20 Years of Bicuspid Aortic Valve Repair

Ulrich Schneider
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First Steps

J THORAC CARDIOVASC SURG 1991;102:571-7

Valvuloplasty for aortic insufficiency

Twenty-eight consecutive patients underwent aortic valvuloplasty for aortic insufficiency caused by leaflet prolapse. The technique involved triangular resection of the free edge of the prolapsing leaflet, annular plication at the commissure, and resection of a raphe when present in bicuspid valves. Mean age of the patients was 46.8 ± 14.4 years. Twenty-six (92.7%) were male. Seventy-five percent of the patients had a bicuspid aortic valve; the remaining valves were tricuspid. The extent of aortic insufficiency was 3.6 ± 0.8 by aortography, 3.1 ± 0.1 by preoperative Doppler echocardiography, and 3.4 ± 0.7 by intraoperative Doppler echocardiography. The amount of aortic insufficiency decreased from 3.4 ± 0.7 to 0.6 ± 0.5 intraoperatively, immediately after repair ($p < 0.001$). Mean transvalvular gradient by echocardiography was 12.9 ± 6.8 mm Hg. There was one death in a patient who had an intraoperative cerebral vascular accident. Mean follow-up was complete at 6.9 months. One patient had a cerebral vascular accident and one patient required reoperation for recurrent aortic insufficiency caused by partial suture line dehiscence. In 15 patients with late echocardiograms, aortic insufficiency did not progress (0.7 ± 0.6 in the hospital and 0.8 ± 0.5 late). Aortic valve repair for aortic cusp prolapse effectively eliminates aortic insufficiency without causing aortic stenosis. At early follow-up the repair has been stable.

Delos M. Cosgrove, MD, Eliot R. Rosenkranz, MD (by invitation),
William G. Hendren, MD (by invitation), James C. Bartlett, DO[a] (by invitation), and
William J. Stewart, MD[a] (by invitation), *Cleveland, Ohio*

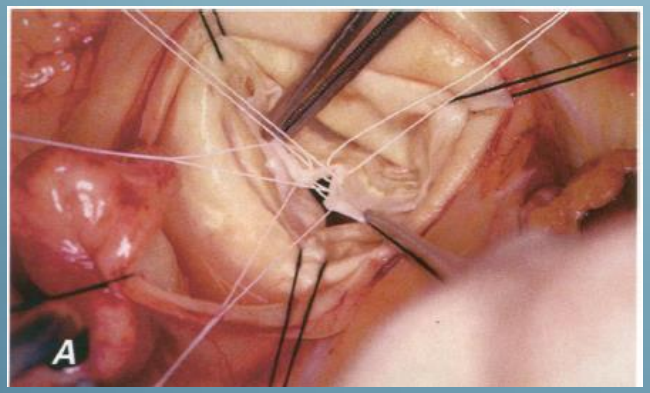
First Steps

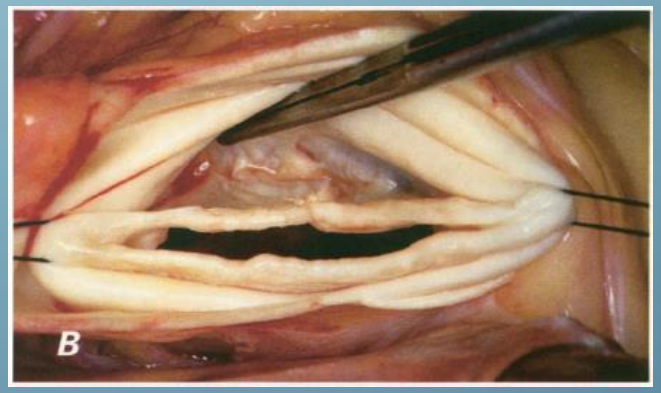
Denton A. Cooley's 50th Anniversary in Medicine

Surgical Techniques for Aortic Valvuloplasty

Charles D. Fraser, Jr., MD
Delos M. Cosgrove III, MD

Since 1988, reparative techniques have been used at our institution to treat valvular insufficiency in selected patients with aortic valve disease. The limitations of aortic valve replacement are well recognized; it is this knowledge that has motivated us to find out whether a subgroup of patients who have aortic insufficiency might be candidates for preservation of their native aortic valves. This subgroup includes patients who have leaflet prolapse, perforation, or calcification. We describe our methods of patient evaluation and selection, as well as our surgical techniques for both bicuspid and tricuspid aortic valve repair. ***(Texas Heart Institute Journal 1994;21:305-9)***



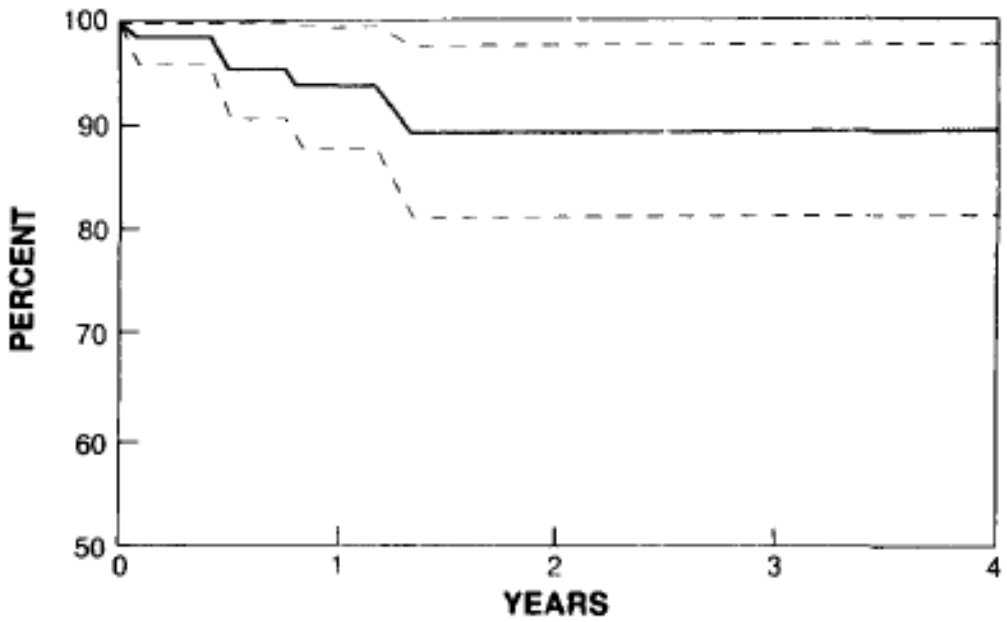


First Steps

Repair of Insufficient Bicuspid Aortic Valves

Charles D. [illegible]. Lytle, MD,
Patrick M. [illegible]
Delos M. C[illegible]

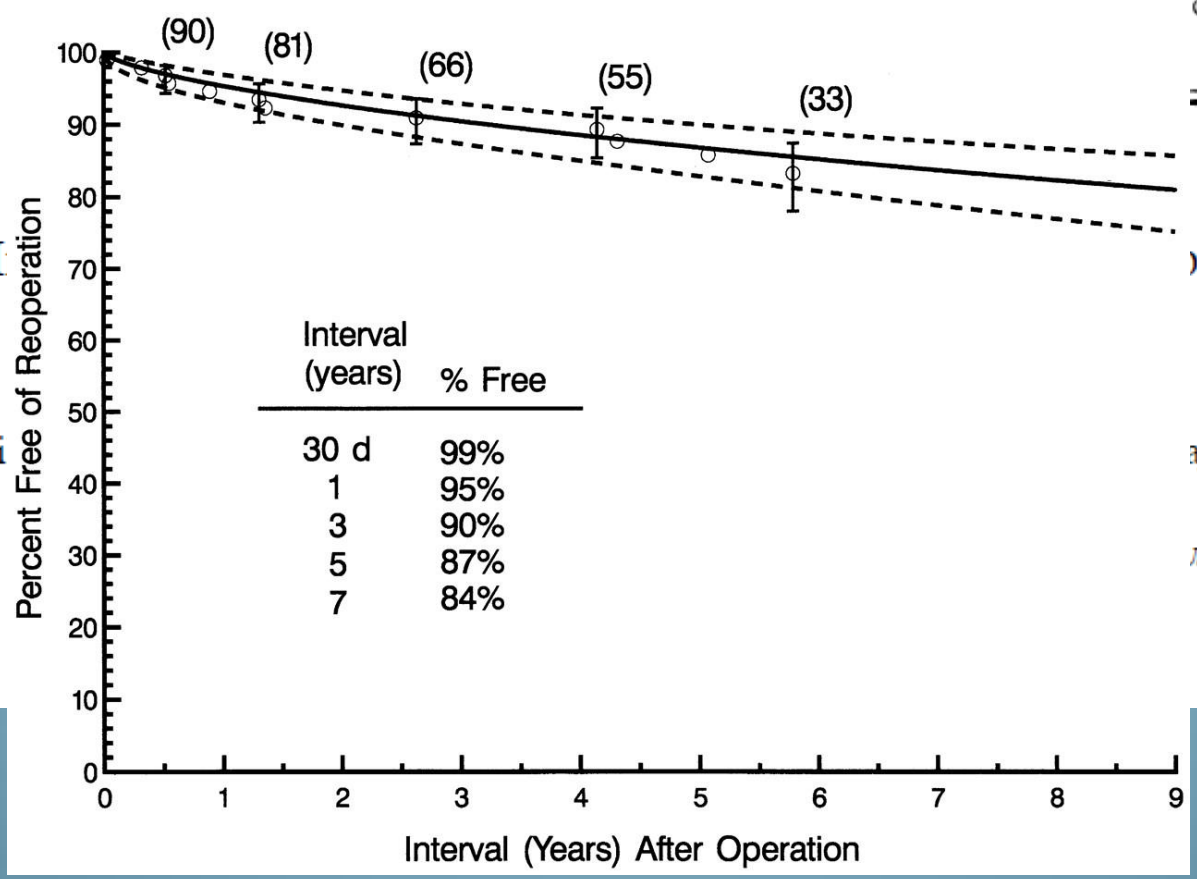
Department of T[illegible]
Cleveland, Ohio



A technique fo[illegible] e follow-up, was 3.6 includes resect[illegible] ively, with a *p* value leaflet, annulo[illegible] versus the preopera- present, has be[illegible] perative deaths. Pa- technique in t[illegible] treatment and there valves, the res[illegible] arditis. Six patients sessed. The me[illegible] went repeat repair. 94% were mal[illegible] ic valve reoperation lated aortic val[illegible] ere 94% and 89.5%, mitral valve r[illegible] loplasty for insuffi- procedures. Al[illegible] cally safe, is associ- cluding 35 (48%[illegible] t insufficiency, and time was 39 ± 12 minutes. There were no operative deaths. The severity of aortic insufficiency, as assessed by Doppler echocardiography (graded from 0 to 4) preoper- has been associated with no other valve-related compli- cations.

(Ann Thorac Surg 1994;58:386–90)

Midterm Results



ELSEVIER

EUROPEAN JOURNAL OF CARDIO-THORACIC SURGERY

Echocardiographic Results After Repair of Incompetent Bicuspid Aortic Valves

Reinhard Moidl, MD, Anton Moritz, MD, Paul Simon, MD, Natascha Kupilik, MD, Ernst Wolner, MD, and Werner Mohl, MD, PhD

Department of Cardiothoracic Surgery, University of Vienna, Vienna, Austria

Underestimated aortic pathology?

The Homburg Experience

Remodeling of the Aortic Root and Reconstruction of the Bicuspid Aortic Valve

Hans-Joachim Schäfers, MD, PhD, Frank Langer, MD, Diana Aicher, MD, Thomas P. Graeter, MD, and Olaf Wendler, MD

Department of Thoracic and Cardiovascular Surgery, University Hospitals Homburg, Homburg, Germany

Background. Currently, isolated reconstruction of a regurgitant bicuspid aortic valve can be performed with adequate early results. Dilatation of the proximal aorta is known to be associated with this valve anomaly and may be partially responsible for the development of primary regurgitation or secondary failure of valve repair. We have used repair of the bicuspid valve with remodeling of the aortic root as an alternative to insertion of a composite graft.

Methods. Between October 1995 and May 1999, 16 patients (12 men, 4 women, aged 35 to 73 years) were seen with a regurgitant bicuspid aortic valve and dilatation of the proximal aorta of more than 50 mm. All patients underwent repair of the valve using either coapting sutures alone (n = 12) or in combination with triangular resection of a median raphe (n = 4). Using a Dacron graft, the aortic root was remodeled and the ascending aorta (n = 16) and proximal arch (n = 4) replaced.

Results. No patient died. The postoperative degree of aortic regurgitation was less than grade II in all patients. Valve function has remained stable in all patients between 2 and 43 months postoperatively.

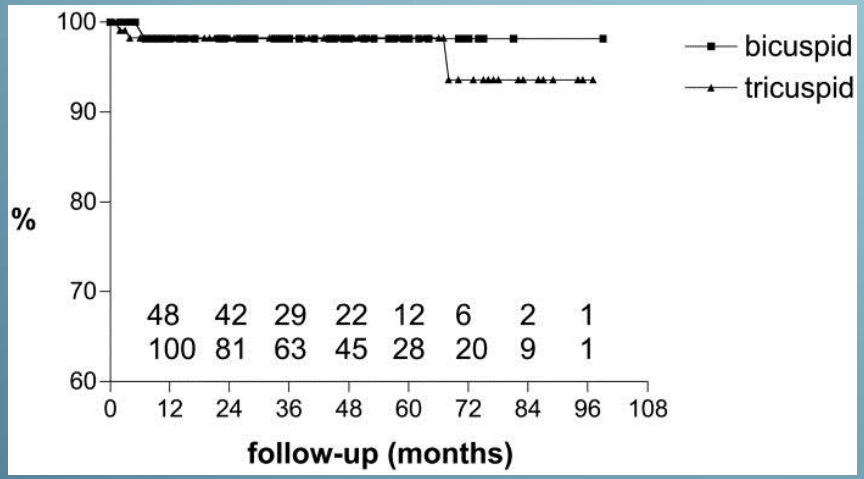
Conclusions. Reconstruction of the regurgitant bicuspid valve in the presence of proximal aortic dilatation is feasible with good results by combining the root remodeling technique with valve repair.

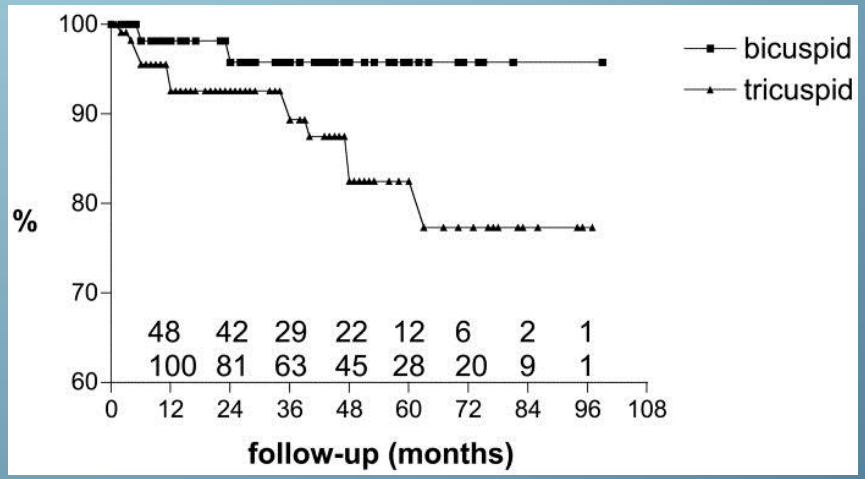
(Ann Thorac Surg 2000;70:542–6)

The Homburg Experience

Valve-sparing aortic root replacement in bicuspid aortic valves: A reasonable option?

Diana Aicher, MD[a]
Frank Langer, MD[a]
Anke Kissinger[a]
Henning Lausberg, MD[a]
Roland Fries, MD[b]
Hans-Joachim Schäfers, MD[a]

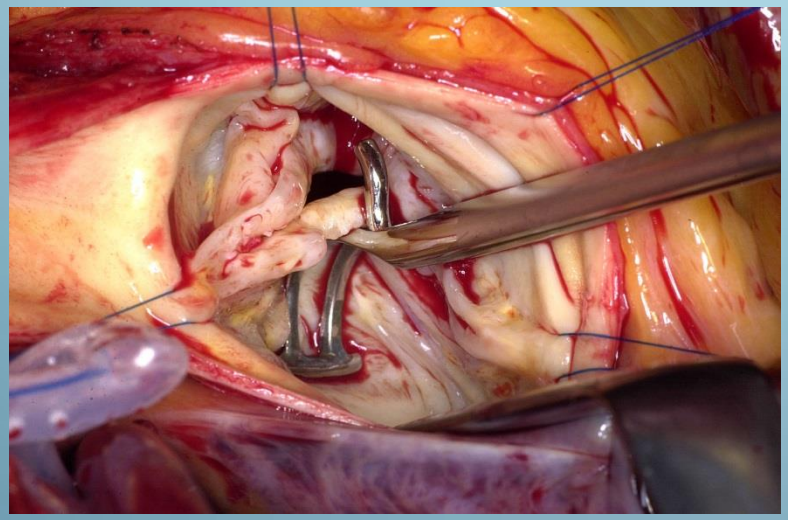


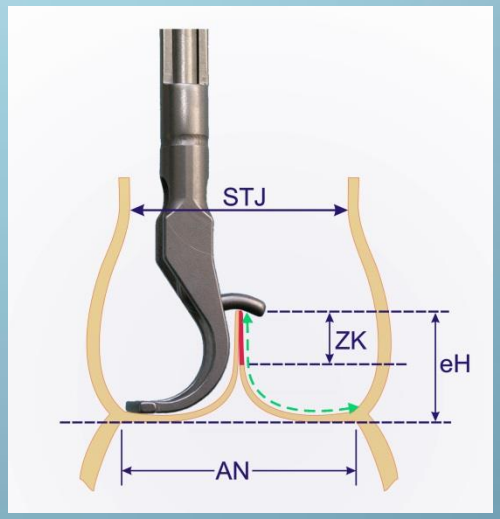


The Homburg Experience

A new approach to the assessment of aortic cusp geometry

Hans-Joachim Schäfers, MD, PhD, Benjamin Bierbach, MD, and Diana Aicher, MD, Homburg/Saar, Germany





- Systematic approach
- Objective analysis of cusp prolapse
- Prolapse of the fused AND nonfused cusp

The Homburg Experience

Preservation of the Bicuspid Aortic Valve

Hans-Joachim Schäfers, MD, PhD, Diana Aicher, MD, Frank Langer, MD, and Henning F. Lausberg, MD

Department of Thoracic and Cardiovascular Surgery, University Hospitals of Saarland, Homburg/Saar, Germany

AVR + Root Remodeling

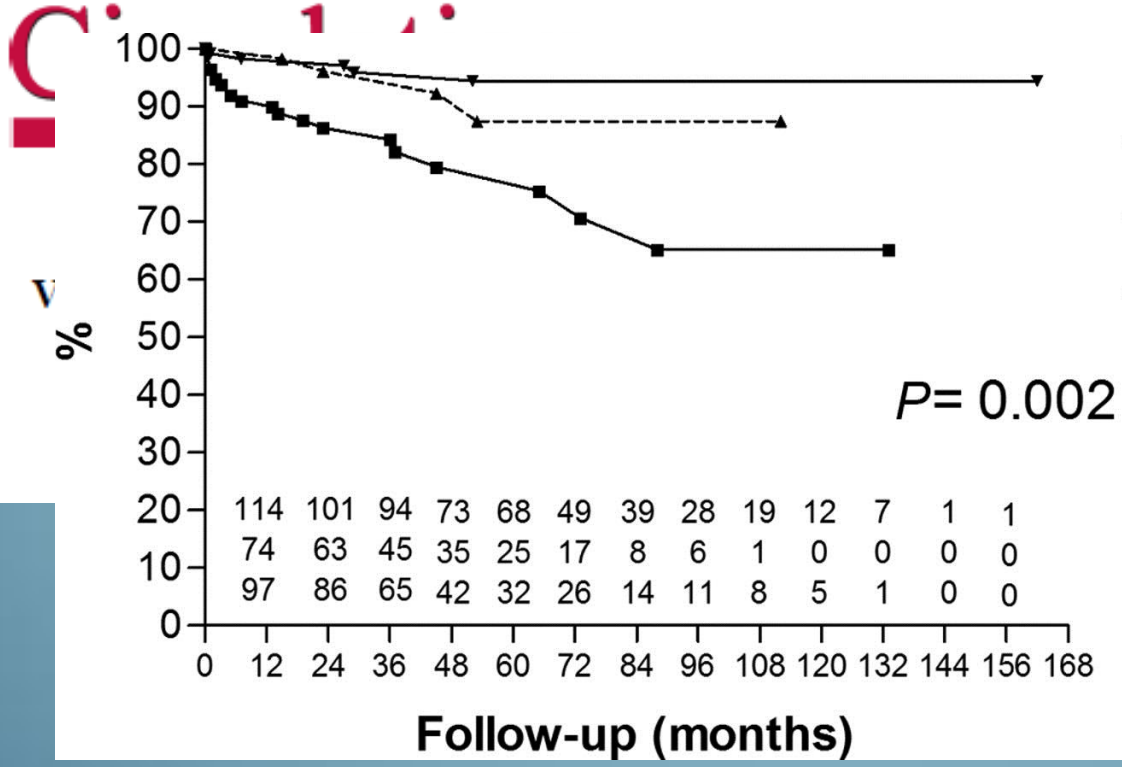
↕

AVR + Sinutubular Junction Remodeling

↕

Isolated BAV Repair

The Homburg Experience



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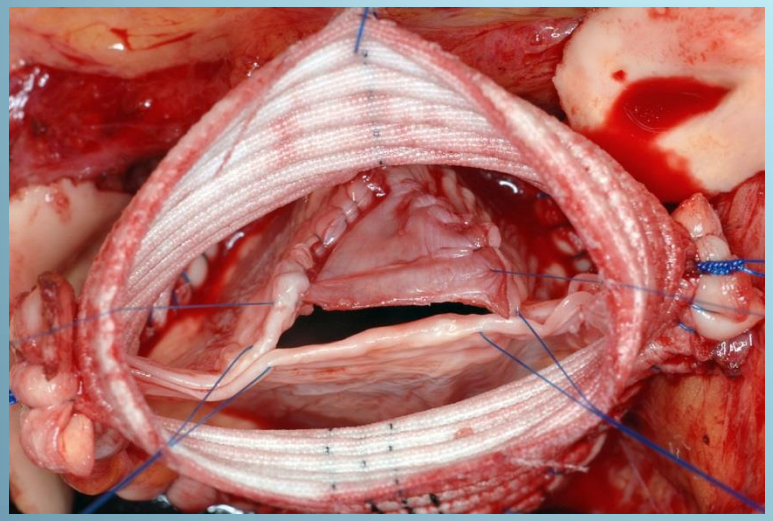

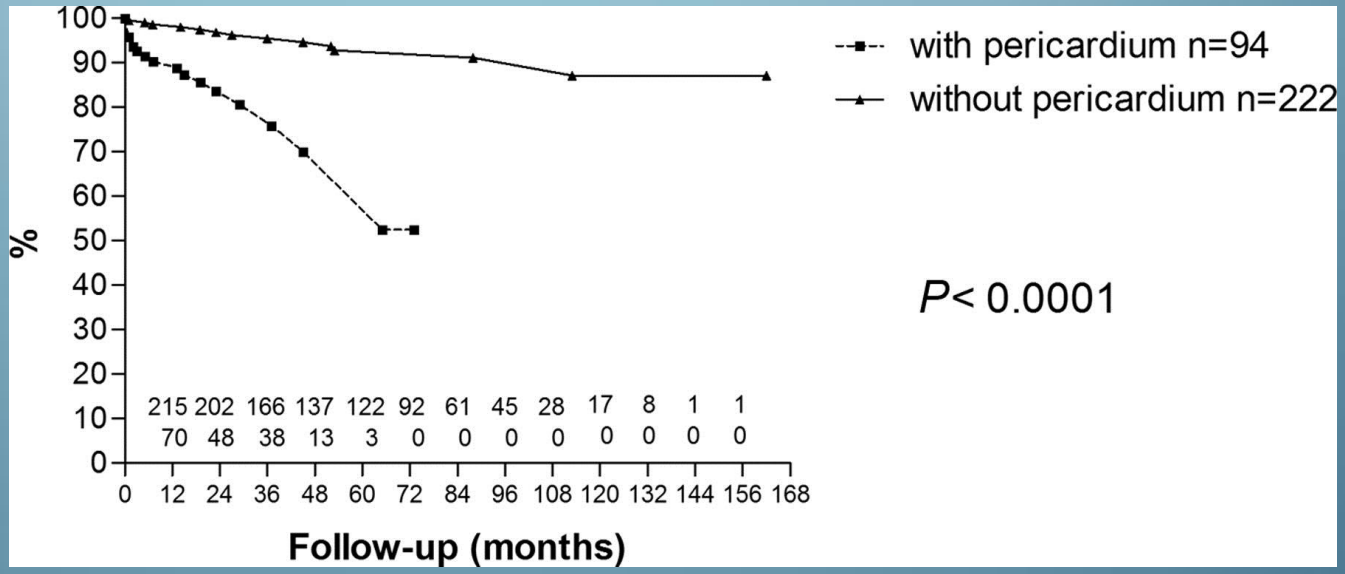

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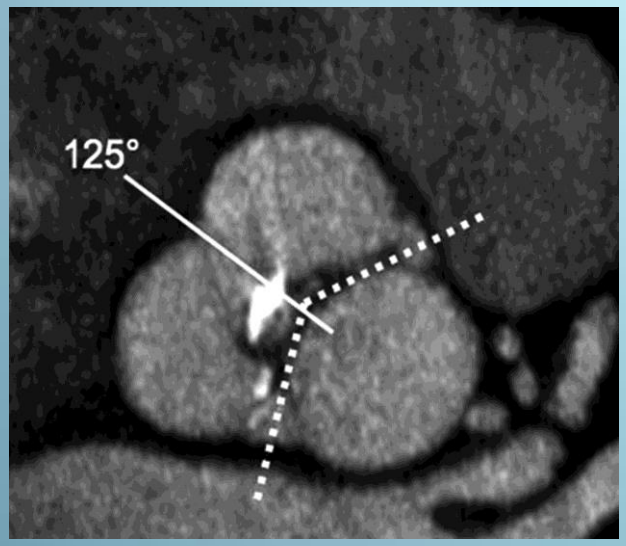

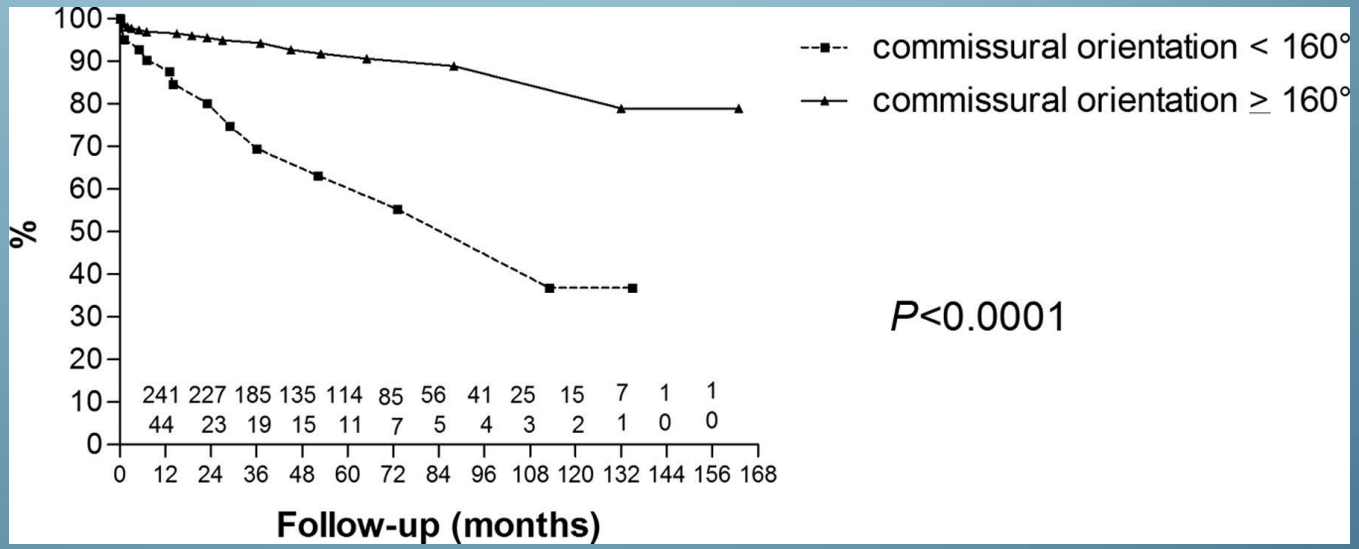

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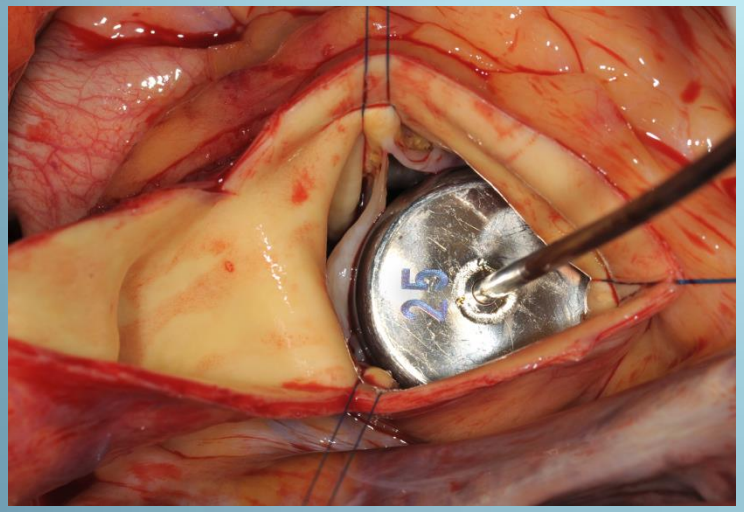

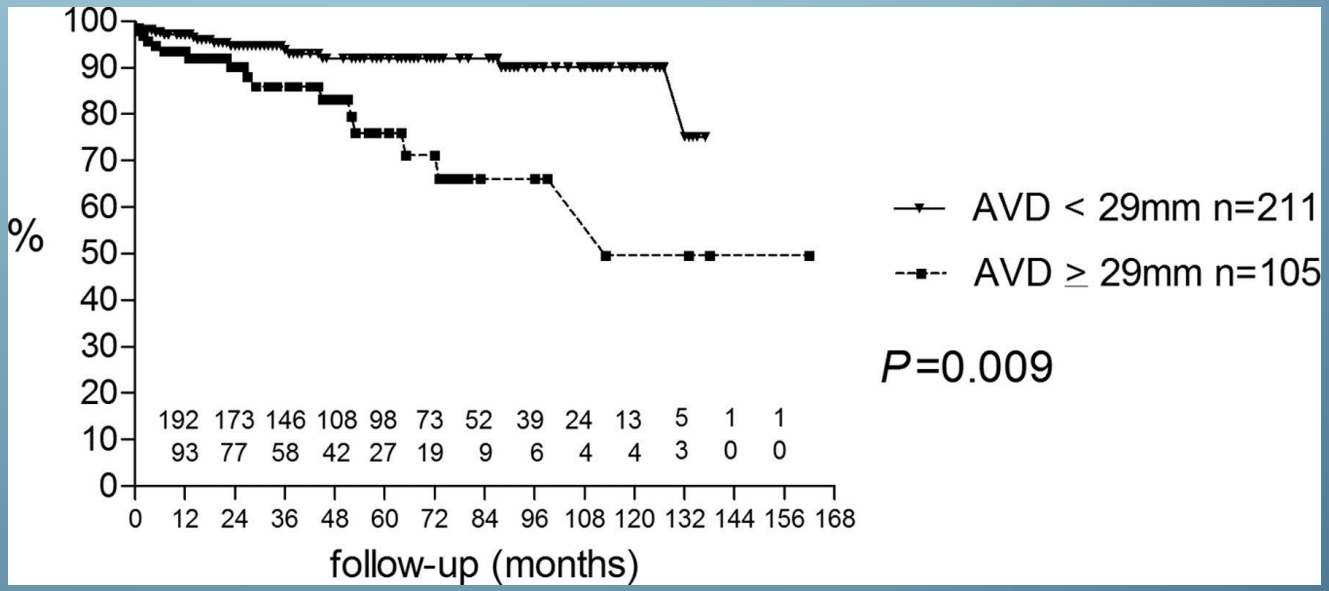

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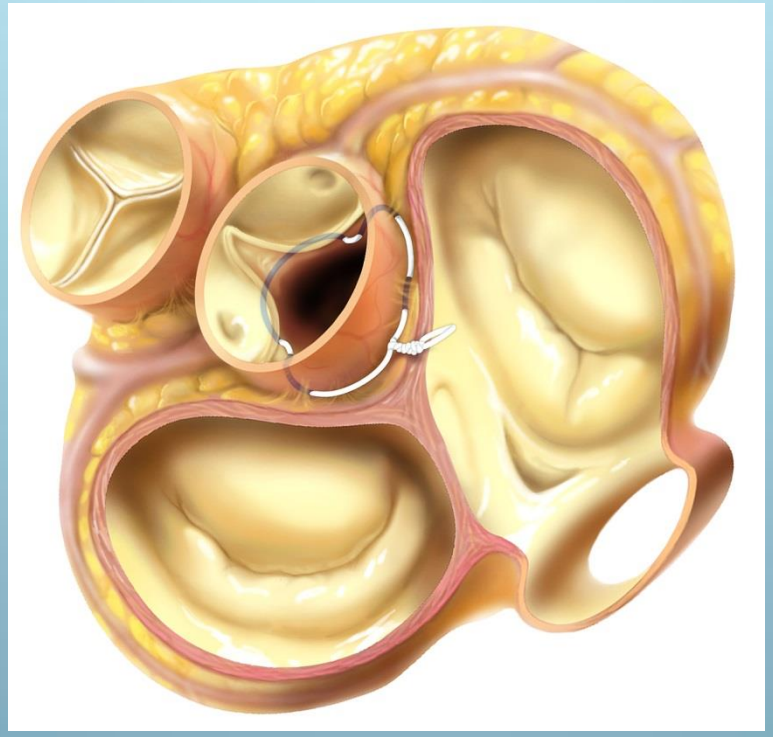
Valve Configuration Determines Long-Term Results After Repair of the Bicuspid Aortic Valve

Diana Aicher, Takashi Kunihara, Omar Abou Issa, Brigitte Brittner, Stefan Gräber and Hans-Joachim Schäfers

Risk factors for repair failure

- Subcommissural plication
- Enlarged basal ring
- Unfavorable commissural orientation
- Use of a pericardial patch

2009: Suture Annuloplasty



Suture Annuloplasty in Aortic Valve Repair

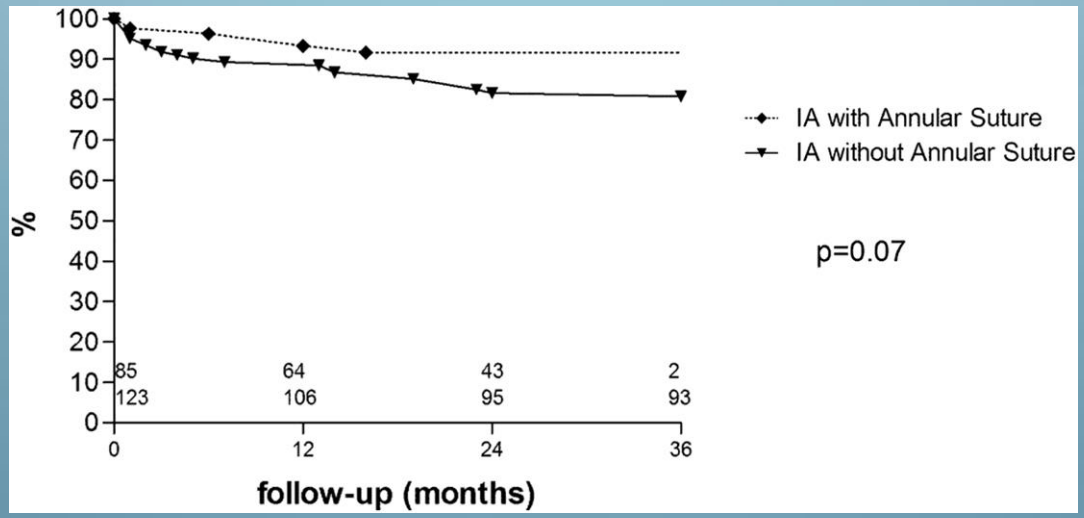
Ulrich Schneider, MD, Diana Aicher, MD, Yujiro Miura, MD, and Hans-Joachim Schäfers, MD

Department of Thoracic and Cardiovascular Surgery, Saarland University Medical Center, Homburg, Saar, Germany

Suture Annuloplasty – Early Results

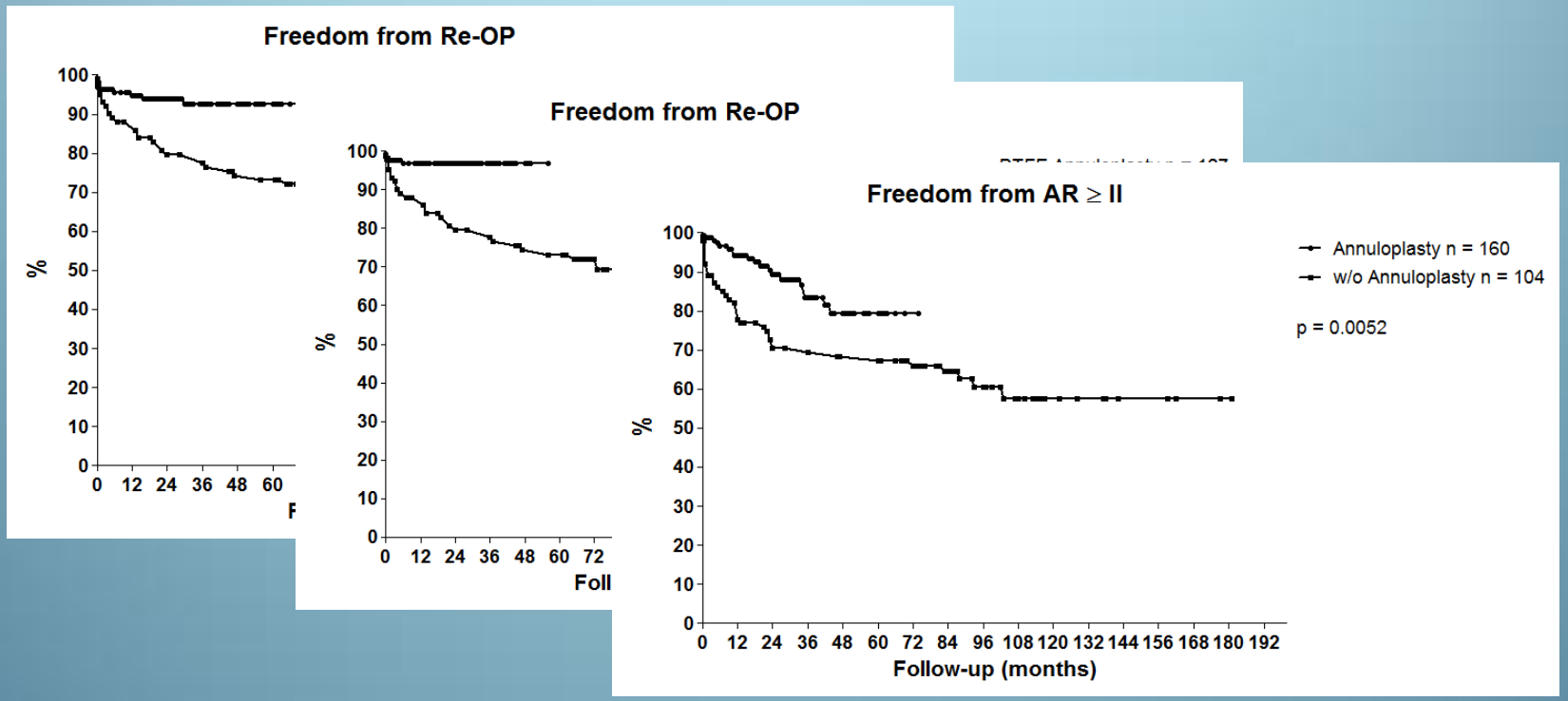
Early results with annular support in reconstruction of the bicuspid aortic valve

Diana Aicher, MD, Ulrich Schneider, Wolfram Schmied, Dipl Psych, Takashi Kunihara, MD, Masato Tochii, MD, and Hans-Joachim Schäfers, MD, PhD



Suture Annuloplasty

"Suture Annuloplasty Significantly Improves the Durability of Bicuspid Aortic Valve Repair"



52nd Annual Meeting
Phoenix, Arizona
January 23–27, 2016

The Society of Thoracic Surgeons

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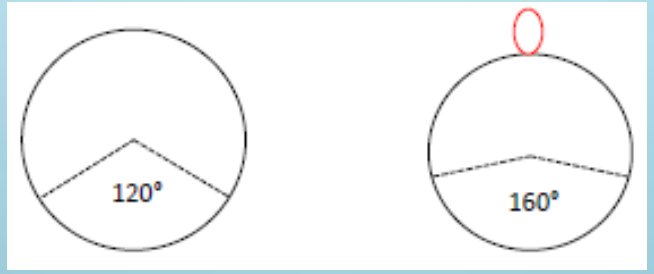
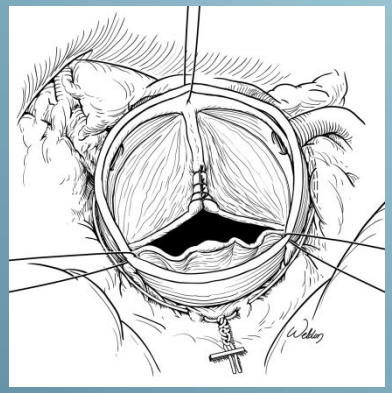
Risk factors for repair failure

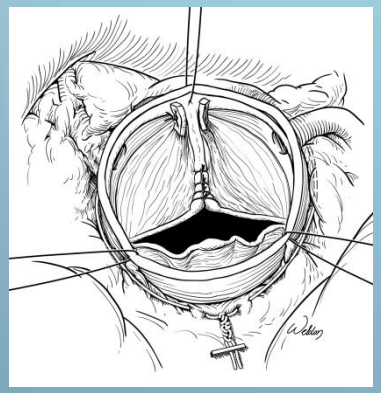
- Subcom[illegible]plication
- Enlarged basal ring → **Suture Annuloplasty**
- Unfavorable commissural orientation
- Use of a pericardial patch

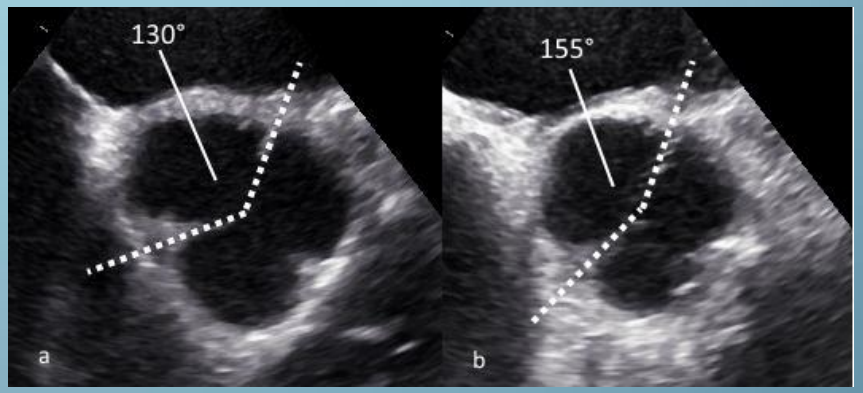
Sinus Plication

Hypothesis: Reducing the circumference of the fused sinuses should improve valve configuration.

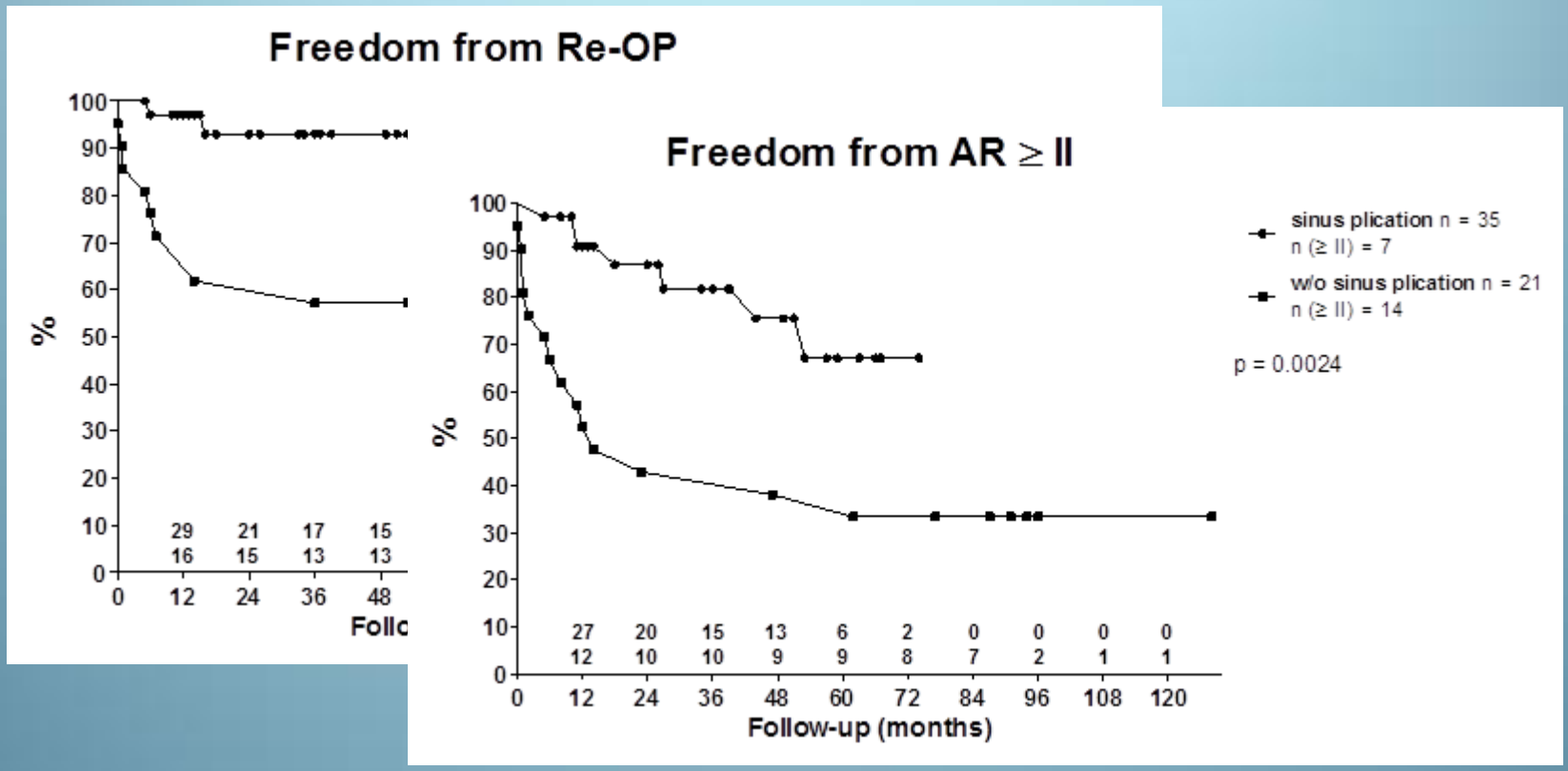








Sinus Plication



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Risk factors for repair failure

- Subcommissural plication
- Enlarged basal ring → **Suture Annuloplasty**
- Unfavorable commissural orientation → **Sinus Plication**
- Use of a pericardial patch **???**

Conclusion

- BAV repair successful using systematic approach
- Known risk factors + surgical solutions
- Coming up next:
  - Long-term results for BAV repair + root remodeling
- Still pending:
  - Pericardial patch

Thank you!