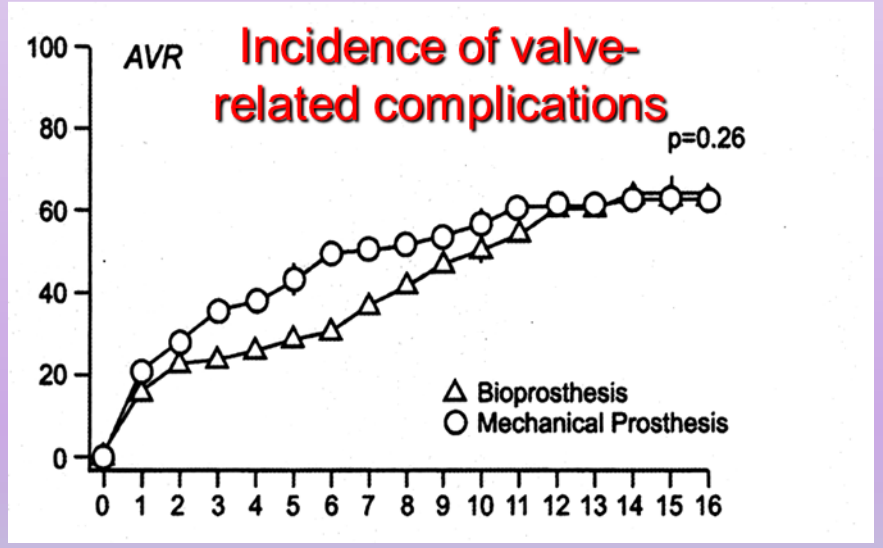
Aortic Valve Replacement

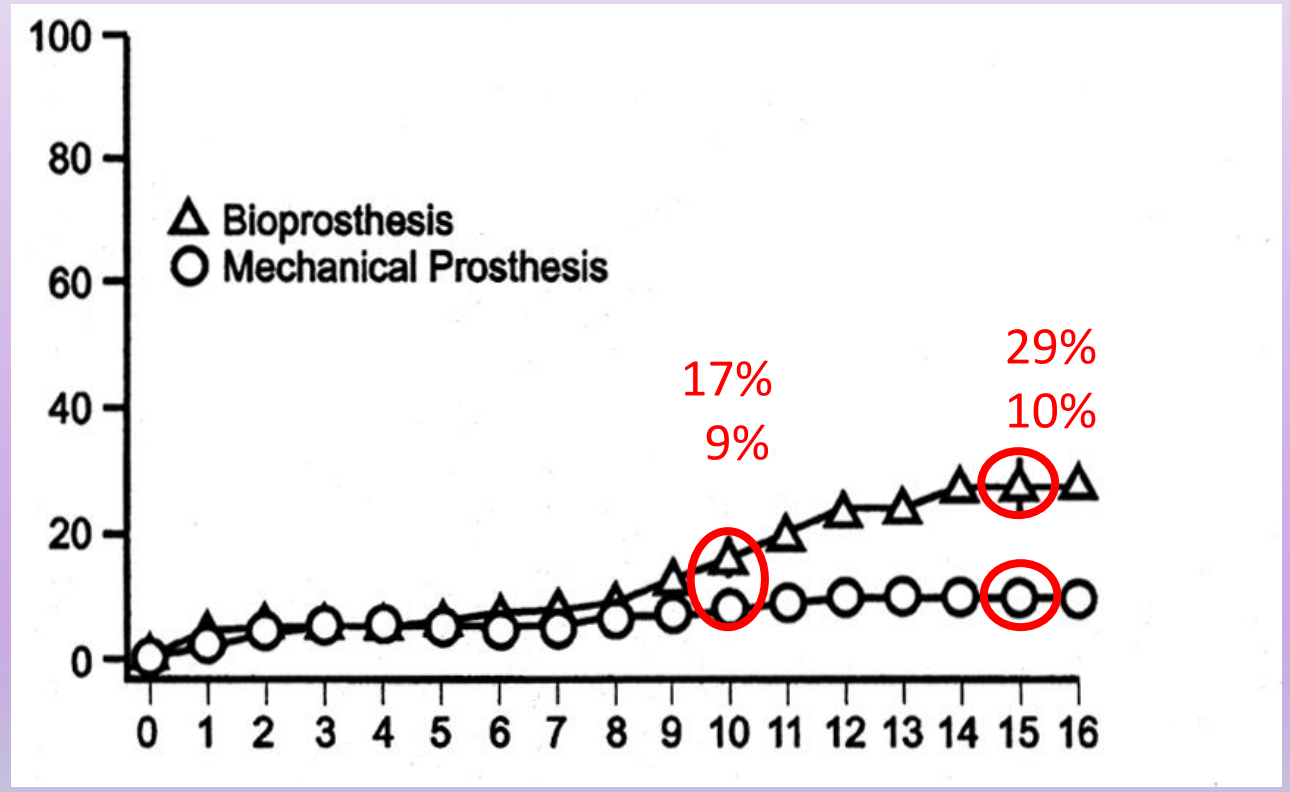


- Anticoagulation
  - Thromboembolism
  - Bleeding
- Valve degeneration
- Prosthetic valve endocarditis



Hammermeister et al JACC 2000; 36:1152-8

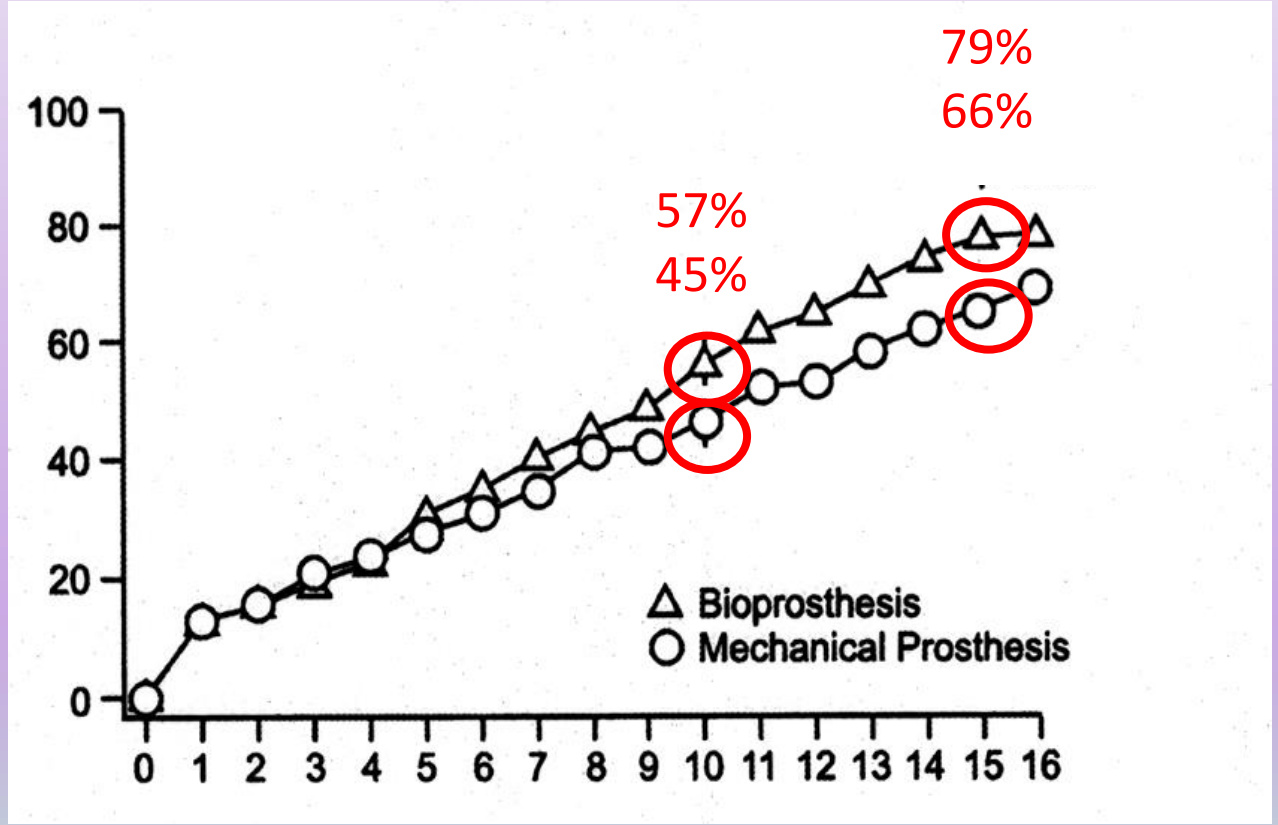
Reoperation after Valve Replacement



p=0.004

Hammermeister et al JACC 2000; 36:1152-8

Mortality after Valve Replacement



p=0.02

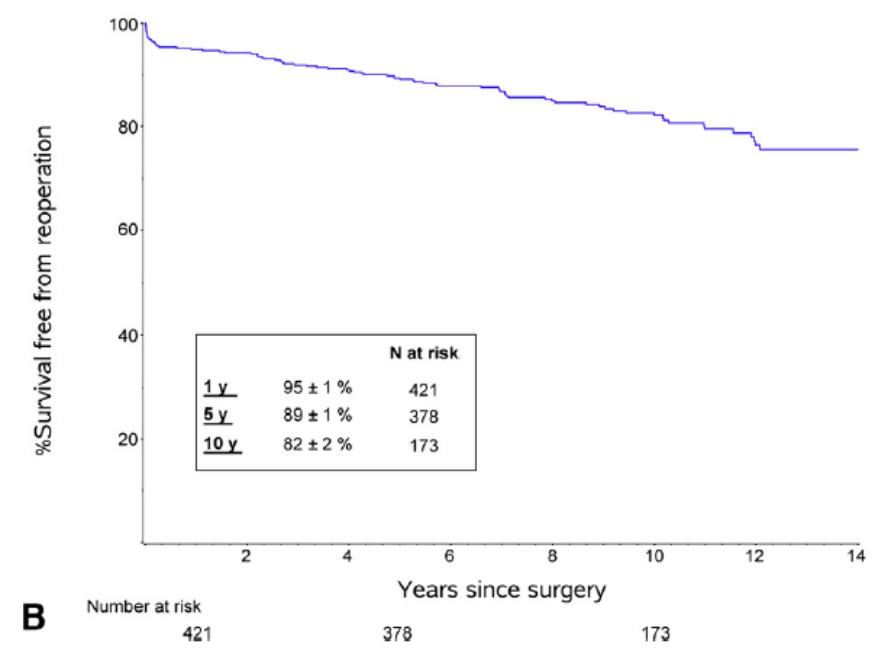
Hammermeister et al JACC 2000; 36:1152-8

Mechanical AVR in Young

Long-term outcomes after elective isolated mechanical aortic valve replacement in young adults

Ismail Bouhout, MSc,[a] Louis-Mathieu Stevens, MD, PhD,[b] Amine Mazine, MSc,[a] Nancy Poirier, MD,[a] Raymond Cartier, MD,[a] Philippe Demers, MD,[a] and Ismail El-Hamamsy, MD, PhD[a]

The Journal of Thoracic and Cardiovascular Surgery • Volume 148, Number 4



Cause of death	N (%)
Valve-related death	31 (53)
Reintervention	4
Thrombembolism	2
Massive hemorrhage	1
Valve thrombosis	1
Sudden unexplained death	20
Mediastinal infection	1
Endocarditis	2
Other cardiac death	10 (17)
Myocardial infarction	3
Heart failure	7
Noncardiac	17 (30)

AV Replacement: Excess Mortality

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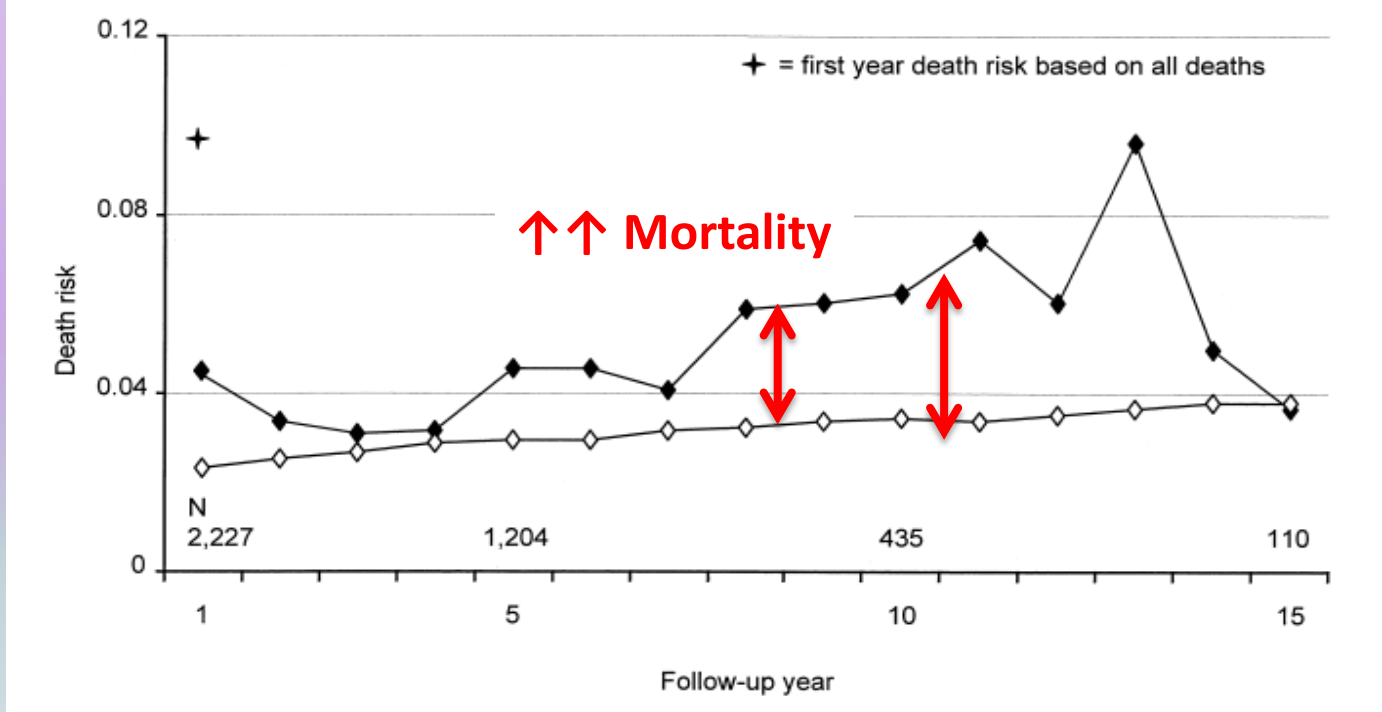
PII S0735-1097(99)00584-7

Observed and Relative Survival After Aortic Valve Replacement

Per Kvidal, MD,* Prof. Reinhold Bergström, PHD,‡ Lars-Gunnar Hörte, PM, BA,§
Elisabeth Ståhle, MD, PHD†



Lesion-dependent Survival after AVR

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Vol. 35, No. 3, 2000
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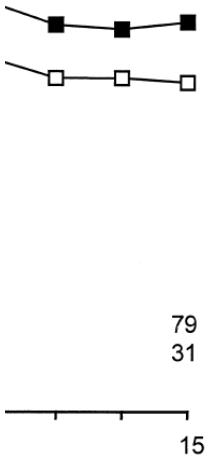
Observed and
After Aortic V

Per Kvidal, MD,* Prof. Rei
Elisabeth Ståhle, MD, PhD

Table 4. Basic Data Concerning Observed and Expected Deaths Based on Data From Follow-Up Years 1 through 15*

	Patient-Years at Risk	Observed Number of Deaths	Expected Number of Deaths	O/E Deaths	O/E Deaths Relative to Baseline Category
NYHA functional class					
II	1,954.5	36	32.9	1.1	1.0
IIIA	6,134.5	240	163.2	1.5	1.3
IIIB/IV	6,206	339	208.0	1.6	1.5
Type of valve lesion					
AVS/combination†	11,079	472	349.9	1.4	1.0
Regurgitation	3,216	143	54.1	2.6	2.0
Concomitant CABG					
No	9,452	353	230.3	1.5	1.0
Yes	4,843	262	173.8	1.5	1.0
AF					
No	13,158	517	364.0	1.4	1.0
Yes	1,137	98	40.1	2.4	1.7
Age (yrs)					
≤50	2,182	31	6.8	4.5	1.0
51–60	2,954.5	98	36.9	2.7	0.6
61–70	5,578.5	274	152.1	1.8	0.4
≥71	3,579	212	208.2	1.0	0.2

*Deaths within 30 days of the operation are excluded. †Aortic valve stenosis or combined stenotic and regurgitant lesion.
O/E = observed deaths/expected deaths; other abbreviations as in Table 2.



Are allografts the biologic valve of choice for aortic valve replacement in nonelderly patients? Comparison of explantation for structural valve deterioration of allograft and pericardial prostheses

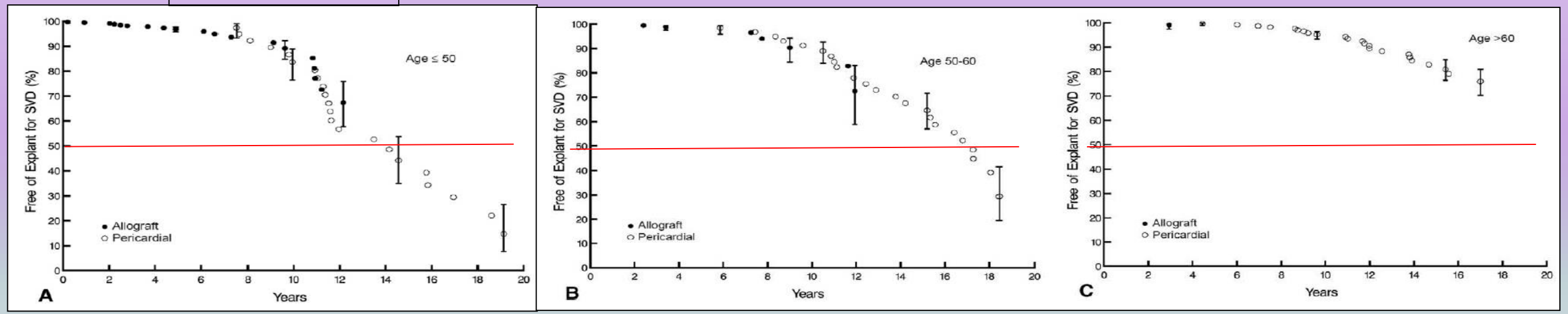
Nicholas G. Smedira, MD,[a] Eugene H. Blackstone, MD,[a,b] Eric E. Roselli, MD,[a] Colleen C. Laffey, RN,[a] and Delos M. Cosgrove, MD[a]

The Journal of Thoracic and Cardiovascular Surgery • March 2006

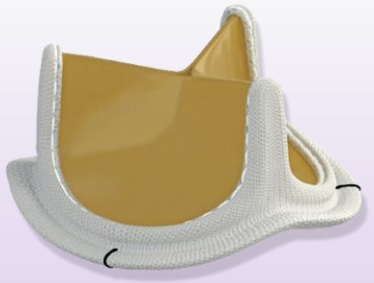
Age ≤ 50

Age: 50 - 60

Age > 60



Inspiris Resilia: An Alternative?



- RESILIA tissue
- Perimount valve design
- VFit technology
- Dry storage
- Durability?

A randomized assessment of an advanced tissue preservation technology in the juvenile sheep model

Willem Flameng, MD, PhD, Hadewich Hermans, MD, Erik Verbeken, MD, PhD, and Bart Meuris, MD, PhD

The Journal of Thoracic and Cardiovascular Surgery • January 2015

include detergents or surfactants, such as polysorbate 80 (Tween-80). Polysorbate 80 is the major component of the anticalcification technology used in the construction of the Carpentier-Edwards Perimount valve, which, in

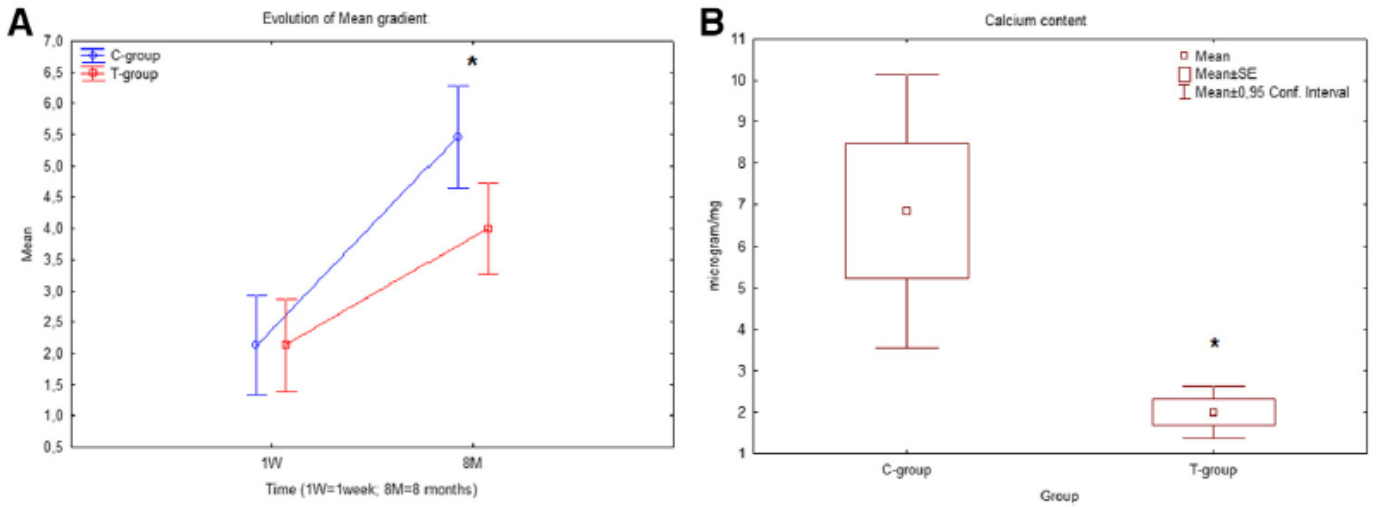


FIGURE 2. A, Evolution in mean transvalvular gradients (mean ± standard error of the mean) from 1 week to 8 months in both groups (*$P = .03$ at 8 months). B, Final calcium content of both valve types (*$P = .002$). *SE*, Standard error.

Clinical data – durability?

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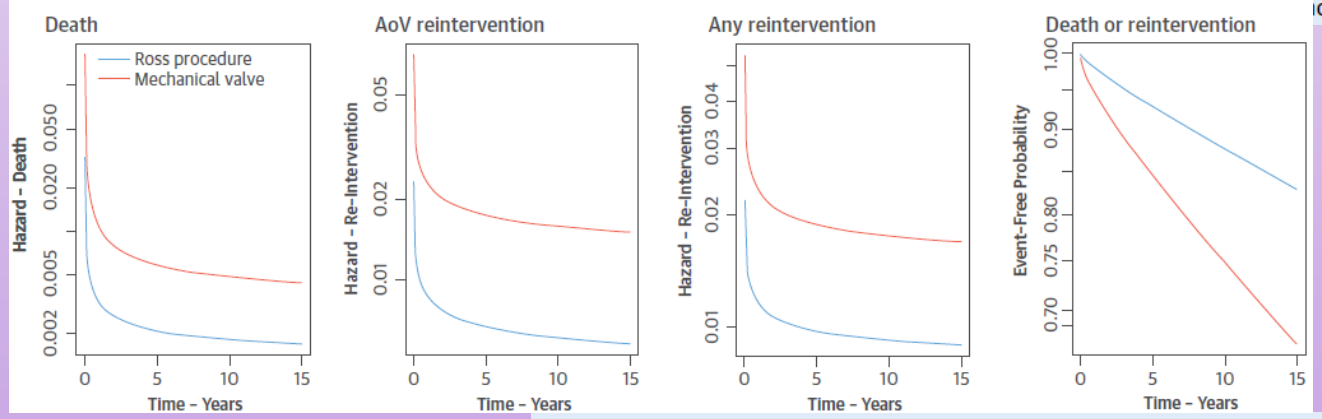
Aortic Valve Replacement and the Ross Operation in Children and Young Adults

Mansour T.A. Sharabiani, PHD,[a] Dan M. Dorobantu, MD,[b,c] Alireza S. Mahani, PHD,[d] Mark Turner, PHD,[b] Andrew J. Peter Tometzki, MBCHB,[b] Gianni D. Angelini, MD,[a,b] Andrew J. Parry, MBCHB,[b] Massimo Caputo, Serban C. Stoica, MD[b]

METHODS AVR procedures were compared after advanced matching, both in pairs and in a 3-way manner, using a Bayesian dynamic survival model.

ESULTS A total of 1,501 patients who underwent AVR in the United Kingdom between 2000 and 2012 were ıcluded. Of these, 47.8% had a Ross procedure, 37.8% a mechanical AVR, 10.9% a bioprosthesis AVR, and 3.5% a

FIGURE 2 Comparison of Long-Term Outcomes Between Ross AVR and Mechanical AVR in Children Using Matched Groups



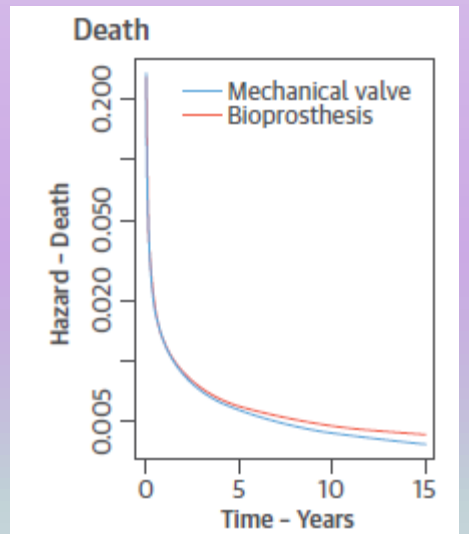
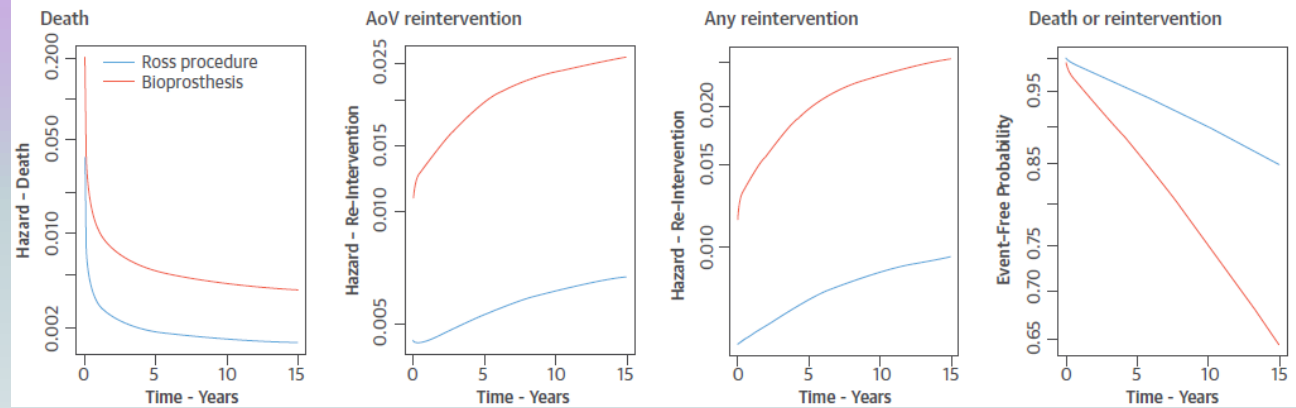
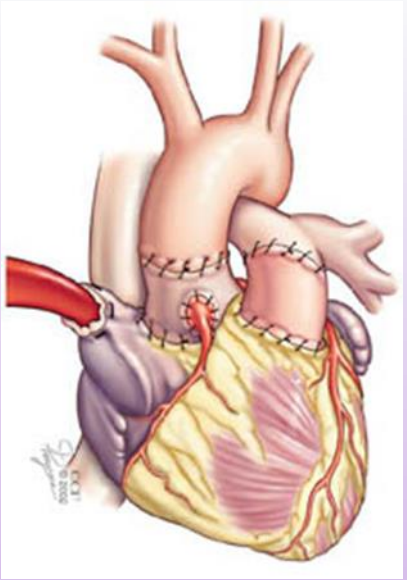


FIGURE 5 Comparison of Long-Term Outcomes Between the Ross Operation and Bioprosthesis AVR in Young Adults Using Matched Groups



ROSS Procedure



- Single valve disease turns to double valve disease
- Higher complexity = operative morbidity & mortality
- Reoperation
- Availability of pulmonary homografts

Why repair?

ELSEVIER

European Journal of Cardio-thoracic Surgery 37 (2010) 127—132

www.elsevier.com/locate/ejcts

Aortic valve repair leads to a low incidence of valve-related complications

Diana Aicher [a], Roland Fries [b], Svetlana Rodionycheva [a], Kathrin Schmidt [a], Frank Langer [a], Hans-Joachim Schäfers [a,*]

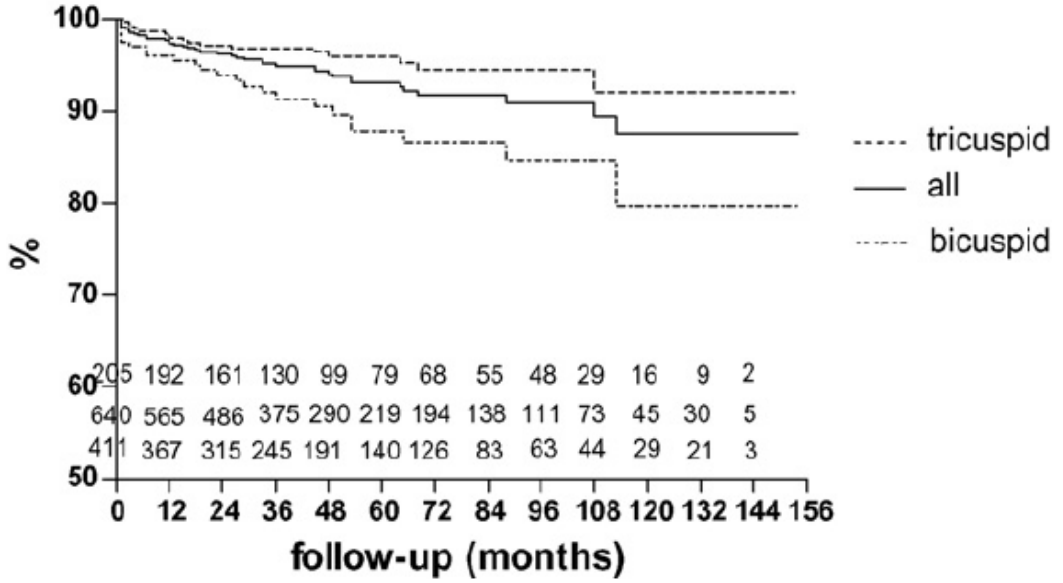


Fig. 3. Freedom from all valve-related complications in all patients versus those with bicuspid or tricuspid AV morphology.

Reoperations were by far the most frequent valve-related complications

Quality of life after aortic valve surgery: Replacement versus reconstruction

Diana Aicher, MD,[a] Annika Holz,[a] Susanne Feldner, MD,[a] Volker Köllner, MD,[b] and Hans-Joachim Schäfers, MD[a]

(J Thorac Cardiovasc Surg 2011;142:e19-24)

Methods: In a cross-sectional study, 166 patients (age, 18–45 years) were studied after isolated elective aortic valve surgery. They had undergone aortic valve repair (group I, n = 86), replacement with mechanical prosthesis (group II, n = 41), or pulmonary autograft (group III, n = 39). Assessment was performed by Short Form Health Survey, Hospital Anxiety and Depression Scale, Cardiac Anxiety Questionnaire, and valve-specific questions.

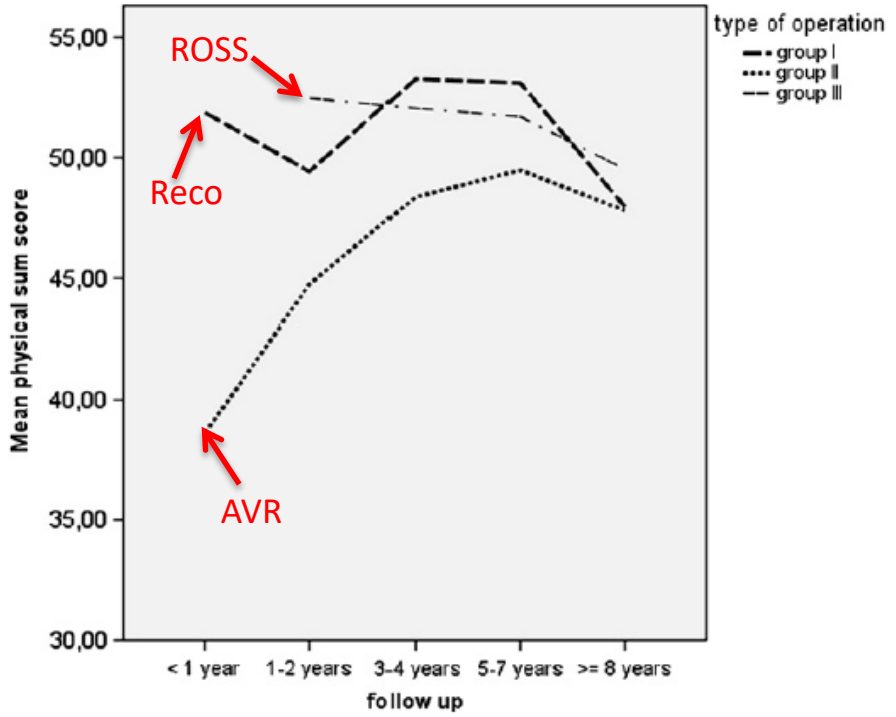


FIGURE 1. Mean physical sum scores at follow-up in patients with valve repair *(group I)*, patients after mechanical aortic valve replacement *(group II)*, and patients after the Ross procedure *(group III)*.

Valve repair improves the outcome of surgery for chronic severe aortic regurgitation: A propensity score analysis

Christophe de Meester, MS,[a,b] Agnès Pasquet, MD, PhD,[a,b] Bernhard L. Gerber, MD, PhD,[a,b] David Vancraeynest, MD, PhD,[a,b] Philippe Noirhomme, MD,[a,c] Gébrine El Khoury, MD,[a,c] and Jean-Louis J. Vanoverschelde, MD, PhD[a,b]

(J Thorac Cardiovasc Surg 2014;148:1913-20)

Methods: We performed a propensity score a tion of severe AR by either AVR or AV repair betw s were

TABLE 1. Baseline demographic and clinica

Characteristic	Ao n or me	t (n = 44) ange or %	*P* value
Age (mean y ± SD)	65 ±	36-82	.45
Male gender	3	81.8	.45
Smoking habits	1	38.6	.48
Hypertension	2	54.5	>.99
Diabetes mellitus		11.4	>.99

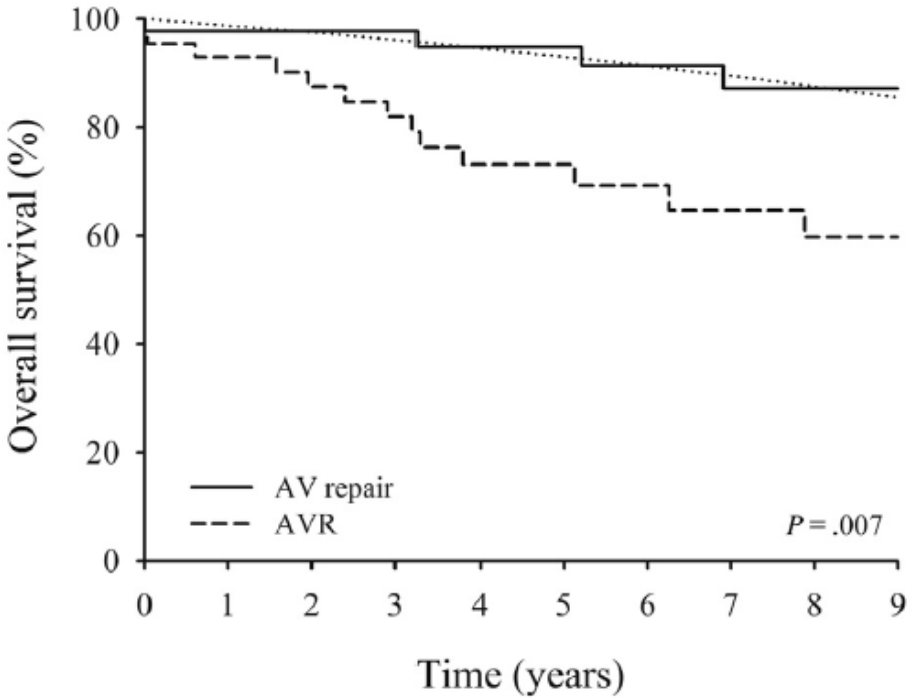
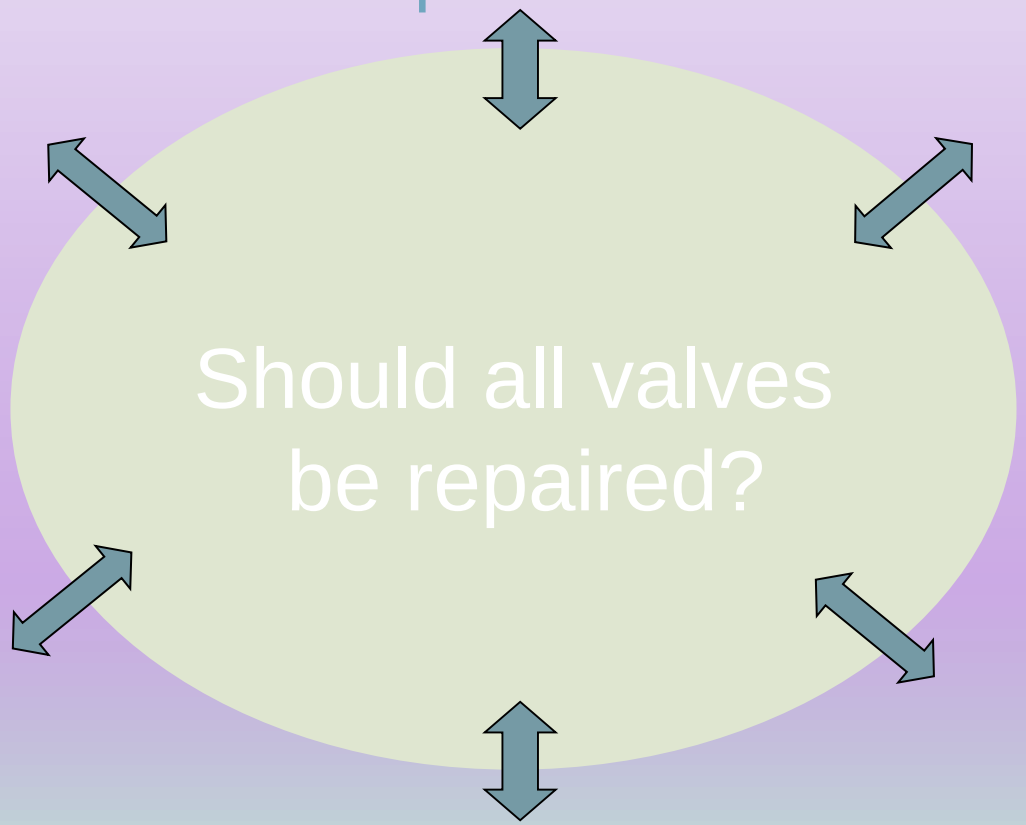


FIGURE 2. Kaplan-Meier survival curves comparing overall postoperative survival among patients undergoing aortic valve (*AV*) repair (*solid line*) or aortic valve replacement (*AVR*) (*dashed line*). Numbers at *bottom* indicate patients at risk. The *dotted line* shows the survival of the age- and gender-matched Belgian population.

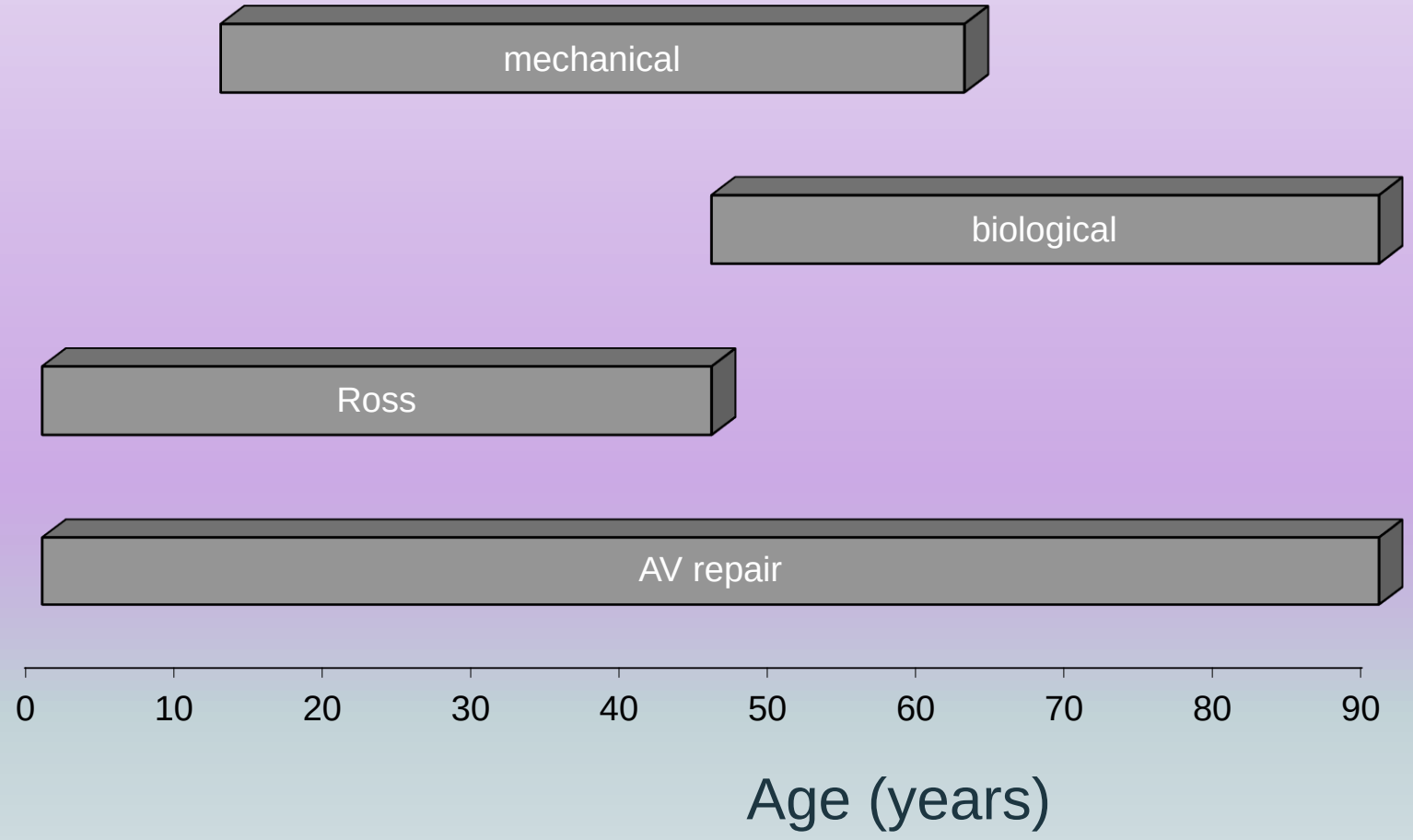
Patient Selection



Repairable Valve Morphology

- Bi- /tricuspid aortic valves with preservation of the natural design
- Unicuspid switched to bicuspid design (Schäfers ATS 2008)
- Quadricuspid switched to tricuspid design (Schmidt ATS 2008)

Choice of Aortic Valve Procedure
Homburg Routine



Limitations of Repair

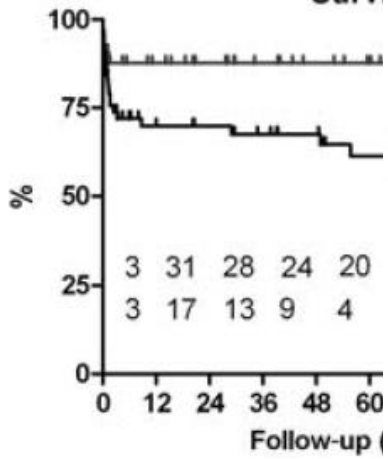
European Journal of Cardio-Thoracic Surgery 42 (2012) 122–127
doi:10.1093/ejcts/ezr276 Advance Access publication 19 March 2012

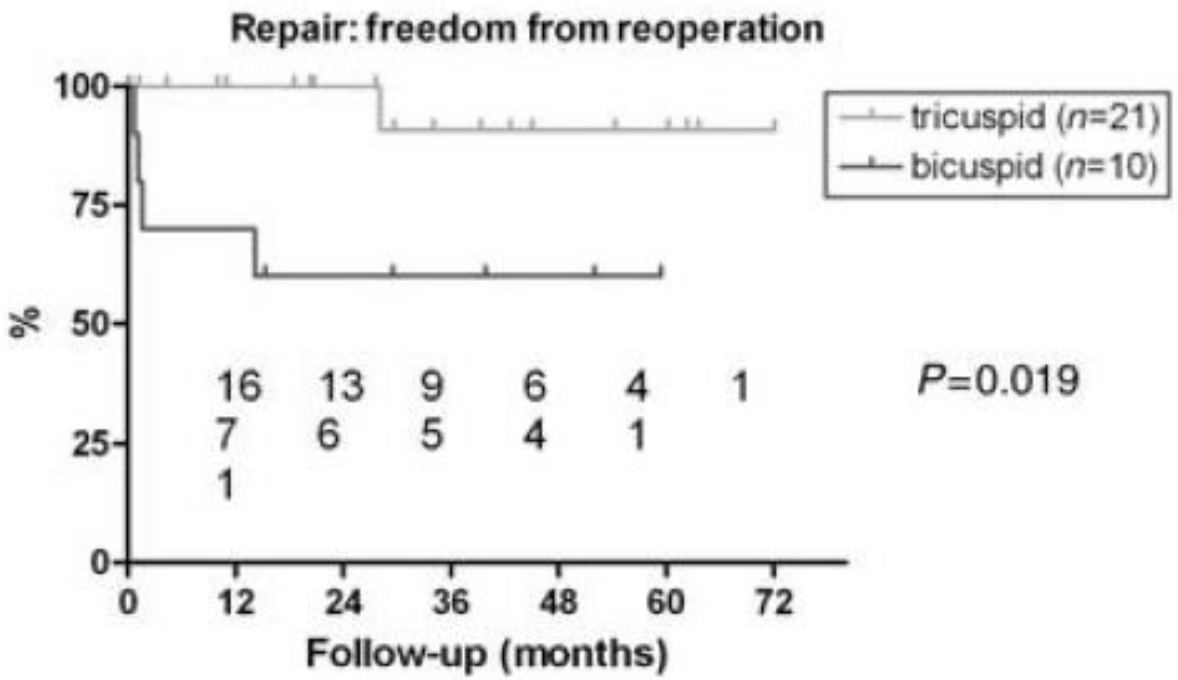
ORIGINAL ARTICLE

Repair versus replacement of the aortic valve in active infective endocarditis

Katharina Mayer, Diana Aicher, Susanne Feldner, Takashi Kunihara and Hans-Joachim Schäfers*

erwent surgery for aortic valve endocarditis.
ıent (II: 51 biologic, 10 mechanical valves, 6
ial patches. A root abscess was present in 32





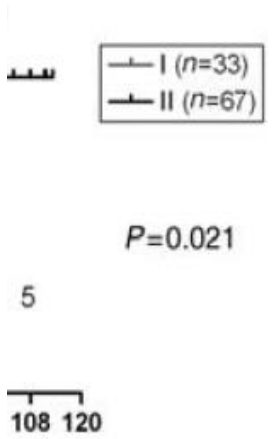


Figure 1: Survival following aortic val
(II) for AIE.

valve repair (I) or aortic valve

replacement (II) for AIE.

Two decades of experience with root remodeling and valve repair for bicuspid aortic valves

Ulrich Schneider, MD,[a] Susanne K. Feldner, MD,[a] Christopher Hofmann,[a] Jakob Schöpe, MSc,[b] Stefan Wagenpfeil, PhD,[b] Christian Giebels, MD,[a] and Hans-Joachim Schäfers, MD[a]

The Journal of Thoracic and Cardiovascular Surgery • April 2017

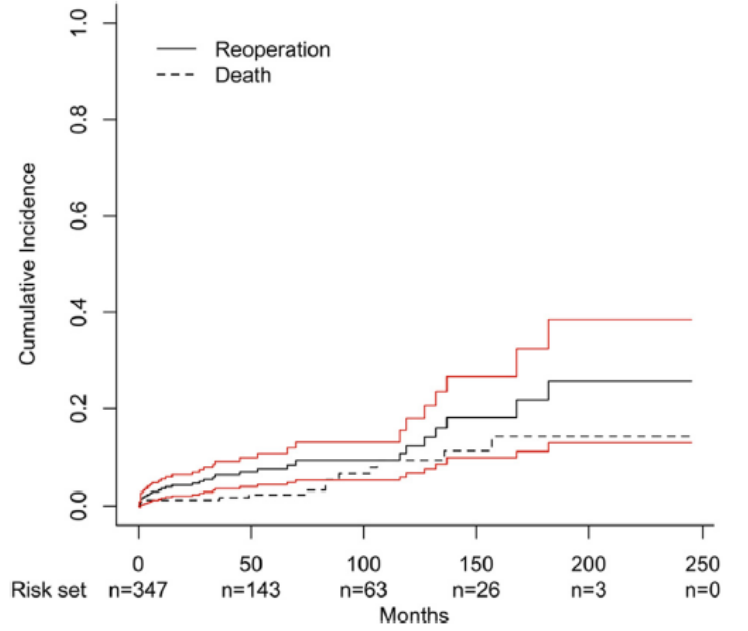


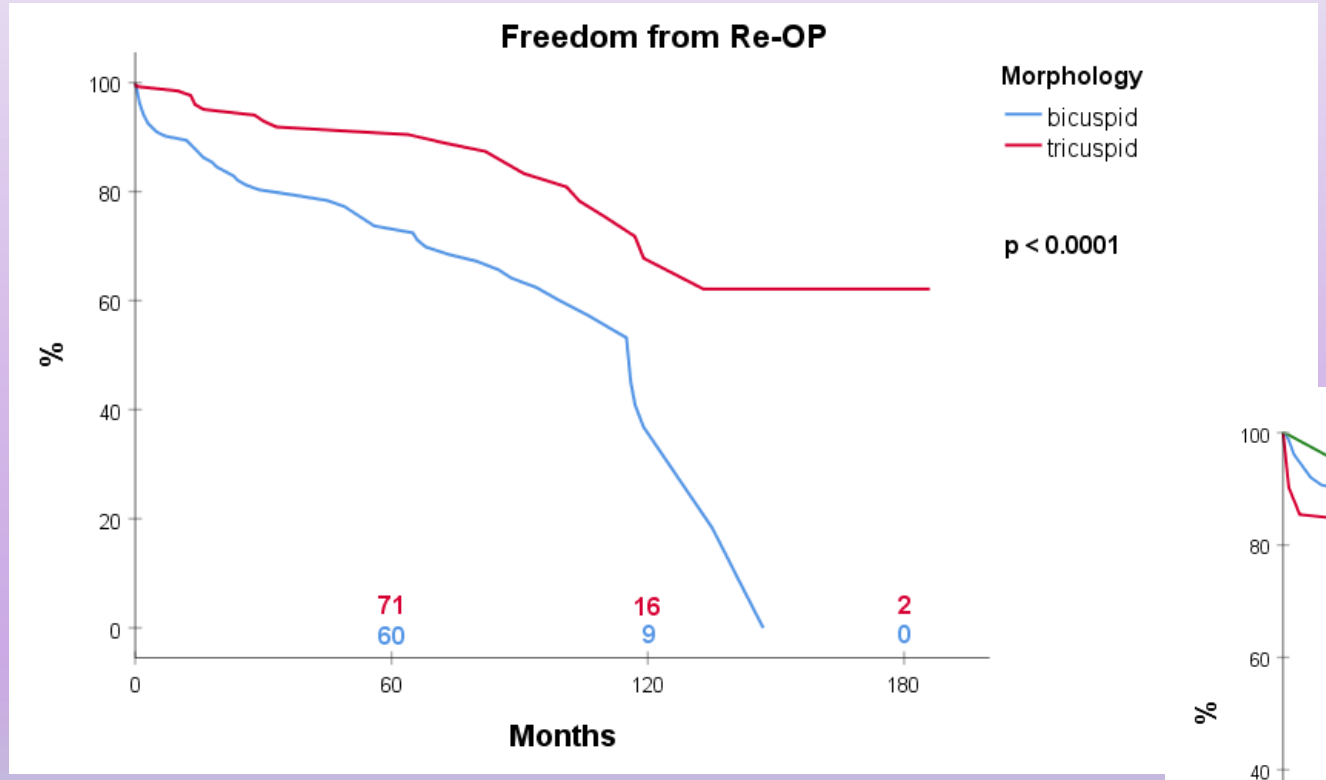
FIGURE 2. Cumulative incidence for reoperation. *Red lines* highlight the 95% confidence interval.

TABLE 2. Competing risks regression models

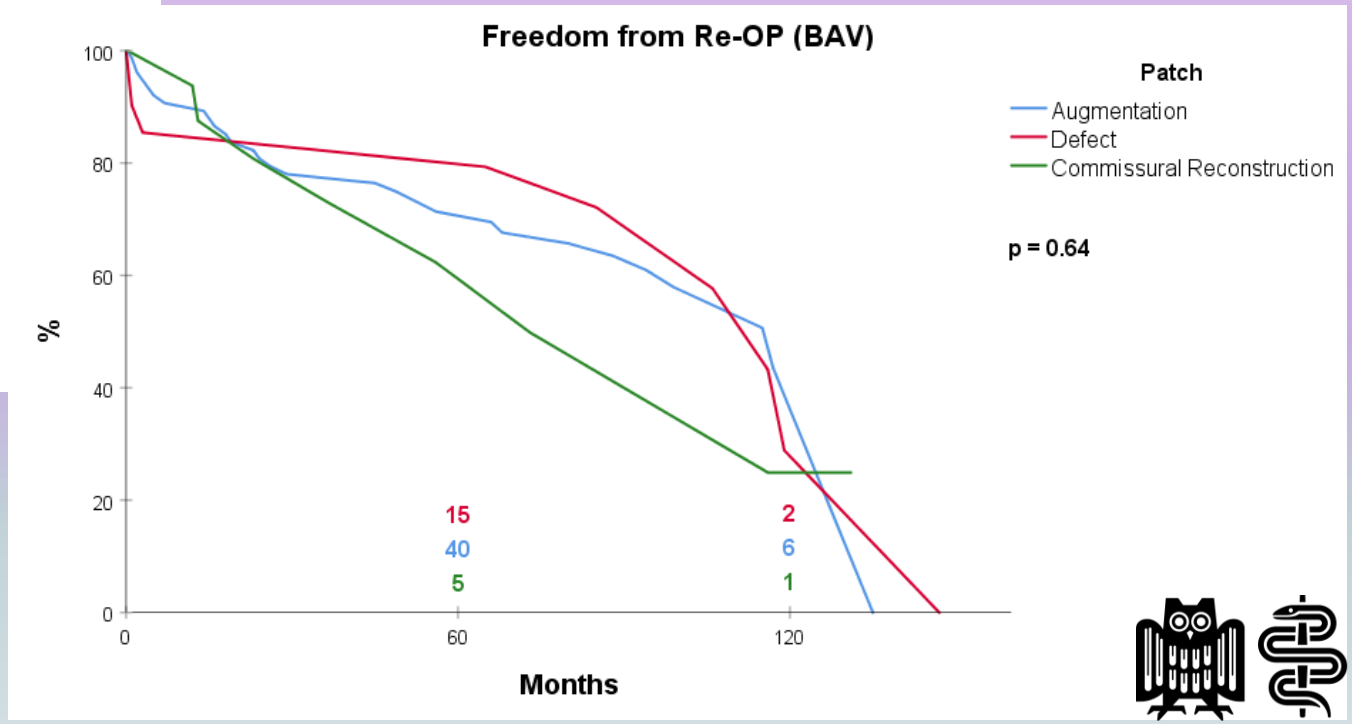
	Crude model			Adjusted model		
	Subdistributional HR	***P* value**	**95% CI**	**Subdistributional HR**	***P* value**	**95% CI**
Effective height measurement†	1.62	.240	0.73-3.63	1.23	.680	0.46-3.27
Aneurysm‡	0.49	.083	0.22-1.10	0.53	.130	0.24-1.20
Graft size§ (24 mm)	1.14	.760	0.49-2.65	1.22	.670	0.49-3.03
Graft size§ (28 mm)	1.58	.480	0.44-5.72	1.34	.690	0.32-5.65
Degree of fusion‖	0.59	.220	0.25-1.39	0.38	.034	0.15-0.93
Calcification¶	2.31	.030	1.08-4.94	**4.34**	**.002**	1.69-11.16
Pericardial Patch#	5.17	<.001	2.28-11.7	**4.00**	**.002**	1.65-9.66
Annuloplasty**	1.55	.300	0.68-3.52	1.21	.680	0.49-2.97

Competing Risks Regression Models (adjusted for age, calcification* [no/yes], degree of fusion* [no/yes], sex [male/female]). *Only when not considered as investigated independent variable. Bold values indicate statistical significance. *HR*, Hazard ratio; *CI*, confidence interval. †Reference group: no effective height measurement. ‡Reference group: AR. §Reference group: graft size (26 mm). ‖Reference group: partial. ¶Reference group: no calcification. #Reference group: no pericardial patch. **Reference group: no annuloplasty.

Patch Cusp Repair
Homburg Results

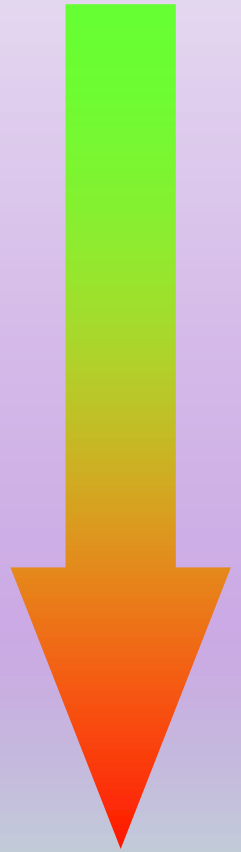


- 2000-2017
- n= 277 (BAV=137, TAV= 140)
- Autologous n= 236, heterologous n= 41



When to repair

reasonable



uncertain

Root dilatation in tricuspid/bicuspid valves
Prolapse (1 -2 cusps), annular dilatation

Fenestrations, prolapse 3 cusps
UAV, limited retraction

Retraction/calcium
Infective endocarditis

Conclusion

- Excess mortality after AVR in young.
- Relevant valve related complications after AVR.
- Valve related complications lower in AV reconstruction vs AVR.
- Quality of life better in AV reconstruction vs AVR.
- Improved survival after AV reconsutrcution vs AVR (?)