

# Why and when to repair the aortic valve

**Ulrich Schneider**

Dept. of Thoracic and Cardiovascular Surgery

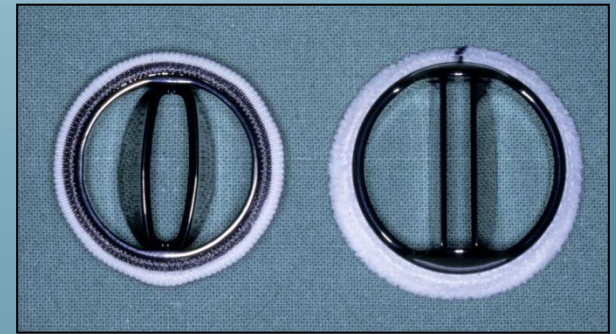
Saarland University Medical Center

Homburg/Saar, Germany

Why?

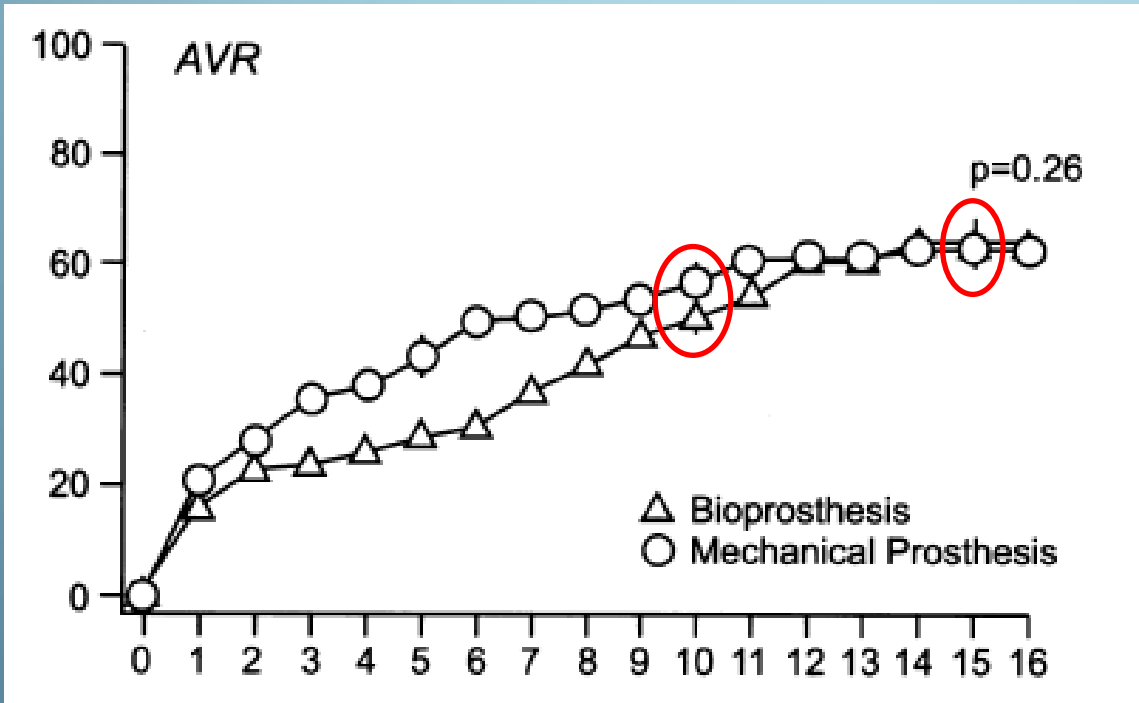
# Aortic Valve Replacement

- Valve related complications
  - Bleeding
  - Thromboembolism
  - Endocarditis
  - Valve degeneration
  - ...



Outcomes 15 Years After Valve Replacement With a Mechanical Versus a Bioprosthetic Valve: Final Report of the Veterans Affairs Randomized Trial

Karl Hammermeister, MD, FACC,\* Gulshan K. Sethi, MD, FACC,† William G. Henderson, PhD,‡  
 Frederick L. Grover, MD, FACC,\* Charles Oprian, PhD,‡  
 Shahbudin H. Rahimtoola, MB, FRCP, MACP, MACC§  
 Denver, Colorado; Tucson, Arizona; Hines, Illinois; and Los Angeles, California



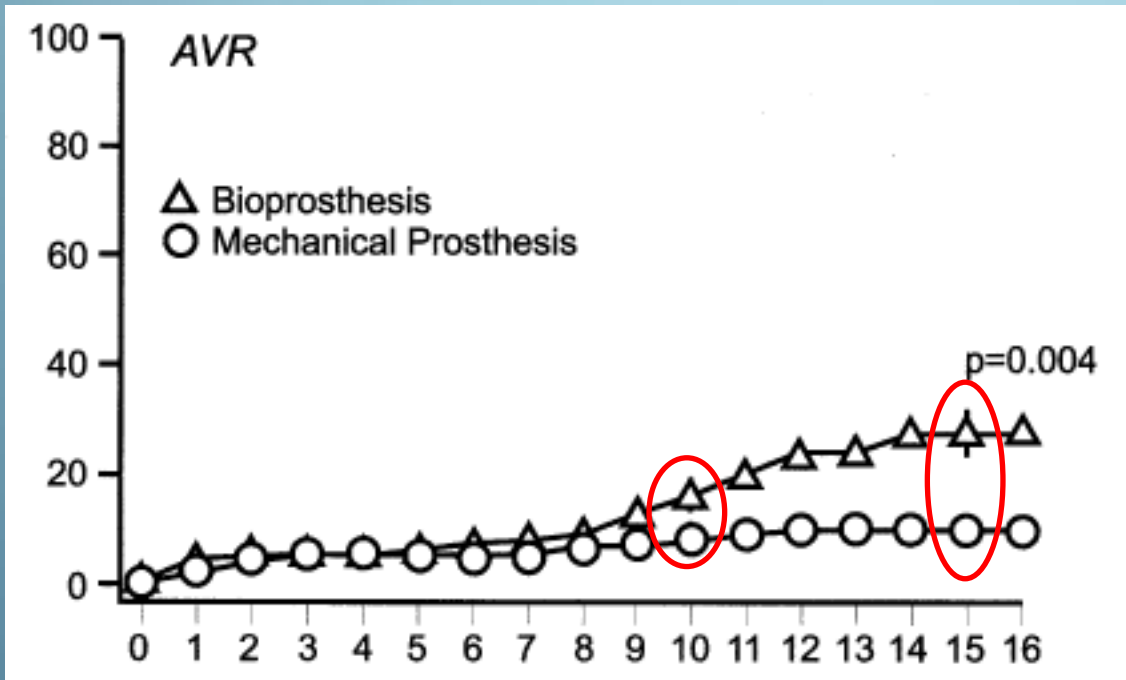
10 years: 50% vs. 58%

15 years: 62%

All valve related complications

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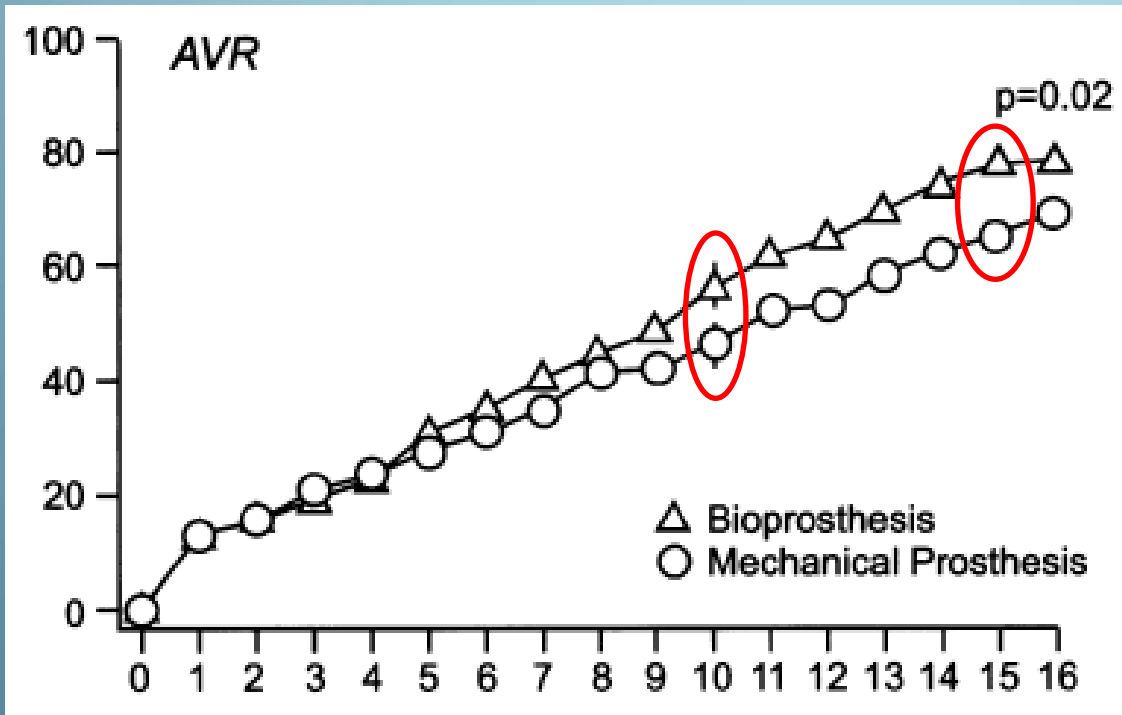
10 years: 9% vs. 17%

15 years: 10% vs. 29%

All reoperations

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10 years: 45% vs. 57%

15 years: 66% vs. 79%

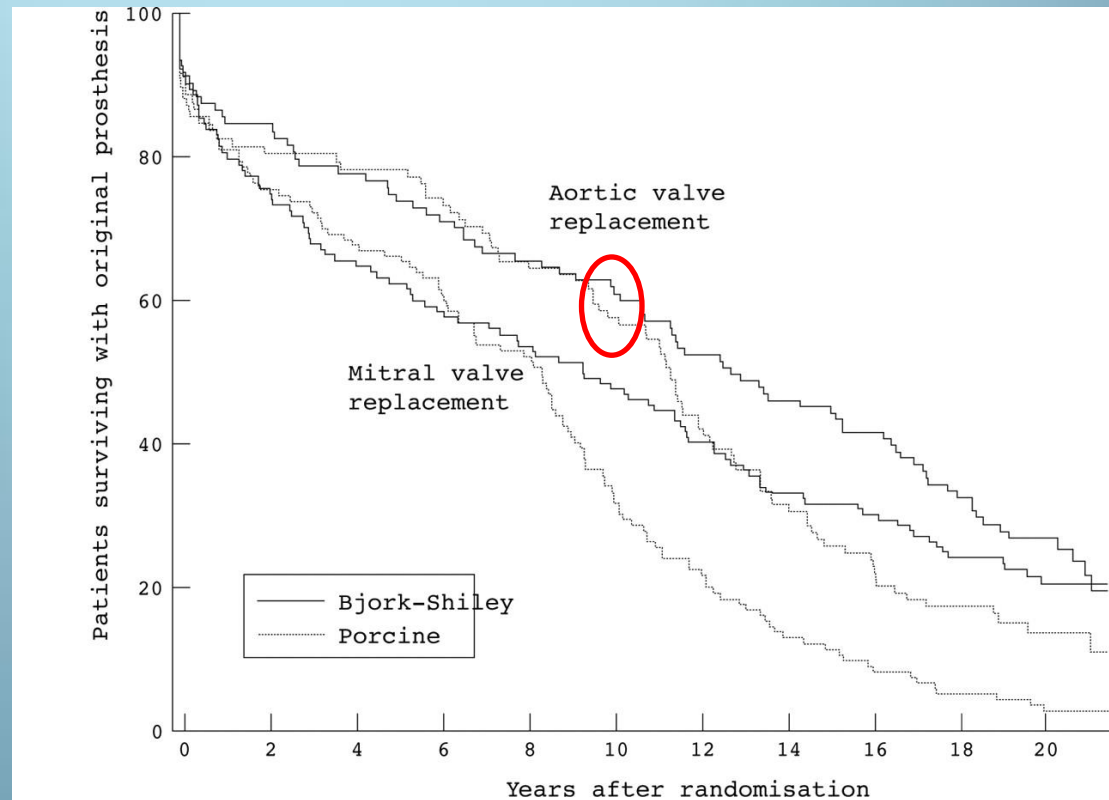
Mortality

# Twenty year comparison of a Bjork-Shiley mechanical heart valve with porcine bioprostheses

H Oxenham, P Bloomfield, D J Wheatley, R J Lee, J Cunningham, R J Prescott, H C Miller

Heart 2003;89:715-721

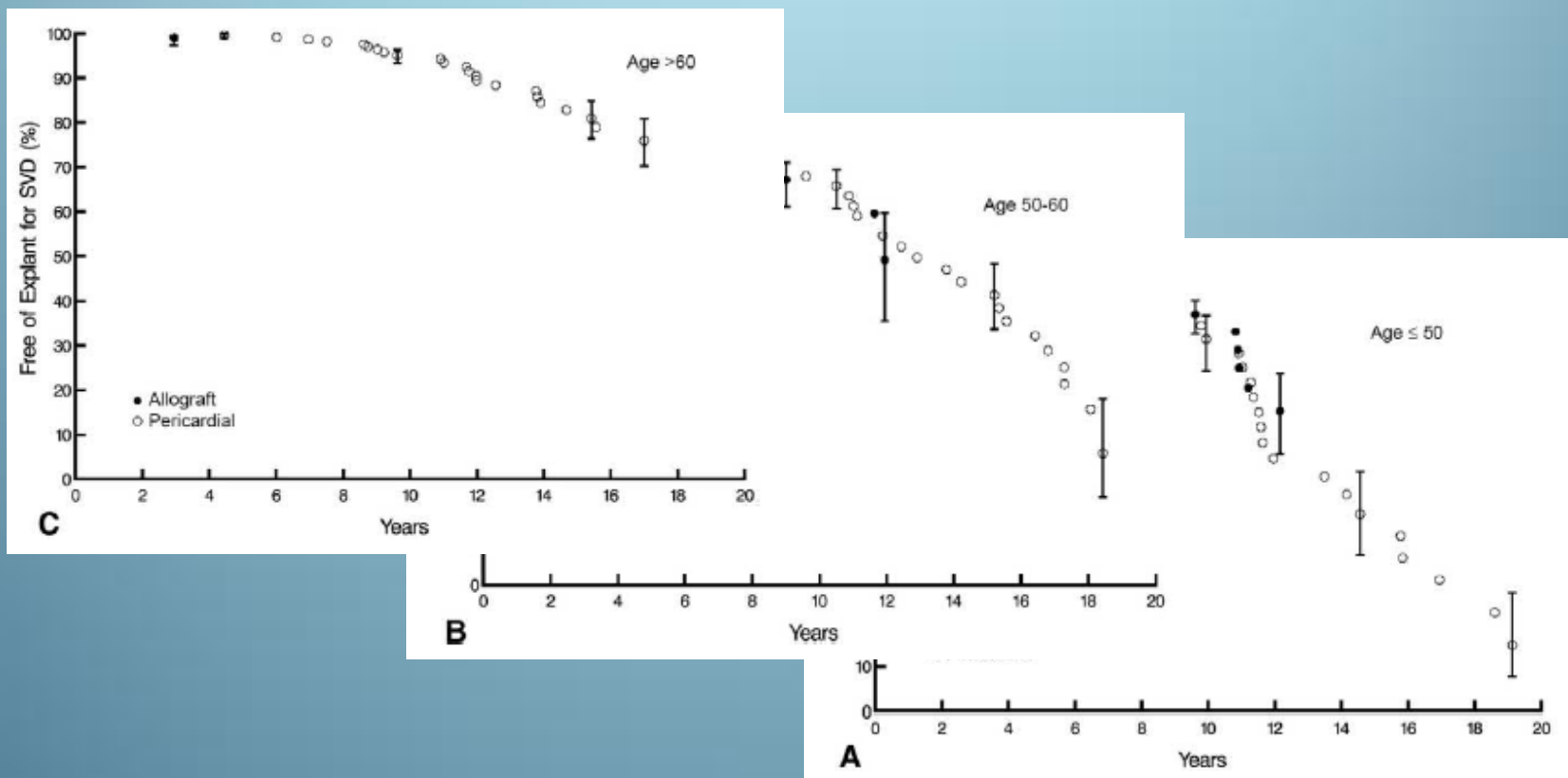
|   | Aortic valve replacement |             |          |
|---|--------------------------|-------------|----------|
|   | 10 Years                 | 20 Years    | p Value* |
| <b>Survival</b>                           |                          |             |          |
| All survivors                             |                          |             |          |
| Bjork-Shiley valve                        | 64.0 (4.6)               | 28.4 (4.4)  | 0.57     |
| Porcine valve                             | 65.7 (4.7)               | 31.3 (4.7)  |          |
| Survivors with original prosthesis intact |                          |             |          |
| Bjork-Shiley valve                        | 63.1 (4.6)               | 27.5 (4.3)  | 0.025    |
| Porcine valve                             | 58.8 (4.9)               | 13.7 (3.6)  |          |
| Survivors without a major event           |                          |             |          |
| Bjork-Shiley valve                        | 53.8 (4.8)               | 15.2 (3.5)  | 0.34     |
| Porcine valve                             | 52.0 (5.0)               | 8.1 (3.0)   |          |
| <b>Valve related events</b>               |                          |             |          |
| <b>Reoperation</b>                        |                          |             |          |
| Bjork-Shiley valve                        | 4.2 (2.1)                | 7.4 (3.0)   | <0.0001  |
| Porcine valve                             | 11.3 (3.6)               | 56.2 (8.4)  |          |
| <b>Bleeding: all episodes</b>             |                          |             |          |
| Bjork-Shiley valve                        | 16.3 (4.2)               | 61.1 (7.6)  | 0.001    |
| Porcine valve                             | 5.9 (2.9)                | 42.4 (12.1) |          |
| <b>Bleeding: major episodes</b>           |                          |             |          |
| Bjork-Shiley valve                        | 12.2 (3.7)               | 37.8 (7.1)  | 0.021    |
| Porcine valve                             | 4.2 (2.4)                | 32.0 (12.6) |          |
| <b>Embolism: all episodes</b>             |                          |             |          |
| Bjork-Shiley valve                        | 9.8 (3.2)                | 24.0 (6.2)  | 0.13     |
| Porcine valve                             | 22.6 (4.9)               | 39.2 (8.8)  |          |
| <b>Embolism: major episodes</b>           |                          |             |          |
| Bjork-Shiley valve                        | 2.0 (1.4)                | 10.3 (4.9)  | 0.26     |
| Porcine valve                             | 8.9 (3.3)                | 15.4 (7.0)  |          |
| <b>Endocarditis</b>                       |                          |             |          |
| Bjork-Shiley valve                        | 4.8 (2.4)                | 8.3 (4.1)   | 0.71     |
| Porcine valve                             | 2.2 (1.6)                | 8.7 (6.5)   |          |



|              |     | 0   | 2  | 4  | 6  | 8  | 10 | 12 | 14 | 16 | 18 | 20 |
|--------------|-----|-----|----|----|----|----|----|----|----|----|----|----|
| <b>AVR:</b>  |     |     |    |    |    |    |    |    |    |    |    |    |
| Bjork-Shiley | 99  | 92  | 85 | 78 | 72 | 68 | 58 | 51 | 46 | 37 | 20 |    |
| Porcine      | 102 | 83  | 81 | 77 | 67 | 60 | 44 | 33 | 25 | 17 | 7  |    |
| <b>MVR:</b>  |     |     |    |    |    |    |    |    |    |    |    |    |
| Bjork-Shiley | 99  | 99  | 85 | 76 | 71 | 63 | 53 | 44 | 40 | 32 | 19 |    |
| Porcine      | 132 | 101 | 90 | 81 | 69 | 39 | 27 | 16 | 10 | 6  | 3  |    |

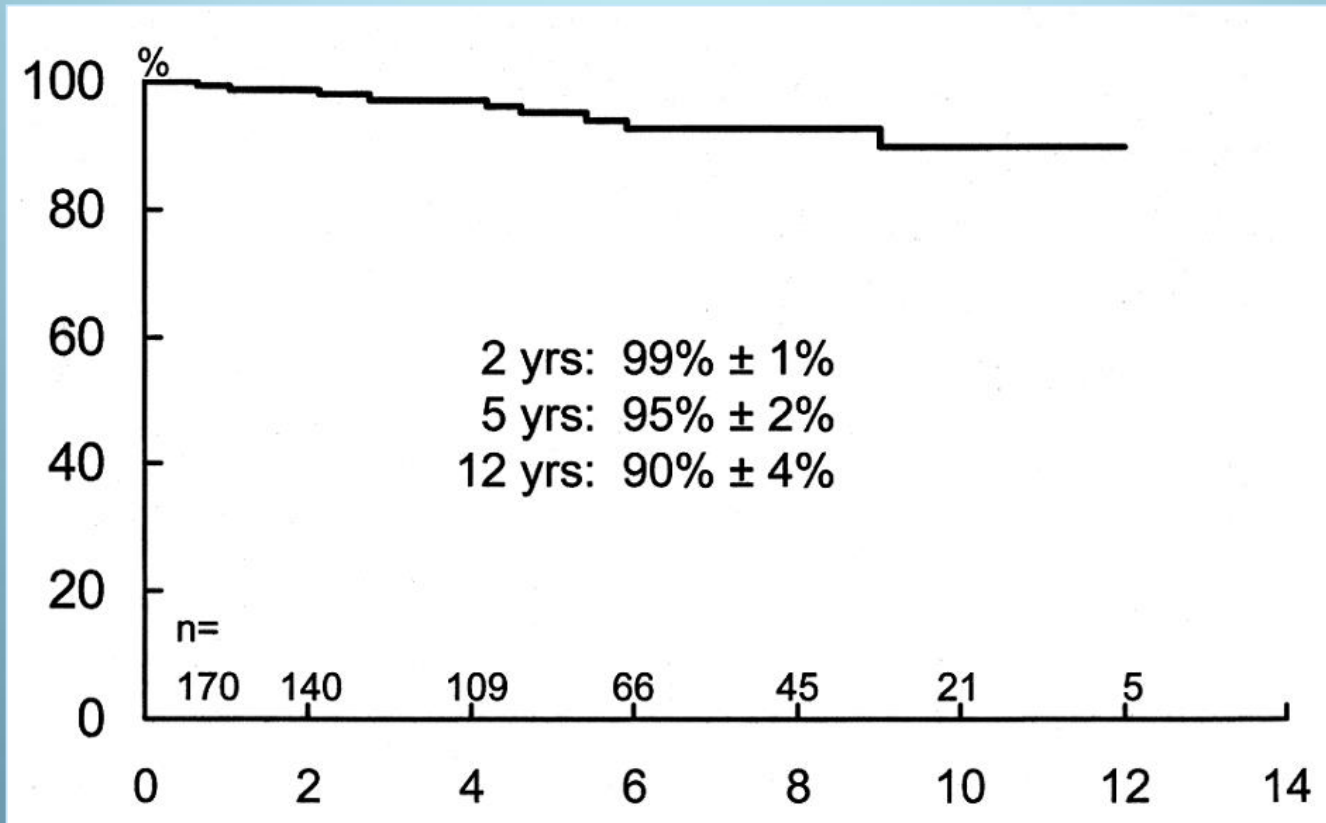
# Are allografts the biologic valve of choice for aortic valve replacement in nonelderly patients? Comparison of explantation for structural valve deterioration of allograft and pericardial prostheses

Nicholas G. Smedira, MD,<sup>a</sup> Eugene H. Blackstone, MD,<sup>a,b</sup> Eric E. Roselli, MD,<sup>a</sup> Colleen C. Laffey, RN,<sup>a</sup> and Delos M. Cosgrove, MD<sup>a</sup>





# The Ross Procedure

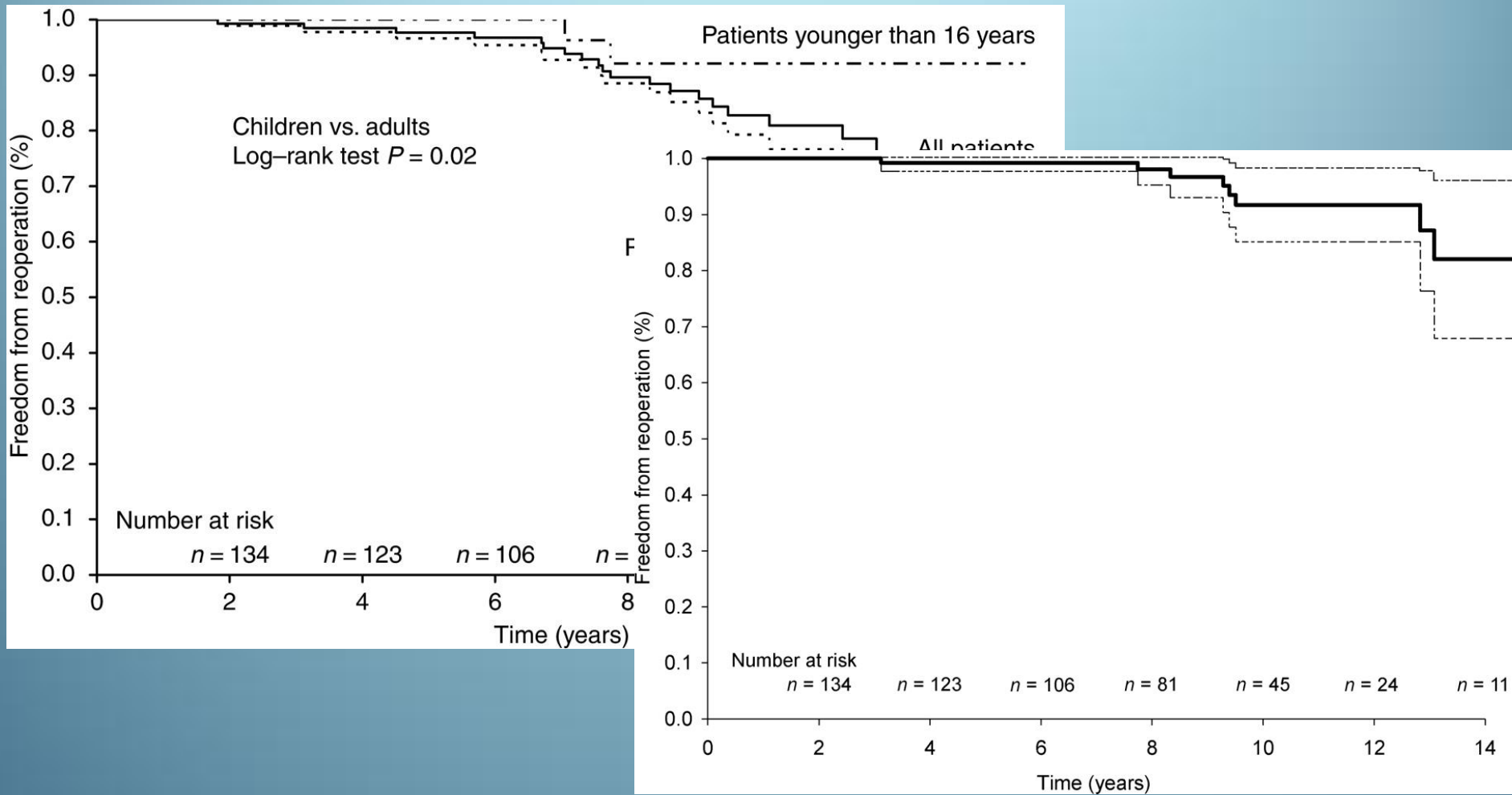


Freedom from reoperation

*Elkins et al., J Heart Valve Disease 1999*

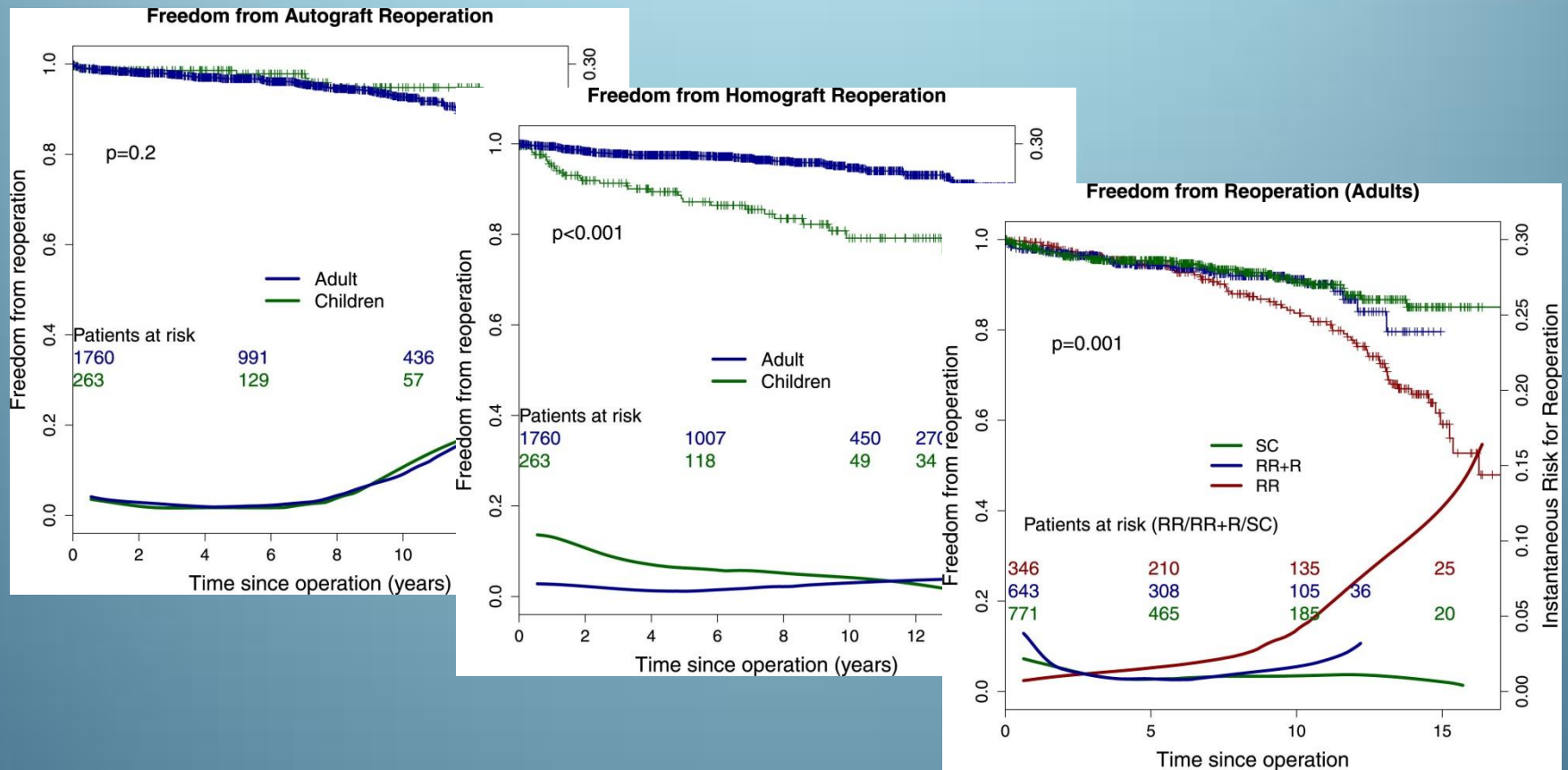
# The Ross operation: a Trojan horse?†

Loes M.A. Klieverik<sup>1\*</sup>, Johanna J.M. Takkenberg<sup>1</sup>, Jos A. Bekkers<sup>1</sup>, Jolien W. Roos-Hesselink<sup>2</sup>, Maarten Witsenburg<sup>3</sup>, and Ad J.J.C. Bogers<sup>1</sup>



# Reoperations on the pulmonary autograft and pulmonary homograft after the Ross procedure: An update on the German Dutch Ross Registry

Efstratios I. Charitos, MD,<sup>a</sup> Johanna J. M. Takkenberg, MD,<sup>b</sup> Thorsten Hanke, MD,<sup>a</sup> Armin Gorski, MD,<sup>c</sup> Cornelius Botha, MD,<sup>d</sup> Ulrich Franke, MD,<sup>e</sup> Ali Dodge-Khatami, MD,<sup>f</sup> Juergen Hoerer, MD,<sup>g</sup> Rudiger Lange, MD,<sup>g</sup> Anton Moritz, MD,<sup>h</sup> Katharina Ferrari-Kuehne, MD,<sup>i</sup> Roland Hetzer, MD,<sup>j</sup> Michael Huebler, MD,<sup>j</sup> Ad J. J. C. Bogers, MD,<sup>b</sup> Ulrich Stierle, MD,<sup>a</sup> Hans-Hinrich Sievers, MD,<sup>a</sup> and Wolfgang Hemmer, MD<sup>k</sup>

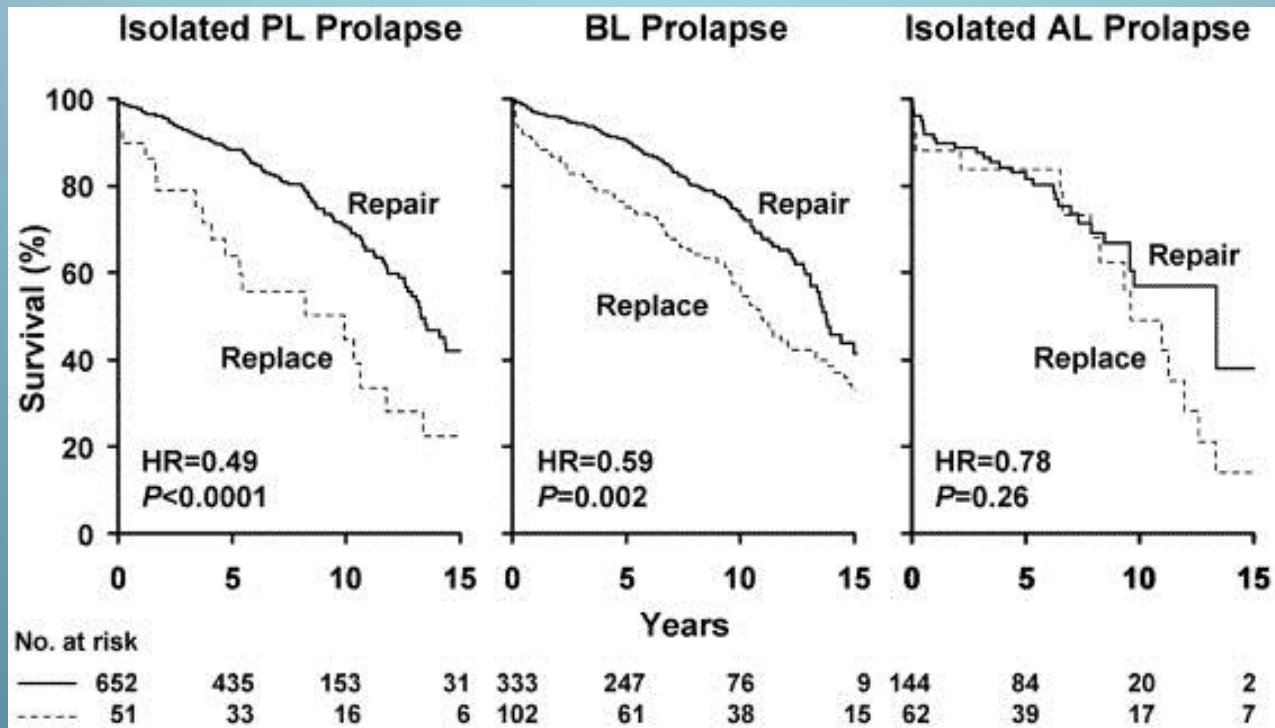


# Mitral Valve Repair

## Survival Advantage and Improved Durability of Mitral Repair for Leaflet Prolapse Subsets in the Current Era

Rakesh M. Suri, MD, DPhil, Hartzell V. Schaff, MD, Joseph A. Dearani, MD, Thoralf M. Sundt III, MD, Richard C. Daly, MD, Charles J. Mullany, MB, MS, Maurice Enriquez-Sarano, MD, and Thomas A. Orszulak, MD

Division of Cardiovascular Surgery, Mayo Clinic College of Medicine, Rochester, Minnesota

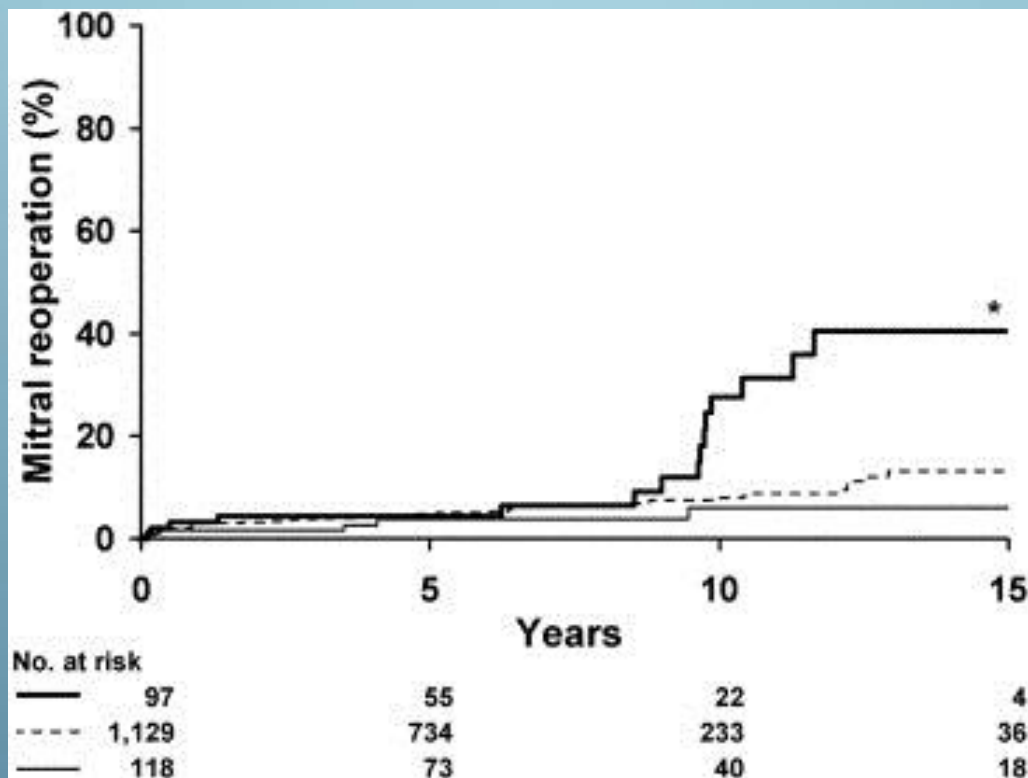


# Mitral Valve Repair

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Division of Cardiovascular Surgery, Mayo Clinic College of Medicine, Rochester, Minnesota



Why?

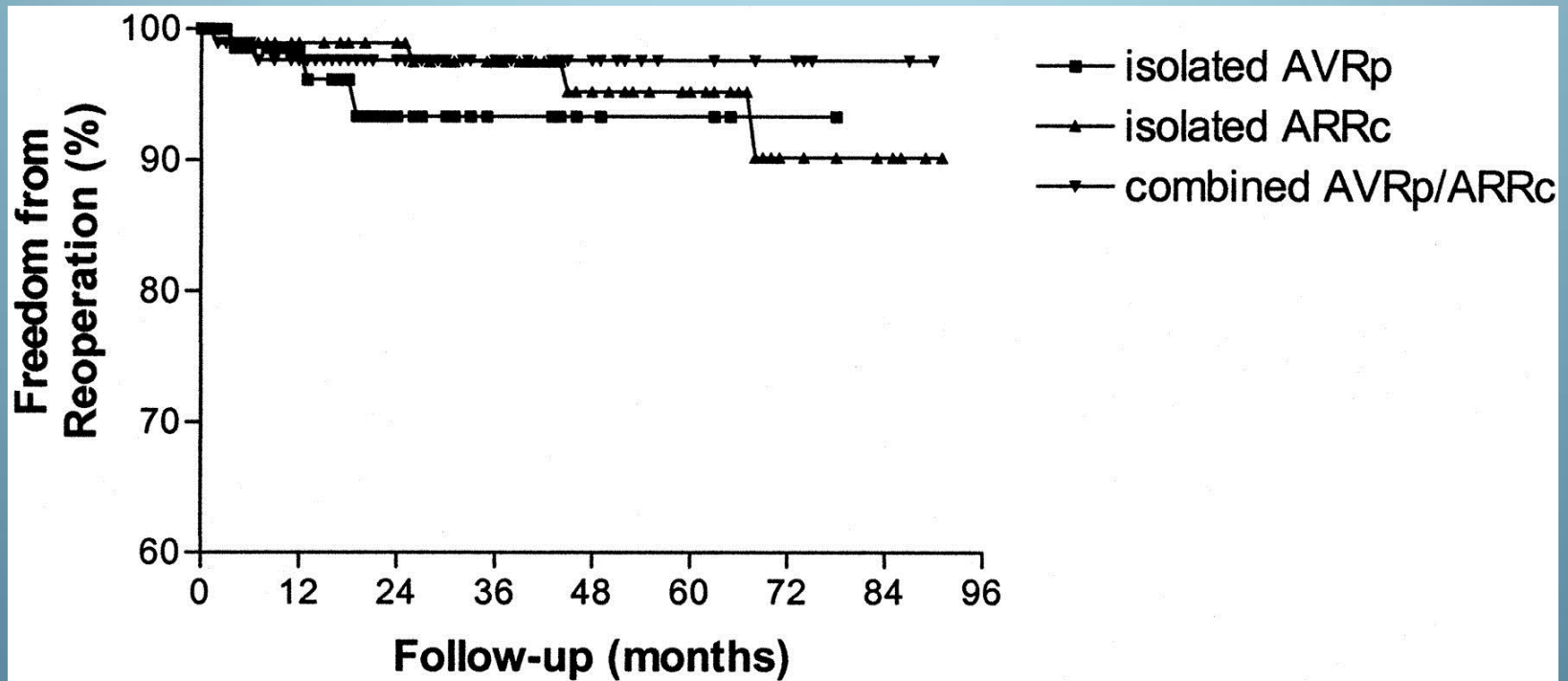
# Results of Aortic Valve Repair (Homburg)

- 10/1995-01/2015 (n=2073)
  - Hospital Mortality: n=35 (1.7%)
  - AV-Block: n=10 (0.5%)
  - Neurologic events
    - early: n=15 (0.7%)
    - late: n=17 (0.3% per patient year)
  - Endocarditis: n=16 (0.25% per patient year)
  - Reoperations: n=155 (7.5%)

# Results of Aortic Valve Repair (Homburg)

## Aortic Valve Repair Using a Differentiated Surgical Strategy

Frank Langer, MD; Diana Aicher, MD; Anke Kissinger, Olaf Wendler, MD; Henning Lausberg, MD;  
Roland Fries, MD; Hans-Joachim Schäfers, MD





# Results of Aortic Valve Repair (Homburg)

## Bicuspidization of the Unicuspid Aortic Valve: A New Reconstructive Approach

Hans-Joachim S  
Angelika Lindin  
and Hashim Ab

**Circulation**  
JOURNAL OF THE AMERICAN HEART ASSOCIATION



### Valve Configuration Determines Long-Term Results After Repair of the Bicuspid Aortic Valve

Diana Aicher, Takashi Kuniyama, Omar Abou Issa, Brigitte Brittner, Stefan Gräber and

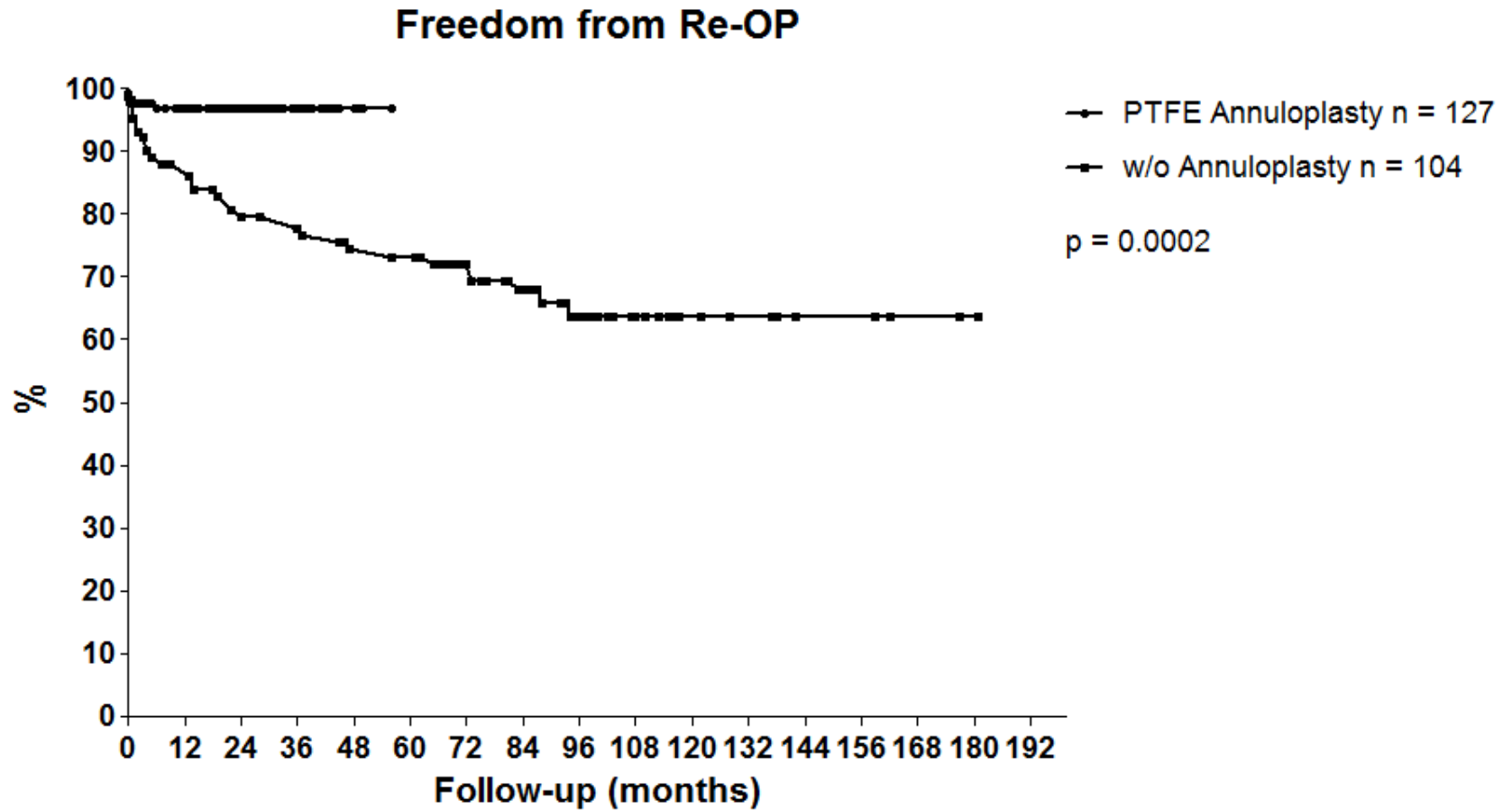
## Aortic Valve Repair Using a Differentiated Surgical Strategy

Frank Langer, MD; Diana Aicher, MD; Anke Kissinger, Olaf Wendler, MD; Henning Lausberg, MD;  
Roland Fries, MD; Hans

## Tricuspidization of the Quadricuspid Aortic Valve

Kathrin I. Schmidt, MD, Michael Jeserich, MD,  
Diana Aicher, MD, and  
Hans-Joachim Schäfers, MD, PhD

# Recent Results (BAV Repair)





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SURGERY

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

Diana Aicher<sup>a</sup>, Roland Fries<sup>b</sup>, Svetlana Rodionycheva<sup>a</sup>, Kathrin Schmidt<sup>a</sup>,  
Frank Langer<sup>a</sup>, Hans-Joachim Schäfers<sup>a,\*</sup>

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**Freedom from all valve-related complications at 10 years: 88%**

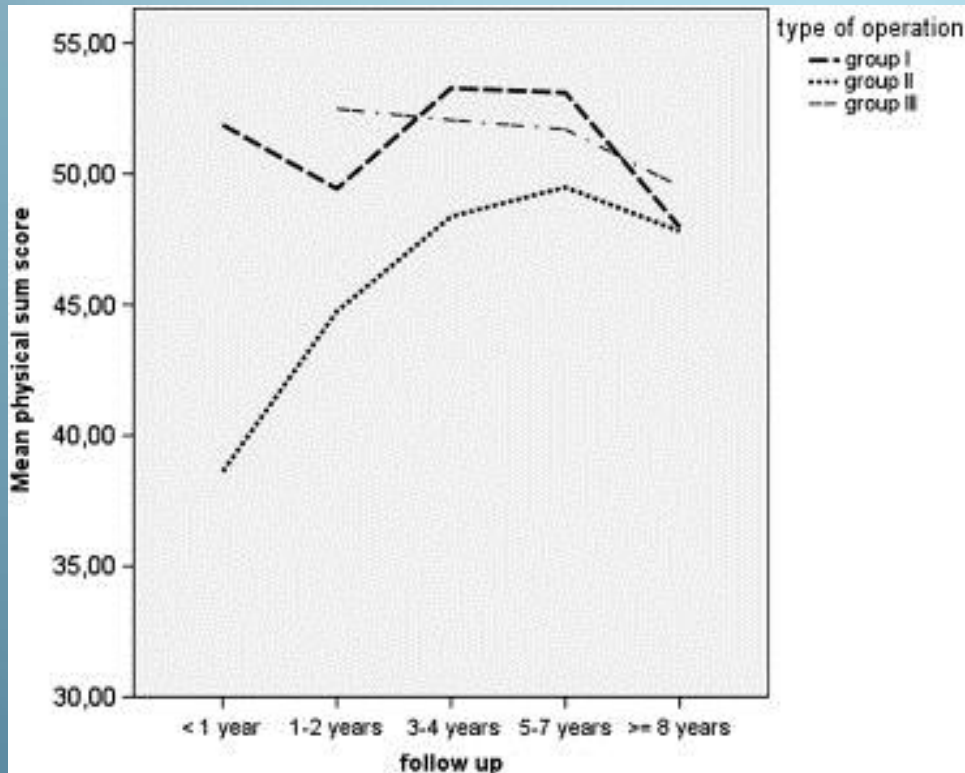
## Abstract

**Objective:** Aortic valve replacement for aortic regurgitation (AR) has been established as a standard treatment but implies prosthesis-related complications. Aortic valve repair is an alternative approach, but its mid- to long-term results still need to be defined. **Methods:** Over a 12-year period, 640 patients underwent aortic valve repair for regurgitation of a unicuspid ( $n = 21$ ), bicuspid ( $n = 205$ ), tricuspid ( $n = 411$ ) or quadricuspid ( $n = 3$ ) aortic valve. The mechanism of regurgitation involved prolapse ( $n = 469$ ) or retraction ( $n = 20$ ) of the cusps, and dilatation of the root ( $n = 323$ ) or combined pathologies. Treatment consisted of cusp repair ( $n = 529$ ), root repair ( $n = 323$ ) or a combination of both ( $n = 208$ ). The patients were followed clinically and echocardiographically; follow-up was complete in 98.5% (cumulative follow-up: 3035 patient years). **Results:** Hospital mortality was 3.4% in the total patient cohort and 0.8% for isolated aortic valve repair. The incidences of thrombo-embolism (0.2% per patient per year) and endocarditis (0.16% per patient per year) were low. Freedom from re-operation at 5 and 10 years was 88% and 81% in bicuspid and 97% and 93% in tricuspid aortic valves ( $p = 0.0013$ ). At re-operation, 13 out of 36 valves could be re-repaired. Freedom from valve replacement was 95% and 90% in bicuspid and 97% and 94% in tricuspid aortic valves ( $p = 0.36$ ). Freedom from all valve-related complications at 10 years was 88%. **Conclusions:** Reconstructive surgery of the aortic valve is feasible with low mortality in many individuals with aortic regurgitation. Freedom from valve-related complications after valve repair seems superior compared to available data on standard aortic valve replacement.

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# Quality of life after aortic valve surgery: Replacement versus reconstruction

Diana Aicher, MD,<sup>a</sup> Annika Holz,<sup>a</sup> Susanne Feldner, MD,<sup>a</sup> Volker Köllner, MD,<sup>b</sup> and Hans-Joachim Schäfers, MD<sup>a</sup>



Aortic valve repair leads to a higher quality of life due to

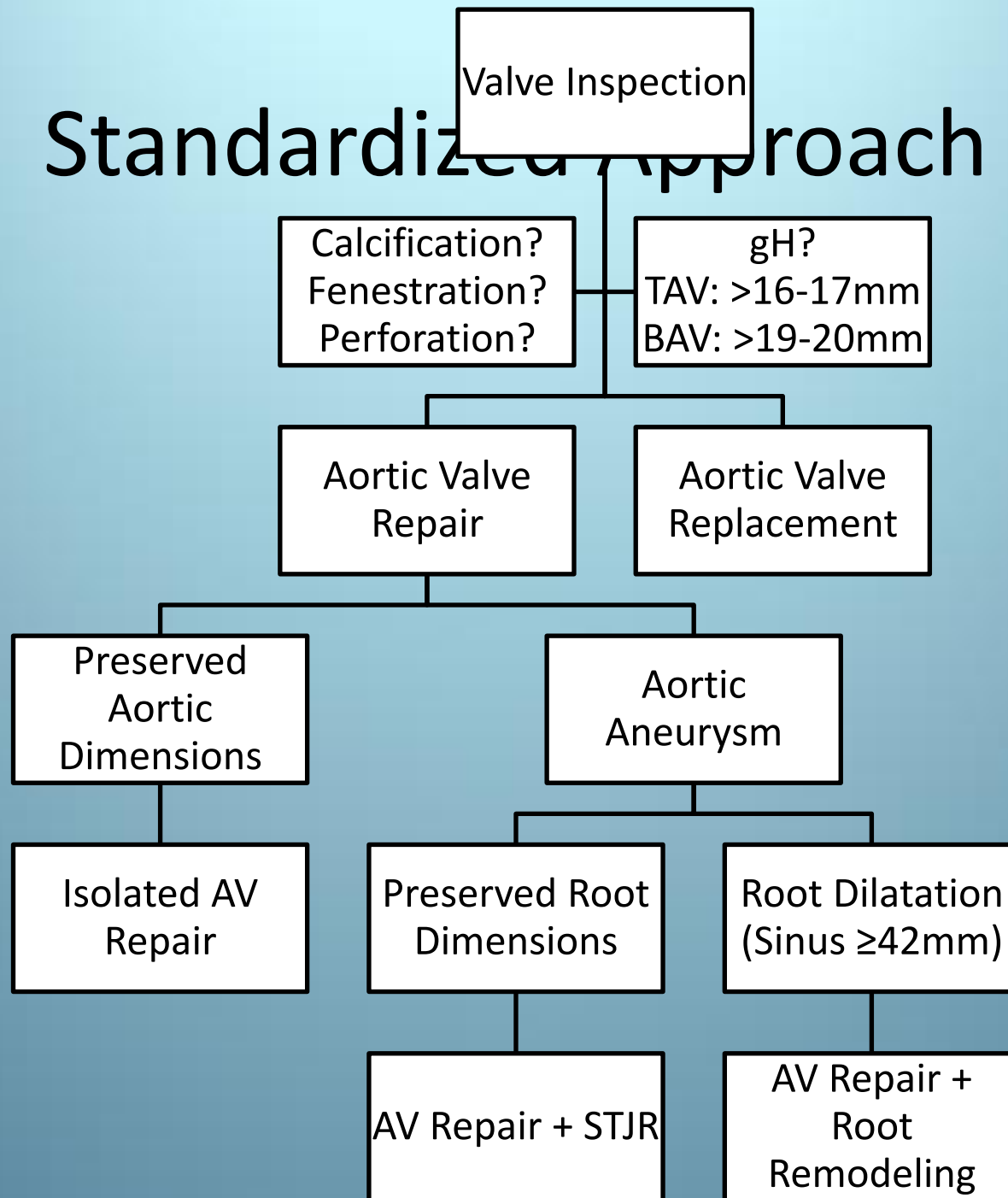
- Low incidence of valve related complications
- Absence of anticoagulation

# When?

In the absence of severe calcification/stenosis

In the presence of aortic regurgitation (combined with aortic pathology)

# Standardized Approach



# Conclusion

- Why?
  - Low mortality
  - Lower valve related complications
  - Better quality of life
  - Feasible in most patients with AR (uni-, bi-, tri-, quadricuspid AV)
- When?
  - In the presence of AR
  - In the absence of calcification/stenosis, marked degeneration/destruction and retraction
  - Different approaches for different pathologies

Thank you!