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Use of Bioprosthetic Valves in Younger Patients: Where's the Evidence?

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The Society
of Thoracic
Surgeons



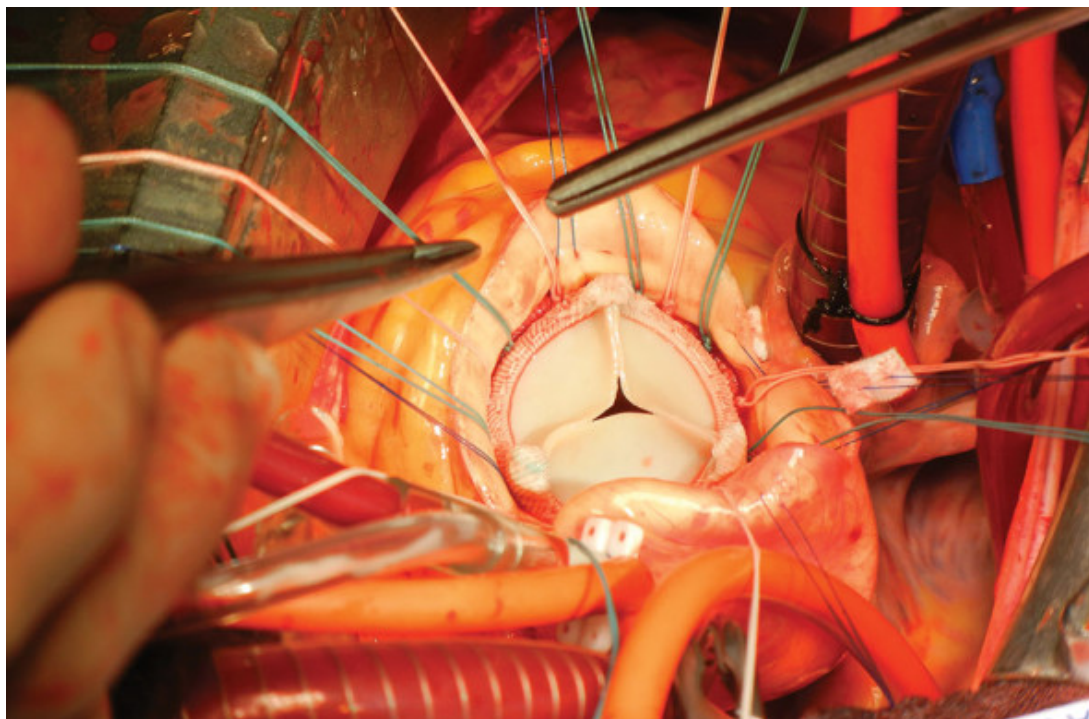
EACTS
European Association For Cardio-Thoracic Surgery



Disclosures

- None

Personal Opinión



- Unchanged same trade off: need for anticoagulation versus need for reintervention
- There is still no perfect option
- Bioprosthetic valve replacement is currently more «fashion»
- Undergoing open heart surgery is not a minor event for the patient and his family
- First aortic valve replacement in the young is a very low risk procedure; second or third replacement risk is not as low
- Modern anticoagulation for AVR is better than before

ACC/AHA 2017 Guidelines

Class	Level of evidence	Recommendations	Comment/Rationale
I	C-LD	The choice of type of prosthetic heart valve should be a shared decision-making process that accounts for the patient's values and preferences and includes discussion of the indications for and risks of anticoagulant therapy and the potential need for and risk associated with reintervention (141–146).	MODIFIED: LOE updated from C to C-LD. In choosing the type of prosthetic valve, the potential need for and risk of “reoperation” was updated to risk associated with “reintervention.” The use of a transcatheter valve-in-valve procedure may be considered for decision making on the type of valve, but long-term follow-up is not yet available, and some bioprosthetic valves, particularly the smaller-sized valves, will not be suitable for a valve-in-valve replacement.

ACC/AHA 2017 Guidelines

I	C	A bioprosthesis is recommended in patients of any age for whom anticoagulant therapy is contraindicated, cannot be managed appropriately, or is not desired.	2014 recommendation remains current.
IIa	B-NR	An aortic or mitral mechanical prosthesis is reasonable for patients less than 50 years of age who do not have a contraindication to anticoagulation (141,149,151,155–157).	MODIFIED: LOE updated from B to B-NR. The age limit for mechanical prosthesis was lowered from 60 to 50 years of age.

ACC/AHA 2017 Guidelines

IIa	B	A bioprosthesis is reasonable for patients more than 70 years of age (163–166).	2014 recommendation remains current.
IIb	C	Replacement of the aortic valve by a pulmonary autograft (the Ross procedure), when performed by an experienced surgeon, may be considered for young patients when VKA anticoagulation is contraindicated or undesirable (167–169).	2014 recommendation remains current.

Accelerated Degeneration of a Bovine Pericardial Bioprosthetic Aortic Valve in Children and Young Adults

Susan F. Saleeb et al. Circulation 2014;130:51-60

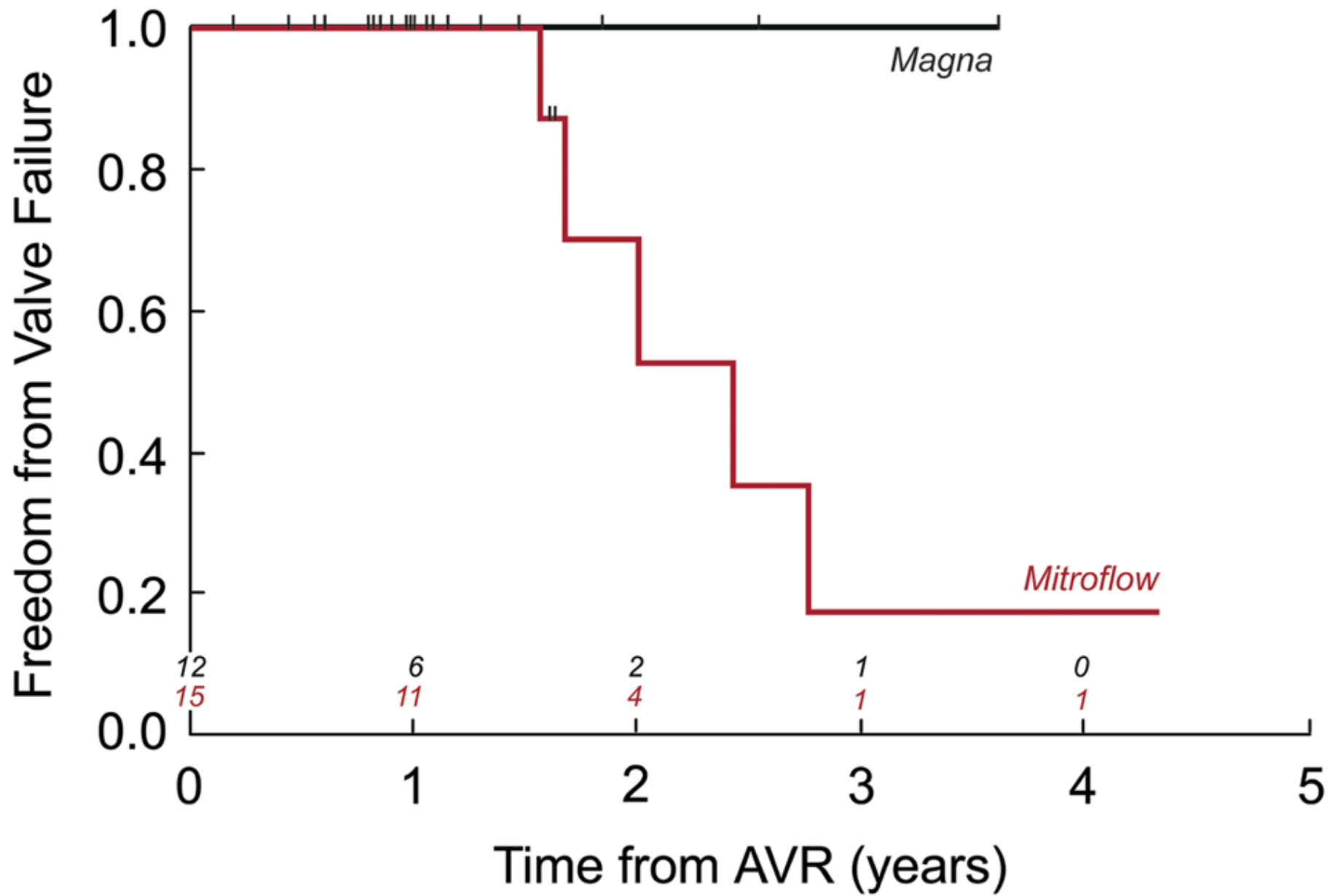
N=27

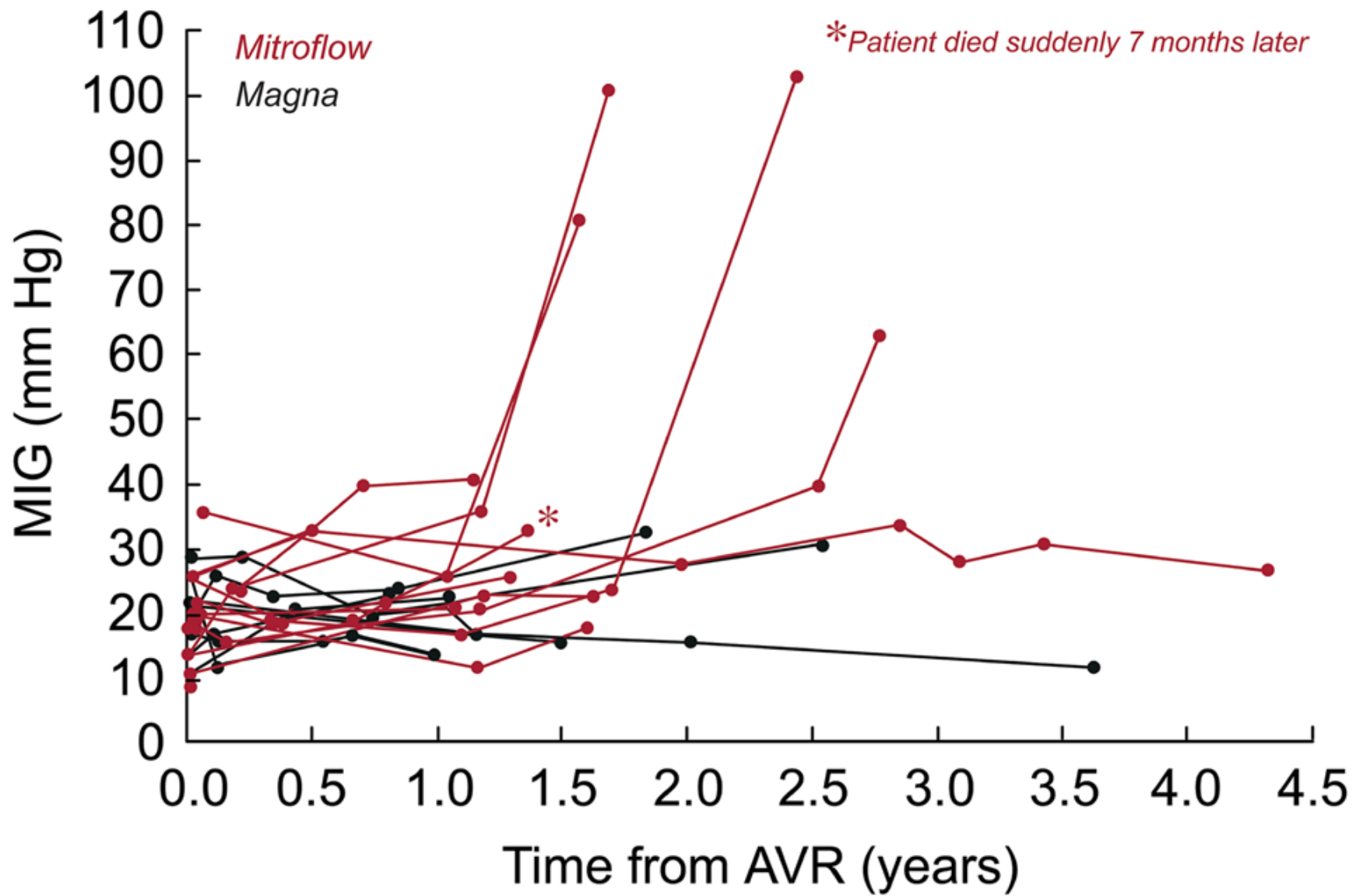
Ages < 30 years old (m18,2)

Follow up 13,7 months

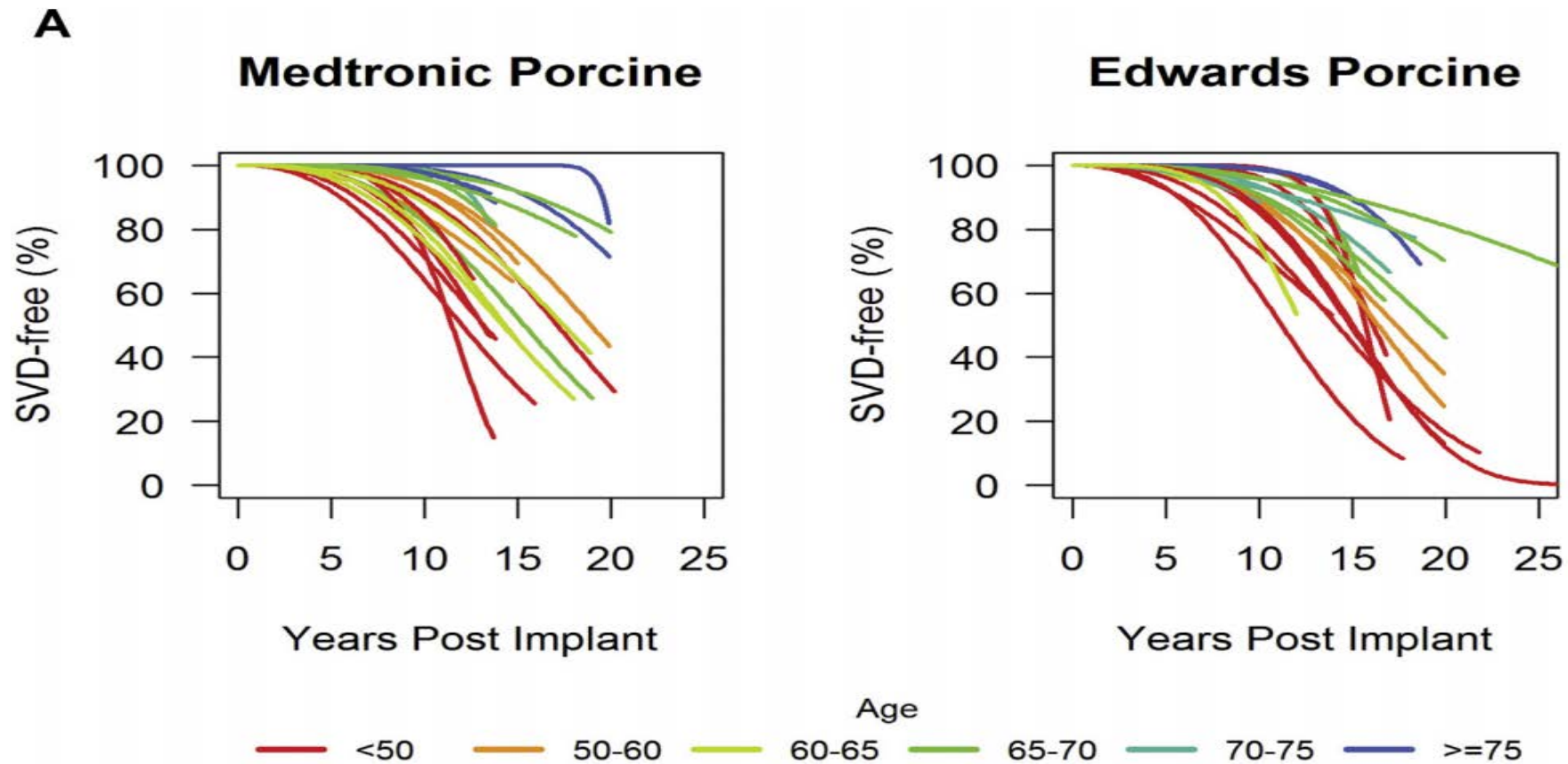


**Mitroflow valve explanted:
Leaflets thickened and densely calcified,
in diastolic position**



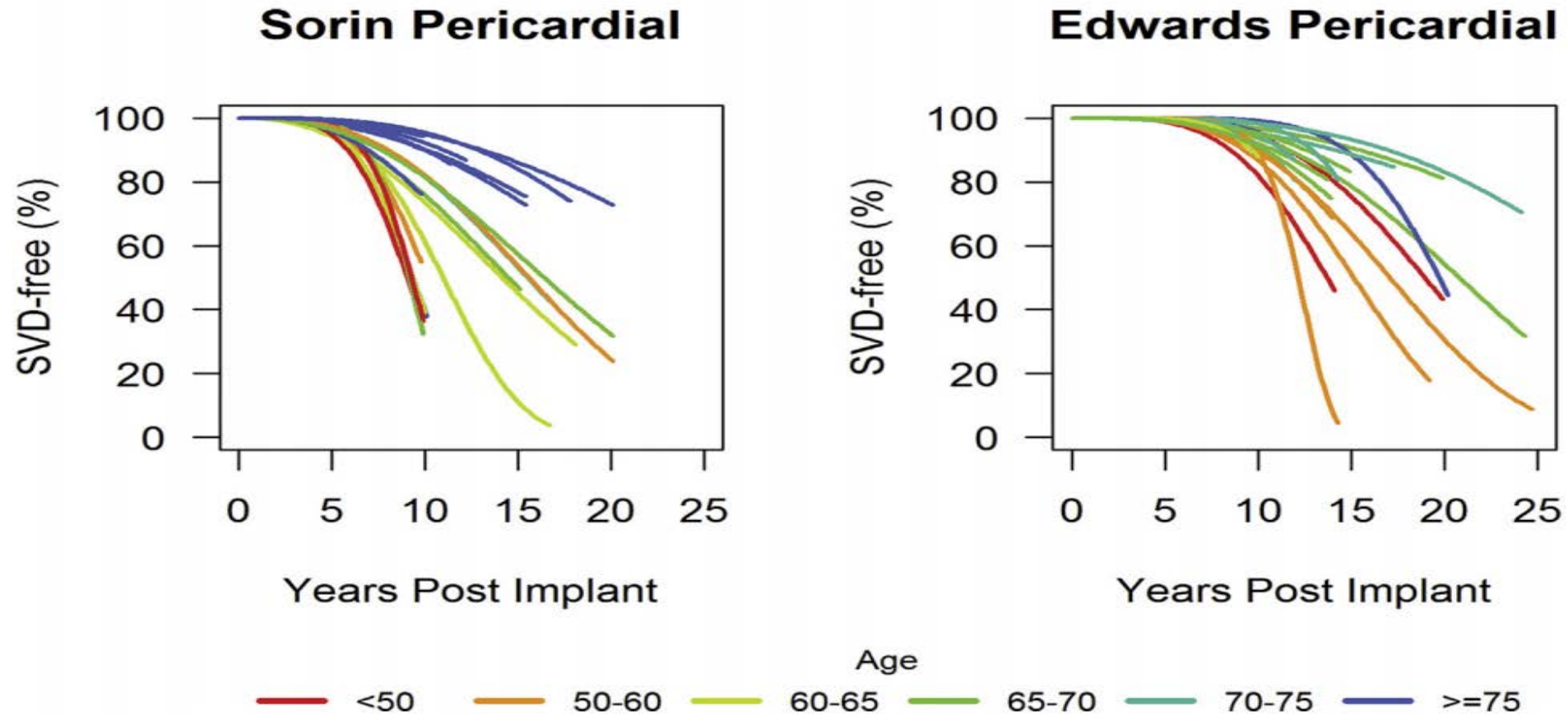


Bioprosthetic Aortic Valve Durability: A Meta-Regression of Published Studies



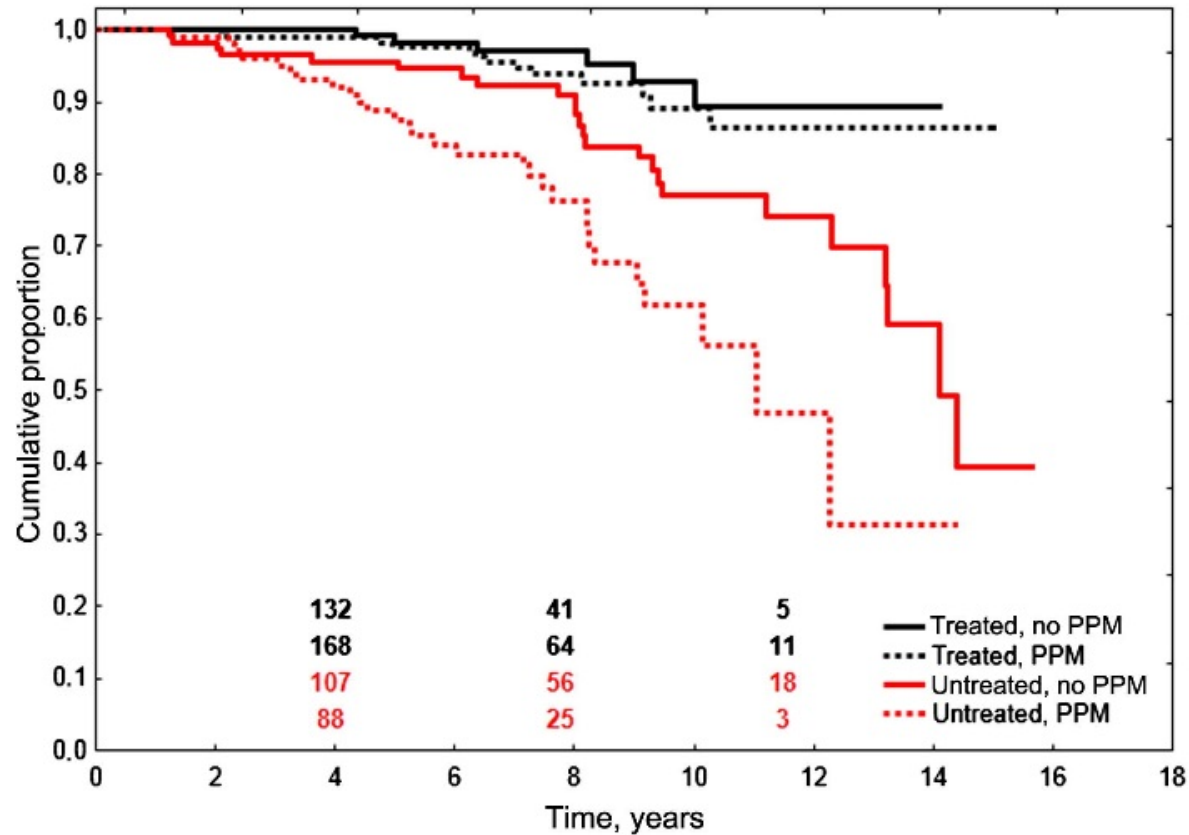
Bioprosthetic Aortic Valve Durability: A Meta-Regression of Published Studies

B



Antimineralization treatment and patient-prosthesis mismatch are major determinants of the onset and incidence of structural valve degeneration in bioprosthetic heart valves

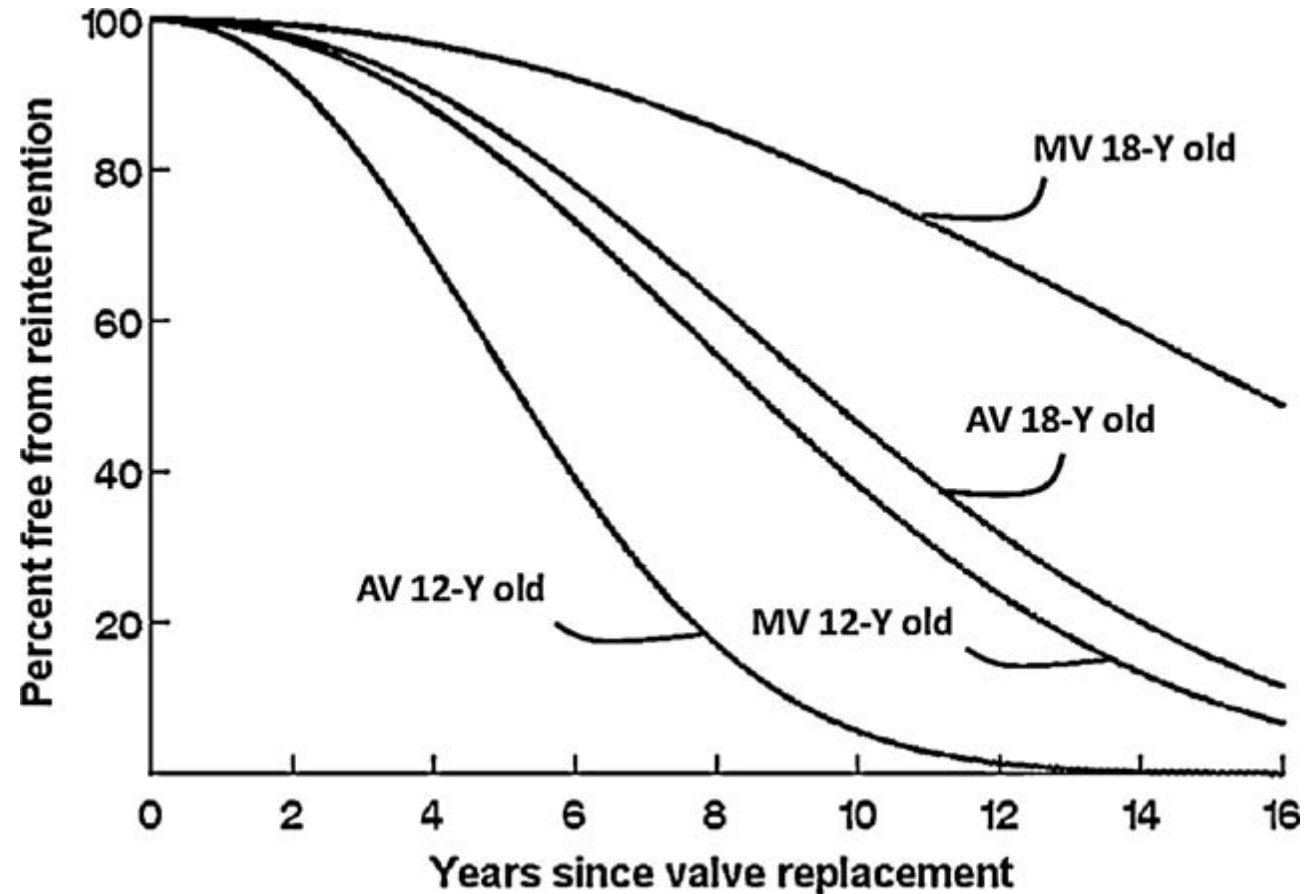
Valve durability



Mean age: 73,8 years
EOAi <0,85 cm²/m²
All AVR

Aortic and mitral valve replacement in children: is there any role for biologic and bioprosthetic substitutes?

Mean age: 15,6 years
80% females
AVR N=36
MVR N=87
No bleeding/thrombo-embolic complications
Pregnancy was not risk factor for accelerated valve deterioration



Bahaaldin Alsoufi et al. EJCTS 2009;36:84-90

Redo Aortic Valve Surgery: Early and Late Outcomes

Sergey Leontyev, MD, **Michael A. Borger**, MD, PhD, Piroze Davierwala, MD, Thomas Walther, MD, PhD, Sven Lehmann, MD, Jörg Kempfert, MD, and **Friedrich W. Mohr**, MD, PhD

Department of Cardiac Surgery, Heart Center, University of Leipzig, Leipzig, Germany

N: 155
Age: 58
Endocarditis: 27%

Table 4. Postoperative Outcomes After Redo Aortic Valve Surgery

Variable	Total
Low cardiac output syndrome	14 (9.0)
Arrhythmias (requiring medical therapy/ cardioversion)	63 (40.6)
Pacemaker implantation	35 (22.6)
Pneumonia	11 (7.1)
Reoperation for bleeding	15 (9.7)
Stroke	9 (5.8)
Renal failure	11 (7.1)
Gastrointestinal bleeding	2 (1.3)
Gastrointestinal ischemia	6 (3.9)
Early mortality	7 (4.5)*

* 3,5% vs 5,8% with root

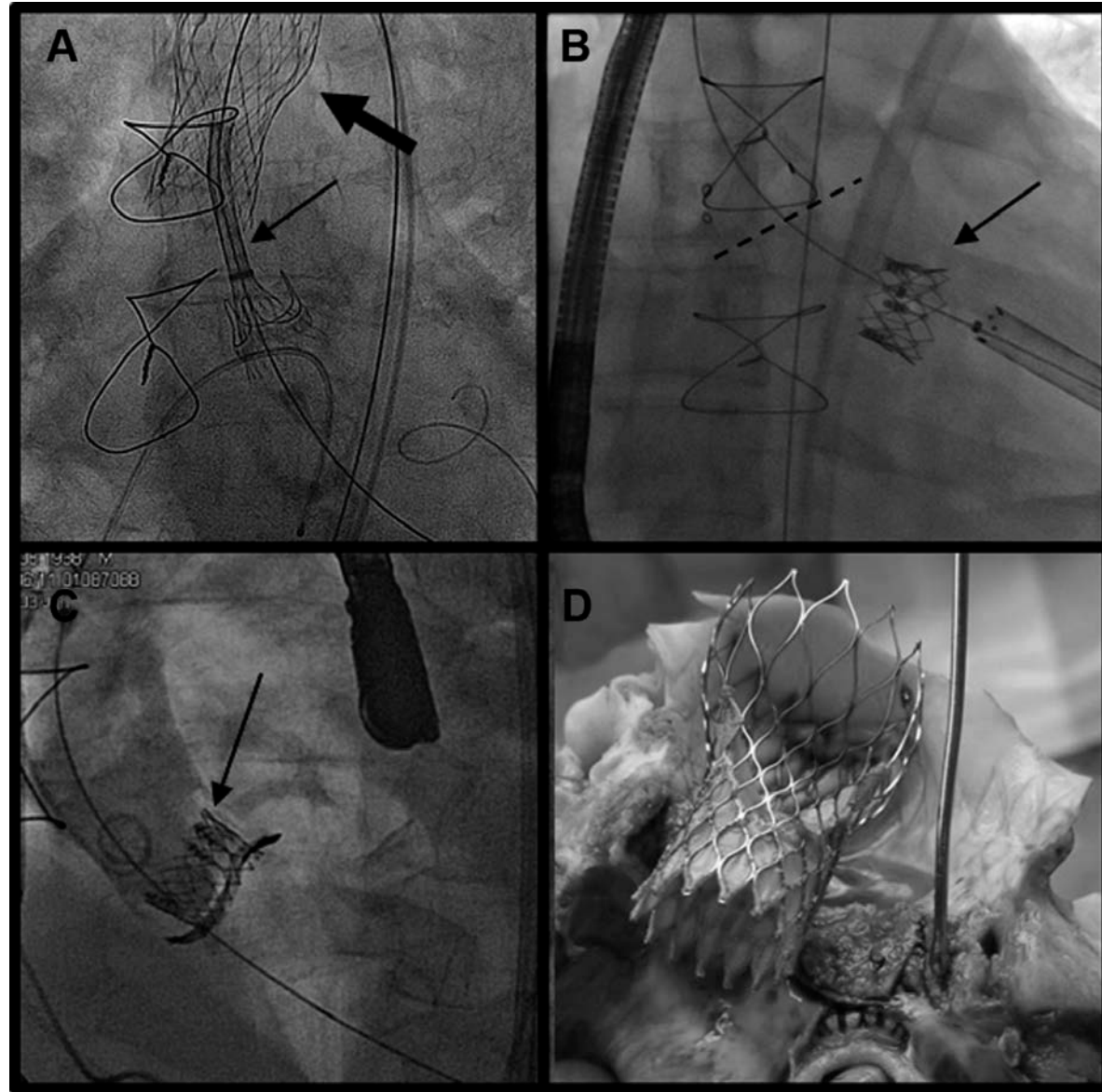
Transcatheter Aortic Valve Replacement for Degenerative Bioprosthetic Surgical Valves

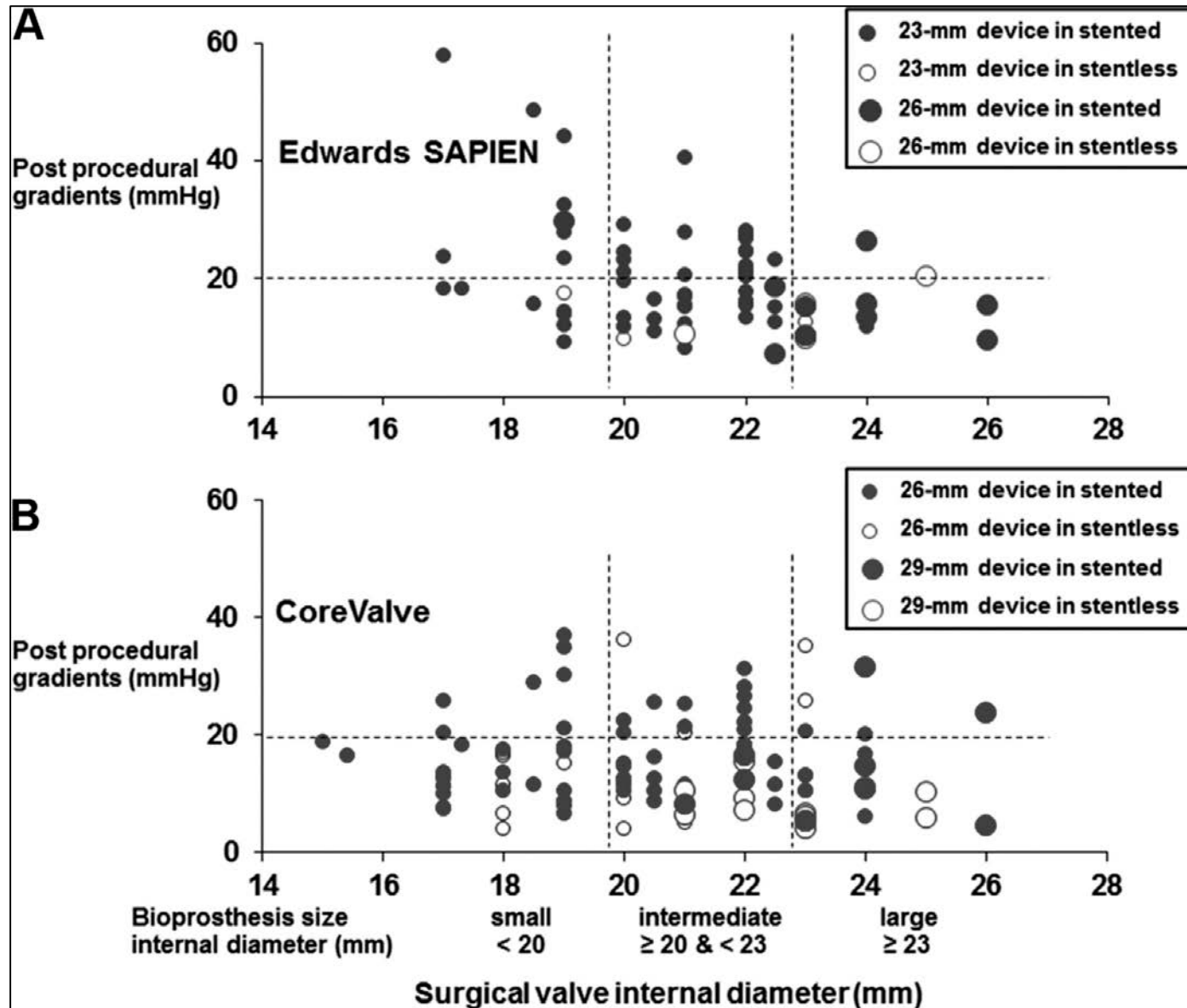
Results From the Global Valve-in-Valve Registry

Background—Transcatheter aortic valve-in-valve implantation is an emerging therapeutic alternative for patients with a failed surgical bioprosthesis and may obviate the need for reoperation. We evaluated the clinical results of this technique using a large, worldwide registry.

Methods and Results—The Global Valve-in-Valve Registry included 202 patients with degenerated bioprosthetic valves (aged 77.7±10.4 years; 52.5% men) from 38 cardiac centers. Bioprosthesis mode of failure was stenosis (n85; 42%), regurgitation (n68; 34%), or combined stenosis and regurgitation (n49; 24%). Implanted devices included CoreValve (n124) and Edwards SAPIEN (n78). Procedural success was achieved in 93.1% of cases. Adverse procedural outcomes included initial device malposition in 15.3% of cases and ostial coronary obstruction in 3.5%. After the procedure, valve maximum/mean gradients were 28.4/14.1/15.9/8.6 mm Hg, and 95% of patients had 1 degree of aortic regurgitation. At 30-day follow-up, all-cause mortality was 8.4%, and 84.1% of patients were at New York Heart Association functional class I/II. One-year follow-up was obtained in 87 patients, with 85.8% survival of treated patients.

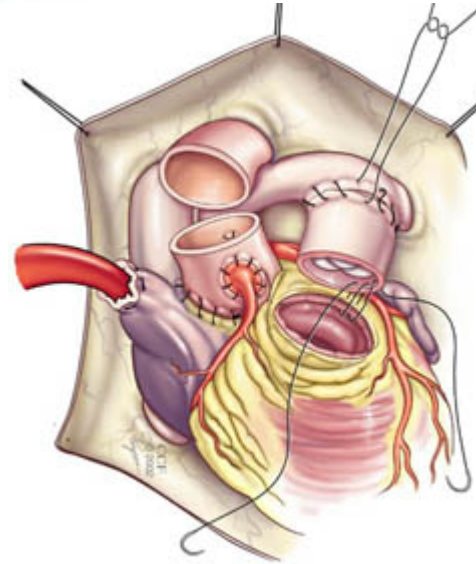
Conclusions—The valve-in-valve procedure is clinically effective in the vast majority of patients with degenerated bioprosthetic valves. **Safety and efficacy concerns include device malposition, ostial coronary obstruction, and high gradients after the procedure.**





The other options

- Mechanical AVR
- Ross operation
- Aortic valve repair

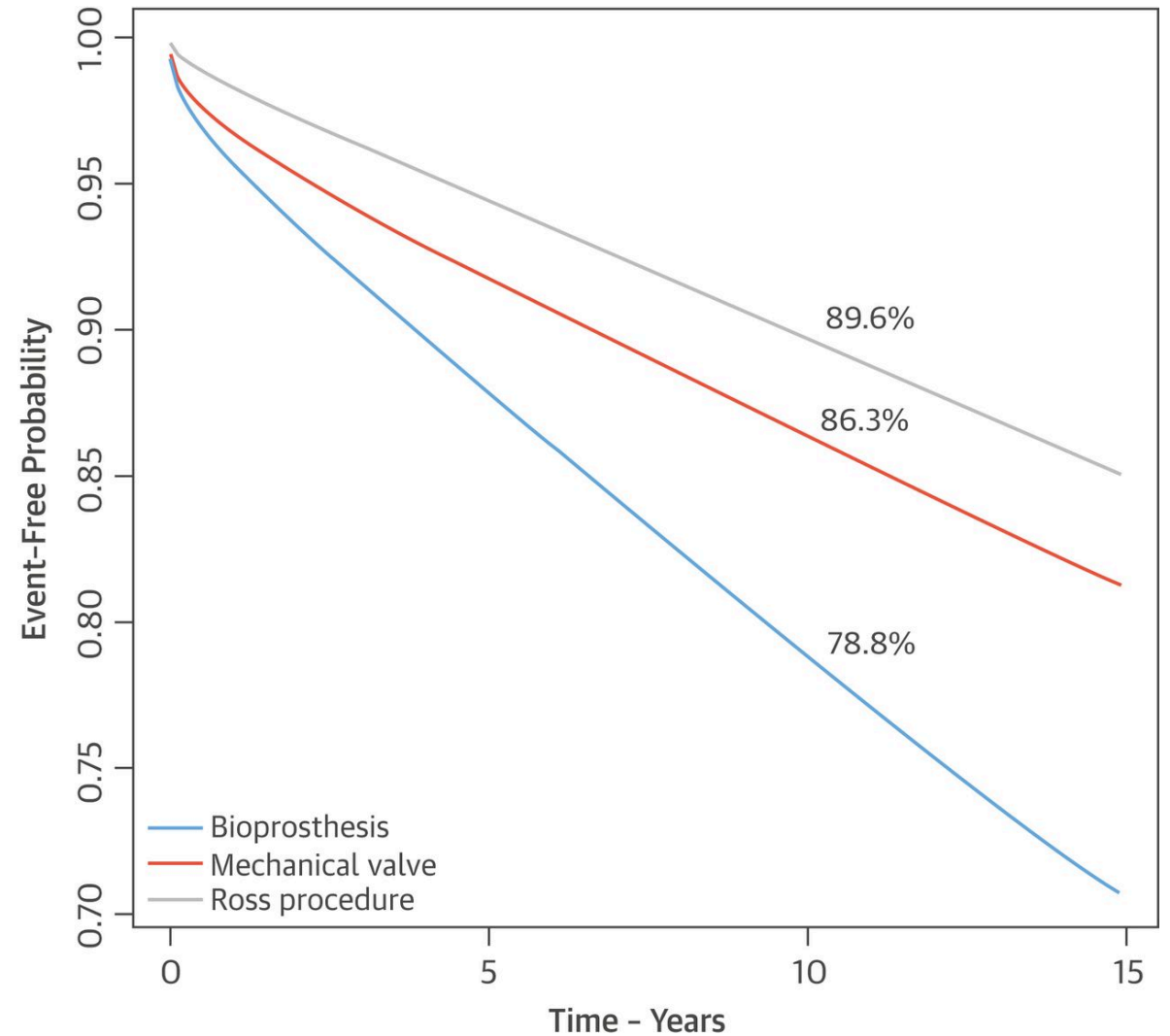


Aortic Valve Replacement and the Ross Operation in Children and Young Adults

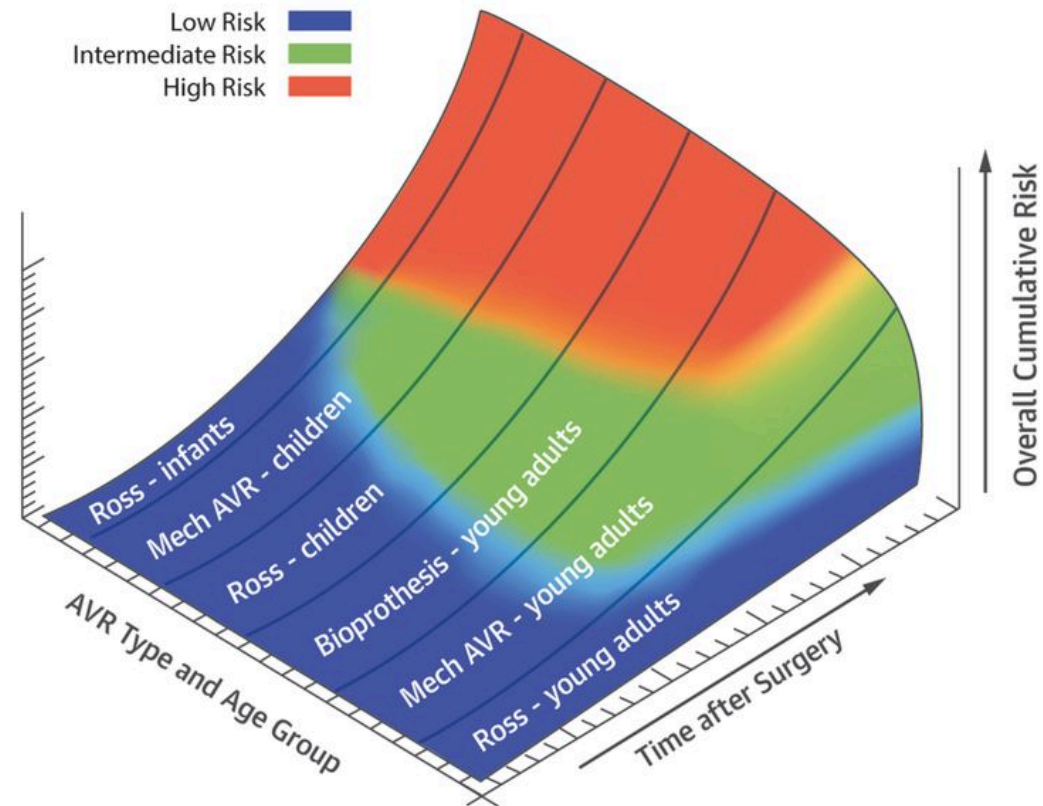
Sharabiani et al. JACC 2016;67:2858-70

N= 1501
Ages 16-40
2000-2012

47,8% Ross
37,8% M AVR
10,9% B AVR
3,5% Hom.



CENTRAL ILLUSTRATION: AVR and the Ross Operation in Children and Young Adults



Sharabiani, M.T.A. et al. J Am Coll Cardiol. 2016;67(24):2858-70.

Aortic valve replacement in children: Are mechanical prostheses a good option ?

Christos Alexiou, et al.

European Journal Cardio-thoracic Surgery 2000; 17: 125 - 33

N=56

Mean age: 11,2 y



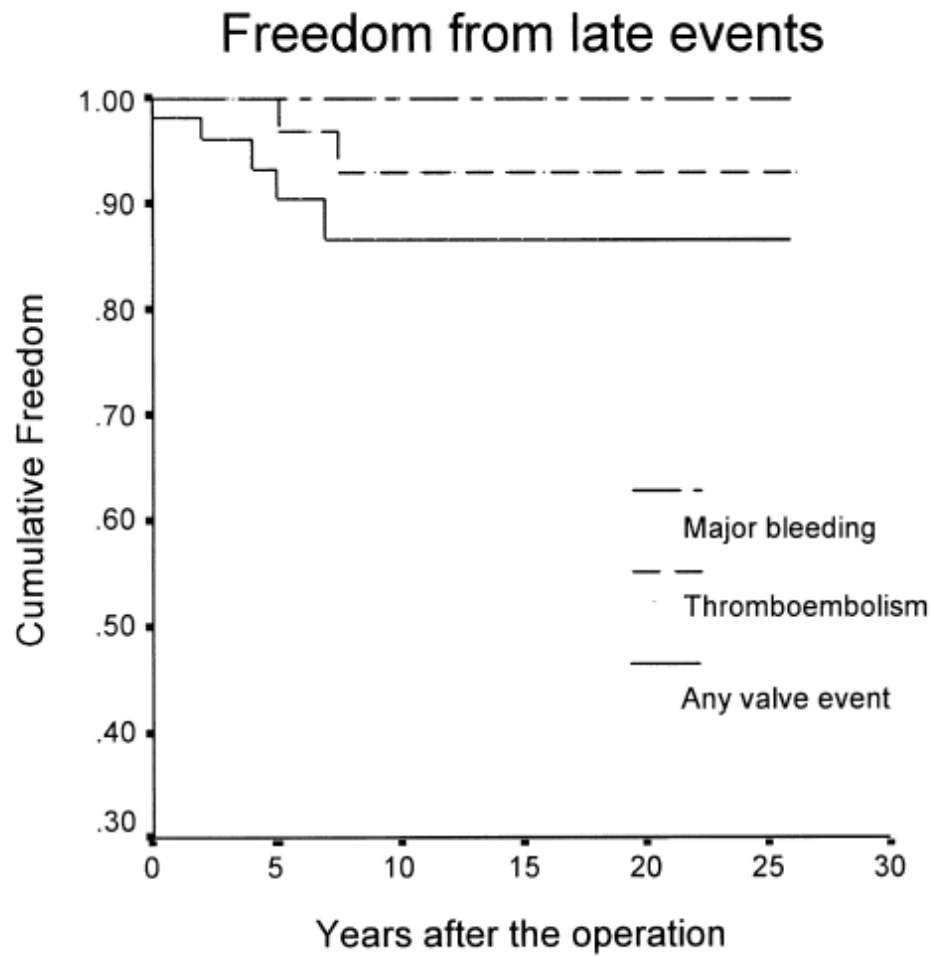


Fig. 2. Actuarial freedom from bleeding requiring blood transfusion, thrombo-embolism and any valve-related event at 20 years was 100.0, 93.0 and 86.6%.

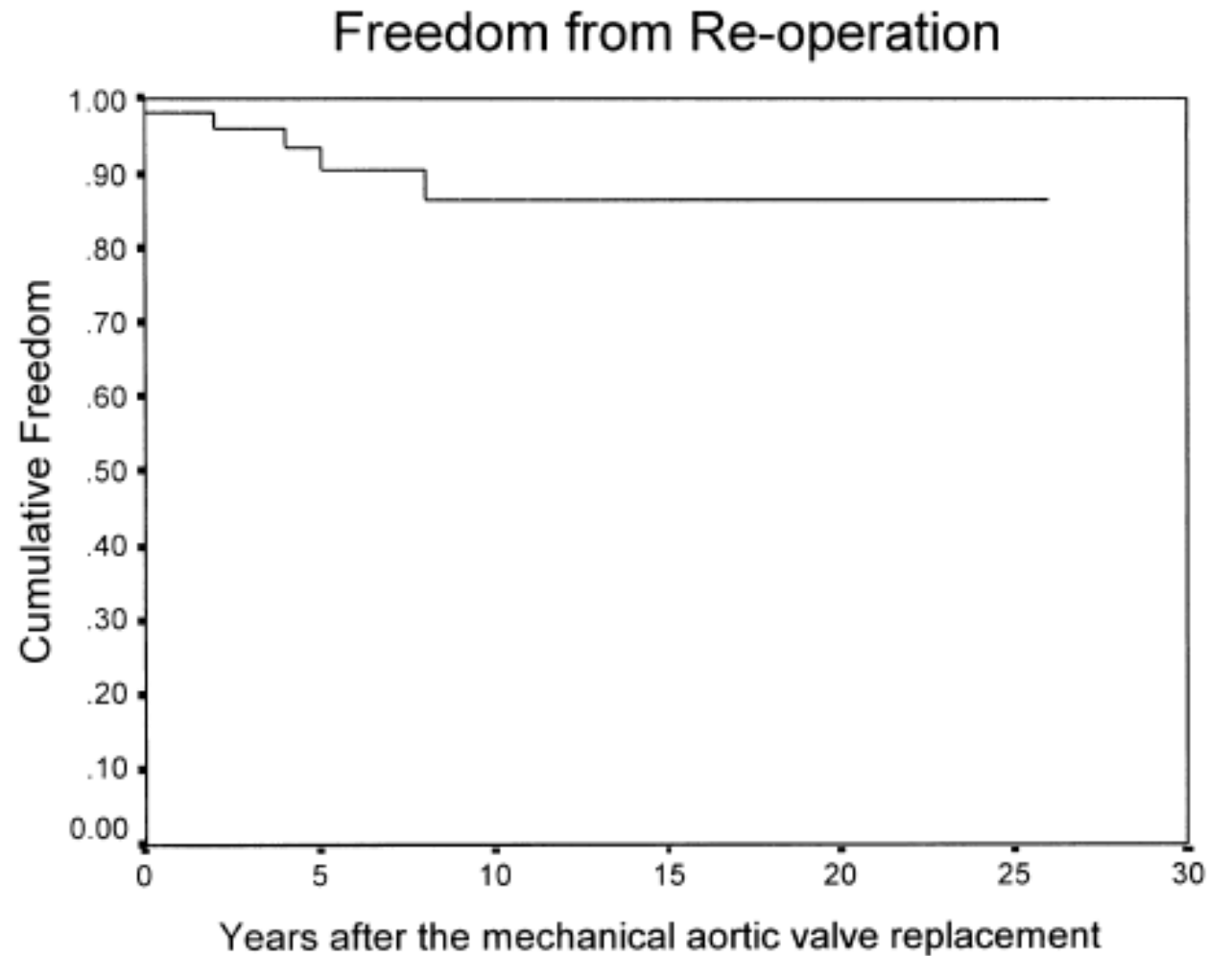
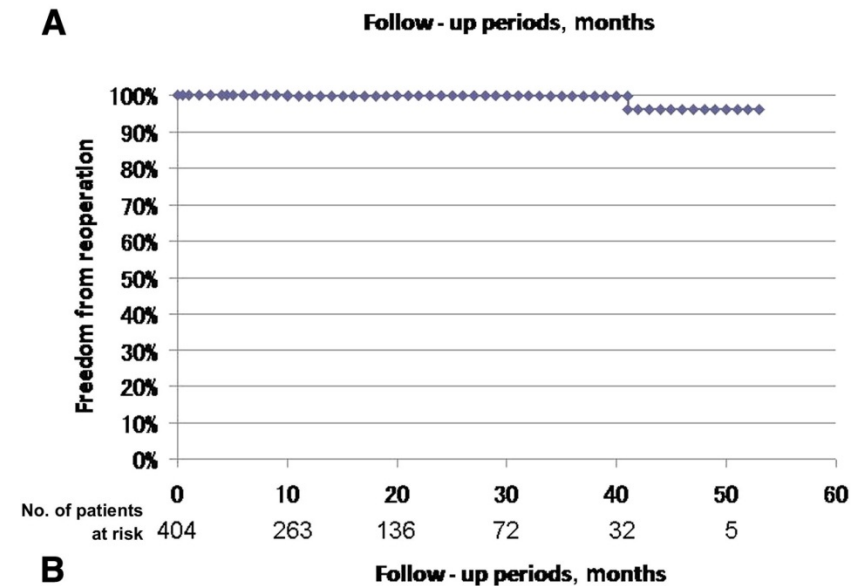
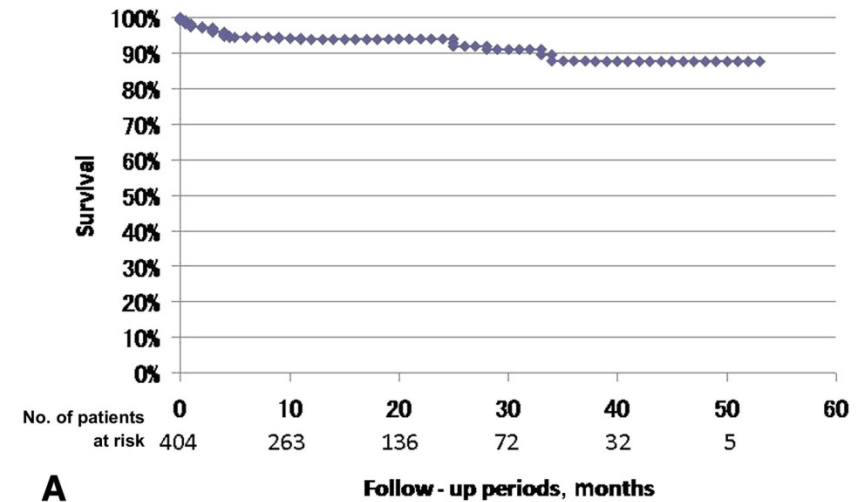
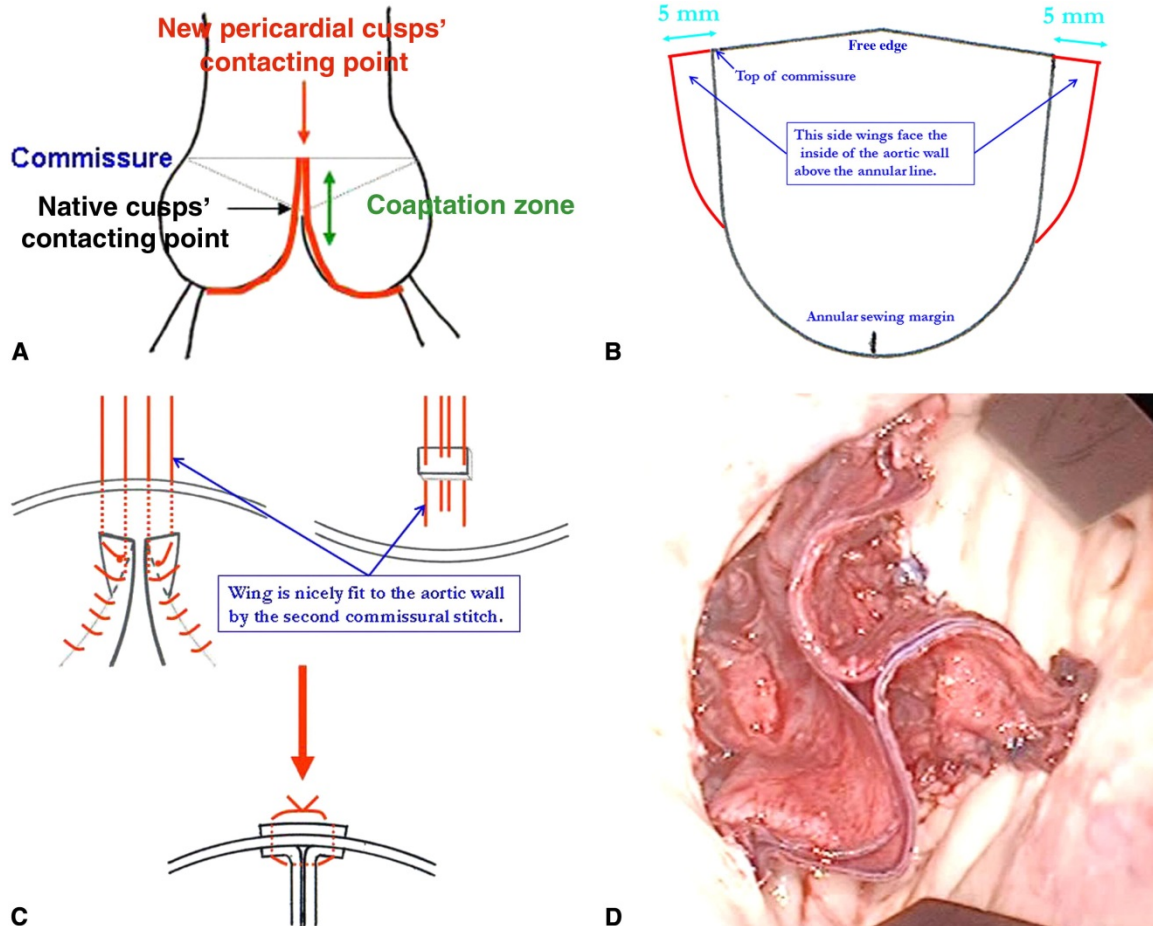


Fig. 3. Actuarial freedom from re-operation at 10 and 20 years was 86.4%.

A total of 404 cases of aortic valve reconstruction with glutaraldehyde-treated autologous pericardium

Ozaki et al JTCVS 2014;147:301-306



Use of Bioprosthetic Valves in Younger Patients: Where's the Evidence?

- There is no absolute superiority over other options
- It is the best option for those not willing (or not candidates) to have anticoagulation therapy and need AVR (repair not feasible and no Ross candidates); **BUT WILL NEED REDO SURGERY**
- Valve in valve TAVI is not standard of care yet
- Ross operation best indication: children and young women
- Ask your patient, but also give him (her) your advice
- Valve reconstruction (Ozaki) may be the best new contribution

