



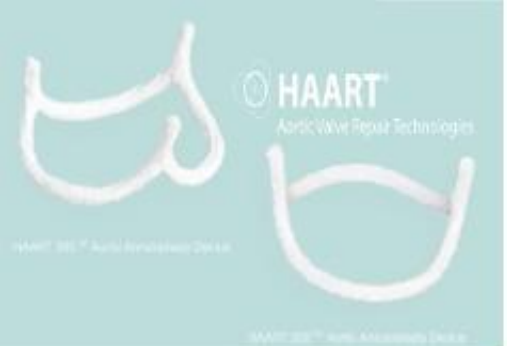
ΕΠΕΜΒΑΣΕΙΣ ΔΙΑΤΗΡΗΣΗΣ ΤΗΣ ΑΟΡΤΙΚΗΣ ΒΑΛΒΙΔΑΣ ΜΕ ΤΟΠΟΘΕΤΗΣΗ ΕΣΩΤΕΡΙΚΟΥ ΔΑΚΤΥΛΙΟΥ HAART

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

Αθήνα, 6 Δεκεμβρίου 2025

Nikolaos A. Papakonstantinou, MD, MSc, PhD

2nd Cardiac Surgery Department. Onassis Hospital, Athens, Greece



DISCLOSURES



Σάββατο, 6 Δεκεμβρίου 2025 - Αμφιθέατρο Γ.Ν.Α. Ιπποκράτειο

11:00 - 13:00 **Επεμβατικές και χειρουργικές επιλογές στις παθήσεις της Αορτικής Βαλβίδας**

11:00 - 11:12	Πρόσφατες κατευθυντήριες οδηγίες στην αντιμετώπιση των βαλβιδοπαθειών
11:12 - 11:24	Σύγκριση αυτοεκπτυσσόμενης βαλβίδας perceval με TAVI
11:24 - 11:36	Αναντιστοιχία πρόθεσης-ασθενούς στην αορτική βαλβίδα (PPM), τρόποι αποφυγής της και κλινική σημασία
11:36 - 11:48	Βιοπροσθετική ή μηχανική αορτική βαλβίδα? Κριτήρια επιλογής
11:48 - 12:00	Επεμβάσεις διατήρησης της αορτικής βαλβίδας με τοποθέτηση εσωτερικού δακτυλίου HAART **Ν. Παπακωνσταντίνου**
12:00 - 12:12	Η χειρουργική του ανευρύσματος της αορτικής ρίζας: πότε προτιμώ David και πότε Bentall
12:12 - 12:24	Ενδείξεις και τεχνικές ταυτόχρονης TAVI & PCI
12:24 - 12:36	TAVI στην Ελληνική πραγματικότητα
12:36 - 13:00	Συζήτηση



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ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ







BEAT THE BENTALL- DE BONO OPERATION



Figure 1: Hugh Bentall (1920–2012).

Thorax (1968), **23**, 338.

A technique for complete replacement of the ascending aorta

HUGH BENTALL AND ANTONY DE BONO

From the Royal Postgraduate Medical School, London, and Hammersmith Hospital

A technique for complete replacement of the aortic valve and ascending aorta in cases of aneurysm of the ascending aorta with aortic valve ectasia is described. The proximal aortic root was too attenuated to afford anchorage to the aortic prosthesis, so this was sutured to the ring of a Starr valve and the prostheses were inserted *en bloc*. The ostia of the coronary arteries were anastomosed to the side of the aortic prosthesis.

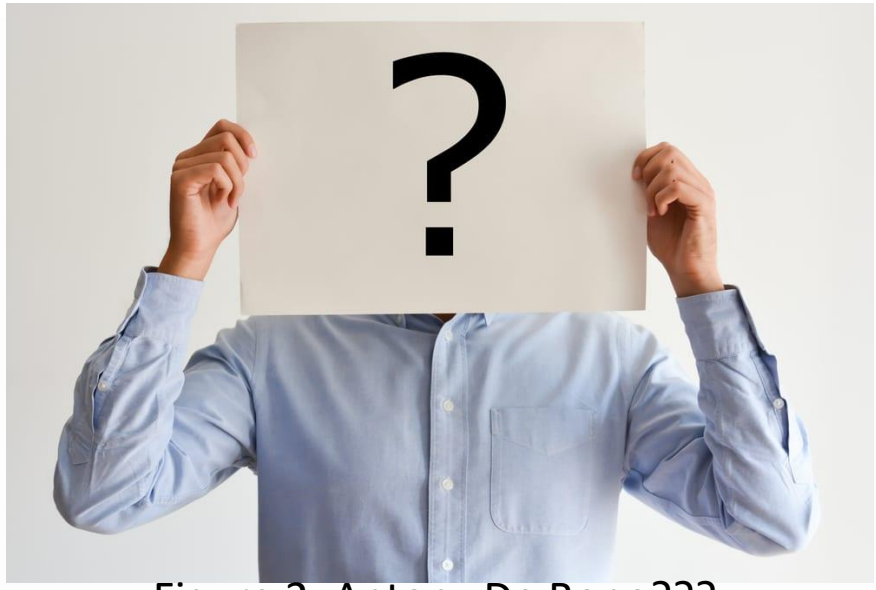


Figure 2: Antony De Bono???

- Bentall H, De Bono A. A technique for complete replacement of the ascending aorta. Thorax. 1968 Jul;23(4):338-9.
- Thiene G. Hugh Henry Bentall, a pioneer of cardiovascular surgery// Interact. Cardiovasc. Thorac. Surg. 2014;18(4):530–531.

BEAT THE STARR-EDWARDS AORTIC VALVE REPLACEMENT





Historical Perspectives

The Development of the Starr-Edwards Heart Valve

Annette M. Matthews

Development of the Starr-Edwards heart valve marked a new era in the treatment of valvular heart disease. Until the development of the Starr-Edwards valve, there were no published reports of patients who had lived longer than 3 months with a prosthetic valve in the mitral position. This valve was the result of a unique partnership between a young surgeon, Dr. Albert Starr, and an experienced engineer, Mr. Lowell Edwards. Working as a team, these 2 men developed and successfully implanted the 1st Starr-Edwards valve within less than 2 years of their 1st meeting. Their key to success was their willingness and ability to make repeated modifications to their design to solve each clinical problem as it arose. Their constant focus on the clinical goal aided the rapid transformation of their design from a leaflet valve to a shielded ball valve, and finally to an unshielded ball valve suitable for implantation in a human being. Along the way, they abandoned the idea of imitating the appearance of native valves, in favor of developing valves that would be clinically successful. Their work has provided help and hope for patients who otherwise would have died from the complications of rheumatic heart disease and other valvular disorders for which valve replacement is the only treatment.
(Tex Heart Inst J 1998;25:282-93)

Dr. Albert Starr recalls the day that he met Lowell Edwards:

> Lowell Edwards was an electrical engineer by training, who, in 1958 at the age of 65 years, stepped out of his Cadillac and into my office with an ambitious plan to build an artificial heart. He was well-versed in hydraulics and believed that the heart could easily be imitated. I thought he was 30 years too soon, and I convinced him to work on one valve at a time.[1]

In less than 2 years from the day they met, Dr. Starr and Mr. Edwards achieved the 1st successful replacement of a human mitral valve. Starr has called this his most memorable operation.[2]

Key words: *Heart valve prosthesis/history; history of medicine, 20th century; human; mechanical valves*

1960's



Fig. 1 *Albert Starr (ca. 1960).*

(Courtesy of Oregon Health Sciences University)



Fig. 2 *Margaret and Lowell Edwards (ca. 1960).*

(Courtesy of Miles Edwards, MD)

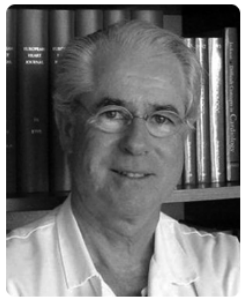
pump that Thompson Ramo Woodridge Corporation used in aircraft engines in World War II.[7,8] At one time, 85% of military airplanes were equipped with

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

- Matthews AM. The development of the Starr-Edwards heart valve. Tex Heart Inst J. 1998;25(4):282-93.


WHERE
?
HOW
WHAT
WHEN
WHO
?
WHY

Science tells us what we can do; Guidelines what we should do; and Registries what we are actually doing.



Lukas Kappenberger

Also published under: L. Kappenberger

Affiliation

Lausanne Heart Group, Switzerland

Publication Topics

Atrial Fibrillation, Sinus Rhythm, Atrial Fibrillation Group, Center Of Mass, Electrocardiogram Recordings, Electrocardiogram Signals, General Anesthesia, Inflection Point, Linear Discriminant Analysis, Lower Heart Rate, PR Interval, Paroxysmal Atrial Fibrillation

Follow

Manage Profile

Lukas Kappenberger MD

HRS ICD Policy Conference

Washington DC, 9/16/05

WHAT WE (cardiac surgeons) ARE DOING???



European Heart Journal (2003) 24, 1231–1243

ELSEVIER

EUROPEAN SOCIETY OF CARDIOLOGY

A prospective survey of patients with valvular heart disease in Europe: The Euro Heart Survey on Valvular Heart Disease

Bernard Iung[a*], Gabriel Baron[b], Eric G. Butchart[c], François Delahaye[d], Christa Gohlke-Bärwolf[e], Olaf W. Levang[f], Pilar Tornos[g], Jean-Louis Vanoverschelde[h], Frank Vermeer[i], Eric Boersma[j], Philippe Ravaud[b], Alec Vahanian[a]

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[e] *Cardiology Department, Heart Centre, Bad Krozingen, Germany*
[f] *Cardiac Surgery Department, St. Elizabeth Hospital, Trondheim, Norway*
[g] *Cardiology Department, Vall d'Hebron Hospital, Barcelona, Spain*
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Received 9 January 2003; revised 7 March 2003; accepted 12 March 2003

Table 7 Type of intervention in single native left-sided valve disease

	Aortic stenosis *n*=512	Aortic regurgitation *n*=119	Mitral stenosis *n*=112	Mitral regurgitation *n*=155
Mechanical prosthesis (%)	49.0	76.5	58.0	43.2
Bioprosthesis (%)	50.0	17.6	4.5	10.3
Homograft (%)	0.6	2.5	0	0
Autograft (%)	0.4	1.7	0	0
Valve repair (%)	0	1.7	3.6	46.5
Percutaneous intervention (%)	0	0	33.9	0
Associated procedures				
— CABG (%)	33.0	15.1	7.1	31.6
— Total aorta replacement (%)	0.6	19.3	0	0
— Anti-arrhythmic surgery (%)	0.2	0.8	4.5	1.9

CABG: coronary artery bypass grafting.

- Iung B, Baron G, Butchart EG, Delahaye F, Gohlke-Bärwolf C, Levang OW, Tornos P, Vanoverschelde JL, Vermeer F, Boersma E, Ravaud P, Vahanian A. A prospective survey of patients with valvular heart disease in Europe: The Euro Heart Survey on Valvular Heart Disease. Eur Heart J. 2003 Jul;24(13):1231-43.

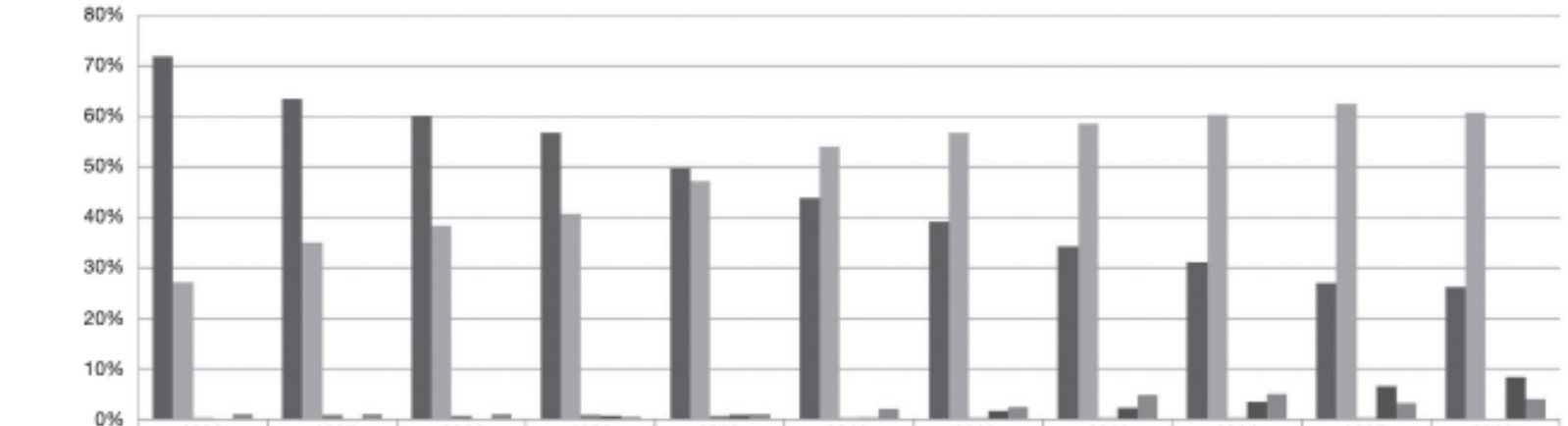


Original Article

Changing trends in aortic valve procedures over the past ten years—from mechanical prosthesis via stented bioprosthesis to TAVI procedures—analysis of 50,846 aortic valve cases based on a Polish National Cardiac Surgery Database

Krzysztof Bartus[1], Jerzy Sadowski[1], Radoslaw Litwinowicz[1], Grzegorz Filip[1], Marek Jasinski[2], Marek Deja[3], Mariusz Kusmierczyk[4], Szymon Pawlak[5,6], Marek Jemielity[7], Dariusz Jagielak[8], Piotr Hendzel[9], Piotr Suwalski[10,11], Zdzisław Tobota[12], Bohdan Maruszewski[12], Boguslaw Kapelak[1]

Figure 5 Characteristics of all AV procedures performed from 2006–2016 (100% complete data). AV, aortic valve; CABG, coronary artery bypass grafting; TAVI, transcatheter aortic valve implantation; MV, mitral valve.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Mechanical	71.8%	63.3%	60.0%	56.63%	49.6%	43.8%	39.1%	34.2%	31.1%	26.89%	26.2%
Bioprothesis	27.1%	34.9%	38.3%	40.67%	47.1%	54.0%	56.6%	58.4%	60.2%	62.30%	60.5%
Homograft	0.1%	0.8%	0.7%	0.75%	0.6%	0.3%	0.1%	0.1%	0.1%	0.02%	0.0%
TAVI	0.0%	0.0%	0.0%	0.70%	0.8%	0.0%	1.6%	2.2%	3.4%	6.60%	8.3%
Valve repair	1.0%	1.0%	1.0%	0.51%	1.0%	1.9%	2.4%	4.8%	4.8%	3.19%	4.0%

1-4.8%!!!

Bartus K, Sadowski J, Litwinowicz R, Filip G, Jasinski M, Deja M, Kusmierczyk M, Pawlak S, Jemielity M, Jagielak D, Hendzel P, Suwalski P, Tobota Z, Maruszewski B, Kapelak B. Changing trends in aortic valve procedures over the past ten years-from mechanical prosthesis via stented bioprosthesis to TAVI procedures-analysis of 50,846 aortic valve cases based on a Polish National Cardiac Surgery Database. J Thorac Dis. 2019 Jun;11(6):2340-2349.

Gen Thorac Cardiovasc Surg
DOI 10.1007/s11748-017-0795-8

CURRENT TOPICS REVIEW ARTICLE

A nationwide survey of aortic valve surgery in Japan: current status of valve preservation in cases with aortic regurgitation

Satoshi Arimura[1] · Masahiro Seki[1] · Kenichi Sasaki[1] · Hideaki Takai[1] · Minoru Matsuhama[1] · Takashi Kunihara[1] · Yutaka Okita[2] · Shuichiro Takanashi[3] · Tatsuhiko Komiya[4] · Hitoshi Yaku[5] · Hitoshi Okabayashi[6] · Hirofumi Takemura[7] · Hirokuni Arai[8] · Masaru Sawazaki[9] · Yoshiro Matsui[10] · Norihiko Shiiya[11]

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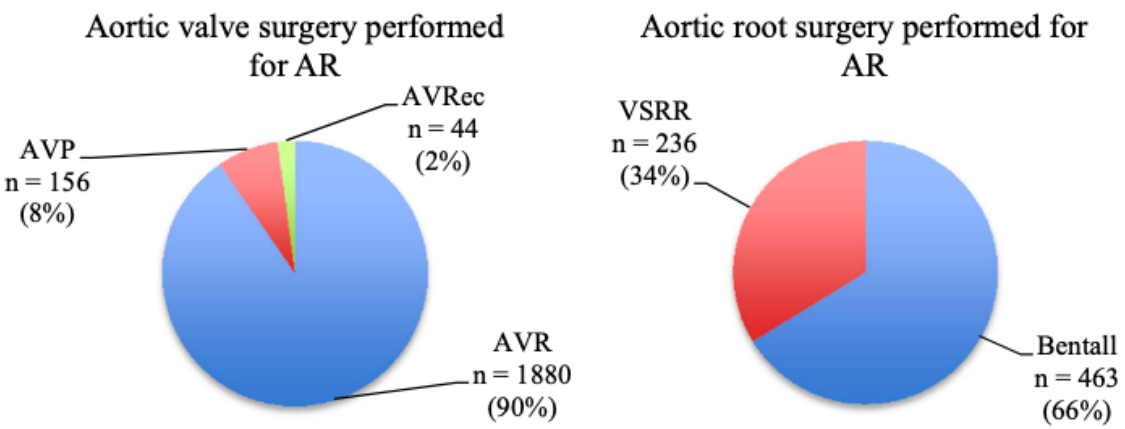


Fig. 1 Numbers and percentages of aortic valve and aortic root surgeries performed for aortic regurgitation (AR) in 2014. *AVP* aortic valvuloplasty, *AVRec* aortic valve reconstruction (with autologous pericardium), *AVR* aortic valve replacement, *VSRR* valve-sparing root replacement

Table 2 Institutions classified according to the number of AVSOs performed

No. of operations performed annually	No. of institutions	Total no. of AVSOs
1–4	48 (84%)	109 (46%)
5–9	4 (7%)	25 (11%)
10 or more	5 (9%)	99 (42%)
Total	57	233

Institutions that responded to the secondary questionnaire
AVSO aortic valve-sparing operation

- Arimura S, Seki M, Sasaki K, Takai H, Matsuhama M, Kunihara T, Okita Y, Takanashi S, Komiya T, Yaku H, Okabayashi H, Takemura H, Arai H, Sawazaki M, Matsui Y, Shiiya N. A nationwide survey of aortic valve surgery in Japan: current status of valve preservation in cases with aortic regurgitation. Gen Thorac Cardiovasc Surg. 2017 Aug;65(8):429-434.

European Journal of Cardio-Thoracic Surgery 2022, 62(4), ezac416
https://doi.org/10.1093/ejcts/ezac416 Advance Access publication 13 August 2022

ORIGINAL ARTICLE

Cite this article as: Girdauskas E, Petersen J, Balaban , Herrmann E, Bauer T, Beckmann A *et al.* Outcomes of aortic valve repair: early results from the German Aortic Valve Registry. Eur J Cardiothorac Surg 2022; doi:10.1093/ejcts/ezac416.



Outcomes of aortic valve repair: early results from the German Aortic Valve Registry

Evaldas Girdauskas [a,b,*], Johannes Petersen [a], Ümniye Balaban [c,d], Eva Herrmann [c,d], Timm Bauer [e], Andreas Beckmann [f], Raffi Bekeredjian [g], Stephan Ensminger [h], Christian Frerker [i], Helge Möllmann [j], Thomas Walther [k] and Sabine Bleiziffer [l]

[a] Department of Cardiovascular Surgery, University Heart & Vascular Center, University Medical Center Hamburg-Eppendorf, Hamburg, Germany
[b] Department of Cardiothoracic Surgery, Augsburg University Hospital, Augsburg, Germany
[c] Institute of Biostatistics and Mathematical Modelling, Goethe University, Frankfurt, Germany
[d] German Center for Cardiovascular Research, DZHK, Partner Site Rhine-Main, Mainz, Germany
[e] Medizinische Klinik I, Department of Cardiology, University of Giessen, Giessen, Germany
[f] German Society for Thoracic and Cardiovascular Surgery, Langenbeck-Virchow-Haus, Berlin, Germany
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[h] Department of Thoracic and Cardiovascular Surgery, University Medical Center Schleswig-Holstein, Lübeck, Germany
[i] II. Department of Medicine, University Medical Center Schleswig-Holstein, Lübeck, Germany
[j] Medizinische Klinik I, St.-Johannes-Hospital Dortmund, Dortmund, Germany
[k] Department of Cardiac Surgery, Goethe University Hospital, Frankfurt, Germany
[l] Clinic for Thoracic and Cardiovascular Surgery, Herz- und Diabeteszentrum NRW, Bad Oeynhausen, Germany

* Corresponding author. Department of Cardiothoracic Surgery, Augsburg University Hospital, Stenglinstr. 2, 86156 Augsburg, Germany. Tel: +49-821-4002672; fax: +49-821-400172671; e-mail: evaldas.girdauskas@uk-augsburg.de (E. Girdauskas).

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ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

METHODS: A total of 2327 patients with AR (mean age 55.2 ± 15.0 years, 76% men), who underwent AV repair/AV-sparing root surgery between 2011 and 2015 (i.e. 5% of 42 868 AV surgery patients enrolled in the German Aortic Valve Registry during the same period) were included. Study cohort was subdivided according to the technique of AV repair: isolated AV repair without root surgery (group I) ($n = 914$), AV-sparing root surgery (i.e. reimplantation or remodelling) without cusp repair (group II) ($n = 1077$) and AV-sparing root surgery (i.e. reimplantation or remodelling) with simultaneous cusp repair (group III) ($n = 336$). Primary end point was 1-year survival after AV repair/AV-sparing root surgery. Secondary end points were freedom from cardiac adverse events and freedom from AV reinterventions at 1-year follow-up.

• Girdauskas E, Petersen J, Balaban Ü, Herrmann E, Bauer T, Beckmann A, Bekeredjian R, Ensminger S, Frerker C, Möllmann H, Walther T, Bleiziffer S. Outcomes of aortic valve repair: early results from the German Aortic Valve Registry. Eur J Cardiothorac Surg. 2022 Sep 2;62(4):ezac416.



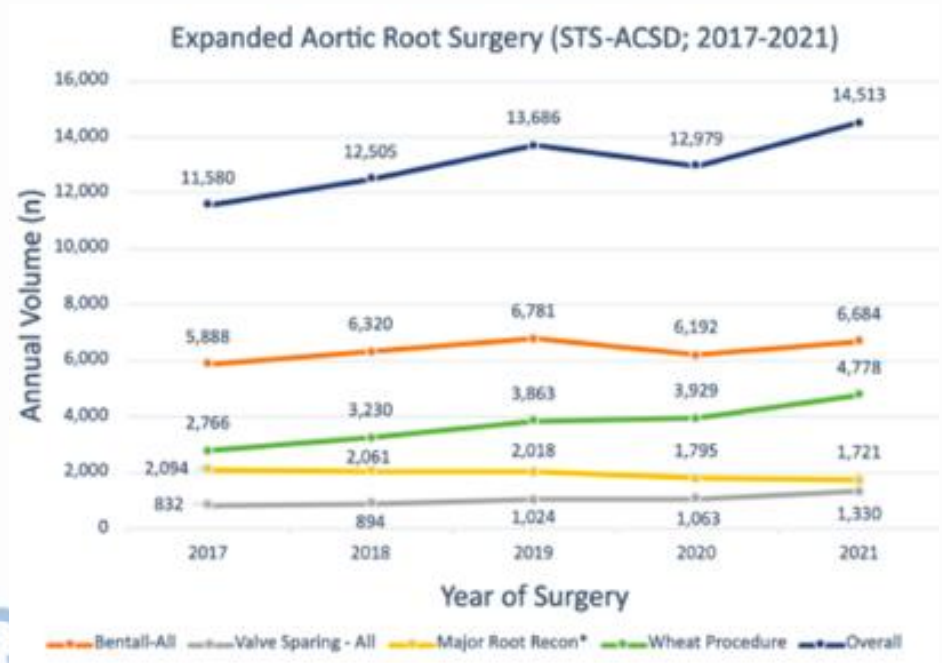
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0003-4975/$36.00
https://doi.org/10.1016/j.athoracsur.2021.03.043

THE SOCIETY OF THORACIC SURGEONS ADULT CARDIAC SURGERY DATABASE: UPDATE ON OUTCOMES AND RESEARCH

STS Adult Cardiac Surgery Database: 2021 Update on Outcomes, Quality, and Research

Michael E. Bowdish, MD, MS, Richard S. D'Agostino, MD, Vinod H. Thourani, MD, Thomas A. Schwann, MD, Carole Krohn, MPH, BSN, Nimesh Desai, MD, David M. Shahian, MD, Felix G. Fernandez, MD, MSc, and Vinay Badhwar, MD





A total of 21.4% had a valve-sparing aortic root replacement, and 76.61% had a composite valve-graft conduit (mechanical, 58.1%; and bioprosthetic, 18.5%).

ΝΟΣΟΚΟΜΕΙΟ

- Bowdish ME, D'Agostino RS, Thourani VH, Schwann TA, Krohn C, Desai N, Shahian DM, Fernandez FG, Badhwar V. STS Adult Cardiac Surgery Database: 2021 Update on Outcomes, Quality, and Research. Ann Thorac Surg. 2021 Jun;111(6):1770-1780.



QUALITY REPORT

The Society of Thoracic Surgeons Adult Cardiac Surgery Database: 2024 Update on National Trends and Outcomes

Alexander Iribarne, MD, MS,[1] Brittany Zwischenberger, MD,[2] J. Hunter Mehaffey, MD, MSc,[3] Tsuyoshi Kaneko, MD,[4] Moritz C. Wyler von Ballmoos, MD, PhD,[5] Jeffrey P. Jacobs, MD,[6] Carole Krohn, MPH, BSN,[7] Robert H. Habib, PhD,[7] Niharika Parsons, MD, MSHI,[7] Vinay Badhwar, MD,[3] and Michael E. Bowdish, MD, MS[8]



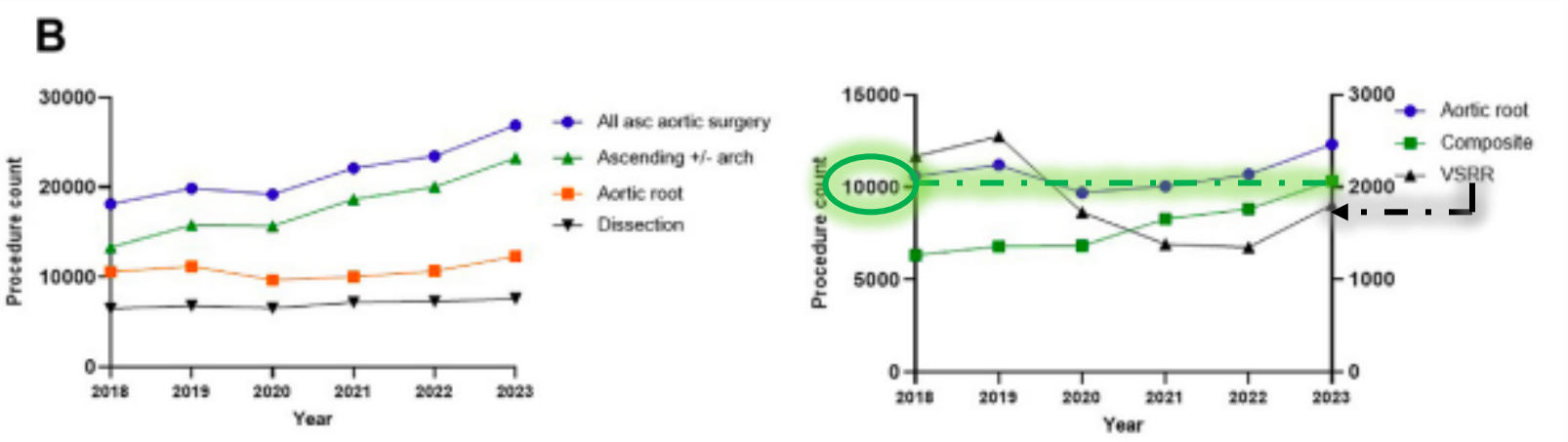


FIGURE 4 (A) Concomitant atrial fibrillation (AF) treatments over time and concomitant surgical ablation over time by procedure type. (B) Trends in ascending aortic surgery over time and aortic root procedural trends over time, including composite graft (left-sided y-axis) and valve-sparing aortic root replacement (VSRR) (right-sided y-axis). (AVR, aortic valve replacement; CABG, coronary artery bypass grafting; LAAO, left atrial appendage occlusion; MVr, mitral valve repair; MVR, mitral valve replacement; SA, surgical ablation.)

Growth in ascending aortic surgery volume was driven by significant increases in both isolated aortic root surgery as well as surgery of the ascending aorta and/or arch (Figure 4B). Aortic root operations increased by 15.3% from the year prior, and growth occurred both in composite aortic root surgery (17.2%) as well as valve-sparing aortic root surgery (33.9%)

ΝΟΣΟΚΟΜΕΙΟ

- Iribarne A, Zwischenberger B, Hunter Mehaffey J, Kaneko T, Wyler von Ballmoos MC, Jacobs JP, Krohn C, Habib RH, Parsons N, Badhwar V, Bowdish ME. The Society of Thoracic Surgeons Adult Cardiac Surgery Database: 2024 Update on National Trends and Outcomes. Ann Thorac Surg. 2025 Jun;119(6):1139-1150..

HOWEVER…



European Journal of Cardio-Thoracic Surgery 00 (2022) 1–10
https://doi.org/10.1093/ejcts/ezac263 Advance Access publication 19 April 2022

ORIGINAL ARTICLE

Cite this article as: Shraer N, Youssefi P, Monin J-L, Berrebi A, Mankoubi L, Noghin M *et al*. Aortic valve fenestration: respect it or fix it? Eur J Cardiothorac Surg 2022; doi:10.1093/ejcts/ezac263.

Aortic valve fenestration: respect it or fix it?

Nathanael Shraer [a,*], Pouya Youssefi[b], Jean-Luc Monin[a], Alain Berrebi[a], Leila Mankoubi[a], Milena Noghin[a], Mathieu Debauchez[c] and Emmanuel Lansac[c]

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[b] Royal Brompton & Harefield NHS Trust, London, United Kingdom
[c] Department of Cardiovascular and Thoracic Surgery, Pitié-Salpêtrière APHP Hospital, Paris, France

* Corresponding author. Department of Cardiac Pathology, Institut Mutualiste Montsouris, Paris, France. Tel: +33 (0) 1 56 61 67 83; e-mail: nathanael.monnier@imm.
(N. Shraer)

Received 17 November 2021; received in revised form 29 March 2022; accepted 14 April 2022

DISCUSSION

Analysis of the results of this study emphasizes that almost 80% of patients with AI, irrespective of their aorta phenotype, have a reparable valve, whether they have AV fenestrations or not.

AV fenestrations are a constitutional abnormality that can over time become pathological and contribute to the mechanism of AI being present mostly in tricuspid valves and in over a third of cases of isolated AI phenotypes. Furthermore, of the 39 patients who had fixed fenestrations, the majority had the isolated AI phenotype ($n = 20$, 51.3%), indicating that fenestrations were more severe in isolated AI, a phenotype in which fenestrations were also more distributed than in other phenotypes. Moreover,

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

• Shraer N, Youssefi P, Monin JL, Berrebi A, Mankoubi L, Noghin M, Debauchez M, Lansac E. Aortic valve fenestration: respect it or fix it? Eur J Cardiothorac Surg. 2022 Jun 15;62(1):ezac263.



Journal of Medical Ultrasonics
https://doi.org/10.1007/s10396-018-0903-0

REVIEW ARTICLE

Aortic valve repair for aortic regurgitation and preoperative echocardiographic assessment

Takashi Kunihara[1]

Received: 20 July 2018 / Accepted: 1 August 2018
© The Japan Society of Ultrasonics in Medicine 2018



All AR lesions can theoretically be repaired, although some lesions are still challenging and long-term durability is unclear.

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

• Kunihara T. Aortic valve repair for aortic regurgitation and preoperative echocardiographic assessment. J Med Ultrason (2001). 2019 Jan;46(1):51-62.





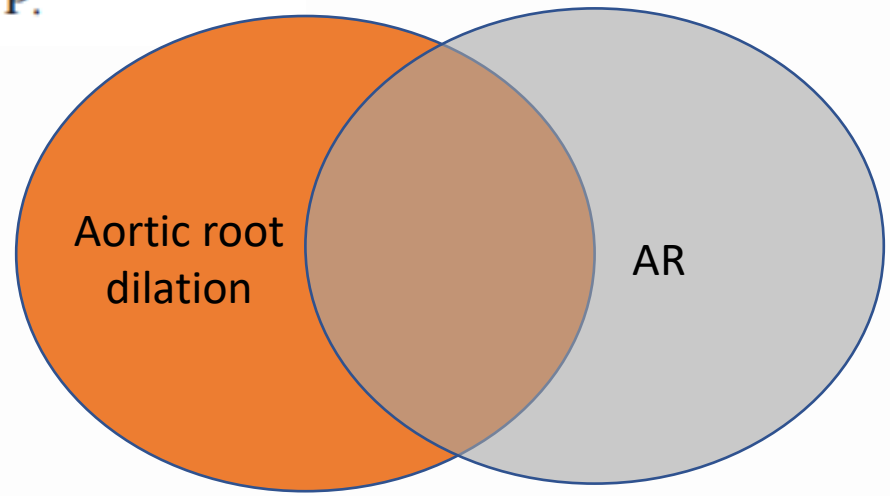
IN OVERALL = UNDERPERFORMED

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

WHAT WE SHOULD DO?? → INDICATIONS??

Introduction

Because both mechanical and biological aortic valve replacement (AVR) have major advantages and disadvantages, aortic valve-preserving surgery (AVP) has emerged as an attractive alternative surgical intervention for relatively young patients with aortic regurgitation (AR) or aortic root dilatation with or without AR. This review presents a comprehensive overview of the natural history of these patients and the impact, current status, and recent advances in AVP.



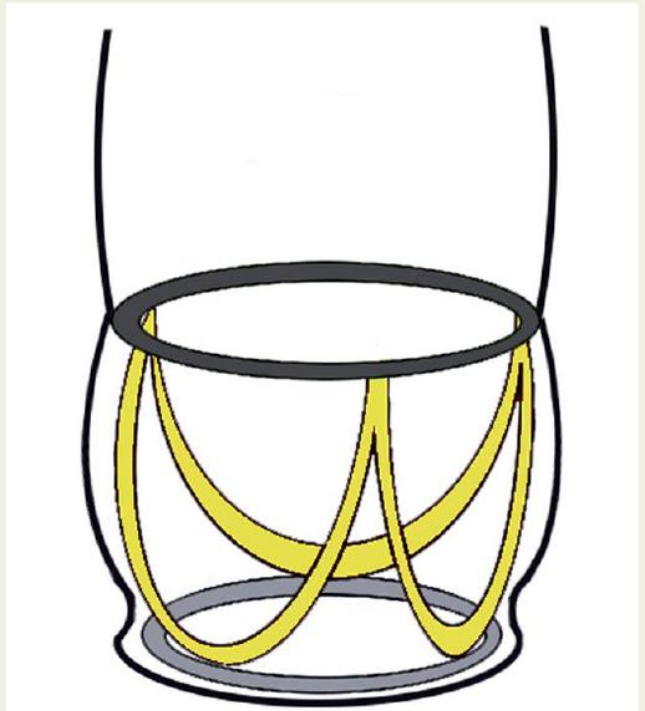


Figure 1 The skeleton of the root. The aortic valve apparatus can be simply described as a cylinder inserted into the root and constituted of two rings, the sino-tubular junction at the top (black) and the virtual basal ring at the bottom (grey), connected by the fibrotic insertion of the aortic cusps (corresponding to the three commissural posts) (yellow)

ΩΝΑΣΕΙΟ ΝΟΣΟΚΟΜΕΙΟ

- Kunihara T. Current trends in aortic valve-preserving surgery. Asian Cardiovasc Thorac Ann. 2021 Jun;29(5):443-456.
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WHAT WE SHOULD DO?? (aortic part)



Recommendation Table 12: Chronic aortic diseases: root and ascending aorta

Recommendations	Class[a]	Level[b]	Ref[c]
Surgery for an ascending aortic aneurysm located at the root or tubular tract, either with TAV or BAV, is recommended when the maximum aortic diameter is ≥55 mm.	I	B	[333, 334]
Surgery for BAV-related aortopathy with 'root phenotype' is recommended when the maximum aortic diameter is ≥50 mm.	I	B	[82, 84–87, 335]
Surgery for TAV-associated aneurysms with 'root phenotype' should be considered when the maximum aortic diameter is ≥50 mm in a low-surgical-risk setting.[d]	IIa	B	[87, 336–338]
In patients with low surgical risk[e] and 'ascending phenotype' dilatation, both with TAV and BAV, surgical treatment should be considered when the maximum aortic diameter is >52 mm.	IIa	C	-
In patients with low surgical risk and 'ascending phenotype' BAV-related aortopathy, surgery should be considered at a maximum diameter ≥50 mm if any of the following is present: • age <50 years • short stature (<1.69 m)[f] • ascending aortic length >11 cm[g] • aortic diameter growth rate >3 mm/year • family history of the acute aortic syndrome • aortic coarctation • refractory hypertension • shared decision with the patient[h] • concomitant non-aortic valve cardiac surgery	IIa	C	-
In patients with non-syndromic TAV with 'ascending phenotype', in a low-surgical-risk setting,[d] surgery may be considered at a maximum diameter ≥50 mm if any of the following is present: • age <50 years • short stature (<1.69 m)[f] • ascending aortic length >11 cm[g] • aortic diameter growth rate >3 mm/year • refractory hypertension • shared decision with the patient[h]	IIb	C	-
Surgery for aortic dilatation in TAV patients undergoing non-aortic valve cardiac surgery should be considered at a root or ascending diameter ≥50 mm.	IIa	C	-
Surgery for aortic dilatation in patients undergoing aortic valve surgery should be considered at a root or ascending diameter ≥45 mm.	IIa	C	-
Surgery for aortic root dilatation in patients undergoing surgery for ascending aortic aneurysm should be considered at an aortic root diameter ≥45 mm.	IIa	C	-
In patients with young age, a family history of the acute type A aortic dissection or known HTAD who are undergoing ascending replacement, a lower threshold than 45 mm may be considered for concomitant root replacement on an individual basis.	IIb	C	-

[a]Class of recommendation.
[b]Level of evidence.
[c]References.
[d]Based on both individual patient's comorbidities (see footnote e) and the centre's experience with the required surgery [141, 339].
[e]Because the 52.5-/53-mm threshold corresponded to an increase in risk of acute aortic events from <1% to 4–5% [340, 341], a predicted perioperative mortality <3% justifies the surgical indication.
[f]For 1.50-m height, a 50-mm diameter corresponds to 13 cm^2/m of ascending cross-sectional area-to- height ratio, which is associated with an increase in risk of acute aortic events [341]; for 1.69 m height, 13 cm^2/m corresponds to 53 mm.
[g]Measured with the centreline method from the aortic annular plane to the brachiocephalic trunk using CTA-scan [196, 336].
[h]Considering the patient's lifestyle, occupation, compliance with medical therapy and surveillance, psychological aspects.
BAV: bicuspid aortic valve; CT: computed tomography; HTAD: heritable thoracic aortic disease; TAV: tricuspid aortic valve.

Aortic diameter

- >55mm
- >50-52mm
- >45mm

More aggressive in BAV, "root phenotype", risk factors presence

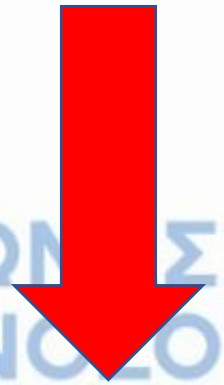
Authors/Task Force Members; Czerny M, Grabenwöger M, Berger T, Aboyans V, Della Corte A, Chen EP, Desai ND, Dumfarth J, Elefteriades JA, Etz CD, Kim KM, Kreibich M, Lescan M, Di Marco L, Martens A, Mestres CA, Milojevic M, Nienaber CA, Piffaretti G, Preventza O, Quintana E, Rylski B, Schlett CL, Schoenhoff F, Trimarchi S, Tsagakis K; EACTS/STS Scientific Document Group; Siepe M, Estrera AL, Bavaria JE, Pacini D, Okita Y, Evangelista A, Harrington KB, Kachroo P, Hughes GC. EACTS/STS Guidelines for Diagnosing and Treating Acute and Chronic Syndromes of the Aortic Organ. Ann Thorac Surg. 2024 Jul;118(1):5-115.

Heritable thoracic aortic disease

Recommendation Table 16: Heritable thoracic aortic disease

Recommendations	Class[a]	Level[b]	Ref[c]
Marfan syndrome			
In patients with Marfan syndrome, surgery on the aortic root or ascending aorta is recommended at a diameter of ≥50 mm.	I	B	[374, 375]
In patients with Marfan syndrome and high-risk features,* surgery on the aortic root or ascending aorta should be considered at a diameter of ≥45 mm.	IIa	B	[374, 375]
In patients with Marfan syndrome without high-risk features with a high likelihood of undergoing valve-sparing aortic root replacement and very low surgical risk, surgery on the aortic root or ascending aorta may be considered at a diameter of ≥45 mm when performed by an experienced aortic team.	IIb	C	-
Loeys-Dietz syndrome			
In patients with Loeys-Dietz syndrome, indication for surgery is recommended based on the specific genetic variant, aortic diameter, aortic growth rate, family history, history of aortic events, patient age and other individual patient-related factors and discussed by a multidisciplinary aortic team.	I	C	-
In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in TGFBR1 or TGFBR2, surgery on the aortic root or ascending aorta is recommended at a diameter of ≥45 mm.	I	C	-
In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in TGFBR1 and high-risk features,* surgery on the aortic root or ascending aorta may be considered at a diameter of ≥40 mm.	IIb	C	-
In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in TGFBR2 and high-risk features,* surgery on the aortic root or ascending aorta should be considered at a diameter of ≥40 mm.	IIa	C	-
In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in TGFB3, surgery on the aortic root or ascending aorta may be considered at a diameter of ≥50 mm.	IIb	C	-
In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in SMAD3, surgery on the aortic root or ascending aorta should be considered at a diameter of ≥45 mm.	IIa	C	-
In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in TGFBR1, TGFBR2 or SMAD3, surgery to replace the intact aortic arch, descending aorta or abdominal aorta at a diameter of ≥45 mm may be considered.	IIb	C	-
In patients with Loeys-Dietz syndrome attributable to a pathogenic variant in SMAD2 or TGFB2, surgery on the aortic root or ascending aorta may be considered at a diameter of ≥45 mm.	IIb	C	-

[a]Class of recommendation.
[b]Level of evidence.
[c]References.
*For Marfan syndrome: family history of aortic dissection; aortic growth >0.3 cm/y; diffuse aortic root and ascending aortic dilation, marked vertebral arterial tortuosity.
[#]For Loeys-Dietz syndrome: certain specific pathogenic variants (R528H/C in TGFBR2); women with TGFBR2 and small body size; severe extra-aortic features (ie, craniosynostosis, cleft palate, hypertelorism, bifid uvula, marked arterial tortuosity, widened scars, and translucent skin); family history of aortic dissection, especially at young age or aortic diameter <4.5cm; aortic growth rate >0.3 cm/y.
TAD: thoracic aortic disease.



Sooner when syndromic or heritable

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Non-syndromic heritable thoracic aortic disease.

Recommendation Table 17: Chronic aortic diseases: non-syndromic heritable thoracic aortic disease

Recommendations	Class[a]	Level[b]	Ref[c]
In patients with HTAD attributable to a pathogenic variant in ACTA2, surgery on the aortic root or ascending aorta should be performed at a diameter of ≥45 mm.	IIa	C	-
In patients with HTAD attributable to a pathogenic variant in ACTA2 and high-risk features,* surgery on the aortic root or ascending aorta may be considered at a diameter of ≥42 mm.	IIb	C	-
In patients with HTAD attributable to a pathogenic variant in PRKG1, surgery on the aortic root or ascending aorta may be considered at a diameter of ≥42 mm.	IIb	C	-
In patients with HTAD attributable to a pathogenic variant in PRKG1 and high-risk features,* surgery on the aortic root or ascending aorta may be considered at a diameter of ≥40 mm.	IIb	C	-
In patients with HTAD attributable to a pathogenic variant in MYLK or MYH11, surgery on the aortic root or ascending aorta may be considered at a diameter of ≥45 mm.	IIb	C	-

[a]Class of recommendation.
[b]Level of evidence.
[c]References.
*Family history of type A aortic dissection in the setting of no or minimal aortic dilation, aortic growth rate >0.3 cm/y.
HTAD: heritable thoracic aortic disease.

- Authors/Task Force Members; Czerny M, Grabenwöger M, Berger T, Aboyans V, Della Corte A, Chen EP, Desai ND, Dumfarth J, Elefteriades JA, Etz CD, Kim KM, Kreibich M, Lescan M, Di Marco L, Martens A, Mestres CA, Milojevic M, Nienaber CA, Piffaretti G, Preventza O, Quintana E, Rylski B, Schlett CL, Schoenhoff F, Trimarchi S, Tsagakis K; EACTS/STS Scientific Document Group; Siepe M, Estrera AL, Bavaria JE, Pacini D, Okita Y, Evangelista A, Harrington KB, Kachroo P, Hughes GC. EACTS/STS Guidelines for Diagnosing and Treating Acute and Chronic Syndromes of the Aortic Organ. Ann Thorac Surg. 2024 Jul;118(1):5-115.

THERAPEUTIC OPTIONS

Aortic root

Recommendation Table 22: Therapeutic options: aortic root

Recommendations	Class[a]	Level[b]	Ref[c]
For aortic dilatations and aneurysms involving the aortic root with a structurally diseased aortic valve, replacement of the aortic valve and sinuses with coronary ostia direct reimplantation (modified Bentall operation) is recommended.	I	B	[559–561]
Valve-sparing root replacement should be considered for patients with a non-diseased tricuspid aortic valve and dilated root, especially young patients, if performed by experienced surgeons.	IIa	B	[562, 563]
Valve-sparing root replacement may be considered for patients with a non-diseased bicuspid aortic valve and dilated root if performed by surgeons with specific expertise in aortic valve repair.	IIb	B	[564]



ΝΟΣΟΚΟΜΕΙΟ

- Authors/Task Force Members; Czerny M, Grabenwöger M, Berger T, Aboyans V, Della Corte A, Chen EP, Desai ND, Dumfarth J, Elefteriades JA, Etz CD, Kim KM, Kreibich M, Lescan M, Di Marco L, Martens A, Mestres CA, Milojevic M, Nienaber CA, Piffaretti G, Preventza O, Quintana E, Rylski B, Schlett CL, Schoenhoff F, Trimarchi S, Tsagakis K; EACTS/STS Scientific Document Group; Siepe M, Estrera AL, Bavaria JE, Pacini D, Okita Y, Evangelista A, Harrington KB, Kachroo P, Hughes GC. EACTS/STS Guidelines for Diagnosing and Treating Acute and Chronic Syndromes of the Aortic Organ. Ann Thorac Surg. 2024 Jul;118(1):5-115.

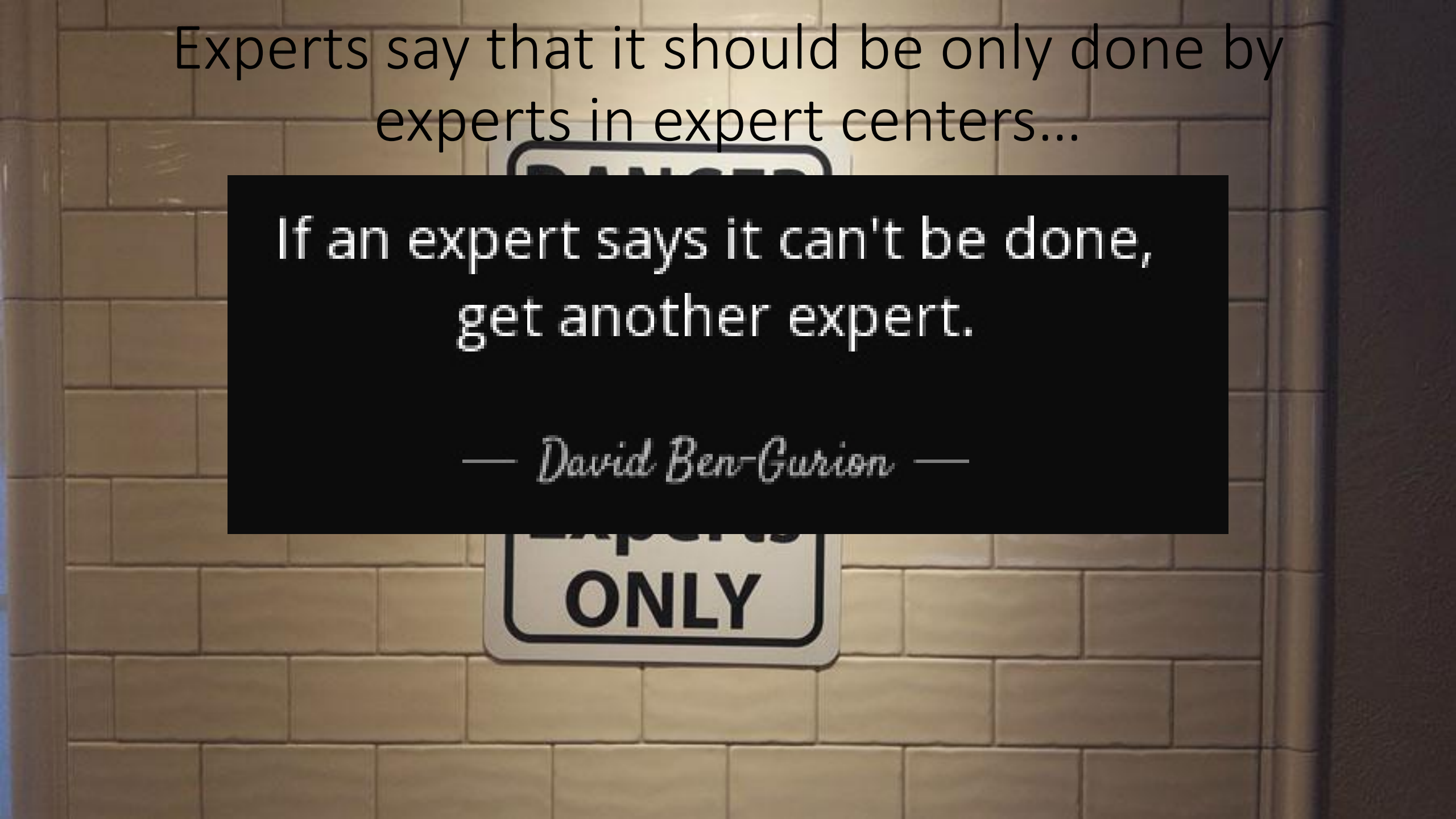
WHAT WE SHOULD DO?? (valvular part)



Recommendations	Class[a]	Level[b]
Severe aortic regurgitation		
AV surgery is recommended in symptomatic patients with severe AR regardless of LV function.[224–228]	I	B
AV surgery is recommended in asymptomatic patients with severe AR and LVESD >50 mm or LVESDi >25 mm/m^2 [especially in patients with small body size (BSA <1.68 m^2)] or resting LVEF ≤50%.[226,228,231,233,234]	I	B
AV surgery is recommended in symptomatic and asymptomatic patients with severe AR undergoing CABG or surgery of the ascending aorta.	I	C
AV repair should be considered in selected patients with severe AR at experienced centres, when durable results are expected.[220,245,246,259]	IIa	B
AV surgery may be considered in asymptomatic patients with severe AR and LVESDi >22 mm/m^2,[226,228,231–234] or LVESVi[c] >45 mL/m^2 [especially in patients with small body size (BSA <1.68 m^2)],[235–241] or resting LVEF ≤55%, if the surgical risk is low.	IIb	B
TAVI may be considered for the treatment of severe AR in symptomatic patients ineligible for surgery according to the Heart Team, if the anatomy is suitable.[264,265,268,269]	IIb	B
Concomitant surgery of the ascending aorta		
Valve-sparing aortic root replacement is recommended in young patients with aortic root dilatation at experienced centres, when durable results are expected.[247,250–253,255]	I	B
When AV surgery is indicated and the predicted surgical risk is low, replacement of the aortic root or ascending aorta should be considered if the maximal diameter is ≥45 mm.[d]	IIa	C

- Praz F, Borger MA, Lanz J, Marin-Cuartas M, Abreu A, Adamo M, Marsan NA, Barili F, Bonaros N, Cosyns B, De Paulis R, Gamra H, Jahangiri M, Jeppsson A, Klautz RJM, Mores B, Pérez-David E, Pöss J, Prendergast BD, Rocca B, Rossello X, Suzuki M, Thiele H, Tribouilloy CM, Wojakowski W; ESC/EACTS Scientific Document Group. 2025 ESC/EACTS Guidelines for the management of valvular heart disease. Eur J Cardiothorac Surg. 2025 Aug 2;67(8):ezaf276.

Experts say that it should be only done by experts in expert centers…



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ORIGINAL ARTICLE

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Aortic valve-sparing root replacement (David): learning curve and impact on outcome

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Key question

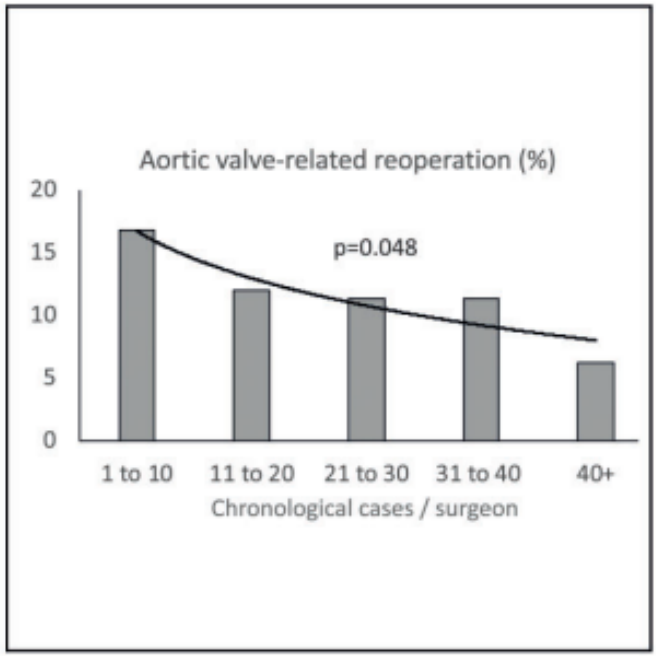
Does the surgeon's level of experience affect outcome in the aortic valve-sparing David procedure?

Key findings

The surgeon's experience impacts short- and long-term outcome including aortic valve-related reoperation-free survival.

Take-home message

There is a learning curve for the David procedure. This operation should be taught under guidance from an experienced senior colleague.



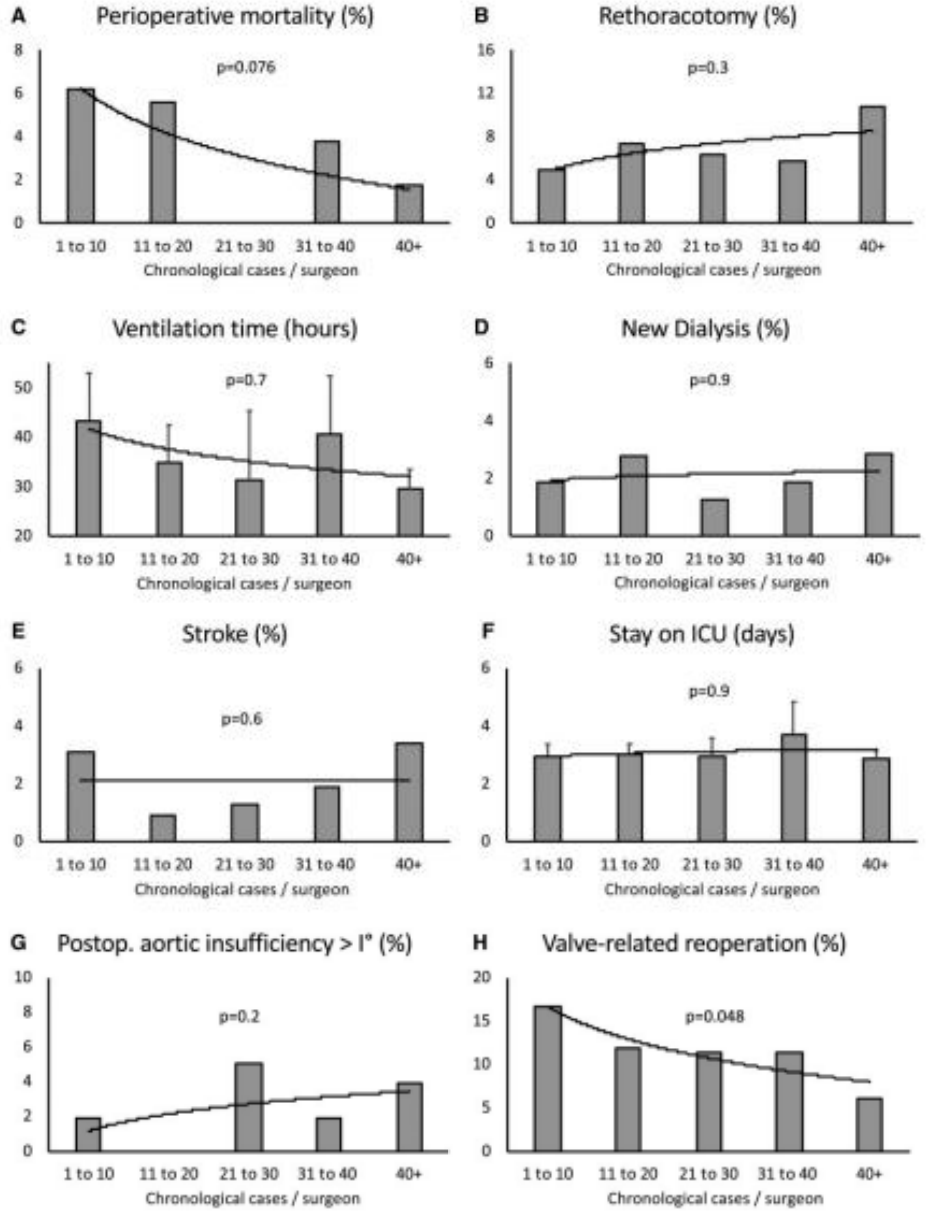


Figure 5: Correlation between surgeon's experience and patient outcome. (**A**) Perioperative mortality, (**B**) the rate for rethoracotomy, (**C**) ventilation time (h), (**D**) rate for new onset of postoperative dialysis, (**E**) incidence for stroke, (**F**) stay on ICU, (**G**) rate of postoperative aortic insufficiency >I° and (**H**) rates for aortic valve-related reoperation during follow-up. The x-axis denotes patients per surgeon. The *P*-values are given in the diagrams. ICU: intensive care unit; Trendline: logarithmic.

NOZOROMEIO

• Beckmann E, Martens A, Krueger H, Kaufeld T, Korte W, Stettinger A, Haverich A, Shrestha ML. Aortic valve-sparing root replacement (David): learning curve and impact on outcome. Interact Cardiovasc Thorac Surg. 2020 May 1;30(5):754-761.

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Twenty-five year experience with aortic valve-sparing root replacement in a single teaching center

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Conclusion: David operations can be performed with excellent perioperative and 10-year follow-up outcomes in centers not running large AVSRR-programs.

Preoperative data

Between February 1996 and November 2019, 131 patients (18% female) underwent AVSRR using the David technique by a total of 17 different surgeons [Median of surgeries performed per surgeon: 4 (1–13)]. Median age at time of surgery was 48 years (38–59). In a total of

Echo- and CT-data	
Cuspidity	
Bicuspid valve	34 (26%)
Tricuspid valve	97 (74%)
Aortic regurgitation	
None (0)	12 (9%)
Trivial (1)	15 (12%)
Mild (2)	23 (18%)
Moderate (3)	50 (39%)
Severe (4)	29 (22%)
LVEF (%)	60 ± 8
LV-Diameter	
LVESD (mm)	36 ± 8
LVEDD (mm)	56 ± 9
Aortic diameters	
Annulus (mm)	27 ± 5
Aortic root (mm)	50 ± 7
ST-junction (mm)	44 ± 9
Ascending aorta (mm)	47 ± 13

Conclusion

Despite being a technically demanding procedure, AVSRR using the David operation can be performed safely in mid-volume centers with excellent perioperative and 10-year follow-up outcomes. The results presented in this study may justify the use of AVSRR-surgery in well evaluated younger patients in centers where only a handful of cases are performed yearly. However, being a time-consuming procedure, dependent on preoperative planning, David operations should preferably be perfomed in elective settings or remain in experienced hands, under aggravating circumstances such as redo-heart-surgery or ATAAD.

FIGURE 1
Reoperation free survival after AVSRR with 95% confidence-interval.

TABLE 4 Follow-up data.

Clinical follow-up ($n = 130$)	
Duration clinical follow-up (years)	8.7 (6.2–12.9)
Status at follow-up	
Alive	100 (76%)
Dead	18 (14%)
Reoperated	15 (12%)
Reoperated and dead	2 (1%)
Postoperative cerebrovascular event	4 (4%)
Clinical follow-up—alive and not reoperated ($n = 100$)	
Duration clinical follow-up (years)	
NYHA Functional class	8.2 (6.1–12.2)
NYHA I	83 (83%)
	15 (15%)
	2 (2%)
NYHA IV	0 (0%)
TTE follow-up—alive and not reoperated ($n = 100$)	
Duration TTE follow-up (years)	7.2 (4.3–10.7)
Aortic regurgitation	
None (0)	19 (19%)
Trivial (1)	35 (35%)
Mild (2)	37 (37%)
Moderate (3)	9 (9%)
Severe (4)	0 (0%)
LVEF (%)	61 ± 6
LV-Diameter	
LVESD (mm)	33 ± 7
LVEDD (mm)	51 ± 7
Aortic valve gradient	
dPmax (mmHg)	13 ± 10
dPmean (mmHg)	8 ± 7
Aortic diameters	
Annulus (mm)	24 ± 3
Aortic root (mm)	34 ± 4
Ascending aorta (mm)	32 ± 4

• Sromicki J, Van Hemelrijck M, Schmiady MO, Greutmann M, Bonassin Tempesta F, Mestres C-A, *et al.* Twenty-five year experience with aortic valve-sparing root replacement in a single teaching center. *Front Cardiovasc Med* 2023;**10**:1104149. https://doi.org/ 10.3389/fcvm.2023.1104149



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Results: Early mortality was ≤ 1% in both cohorts. In cohort A, a total of 12 safety events occurred with a significant reduction in incidence over the tertiles (18%, 15%, and 3%, in T1, T2, and T3, respectively, $P = 0.05$). In cohort B, 20 safety events occurred in 18 patients with a trend toward reduction of incidence over tertiles (20%, 12%, and 8%, in T1, T2, and T3, respectively; $P = 0.14$). aortic crossclamp and cardiopulmonary bypass times decreased significantly after T2 in cohort A and T1 in cohort B ($P < 0.01$). Intraoperative procedural efficacy was similar across tertiles in both cohorts.

Conclusions

In 2 independent centres that initiated dedicated programs in AVr, we found that procedural safety and efficiency improved with experience and efficacy was consistent over time. AVr is safe and reproducible and appears to have a learning curve of approximately 40-60 cases.

Table 2. Study end points for each tertile in both study cohorts

	Tertile		
	1	2	3
Cohort A			
Safety end points, n (%)	6 (18)	5 (15)	1 (3)
In-hospital mortality	0	1	0
Myocardial infarction	0	0	0
Reopening for bleeding	3	2	1
Permanent pacemaker insertion	3	1	0
Intraoperative AV re-exploration	0	0	0
Cerebrovascular accident	0	1	0
Efficiency end points, minutes			
Aortic crossclamp time	151.79 ± 40.70	135.97 ± 39.55	122.03 ± 44.12
Cardiopulmonary bypass time	205 ± 55.89	186.09 ± 53.05	165.56 ± 47.20
Efficacy end points, n (%)			
Follow-up AI > 2+	2 (6)	0 (0)	0 (0)
Mean AV gradient > 20	1 (6)	0 (0)	0 (0)
Case complexity, n (%)			
Preoperative AI > 1+	24 (72)	19 (57)	16 (47)
		14 (42)	14 (41)
		18 (54)	13 (38)
		6 (12)	4 (8)
		0	0
		0	0
		3	2
		3	1
		0	1
		0	0
		81.72 ± 34.26	83.12 ± 32.25
		104.94 ± 43.42	105.76 ± 35.86
		10 (20)	4 (8)
		2 (4)	4 (8)
		48 (96)	46 (92)
		25 (48)	19 (38)
		13 (26)	20 (40)

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WHAT WE CAN DO? SCIENCE

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

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J THORAC CARDIOVASC SURG 86:323-337, 1983

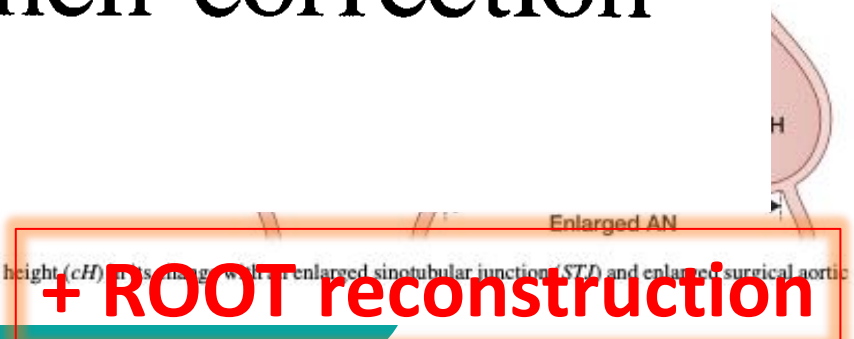
Honored Guest's Address

Cardiac valve surgery—the "French correction"

Alain Carpentier, M.D., *Paris, France*

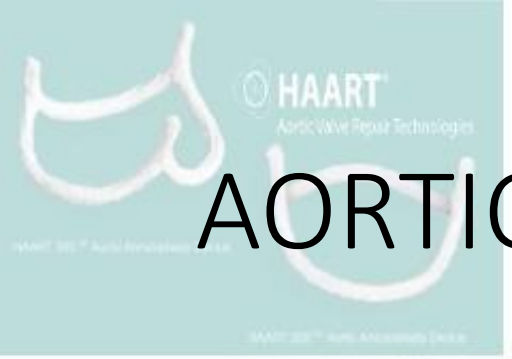
Valve Repair = Ring Annuloplasty + Leaflet Reconstruction

+ ROOT reconstruction

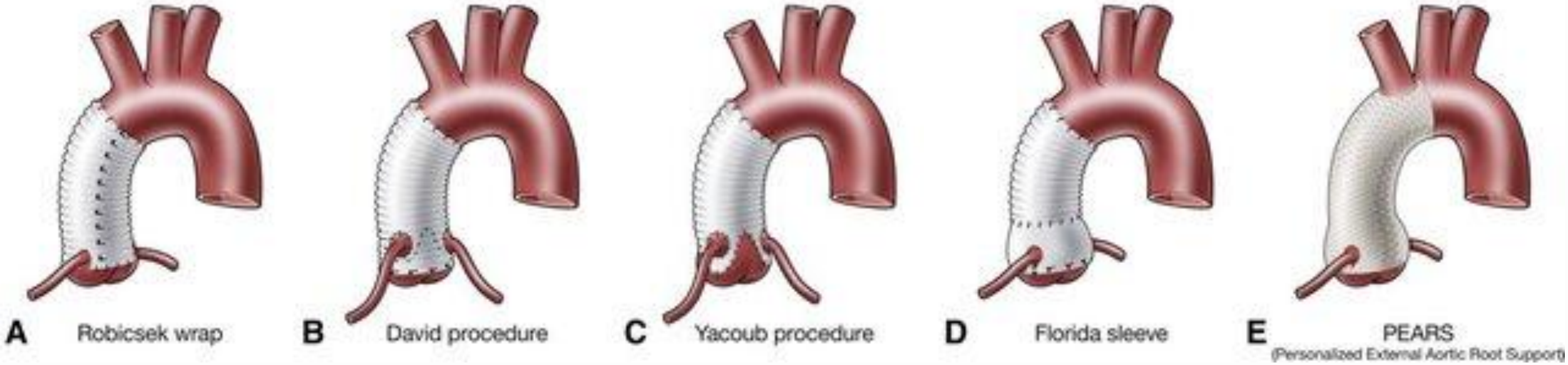


urgical anatomy of aortic root: Toward precise and durable aortic, neo-aortic, and truncal valve repairs. J Thorac Cardiovasc Surg. 2025 May;169(5):1287-1295.

AORTIC ROOT- HISTORY







ΩΝΑΣΕΙΟ
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Valve-sparing aortic root surgeries. Figure reproduced from Buratto E., Konstantinov I.E. Valve-sparing aortic root surgery in children and adults with congenital heart disease. J. Thorac. Cardiovasc. Surg. 2021, 162, 955-962.

AORTIC ROOT



+ annuloplasty

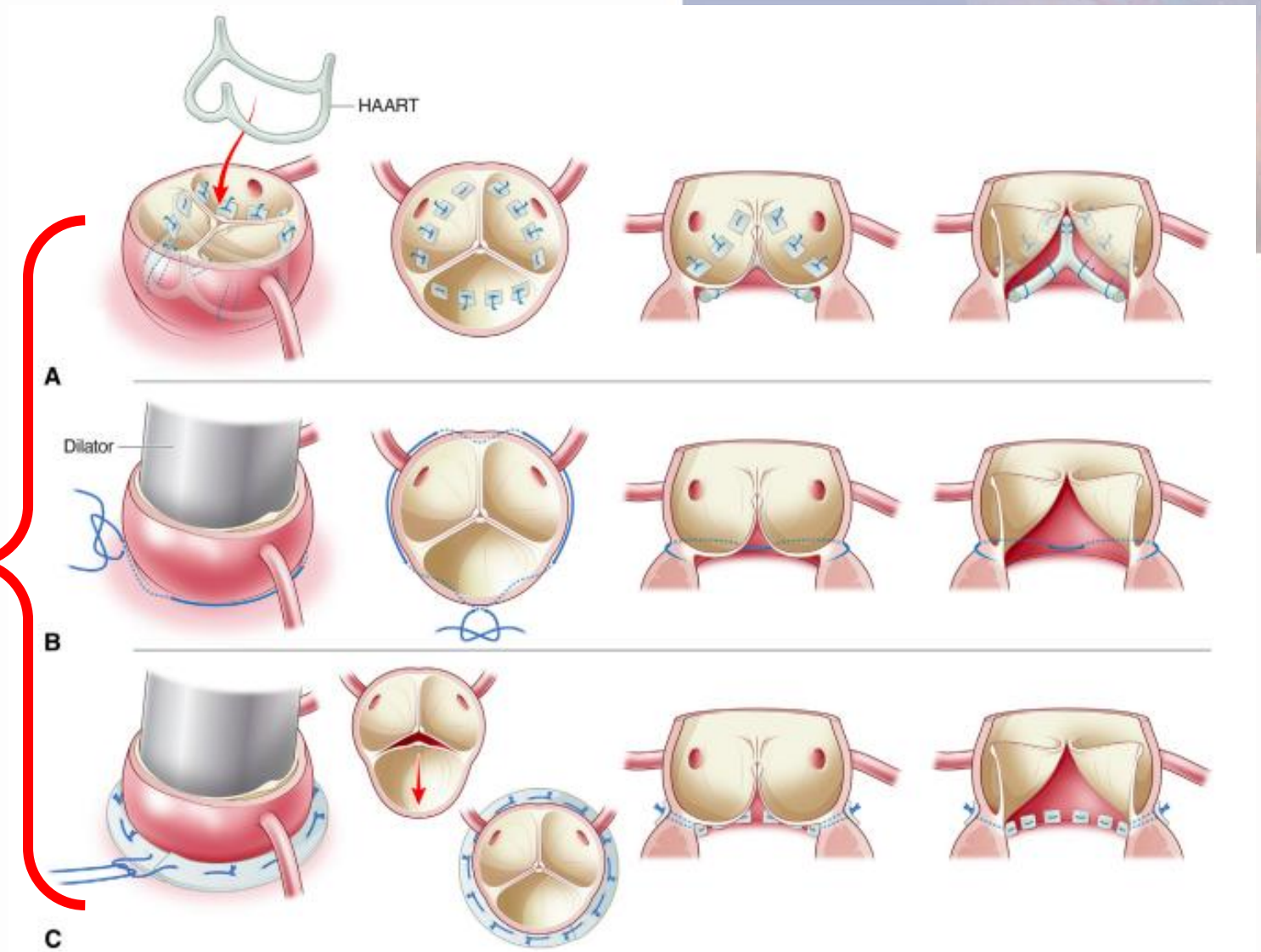


FIGURE 7. Reduction and stabilization of the delated annulus to normal adult size with an internal rigid annuloplasty ring (A) and external annuloplasty suture (B) and annuloplasty band (C). *HAART*, Hemispherical aortic annuloplasty reconstructive technology. Reproduced with permission from Konstantinov IE, Zubritskiy A. Do we all need to learn aortic valve repair the HAART way? *J Thorac Cardiovasc Surg* 2024;167(3):e74-e75.

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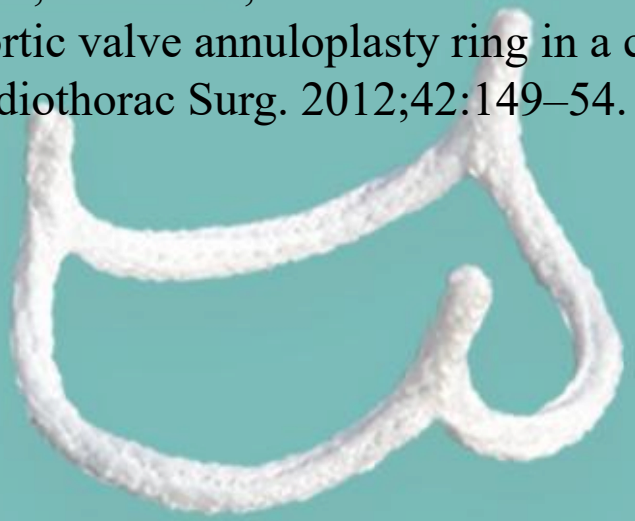
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HAART internal ring annuloplasty, 2012

Rankin JS, Conger JL, Tuzun E, Winkler JA, Harms KM, Beavan LA, Fossum T, Cohn WE. In vivo testing of an intra-annularaortic valve annuloplasty ring in a chronic calf model. Eur J Cardiothorac Surg. 2012;42:149–54.







HAART 300™ Aortic Annuloplasty Device

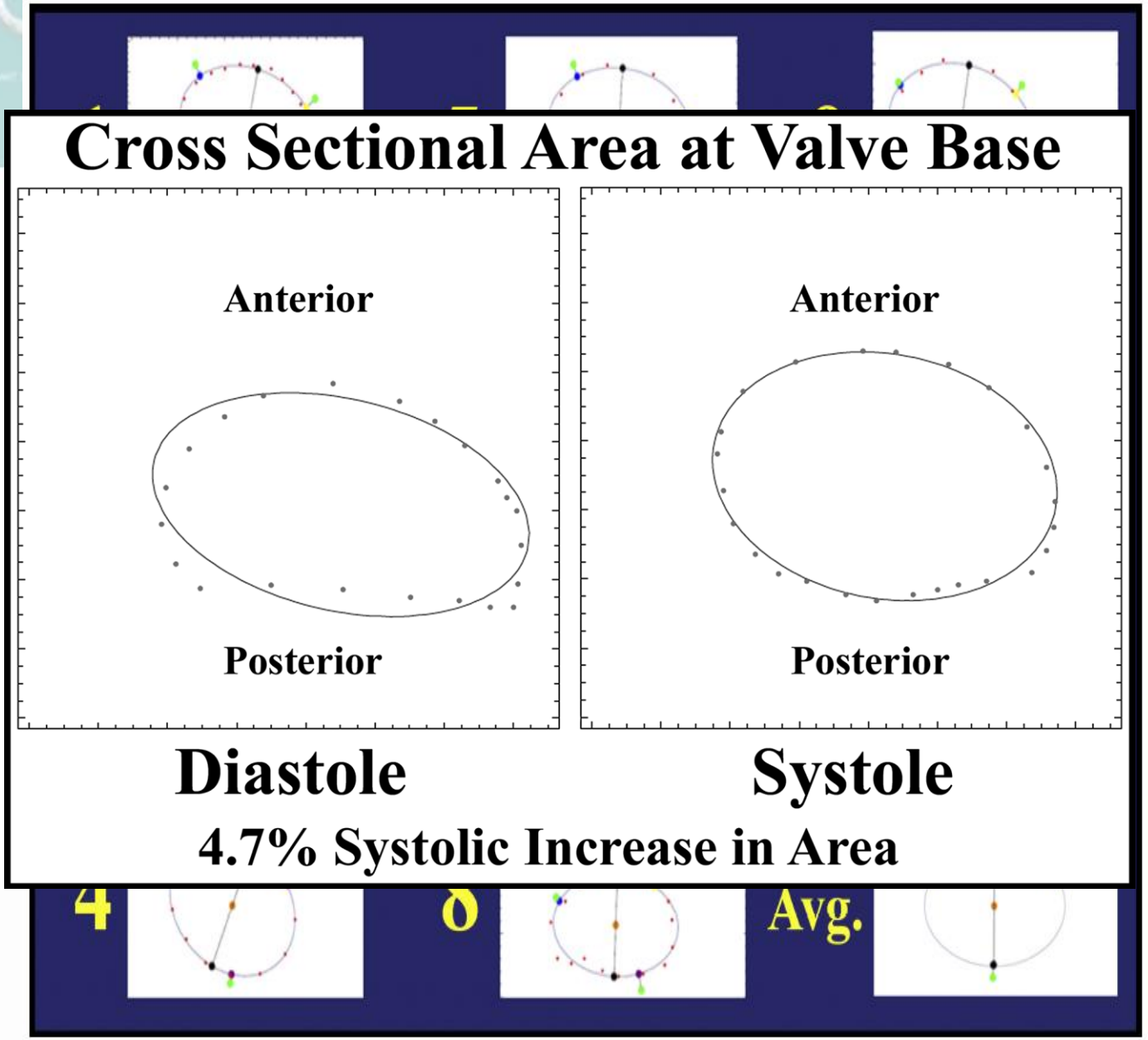
HAART®
Aortic Valve Repair Technologies



HAART 200™ Aortic Annuloplasty Device

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

AORTIC VALVE GEOMETRY



Normal geometry in 1 example from high-resolution CT images of human cadaver aortic valves

Elliptical geometry in 1 example from high-resolution CT images of human cadaver aortic valves

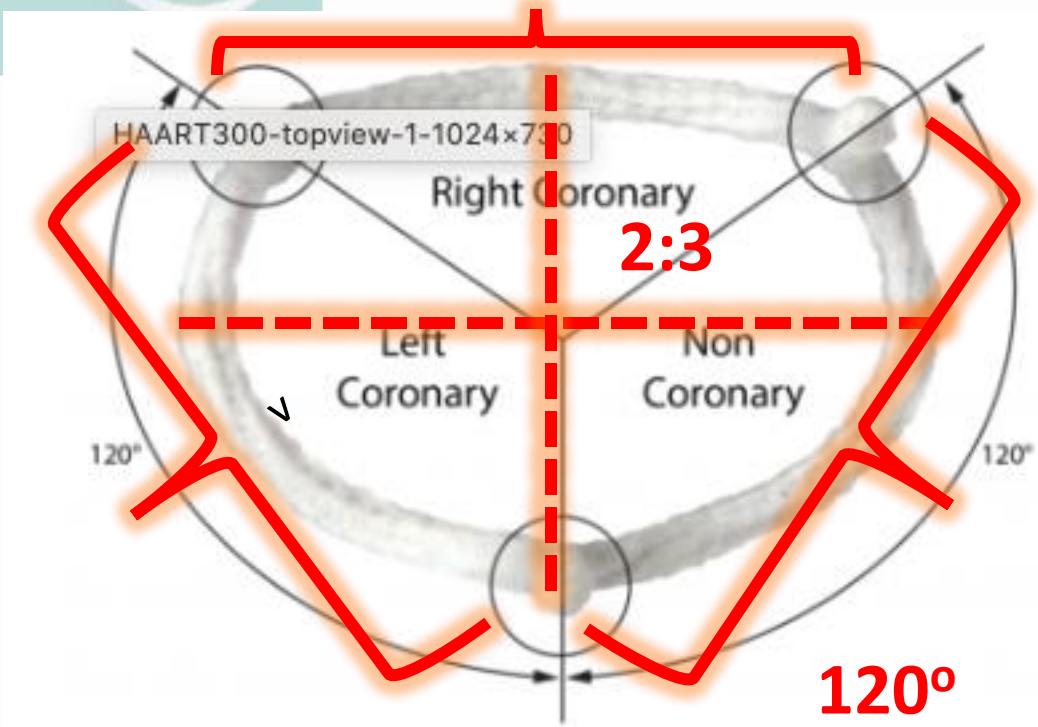
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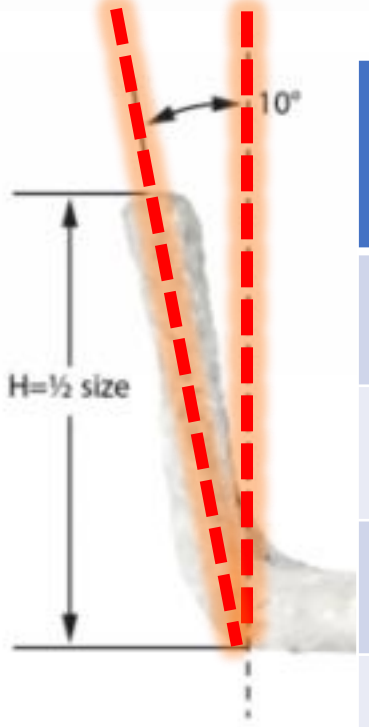
Rigid ring

Elliptical ring

Crooke PS, et al. Design Characteristics of a Three-Dimensional Geometric Aortic Valve Annuloplasty Ring. Innovations 2013;8:364-370.

HAART 300 RING STRUCTURE AND SIZES





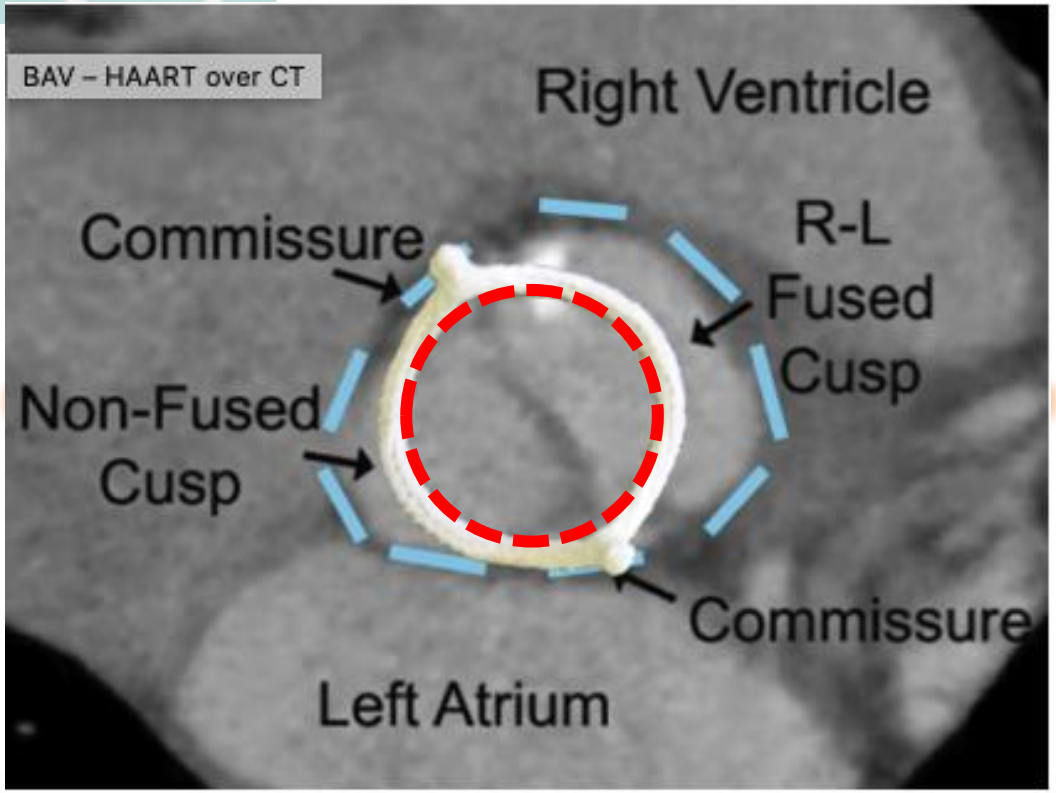
Size	Minor Axis (mm)	Major Axis (mm)	Circumference (mm)
19 mm	15.5	23.0	60
21 mm	17.0	25.0	67
23 mm	18.5	27.5	73
25 mm	20.0	30.0	79

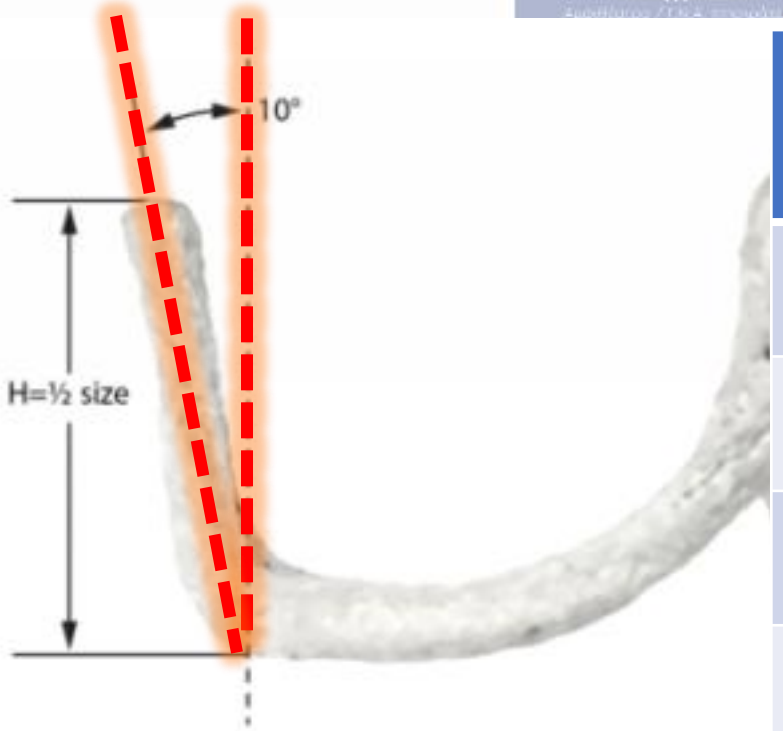
- titanium covered with Dacron cloth
- 2:3 elliptical base geometry
- 3 equidistant subcommissural posts
- 10 degree outward post flare

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

- Rankin JS, et al. A refined hemispheric model of normal human aortic valve and root geometry. J Thorac Cardiovasc Surg. 2013 Jul;146(1):103-108.
- Crooke PS, et al. Design Characteristics of a Three-Dimensional Geometric Aortic Valve Annuloplasty Ring. Innovations 2013;8:364-370.
- https://www.corcym.com/devices/aortic

HAART 200 RING STRUCTURE AND SIZES





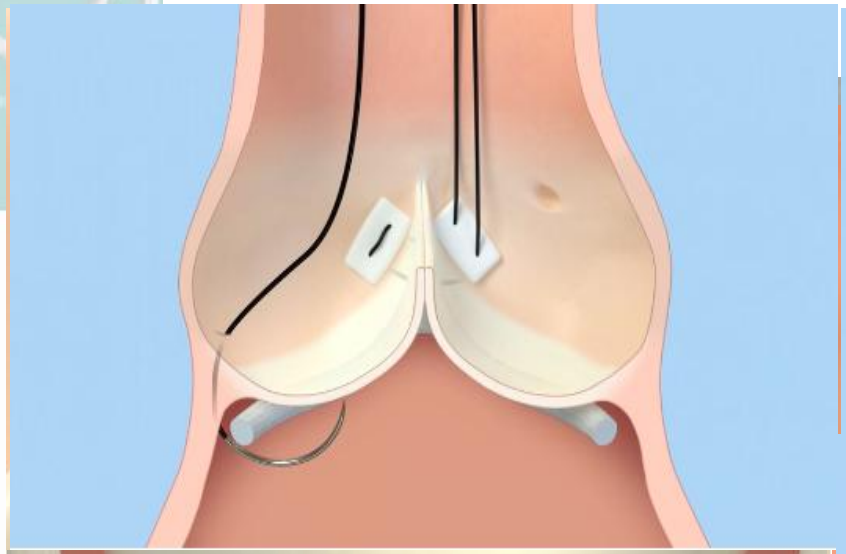
Size	Circumference (mm)
19 mm	60
21 mm	66
23 mm	72
25 mm	78

- titanium covered with Dacron cloth
- 180 degrees configuration
- 10 degree outward post flare
- smaller circular valve geometry drawing the leaflets toward the midline

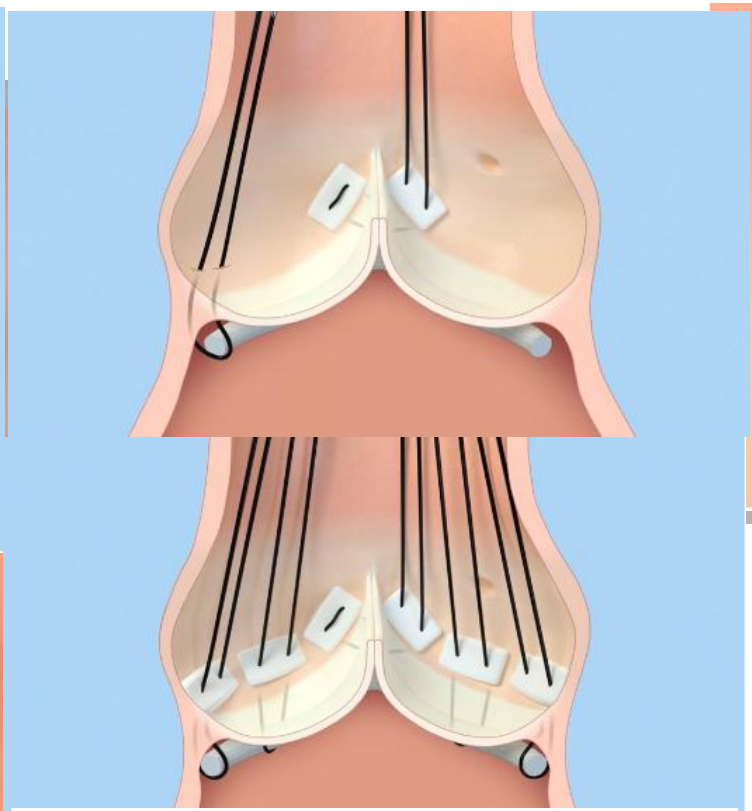
ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

- Rankin JS, et al. A refined hemispheric model of normal human aortic valve and root geometry. J Thorac Cardiovasc Surg. 2013 Jul;146(1):103-108.
- Mazzitelli D, at al. A Regulated Trial of Bicuspid Aortic Valve Repair Supported by Geometric Ring Annuloplasty. Ann Thorac Surg 2015;99:2010–6.
- https://www.corcym.com/devices/aortic

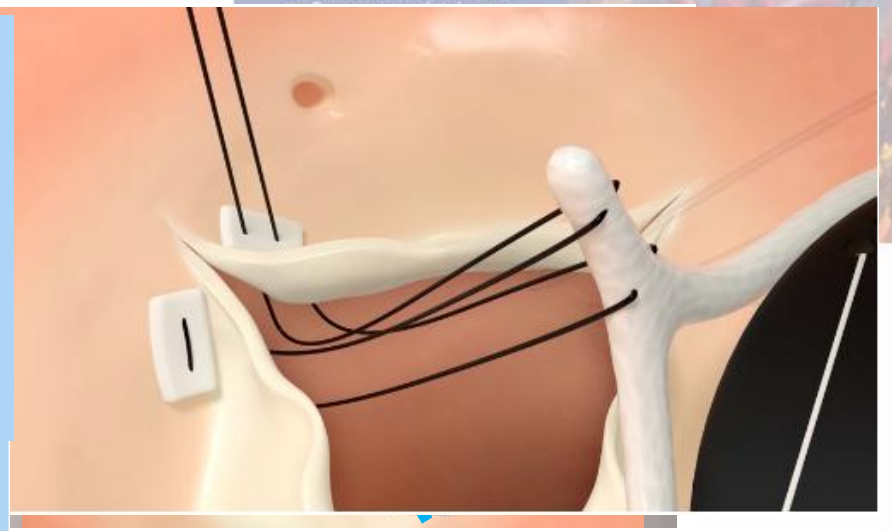
TECHNICAL DETAILS







- No contact between the device and the leaflets
- 2 per sinus for TAV
- 3 in non-fused sinus and 4 in fused sinus for BAV



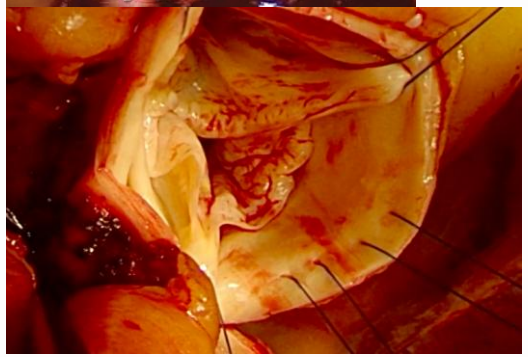
Cabrol-like pledgated horizontal mattress sutures
Tip of the post below pen markings of the subcommissural triangles
Subvalvular position
No contact between the device and the leaflets

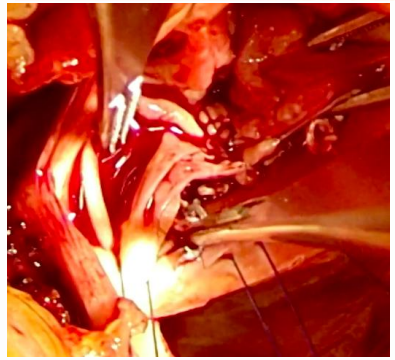
- https://www.corcym.com/devices/aortic
- Rankin JS, et al. Aortic valve repair using geometric ring annuloplasty. Operative Techniques in Thorac Cardiovasc Surg. 2021;26(2):173-188.

TECHNICAL DETAILS- FINAL RESULT

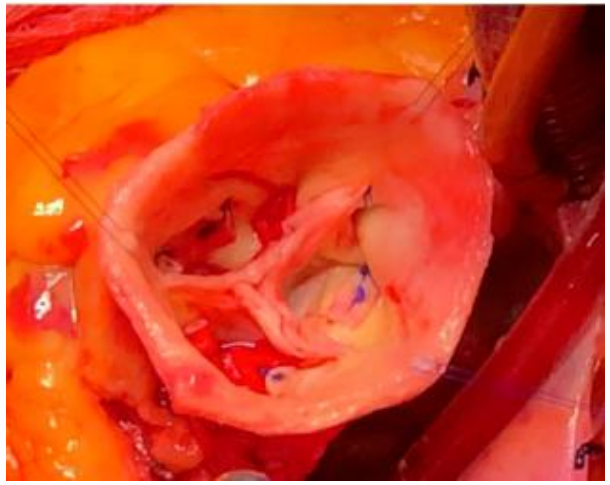












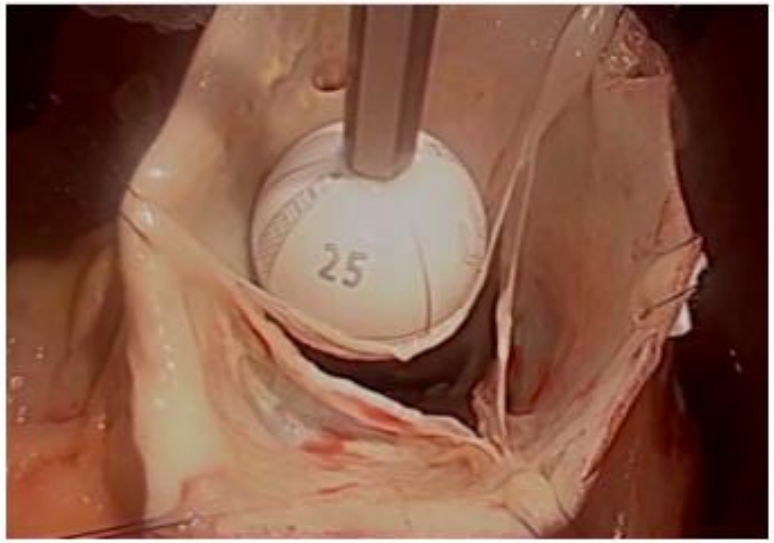


Ring should not be visible from above the valve

- Mazzitelli D, Fischlein T, Rankin JS, Choi YH, Stamm C, Pfeiffer S, Pirk J, Detter C, Kroll J, Beyersdorf F, Griffin CD, Shrestha M, Nöbauer C, Crooke PS, Schreiber C, Lange R. Geometric ring annuloplasty as an adjunct to aortic valve repair: clinical investigation of the HAART 300 device. Eur J Cardiothorac Surg. 2016 Mar;49(3):987-93.
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- Mazzitelli D, Stamm C, Rankin JS, Nöbauer C, Pirk J, Meuris B, Crooke PS, Wagner A, Beavan LA, Griffin CD, Powers D, Nasseri B, Schreiber C, Hetzer R, Lange R. Hemodynamic outcomes of geometric ring annuloplasty for aortic valve repair: a 4-center pilot trial. J Thorac Cardiovasc Surg. 2014 Jul;148(1):168-75.

IN OVERAL TECHNICAL BENEFIT

Accurate Leaflet Based Sizing



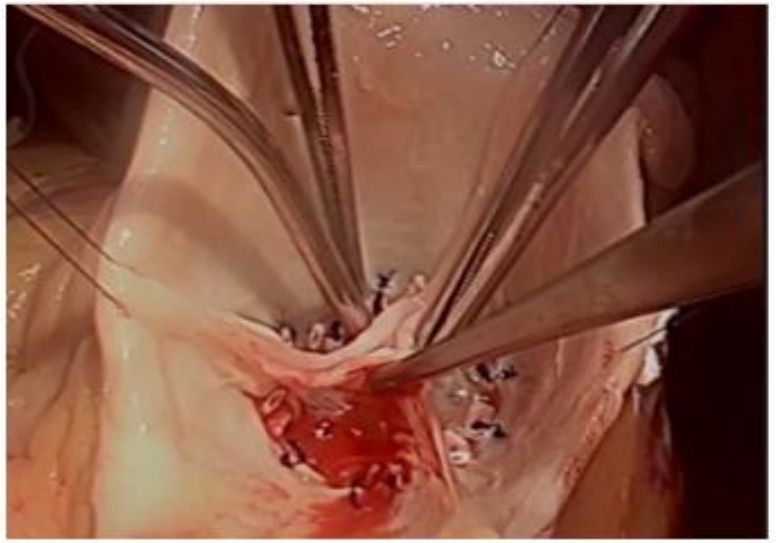
Leaflet free-edge measurements determine the normal annular dimension for improved leaflet coaptation

No Deep Root Dissection



Save time and avoid the deep root dissection and coronary reimplantation when not indicated

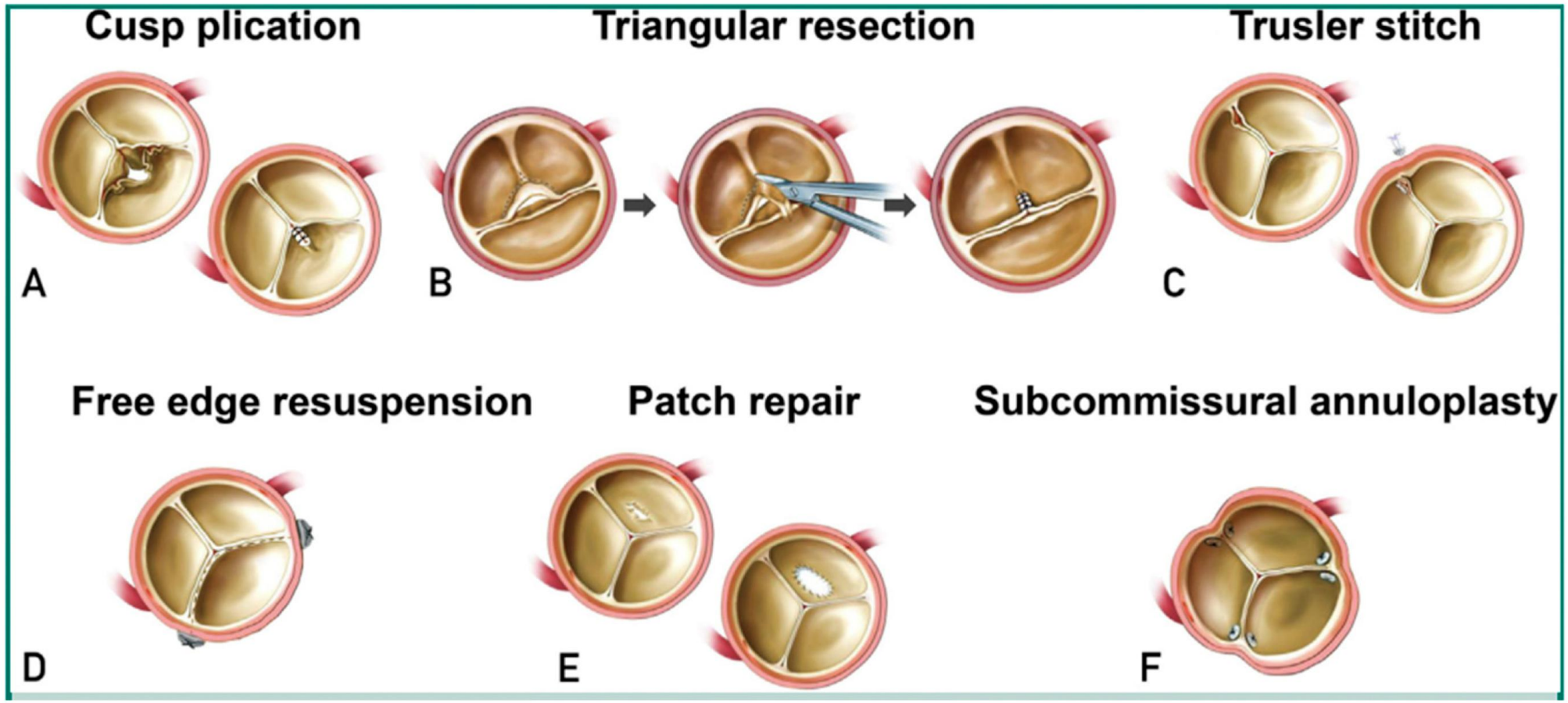
Standardized Leaflet Repairs



Devices recruit the leaflets towards the midline and provide a stable base for reproducible leaflet reconstruction

https://www.corcym.com/devices/aortic

AORTIC VALVE LEAFLETS RECONSTRUCTION



ΩΝΑ
ΝΟΣΟΚΟΜΕΙΟ

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PREOPERATIVE ASSESSMENT





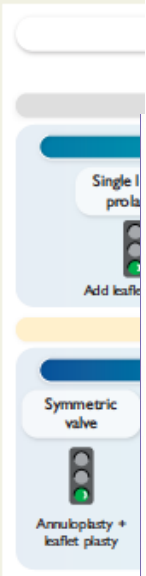
Current st

Ruggero De Paulis
Alessandro Della
Andrea Salica[1], an

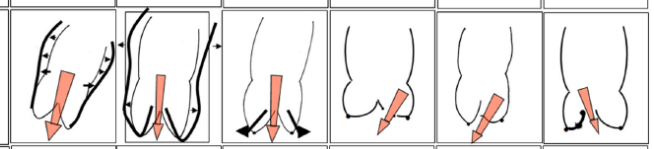
[1]Department of Cardiac Surgery, Europe
Vascular Surgery, Cliniques Universitaire
Campania "L. Vanvitelli", Naples, Italy; [5]
Madrid, Spain; and [7]Department of Tho

Received 26 July 2024; revised 12 Novem

Graphical Abstract



Algorithm to repair a regurgita
easy with good chance of satis
isfactory long-term results. Fin
are unproven.

AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II	Type III
	Ia	Ib	Ic	Id	Cusp Prolapse	Cusp Restriction
Mechanism						
Repair Technique (*Primary*)	STJ remodeling *Ascending aortic graft*	Aortic Valve sparing: *Reimplantation or remodeling with VAJ annuloplasty*	VAJ annuloplasty	Patch Repair *Autologous or bovine pericardium*	Prolapse Repair • *Free margin plication* • *Triangular resection* • *Free margin resuspension* • *Patch*	Leaflet Repair • *Shaving* • *Decalcification* • *Patch*
(*Secondary*)	VAJ annuloplasty		STJ annuloplasty	VAJ annuloplasty	VAJ annuloplasty	VAJ annuloplasty

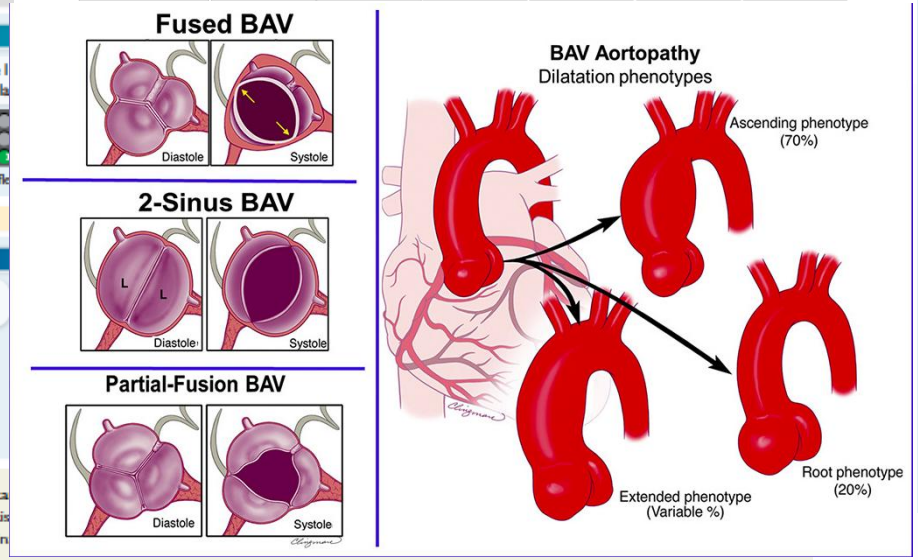


Table 3 Goal-directed pre-repair transoesophageal echocardiogram assessment

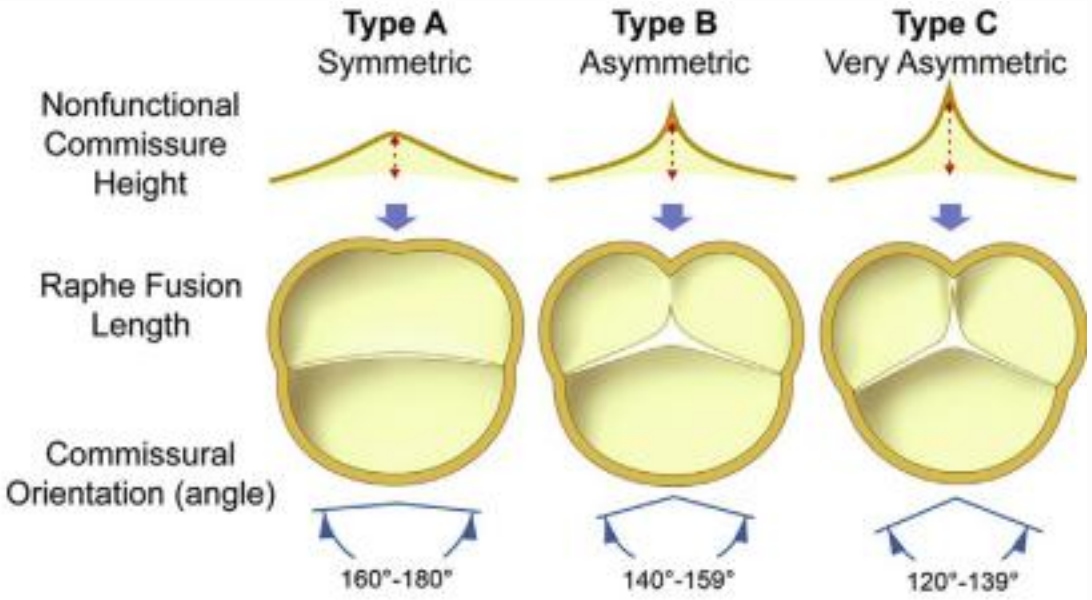
Pre-repair qualitative features	Pre-repair quantitative parameters
• Valve morphology (i.e. BAV, TAV, etc.)	• Annulus measurement
• Cusp systolic mobility	• Sinus of Valsalva measurement
• Cusp thickening	• Sino-tubular junction measurement
• Cusp calcification	• Cusp geometric height
• Cusp prolapse	• Cusp effective height
• Cusp retraction	• Coaptation length
• Cusp perforation	**Specific BAV parameters**
Specific BAV features	• Symmetry assessment (non-fused cusp angle)
• BAV phenotype (fused, two-sinus, forme fruste)	
• Presence of raphe	
• Raphe calcification	
• Raphe free-edge retraction	

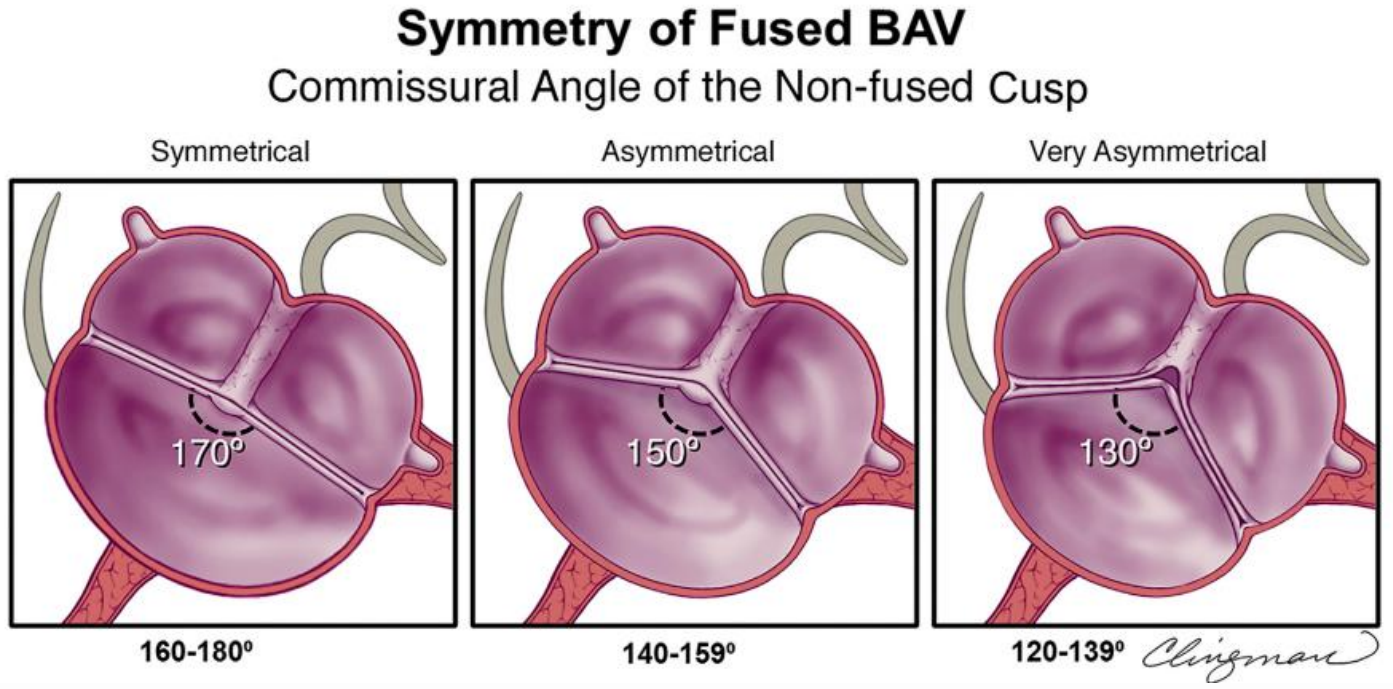
- De Paulis R, Chirichilli I, de Kerchove L, Della Corte A, El Khoury G, Michelena HI, Salica A, Schäfers HJ. Current status of aortic valve repair surgery. Eur Heart J. 2025 Apr 15;46(15):1394-1411.
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PREOPERATIVE ASSESSMENT

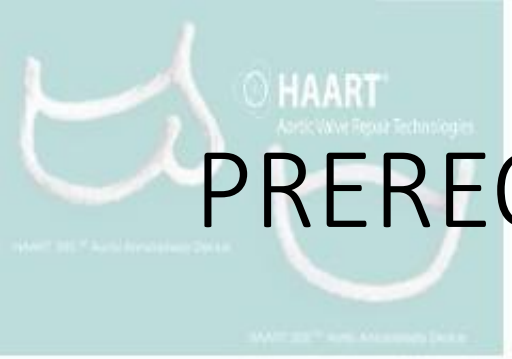
Variability of repairable bicuspid aortic valve phenotypes: towards an anatomical and repair-oriented classification†

Laurent de Kerchove[a,*], Stefano Mastrobuoni[a], Lennart Froede[b], Saadallah Tamer[a], Munir Boodhwani[c], Michel van Dyck[d], Gebrine el Khoury[a] and Hans-Joachim Schäfers[b]





- de Kerchove L, Mastrobuoni S, Froede L, Tamer S, Boodhwani M, van Dyck M, El Khoury G, Schäfers HJ. Variability of repairable bicuspid aortic valve phenotypes: towards an anatomical and repair-oriented classification. Eur J Cardiothorac Surg. 2019 Feb 20:ezz033.
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PREREQUISITES FROM VALVE SIDE



Table 4 Criteria and parameters predicting good chances (and/or favourable long-term prognosis) of repair of a regurgitant aortic valve

Quantitative parameters	Favours choice of repair
• Pre-op geometric height (gH)	>17 mm for TAV; > 20 mm for BAV
• BAV: commissural orientation	>140° (better if ≥160°)
• Post-repair effective height (eH)	>9 mm
• Post-repair coaptation length	>4 mm

Qualitative criteria	Favours choice of repair
• Leaflet fibrosis/retraction	None or minimal
• Leaflet calcifications	Small
• BAV: calcifications	Confined to the raphe
• Fenestrations	Small, single, para-commissural
• Tears/commissure disruption	Absent
• Other endocarditic lesions	Absent

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕ

De Paulis R, Chirichilli I, de Kerchove L, Della Corte A, El Khoury G, Michelena HI, Salica A, Schäfers HJ. Current status of aortic valve repair surgery. Eur Heart J. 2025 Apr 15;46(15):1394-1411.

GOALS

Targets to TAV repair

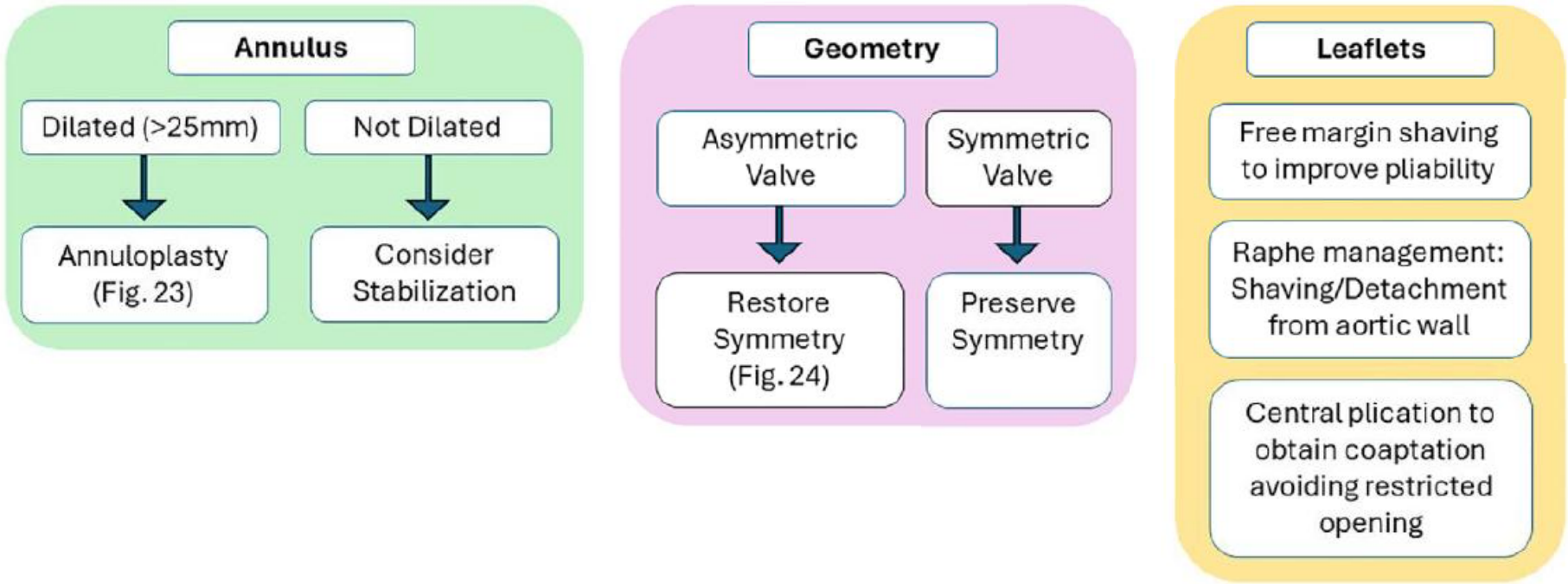


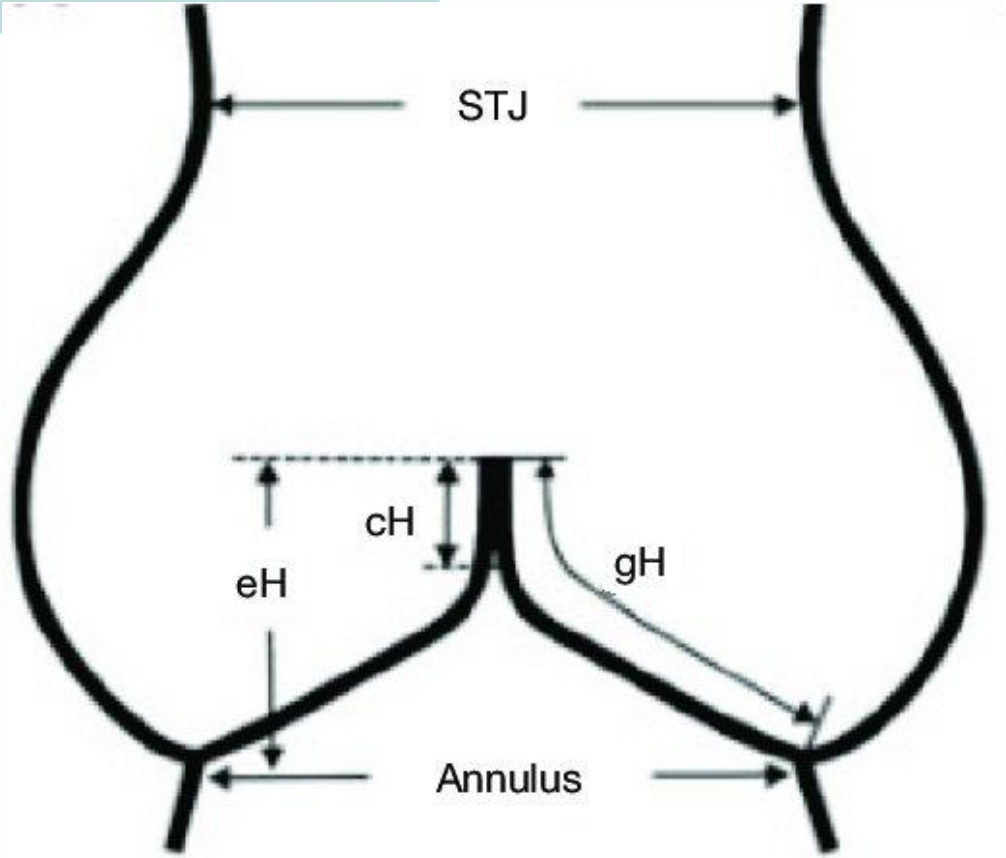
Figure 17 Targets to repair the bicuspid valve: annulus, cusps, and geometry. Each of these anatomical aspects needs to be considered for good and durable results

De Paulis R, Chirichilli I, de Kerchove L, Della Corte A, El Khoury G, Michelena HI, Salica A, Schäfers HJ. Current status of aortic valve repair surgery. Eur Heart J. 2025 Apr 15;46(15):1394-1411.

METRICS OF SUCCESS







What is a good repair result, and when to reclamp?

Immediately after removing the cross-clamp, we perform trans-oesophageal echocardiography to assess for AI. This period of time between removing the cross-clamp and discontinuing cardiopulmonary bypass is when the repaired AV is under the most stress. This is because non-pulsatile flow from the arterial cannula is continuously pushing back on the valve. We find that if there is no residual AI at this stage, the results of the repair will be satisfactory once cardiopulmonary bypass has been discontinued.

We will only accept no residual AI or trace AI with a central jet. Any eccentric jet, even if trivial, is not accepted as long-term results will be poor. Using 3D echo, we will be satisfied with an effective height eH ≥9 mm, coaptation height (cH) ≥4 mm, an aortic annulus <25 mm, and mean transaortic pressure gradient <10 mmHg (52).

The presence of more than trivial AI after repair, or an eccentric jet, defines a suboptimal result. In this case, the AI jet direction is crucial for subsequent surgical management.

Furthermore, a supravalvular annuloplasty is needed at the level of the STJ in order to restore the STJ/annulus ratio of 1.2

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

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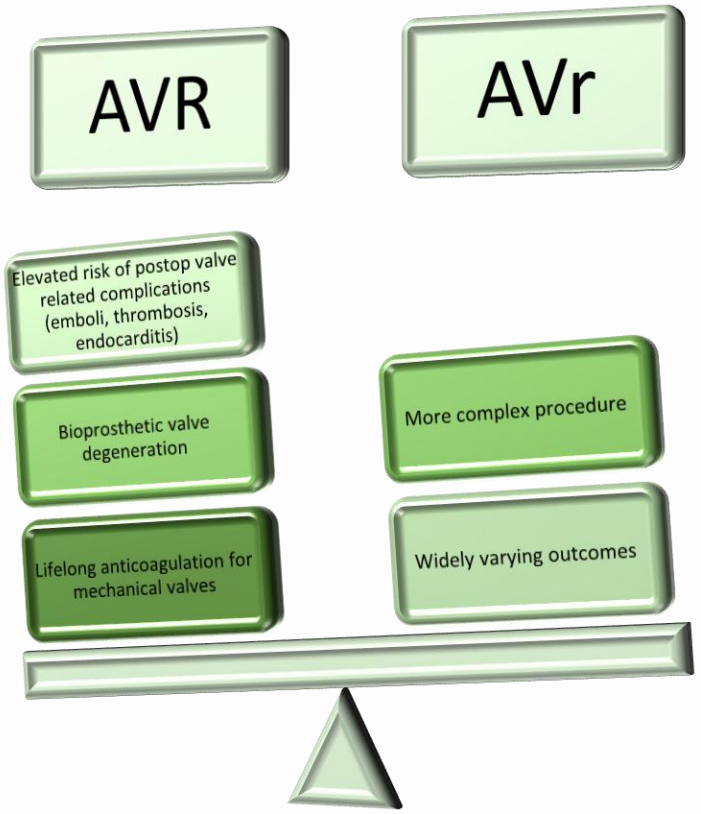




WHY VALVE SPARING/REPAIR?

Valve competent?

Valve needs to be repaired?



Wisely, the Nicelander physicians thought that broken chordae like a broken leg should be treated by early repair rather than by a wooden leg. The patient was in

ΩΝΑΣΕΙΟ ΝΟΣΟΚΟΜΕΙΟ

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- Carpentier A. Cardiac valve surgery--the "French correction". J Thorac Cardiovasc Surg. 1983 Sep;86(3):323-37.



WHY VSRR?

- Survival at 10 years ranges between 85% and 92%
- Freedom from reoperation for AR of 88% at 20 years, 90% at 12 years, 96% at 15 years in various studies
- In the context of AR without aortic dilatation, repair of TAV with cusp prolapse
  - 80% 10-year survival
  - freedom from AV reintervention of 79%–80% at 10 years and 72%–73% at 15 years
- In BAV repair, freedom from reoperation up to 91% at 10 years, 88% at 15 years

ΩΝΑΣΕΙΟ
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- Mastrobuoni S, Govers PJ, Veen KM, Jahanyar J, van Saane S, Segreto A, *et al.* Valve-sparing aortic root replacement using the reimplantation (David) technique: a systematic review and meta-analysis on survival and clinical outcome. *Ann Cardiothorac Surg* 2023;**12**:149–58.
- Sharma V, Suri RM, Dearani JA, Burkhart HM, Park SJ, Joyce LD, *et al.* Expanding relevance of aortic valve repair-is earlier operation indicated? *J Thorac Cardiovasc Surg* 2014; **147**:100–7.
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Systematic Review

Valve-sparing aortic root replacement using the reimplantation (David) technique: a systematic review and meta-analysis on survival and clinical outcome

Stefano Mastrobuoni[1], Pascal J. Govers[2], Kevin M. Veen[3], Jama Jahanyar[4], Silke van Saane[2], Antonio Segreto[1], Luca Zanella[1,5], Laurent de Kerchove[1], Johanna J. M. Takkenberg[3], Bardia Arabkhani[2]

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Background: Current guidelines recommend valve-sparing aortic root replacement (VSRR) procedures over valve replacement for the treatment of root aneurysm. The reimplantation technique seems to be the most widely used valve-sparing technique, with excellent outcomes in mostly single-center studies. The aim of this systematic review and meta-analysis is to present a comprehensive overview of clinical outcomes after VSRR with the reimplantation technique, and potential differences for bicuspid aortic valve (BAV) phenotype.

Methods: We conducted a systematic literature search of papers reporting outcomes after VSRR that were published since 2010. Studies solely reporting on acute aortic syndromes or congenital patients were excluded. Baseline characteristics were summarized using sample size weighting. Late outcomes were pooled using inverse variance weighting. Pooled Kaplan-Meier (KM) curves for time-to-event outcomes were generated. Further, a microsimulation model was developed to estimate life expectancy and risks of valve-related morbidity after surgery.

Results: Forty-four studies, with 7,878 patients, matched the inclusion criteria and were included for analysis. Mean age at operation was 50 years and almost 80% of patients were male. Pooled early mortality was 1.6% and the most common perioperative complication was chest re-exploration for bleeding (5.4%). Mean follow-up was 4.8±2.8 years. Linearized occurrence rates for aortic valve (AV) related complications such as endocarditis and stroke were below 0.3% patient-year. Overall survival was 99% and 89% at 1- and 10-year respectively. Freedom from reoperation was 99% and 91% after 1 and 10 years, respectively, with no difference between tricuspid and BAVs.

Conclusions: This systematic review and meta-analysis shows excellent short- and long-term results of valve-sparing root replacement with the reimplantation technique in terms of survival, freedom from reoperation, and valve related complications with no difference between tricuspid and BAVs.

Keywords: Valve-sparing operations; reimplantation technique; meta-analysis

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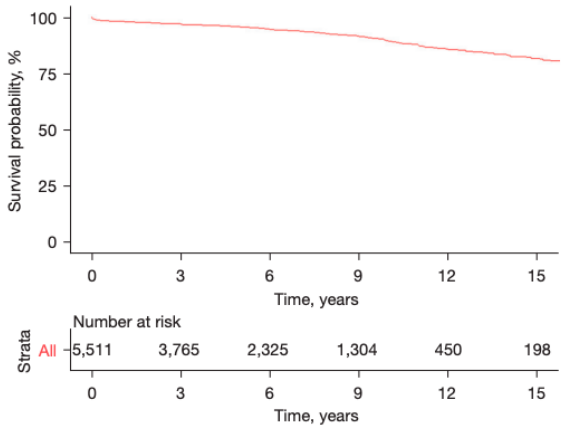


Figure 2 Pooled Kaplan-Meier curve of overall survival.

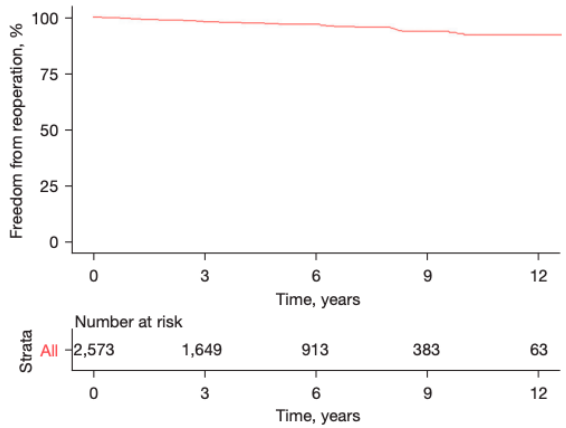


Figure 3 Pooled Kaplan-Meier curve overall freedom from reoperation on the aortic valve.

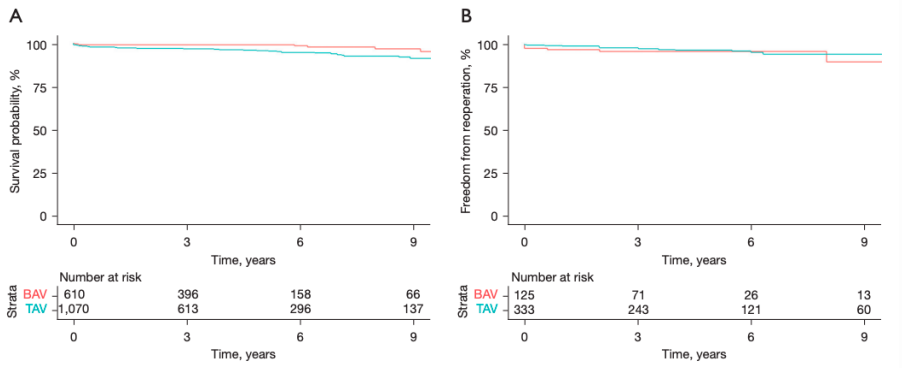


Figure 4 Pooled Kaplan-Meier curve of survival in TAV and BAV (A), and pooled freedom from reoperation on the aortic valve in TAV and BAV (B). BAV, bicuspid aortic valve; TAV, tricuspid aortic valve.

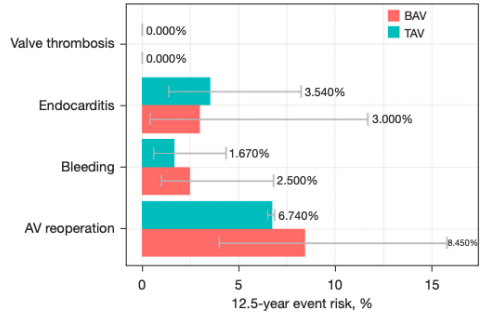


Figure 5 Cumulative 12.5-year risk of valve-related events for BAV and TAV based on microsimulation model. BAV, bicuspid aortic valve; TAV, tricuspid aortic valve.

- Mastrobuoni S, Govers PJ, Veen KM, Jahanyar J, van Saane S, Segreto A, Zanella L, de Kerchove L, Takkenberg JJM, Arabkhani B. Valve-sparing aortic root replacement using the reimplantation (David) technique: a systematic review and meta-analysis on survival and clinical outcome. Ann Cardiothorac Surg. 2023 May 31;12(3):149-158.

Valve-Sparing Root Replacement Versus Composite Valve Grafting in Aortic Root Dilation: A Meta-Analysis

Check for updates

Malak Elbatarny, MD, Derrick Y. Tam, MD, J. James Edelman, MD, PhD, Rodolfo V. Rocha, MD, Michael W. A. Chu, MD, Mark D. Peterson, MD, PhD, Ismail El-Hamamsy, MD, PhD, Jehangir J. Appoo, MDCM, Jan O. Friedrich, MD, Munir Boodhwani, MD, PhD, Bobby Yanagawa, MD, PhD, and Maral Ouzounian, MD, PhD, on behalf of the Canadian Thoracic Aortic Collaborative (CTAC) Investigators

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Background. Aortic valve-sparing operations theoretically have fewer stroke and bleeding complications but may increase late reoperation risk versus composite valve grafts.

Methods. We meta-analyzed all studies comparing aortic valve-sparing (reimplantation and remodelling) and composite valve-grafting (bioprosthetic and mechanical) procedures. Early outcomes were all-cause mortality, reoperation for bleeding, myocardial infarction, and thromboembolism/stroke. Long-term outcomes included all-cause mortality, reintervention, bleeding, and thromboembolism/stroke. Studies exclusively investigating dissection or pediatric populations were excluded.

Results. A total of 3794 patients who underwent composite valve grafting and 2424 who underwent aortic valve-sparing procedures were included from 9 adjusted and 17 unadjusted observational studies. Mean follow-up was 5.8 ± 3.0 years. Aortic valve sparing was not associated with any difference in early mortality, bleeding, myocardial infarction, or thromboembolic complications. Late mortality was significantly lower after valve sparing (incident risk ratio, 0.68; 95% confidence interval [CI], 0.54-0.87; $P < .01$). Late thromboembolism/stroke (incident rate ratio, 0.36; 95% CI, 0.22-0.60; $P < .01$) and bleeding (incident rate ratio, 0.21; 95% CI, 0.11-0.42; $P < .01$) risks were lower after valve sparing. Procedure type did not affect late reintervention.

Conclusions. Aortic valve sparing appears to be safe and associated with reduced late mortality, thromboembolism/stroke, and bleeding compared with composite valve grafting. Late durability is equivalent. Aortic valve sparing should be considered in patients with favorable aortic valve morphology.

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Table 2. Summary of Pooled Perioperative and Late Outcomes After Aortic Valve-Sparing vs Composite Valve-Grafting Operations[a]

Pooled risk ratios for early outcomes	Risk Ratio Overall Analysis (95% CI)	*P*	Risk Ratio Adjusted Data Only (95% CI)	*P*
30 day/hospital mortality	0.65 (0.42-1.03)	.06	0.65 (0.42-1.03)	.88
Reoperation for bleeding	1.08 (0.79-1.48)	.62	0.74 (0.35-2.13)	.57
Myocardial infarction	1.99 (0.37-10.54)	.42	…	…
Thromboembolism/stroke	0.87 (0.51-1.47)	.60	0.87 (0.39-1.93)	.72
Crude pooled surgical outcomes	**Events/Total AVS (%)**	…	**Events/Total CVG (%)**	…
30 day/hospital Mortality	29/1915 (1.5)	…	63/3187 (2.0)	…
Reoperation for bleeding	71/1456 (4.9)	…	119/2693 (4.4)	…
Myocardial infarction	11/824 (1.3)	…	7/1762 (0.4)	…
Thromboembolism/stroke	13/1419 (0.9)	…	33/2627 (1.3)	…
Late outcome	Incident Rate Ratio Overall Analysis (95% CI)	…	Incident Rate Ratio Adjusted Data Only (95% CI)	…
Mortality	0.68 (0.54-0.87)	<.01	0.66 (0.49-0.89)	<.01
Reintervention:	1.15 (0.66-2.01)	.62	0.56 (0.25-1.24)	.15
AVS vs bCVG only	0.29 (0.07-1.21)	.09	…	…
AVS vs mCVG only	1.12 (0.69-1.82)	.65	…	…
Thromboembolism/stroke	0.36 (0.22-0.60)	<.01	0.30 (0.07-1.37)	.12
Bleeding	0.21 (0.11-0.42)	<.01	0.19 (0.07-0.51)	<.01

[a]Studies compare patients undergoing AVS vs CVG operations. Pooled risk ratios were calculated for perioperative outcomes in the overall analyses and in data from adjusted studies only. Incident rate ratios were calculated for late outcomes in the overall analyses and in data from adjusted studies only. Each risk ratio and incident rate ratio is reported for patients undergoing AVS compared with CVG and presented with the 95% CI.

AVS, aortic valve-sparing; bCVG, biological composite valve graft; CI, confidence interval; CVG, composite valve-grafting; mCVG, mechanical composite valve graft.

Elbatarny M, Tam DY, Edelman JJ, Rocha RV, Chu MWA, Peterson MD, El-Hamamsy I, Appoo JJ, Friedrich JO, Boodhwani M, Yanagawa B, Ouzounian M; Canadian Thoracic Aortic Collaborative (CTAC) Investigators. Valve-Sparing Root Replacement Versus Composite Valve Grafting in Aortic Root Dilation: A Meta-Analysis. Ann Thorac Surg. 2020 Jul;110(1):296-306.



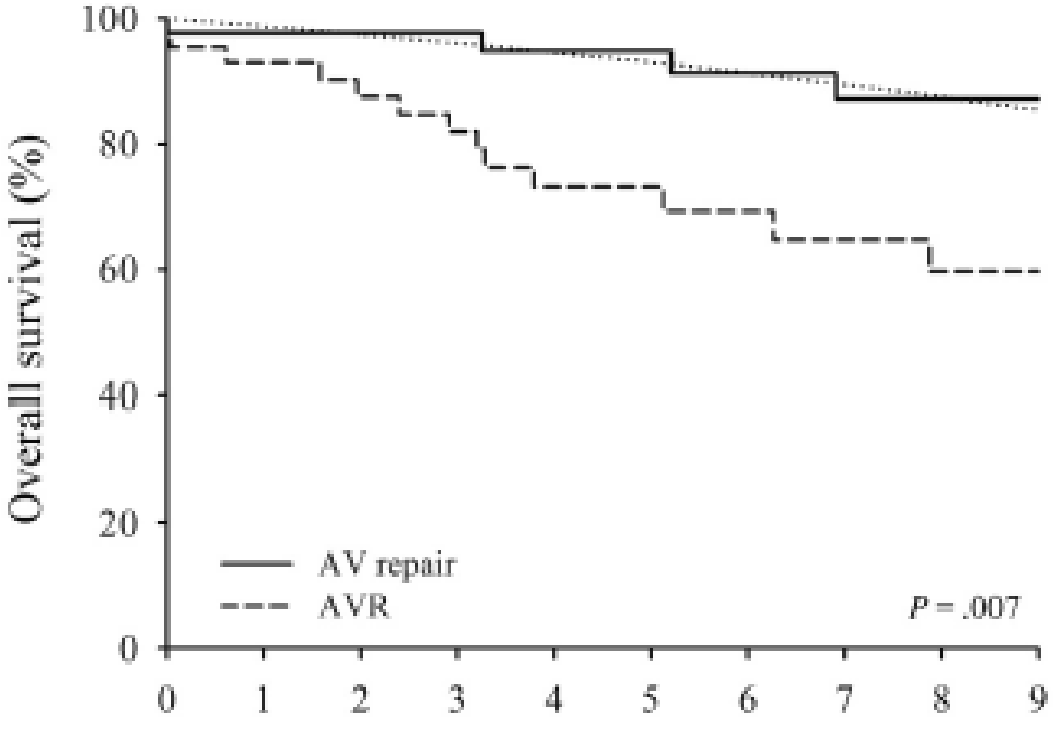


WHY AV REPAIR?

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

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] Choury, MD,[a,c] and Jean-Louis J. Vanoverschelde,



Background: For patients repair represents an attractive alternative to AV replaceme risk of prosthetic valve complications. Although the durab has not yet been compared with prognosis of AVR.

Methods: We performed a nderwent surgical correction of severe AR by either AVR hing, 44 pairs of patients were compared regarding baseli ival; cardiac events, including reoperations; recurrent AR: at final follow-up.

Results: Operative mortalit vs 5%; $P = .56$). Kaplan-Meier survival analysis indicated a significantly better overall 9-year survival after AV repair than after AVR (87% vs 60%; $P = .007$). Cox proportional survival analysis demonstrated that the choice of treatment was an independent predictor of postoperative survival. Finally, AV repair resulted in a slight increase, albeit not statistically significant, in reoperation rate (8% vs 2%; log rank $P = .35$).

Conclusions: AV repair significantly improves postoperative outcomes in patients with AR and whenever feasible should probably be the preferred mode of surgical correction. (J Thorac Cardiovasc Surg 2014; ■:1-8)

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Valve: Research

Aortic Valve Repair Resul
Survival Than Replaceme
German Aortic Valve Regi

Evaldas Girdauskas, MD,[1,2] Ümniye Bala
Timm Bauer, MD,[5] Andreas Beckmann, M
Stephan Ensminger, MD,[8] Christian Frerk
Johannes Petersen, MD,[1] Thomas Walth

ABSTRACT

BACKGROUND Aortic valve (AV) repair is an evolvir
regurgitation. We aimed to determine the 1-year out
world data from the German Aortic Valve Registry.

METHODS A total of 8076 aortic regurgitation patie
Thoracic Surgeons score, 1.3 ± 1.1), who underwent A
German Aortic Valve Registry. The AV was repaired
derwent sAVR. A weighted propensity score model, i
geons score, was used to correct for baseline differen
1-year survival after AV repair vs sAVR. Secondary en

RESULTS Survival at 1 year was 97.7% (95% CI, 97.
in the propensity score-weighted sAVR cohort (log-r
repair vs sAVR (hazard ratio, 0.68; 95% CI, 0.51-0.
Cardiac event-free survival at 1 year was 85.7% (9
80.7%-82.9%) in the sAVR group (log-rank $P < .00$
compared with 1.6% in the sAVR cohort ($P = .59$).

CONCLUSIONS AV repair surgery, whenever intraoperatively feasible, is associated with a significantly better 1-year survival und 1-year cardiac event-free survival compared with sAVR.

(Ann Thorac Surg 2023;■:■-■)

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Although all study patients had an isolated/predominant AR, only 29% underwent AV repair (Figure 2A). The reasons for not performing AV repair in the sAVR cohort (eg, lack of expertise, severe prognosis-limiting comorbidities, cusp fibrosis/calcification, and large fenestrations) are not specifically reported in GARY; however, we suppose that the proportion of AV repair could be potentially higher in this cohort of young and low-risk patients. To enable the sparing of all "technically repairable" AVs, such patients should be referred to specialized high-volume AV repair centers. Indeed, almost one-half of all AV repair patients (47%) in the current study were treated by 4 participating hospitals. This fact highlights an already existent network of selective referrals to specialized AV repair centers that have an appropriate infrastructure and expertise.

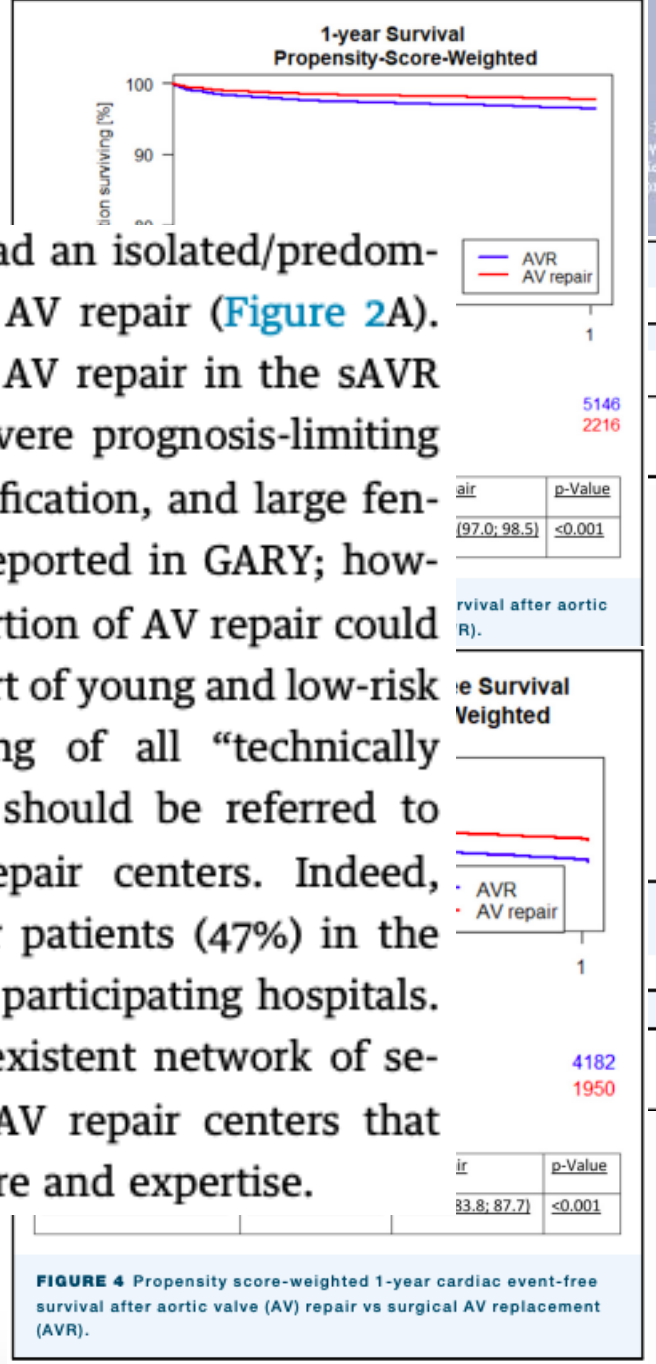


FIGURE 4 Propensity score-weighted 1-year cardiac event-free survival after aortic valve (AV) repair vs surgical AV replacement (AVR).



TABLE 3 Cox Regression Analysis of Survival[a]

Risk Factor	Hazard Ratio	95% CI	*P* Value
Age, y	1.05	1.03-1.06	<.001
AV repair (vs sAVR)	0.64	0.47-0.87	.005

[a]Propensity score-weighted on age, sex, and The Society of Thoracic Surgeons score. AV, aortic valve; sAVR, surgical aortic valve replacement.

TABLE 4 Cox Regression Analysis of Adverse Cardiac Events[a]

Risk Factor	Hazard Ratio	95% CI	*P* Value
AV repair (vs sAVR)	0.77	0.67-0.88	.0001

[a]Propensity score-weighted on age, sex, and The Society of Thoracic Surgeons score. AV, aortic valve; sAVR, surgical aortic valve replacement.

• Girdauskas E, Balaban Ü, Herrmann E, Bauer T, Beckmann A, Bekeredjian R, Ensminger S, Frerker C, Möllmann H, Petersen J, Walther T, Bleiziffer S. Aortic Valve Repair Results in Better 1-Year Survival Than Replacement: Results From German Aortic Valve Registry. Ann Thorac Surg. 2024 Mar;117(3):517-525.

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ORIGINAL ARTICLE

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Aortic valve repair in adults: long-term clinical outcomes and echocardiographic evolution in different valve repair techniques

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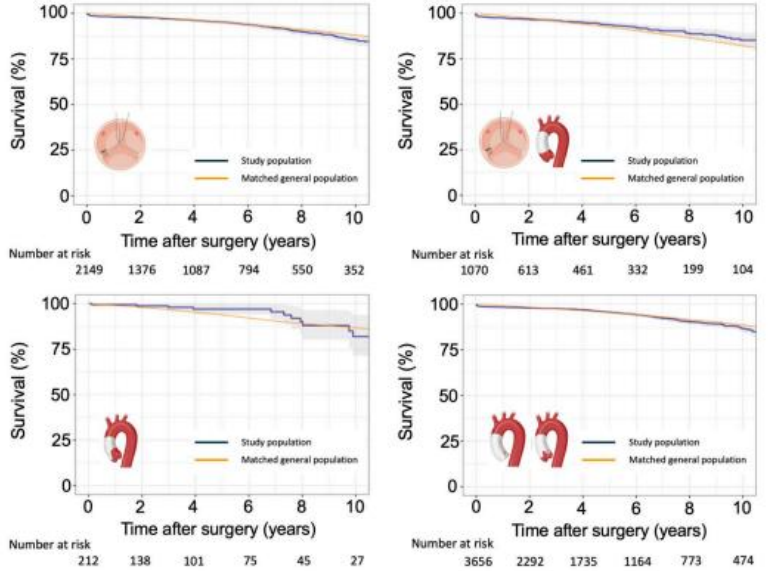


Figure 1: Long-term survival after aortic valve repair/sparing techniques compared with the age-, country of origin- and sex-matched general population for each group.

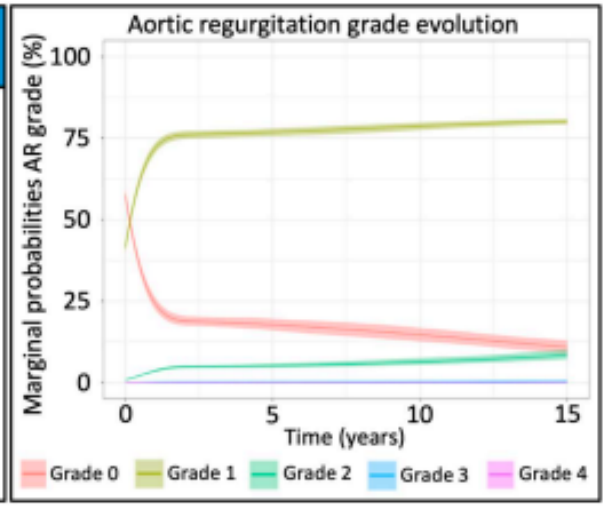
Aortic valve repair in adults: long-term clinical outcomes and echocardiographic evolution in different valve repair techniques

Summary

This multicenter retrospective study included 7,126 adults that underwent different aortic valve repair/sparing techniques.

This study found that AVR provides durable long-term results with low rates of recurrent more than mild AR.

Ten-year survival was comparable to the matched general population, with a relative survival of 99.4% (97.7-100%), suggesting that AVR may restore life expectancy.



Legend: Aortic regurgitation (AR); Aortic valve repair/sparing (AVR)

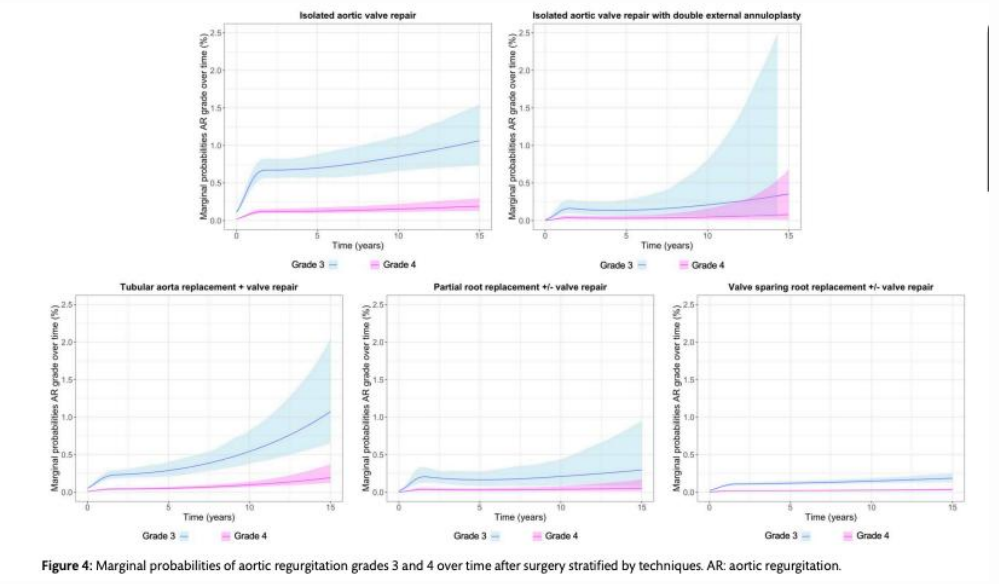


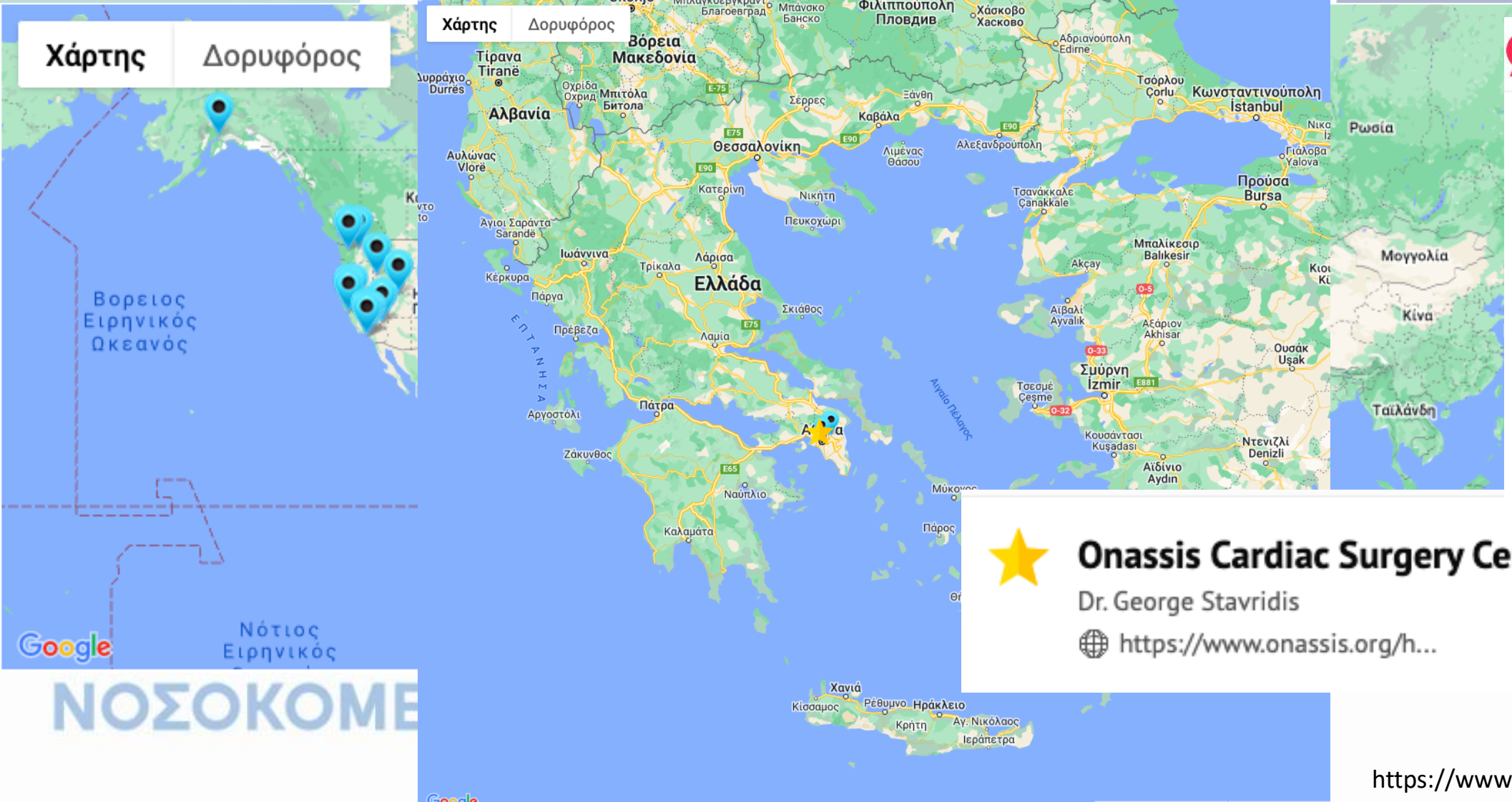
Figure 4: Marginal probabilities of aortic regurgitation grades 3 and 4 over time after surgery stratified by techniques. AR: aortic regurgitation.

Zito F, Veen KM, Melina G, Lansac E, Schäfers HJ, de Kerchove L, Takkenberg JJM, Kluin J, Mokhles MM. Aortic valve repair in adults: long-term clinical outcomes and echocardiographic evolution in different valve repair techniques. Eur J Cardiothorac Surg. 2025 Mar 4;67(3):ezaf020.

WHAT WE (ocsc) ARE DOING? → HAART ring









Onassis Cardiac Surgery Center (Kallithea, Greece)

Dr. George Stavridis

https://www.onassis.org/h...

https://www.corcym.com/devices/aortic

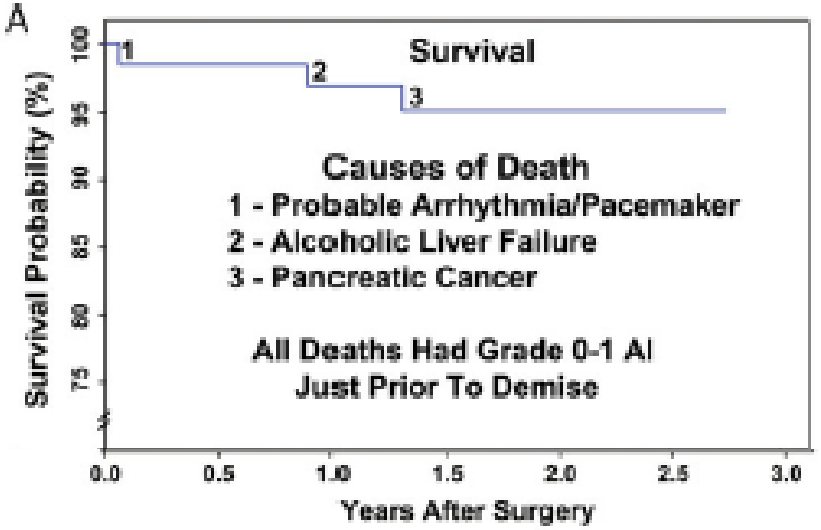
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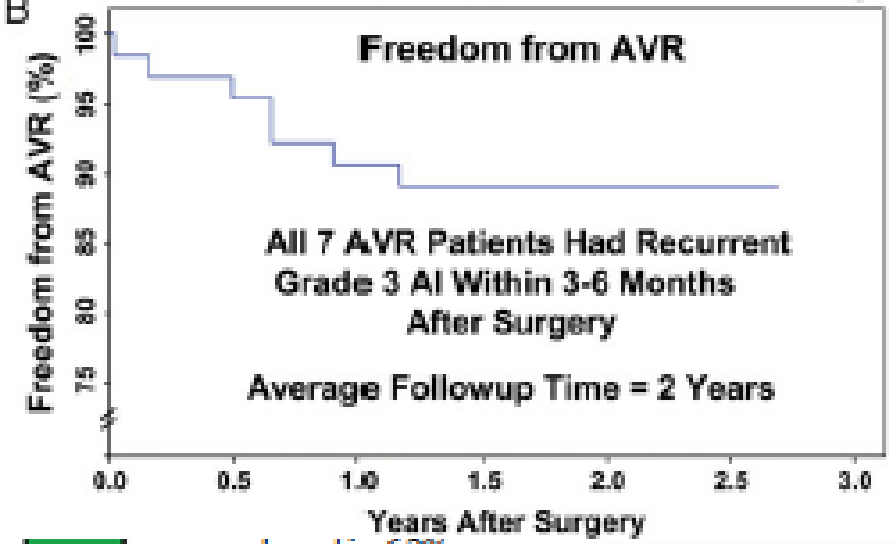
Abstract

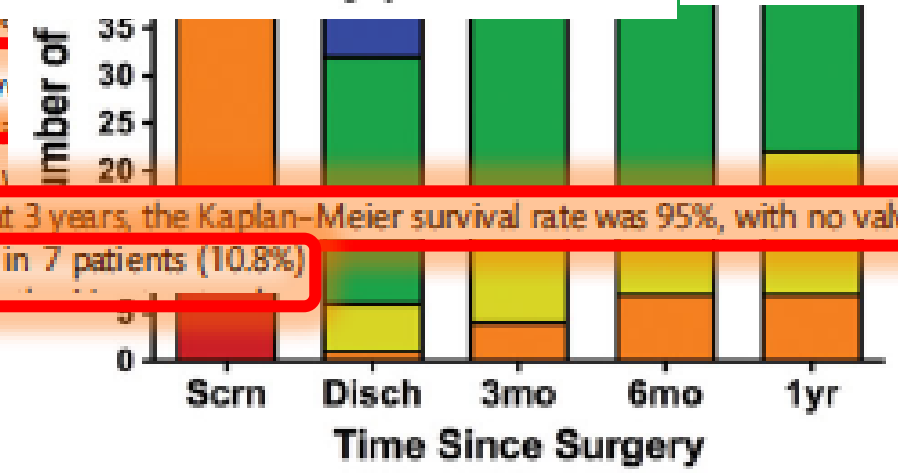
OBJECTIVES: This study assess
construction (ClinicalTrials.gov

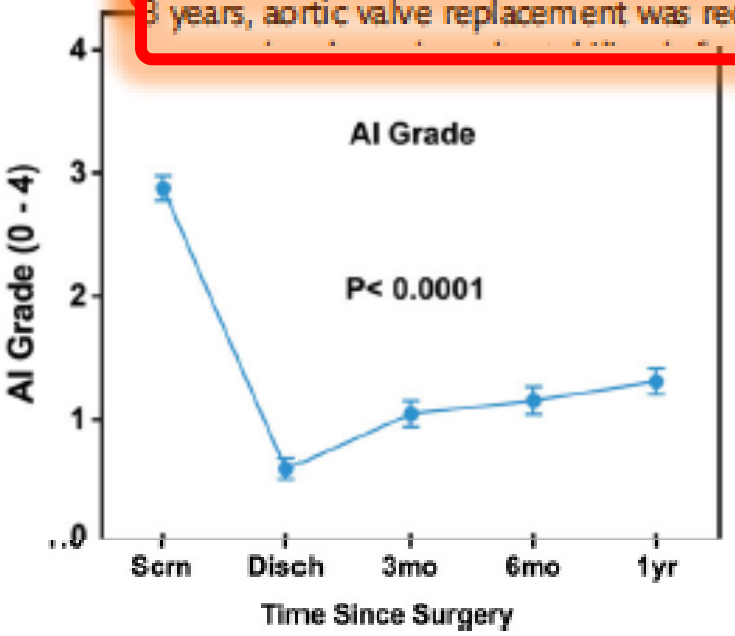
METHODS: Sixty-five patients
an average age of 63 ± 13 years
and facilitate leaflet reconstruc
usually employing autologous

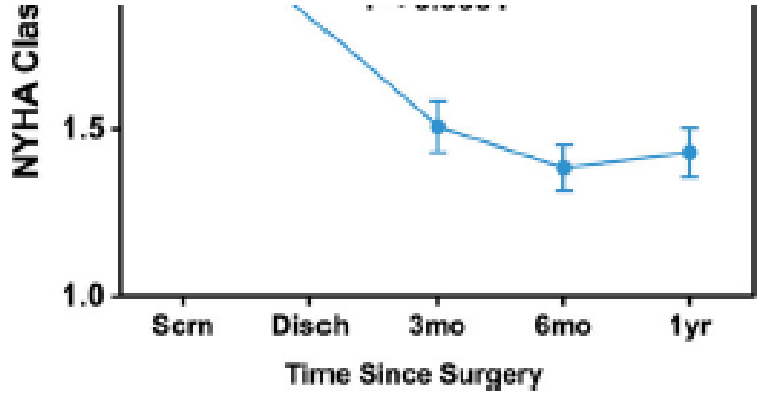
RESULTS: Follow-up was for a maximum of 3 y
early or late
21.5 ± 1.6 mm. The preoperative AI grade (0–4)
mean valve gradient was 8.6 ± 4.3 mm Hg
3 years, aortic valve replacement was required in 7 patients (10.8%)











laced in 62%.

major complications or
ing diameter used was
id the NYHA class. The
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n of annular dilatation
e with geometric ring

a regulatory trial of aortic valve re-

underwent aortic valve repair with
sty ring to correct annular dilatation
d more complex leaflet procedures,
sms were replaced in 62%.

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ir 3 years and a mean of 2 years. No in-hospital operative mortalities, major complications or
The annular diameter before repair was 26.5 ± 2.3 mm, and the average ring diameter used was
0–4) was 2.9 ± 0.8 and improved after repair to 0.6 ± 0.7 ($P < 0.0001$), as did the NYHA class. The
nd at 3 years, the Kaplan–Meier survival rate was 95%, with no valve-related mortality. Over the
ired in 7 patients (10.8%) for reasons usually related to surgical technique. Most repair failures
months. No structural complications of the rings were observed.

sty was a safe and effective adjunct to aortic valve repair. Initial correction of annular dilatation
. Because most early repair failures were technical, increasing experience with geometric ring
has the potential to standardize and improve outcomes.

e repair • Aortic insufficiency

RESULTS (HAART 300 & 200)

Geometric Ring Annuloplasty for Aortic Valve Repair During Aortic Aneurysm Surgery

Two-Year Clinical Trial Results

J. Scott Rankin, MD, Domenico Mazzitelli, MD,† Theodor Fischlein, MD,‡ Yeong-Hoon Choi, MD, PhD,§ Jan Pirk, MD,|| Steffen Pfeiffer, MD,‡ Lawrence M. Wei, MD,* and Vinay Badhwar, MD**

Objective: An aortic annuloplasty ring could be useful for aortic valve repair. This trial evaluated intermediate-term outcomes of internal geometric ring annuloplasty for repair of trileaflet and bicuspid aortic insufficiency associated with ascending aortic and/or aortic root aneurysms.

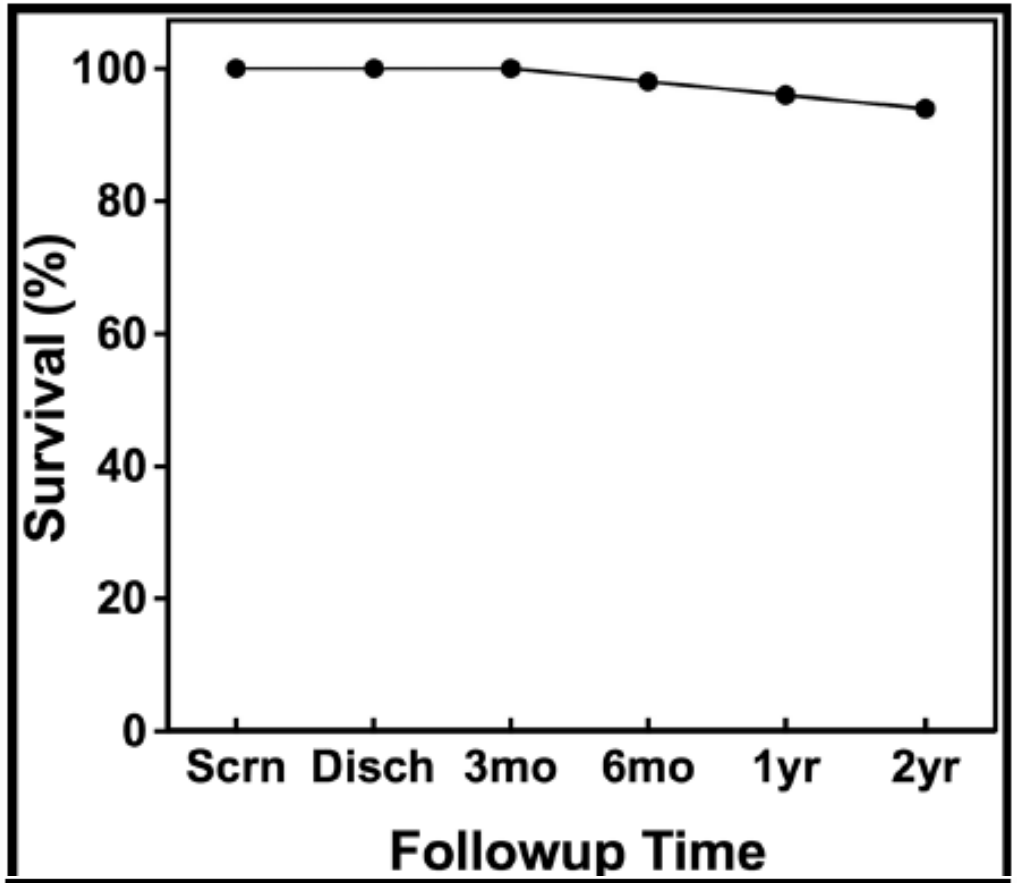
Methods: Under regulatory supervision, 47 patients with aortic insufficiency and ascending aortic (n = 22) and/or aortic root (n = 25) aneurysms were managed with aortic valve repair and aneurysm resection. Valve repair was performed using trileaflet (n = 40) or bicuspid (n = 7) internal geometric rings, together with leaflet reconstruction. Ascending aortic and/or remodeling root replacements were accomplished with Dacron grafts 5 to 7 mm larger than the rings. An Echo Core Lab provided independent echocardiographic assessments, and changes over time were evaluated by Friedman tests.

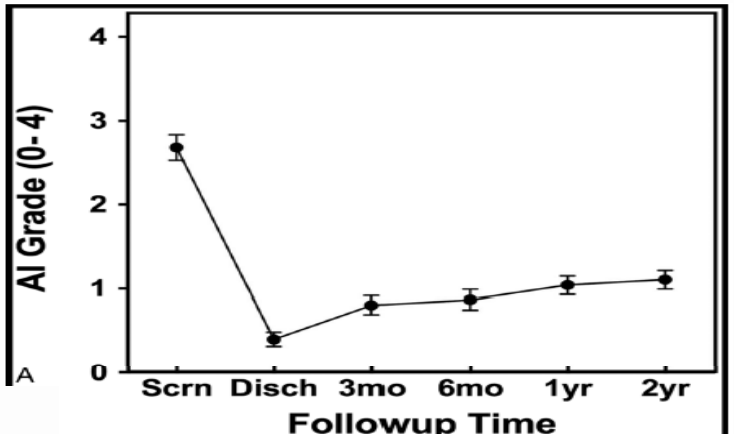
Results: Mean ± SD age was 60 ± 14 years, 57% (27/47) were male, 15% (7/47) had bicuspid valves, 87% (41/47) had moderate-to-severe aortic insufficiency, and 13% (6/47) had mild aortic insufficiency. All patients had annular dilatation, with a mean ± SD of 26.5 ± 2.6 mm before repair, and mean ± SD ring sizes were 21.7 ± 1.7 mm. Follow-up was 42 months (mean = 27 months). No operative mortality or valve-related complications occurred. Two patients died beyond 1 year from nonvalve-related causes. One patient required valve replacement for repair failure. Survival free of complications or valve replacement was 94% at 2 years. Significant reduction in aortic insufficiency and New York Heart Association class were observed ($P < 0.0001$), and valve gradients remained low. No heart block or direct ring complications occurred.

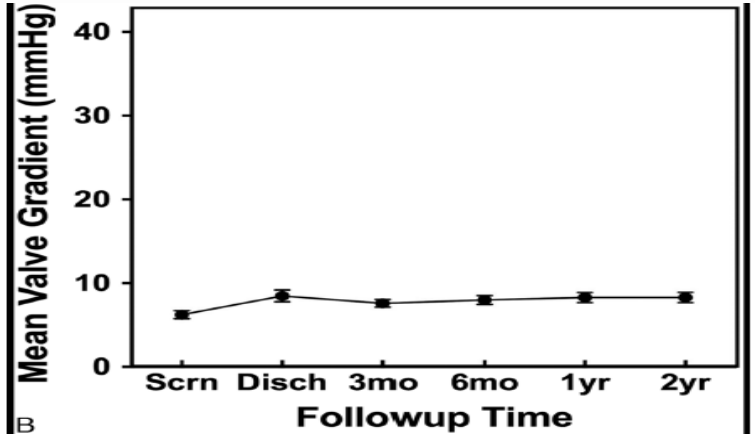
Conclusions: In preliminary regulatory studies, aortic ring annuloplasty seemed safe and effective during aortic aneurysm surgery. This approach could help standardize aortic valve repair.

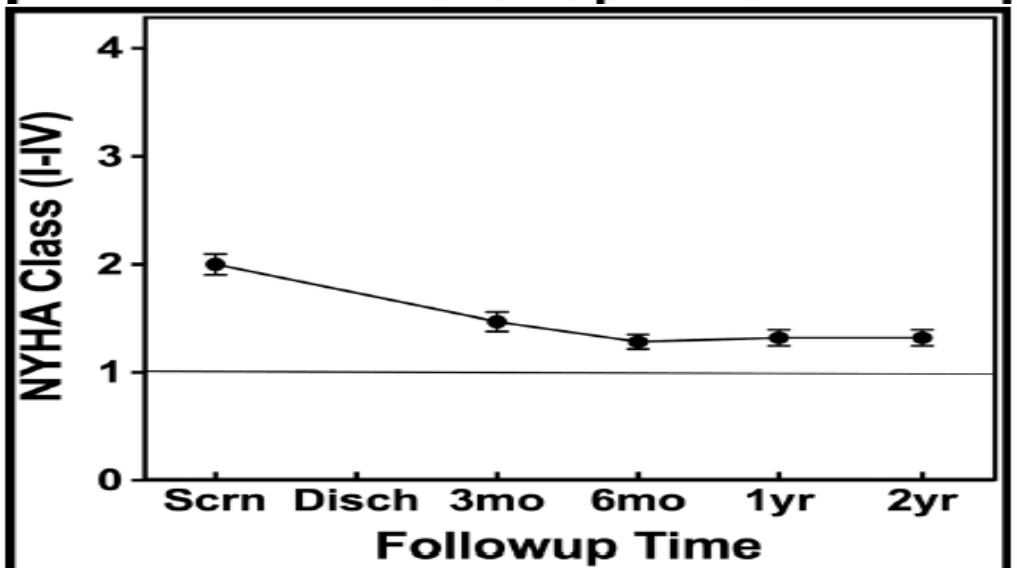
Key Words: Aortic annuloplasty, Aortic valve repair, Aortic root aneurysm, Aortic valve replacement.

(*Innovations* 2018;13:248–253)





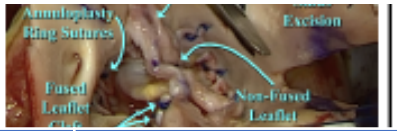




Results: Ring size was 23 (21-23) mm, and 26 of 40 root procedures were selective nonfused sinus replacements. Aortic clamp time was 139 (112-170) minutes, and bypass time was 178 (138-217) minutes. Postrepair aortic insufficiency grade was 0 (0-0) ($P < .0001$), and mean valve gradient was 10 (7-14) mm Hg. No early and 1 late mortality occurred. Four patients required reoperation for bleeding, and 4 patients required pacemakers. At a mean follow-up of 20 months (maximal 93), there were no valve-related complications, 5 late repair failures prompting valve replacement, and 1 death due to Coronavirus Disease 2019.

aortic valve repair associated with proximal aortic aneurysm replacement.

Methods: From September 2017 to November, 2021, 127 patients underwent bicuspid aortic valve repair with concomitant proximal aneurysm reconstruction. Patient age



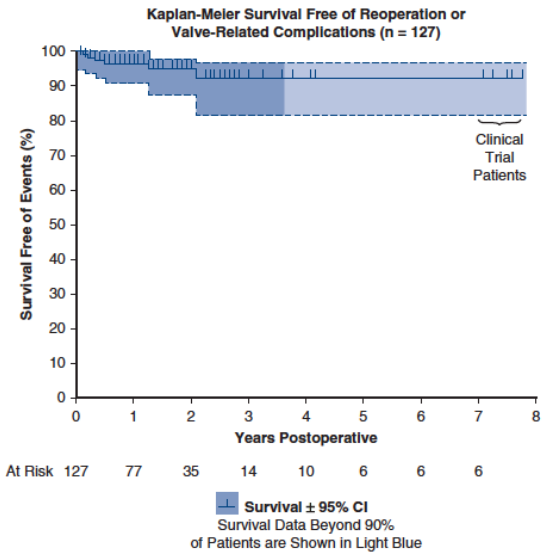


FIGURE 6. Kaplan–Meier analysis of time-varying events after BAV and proximal aneurysm repair in 127 patients. The composite outcome of interest was survival free of reoperation or valve-related complications. Patients from the early device clinical trials are on the upper right. Blue shading indicates ± 95% confidence limits. Lighter blue shading denotes data from the last 10% of the population. *CI*, Confidence interval.

	Early outcomes (pts/127)	Outcomes at last follow-up [mean of 20 months] (pts/127)*
Mortality	0	1 (COVID-19 at 4 mo postop)
AVR requirement	0	5
AI grade 0-1	127	119
AI grade 2	0	3
AI grade 3-4	0	5
Mean valve gradient (mmHg)	10 (7-14)	12 (8-16)
Reoperation for bleeding	4	-
Permanent pacemaker	5	-

eplacements, N (%)	26 (20%)	–
p time (min)	–	139 (112-170)
e (min)	–	178 (138-217)
e annular diameter	27.2 ± 3.7*	–
	–	23 (21-23)
	–	3 (2-4)
	–	0 (0-0)
	–	10 (7-14)
	–	6 (4-8)

*Intraop data in 17pts
Within 1st postop year in 75 pts
Within 2nd postop year in 15 pts
Within 3rd postop year in 5 pts
Within 4th postop year in 3 pts
Between 4 and 8 postop years in 7 pts

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TAVI IN HAART

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CASE REPORT

Transfemoral transcatheter aortic valve implantation after aortic valve repair with HAART 300 device

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Email: t.gyoten29@gmail.com

Abstract

We report the first successful case, to our knowledge, of CoreValve Evolut R (Medtro Minneapolis, MN) implantation into a failed HAART 300 aortic annuloplasty device (BioSta Science & Engineering, TX). An 81-year-old man presented with severe symptomatic ao regurgitation secondary to failure of the 21 mm HAART 300 device, which had been implant 45 days previously. Transthoracic echocardiography (TTE) revealed grade 3 aortic regurgitat with central jet, without aortic valve stenosis. Because of the high risk for redo surgery, heart team proceeded with femoral transcatheter aortic valve implantation. The 26 mm Co Valve Evolut R was deployed into the 21 mm HAART 300 device without difficulty or compli tions. There were no intraoperative or postoperative complications. The patient was discharg after 5 days. TTE showed a mean aortic valve gradient of 18 mmHg, with minimal paravalvu leak. Our experience suggests that CoreValve Evolut R implantation may be an attractive opti in patients with failed HAART 300 aortic annuloplasty.

KEYWORDS

transcatheter aortic valve implantation, aortic annuloplasty device, aortic valve plasty

Balloon Transcatheter Aortic Valve Replacement After Aortic Valve Repair With HAART 300 Device

Ferdinand Vogt, MD,* Jill Marianowicz, MD,* Jürgen Jessl, MD, Dennis Eckner, MD, and Theodor Fischlein, MD

Departments of Cardiac Surgery and Cardiology, Paracels Medical University Nuremberg, Nuremberg, Germany

The HAART 300 (BioStable Science and Engine Austin, TX) is a rigid, elliptical device introduc facilitate aortic valve repair providing annular stab tion in the setting of aortic regurgitation. Percutar strategies have been described for patients dysfunctional biological prostheses or recurrence i ficiency after mitral ring annuloplasty. This report s the feasibility of aortic valve-in-ring transcatheter valve replacement (TAVR). The sufficient ring stabil support the implanted TAVR-prosthesis and the fac the elliptical shape of the HAART-ring did not resul problem concerning paravalvular leakage were impo for the success of this procedure.

(Ann Thorac Surg 2020;110:e3

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Valve-in-Ring Transcatheter Aortic Valve Replacement After Left Ventricular Assist Device Therapy

Matthew J. Chung, MD, Asvin M. Ganapathi, MD, Amit N. Vora, MD, MPH, Jacob N. Schroder, MD, Todd L. Kiefer, MD, and G. Chad Hughes, MD

Division of Cardiology and Division of Cardiovascular ar Thoracic Surgery, Duke University Medical Center, Durh North Carolina

Aortic regurgitation after left ventricular assist (LVAD) implantation is a well-described problen decreases the clinical effectiveness of LVAD therap may eventually prompt consideration of aortic replacement once the regurgitation becomes s Transcatheter aortic valve replacement is an attra less invasive option compared with surgical aortic replacement in these patients. We report a valve-in transcatheter aortic valve replacement for a patient severe aortic regurgitation associated with LVAD nation therapy. Our case demonstrates that this app is feasible in humans and can yield excellent cl results.

(Ann Thorac Surg 2020;109:e1

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CCI Catheterization & Cardiovascular Interventions

CASE REPORT

Successful transcatheter aortic valve replacement in a failing HAART 300 aortic valve annuloplasty ring: A case report

Omar Abdel-Razek MD, MSc, Alessandro El Khoury BS, Daniel McGrail MD, Roger J. Laham MD

First published: 05 August 2024 | https://doi.org/10.1002/ccd.31177

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Abstract

Transcutaneous aortic valve replacement (TAVR) has evolved from a complex procedure meant only for patients at prohibitive risk for surgery to a commonly performed procedure across a wide variety of clinical scenarios including the treatment of failed aortic valve bioprosthesis. Annuloplasty rings in the aortic position such as HAART 300 (Biostable Science and Engineering) have been introduced in the management of native aortic regurgitation. Percutaneous management of failed bioprosthesis rings in the aortic position has not been widely described. We present a case of a 69-year-old man with recurrent aortic regurgitation successfully treated with TAVR using a SAPIEN 3 valve within a HAART 300 ring.

CONFLICT OF INTEREST STATEMENT

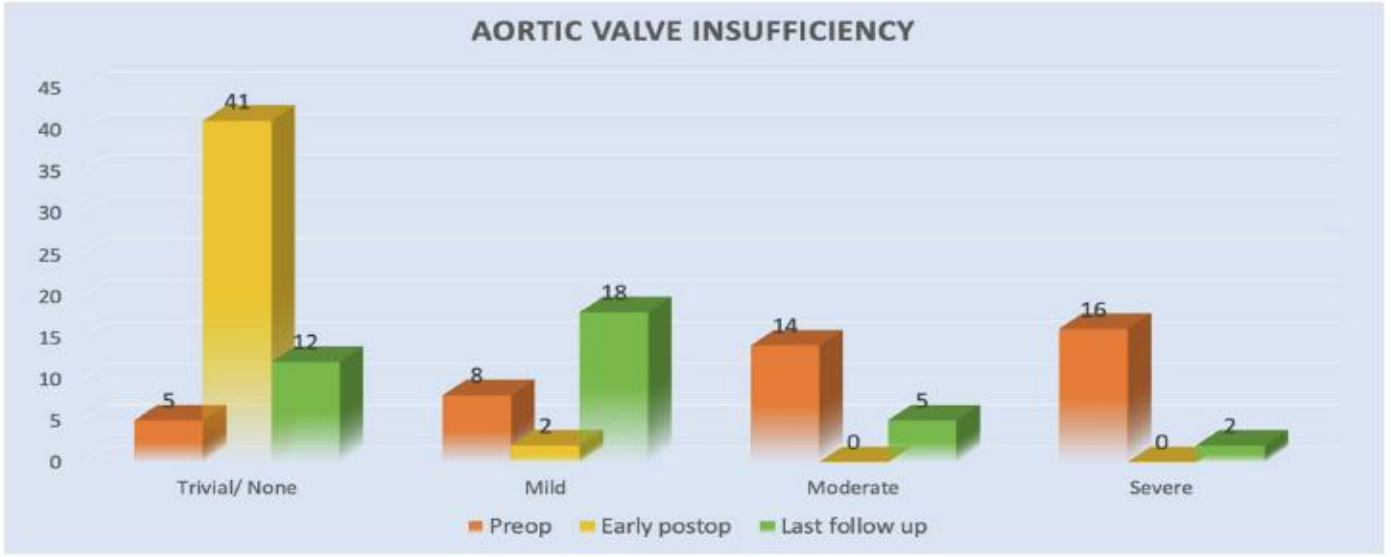
Roger J. Laham is a paid consultant for Medtronic, Abbott, and Edwards. No other conflict of interest.

ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

TABLE 3 Early postoperative and midterm outcomes

Complications	Early postoperative		At last follow up	
Death	1	2.3%	0	0
Reoperation for valve replacement	-	-	2/43	4.7%
Transfusion	27	62.8%	-	-
NYHA I	-	-	29/39	74.4%
Atrial fibrillation	3	7%	-	-
New complete heart block	1	2.3%	-	-
Prolonged ventilation	3	7%	-	-
Reexploration for bleeding	1	2.3%	-	-
Stroke	0	0	-	-
IABP insertion	1	2.3%	-	-
ECMO insertion	1	2.3%	-	-
Open chest	1	2.3%	-	-

FIGURE 2 Comparison between preoperative, early, and mid-term postoperative aortic valve insufficiency grade. Preoperatively, 30% of cases (13 pts) had mild AI, 33% (14 pts) of them had moderate AI, and 37% of them (16 pts) had severe AI. The corresponding early postoperative rate values reported no or trivial AI in 95% (41 pts) of the cohort and only mild AI in the rest of them (2 pts). Finally, at the last follow-up, 32% of the patients (12 pts) had no/trivial AI, 49% of them (18 pts) had mild AI, whereas 14% of them (5 pts) had moderate AI. Only 2 patients (5%) had severe AI, both of them requiring reoperation



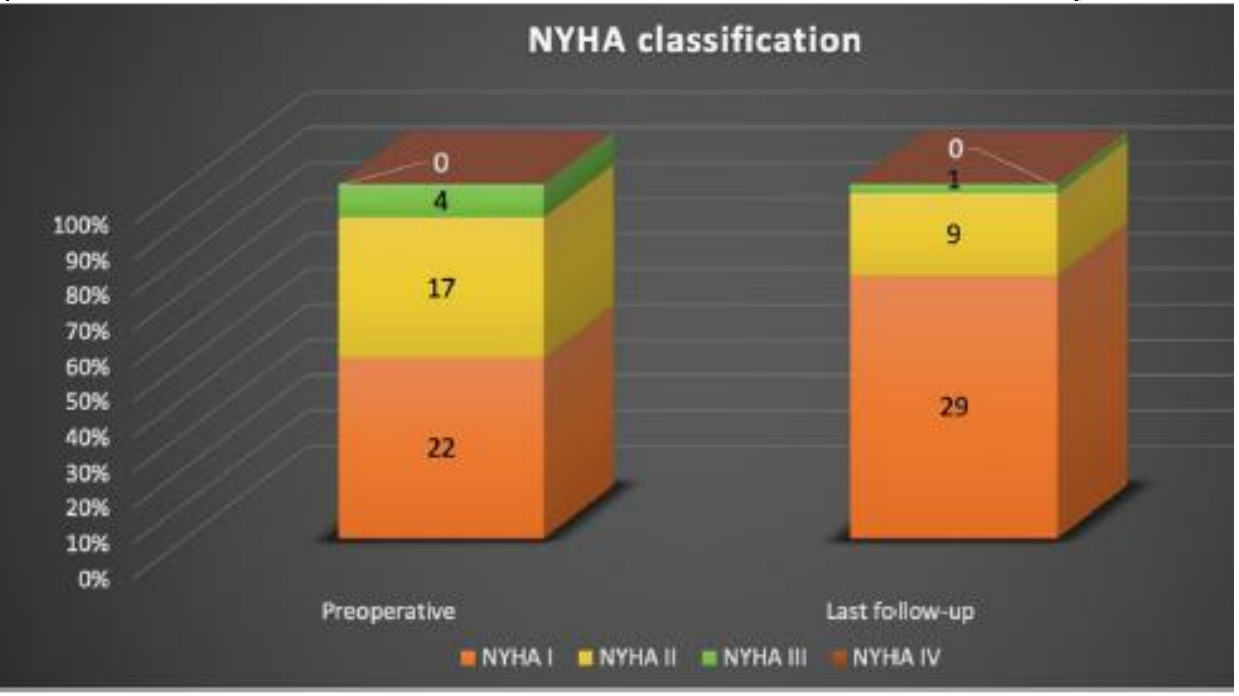


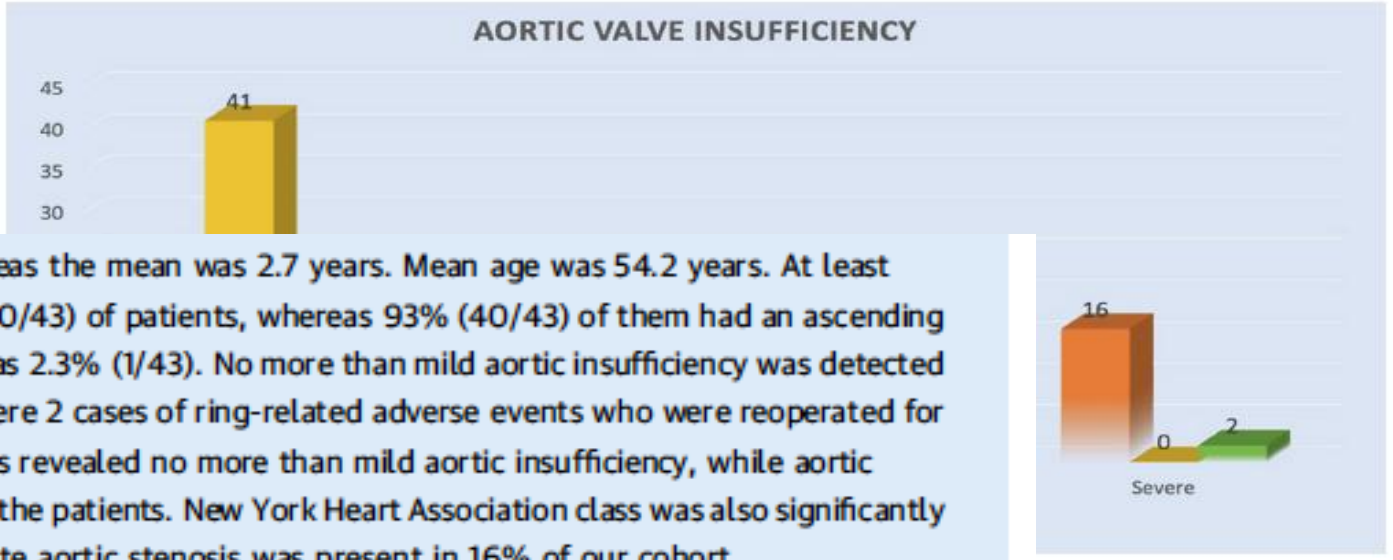
TABLE 4 TTE results at the last follow-up

Last follow-up results by TTE (37 pts)	
None/trace AI	12
Mild AI	18
Moderate AI	5
Severe AI	2
Mild AS	12
Moderate AS	6
Aortic root ≥ 50 mm	3

TABLE 3 Early postoperative and midterm outcomes

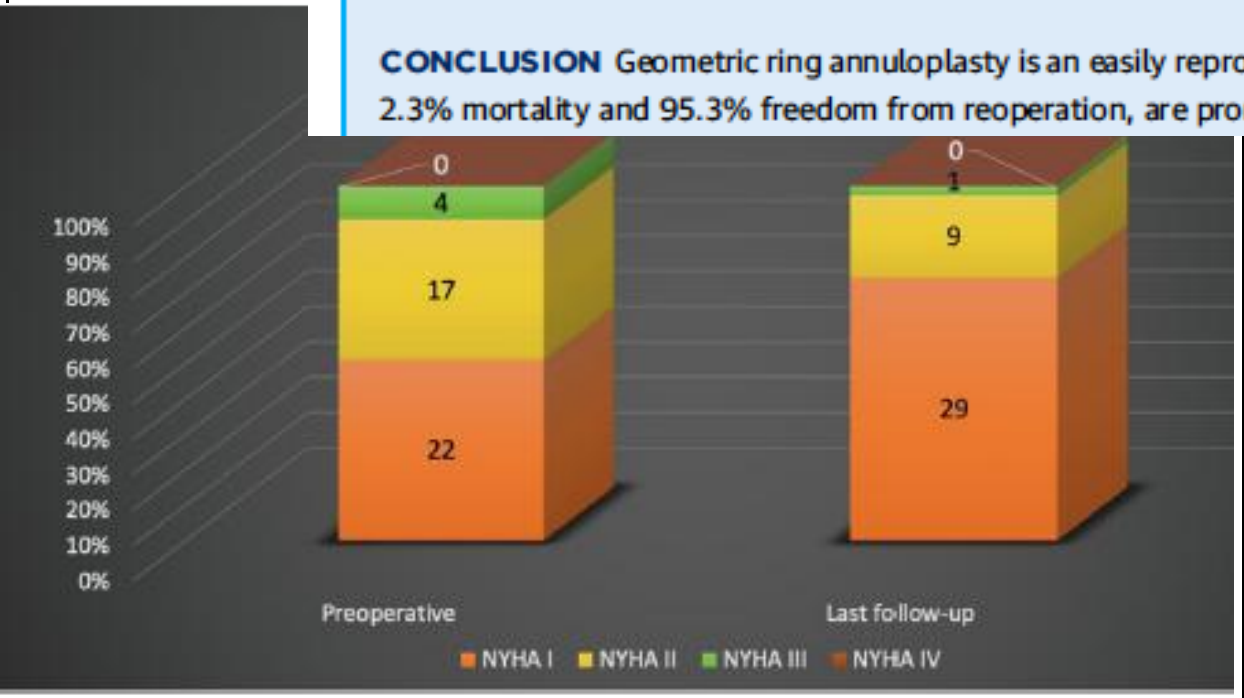
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ECMO insertion				
Open chest				

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RESULTS Maximum follow-up was 6.3 years, whereas the mean was 2.7 years. Mean age was 54.2 years. At least moderate aortic insufficiency was noted in 69.8% (30/43) of patients, whereas 93% (40/43) of them had an ascending aorta or aortic root over 45 mm. Overall mortality was 2.3% (1/43). No more than mild aortic insufficiency was detected early postoperatively. At the last follow-up, there were 2 cases of ring-related adverse events who were reoperated for aortic valve replacement (4.7%). Mid-term outcomes revealed no more than mild aortic insufficiency, while aortic diameter was less than 50 mm in the vast majority of the patients. New York Heart Association class was also significantly lower compared to preoperatively, although moderate aortic stenosis was present in 16% of our cohort.

CONCLUSION Geometric ring annuloplasty is an easily reproducible valve-sparing approach. Midterm results, revealing 2.3% mortality and 95.3% freedom from reoperation, are promising, but long-term outcomes are yet to be discovered.



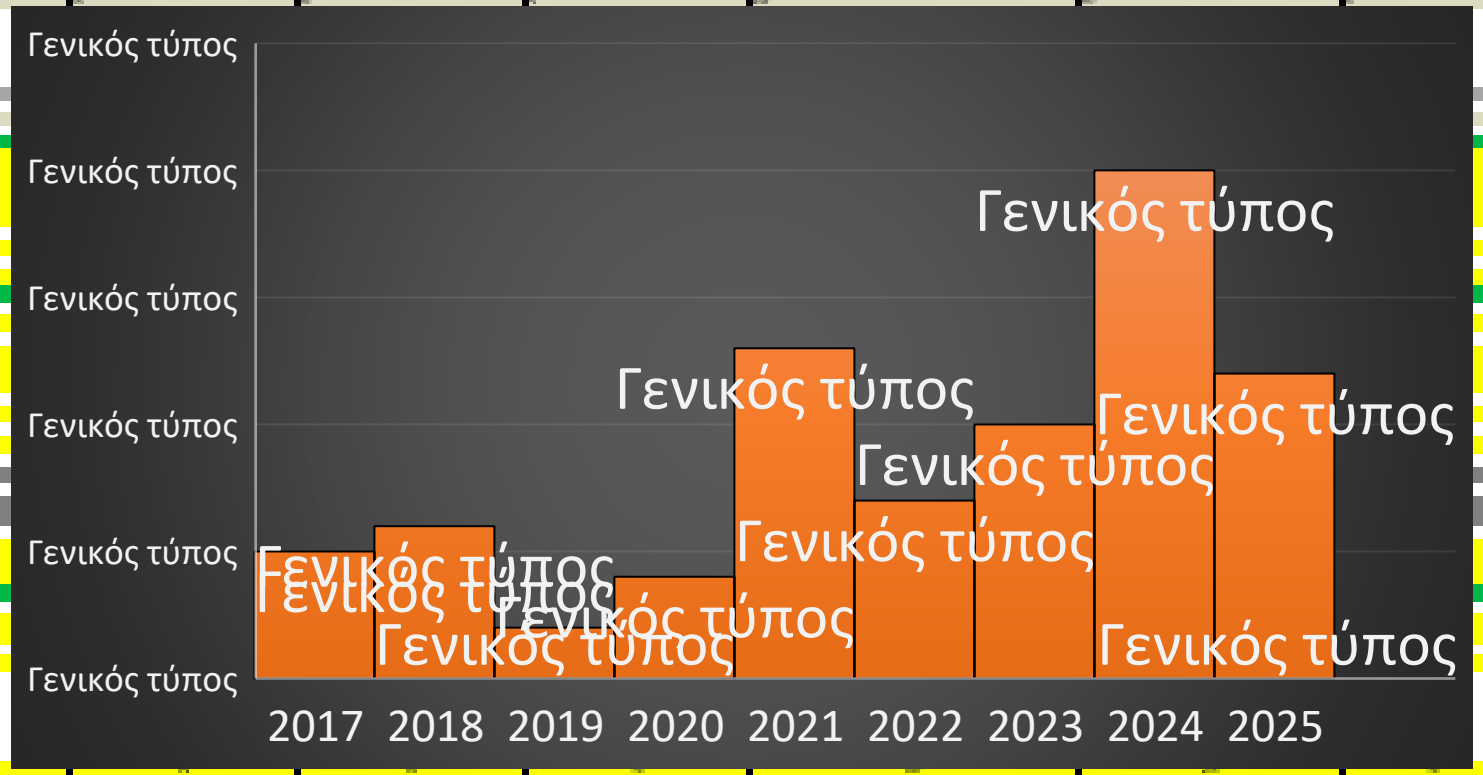
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Mild AI	18
Moderate AI	5
Severe AI	2
Mild AS	12
Moderate AS	6
Aortic root ≥ 50 mm	3



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PATIENTS' CHARACTERISTICS
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HAART ADVANTAGES IN OVERALL



- Central leaflet recruitment and optimization of leaflet coaptation
- Standardization/ symmetrization of aortic valve repair
- Simplicity eliminating deep external root dissection
- Stable rigid valvular substrate to repair
- AVr part precedes root part
- No need for anticoagulation

ΑΝΑΣΕΙΟ
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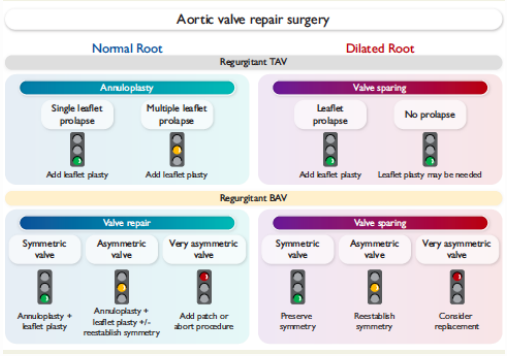
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TAKE HOME MESSAGE

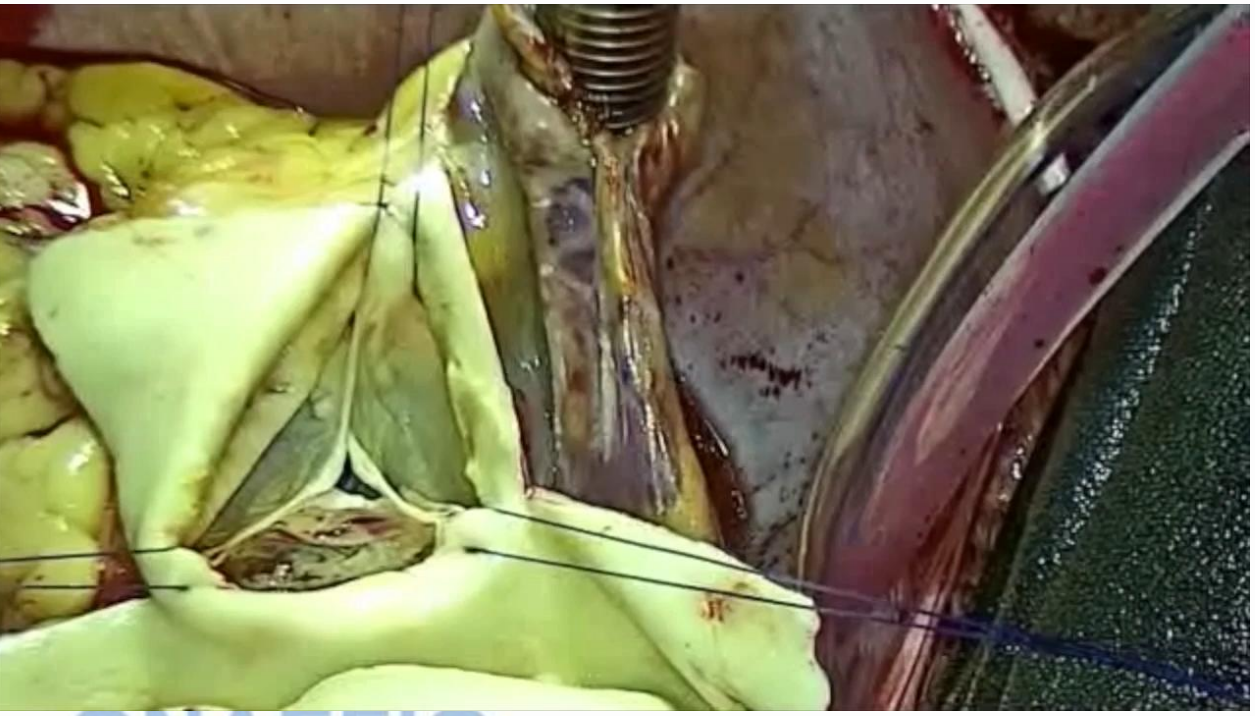
- ✓Underperformed
- ✓Intervention at 3 levels (root, annulus, leaflets)
- ✓Experts say that only experts should do… but …
  - ❖Excellent results even by low volume centers
- ✓Careful patient selection
- ✓Longterm results?
- ✓Registries to follow long term results



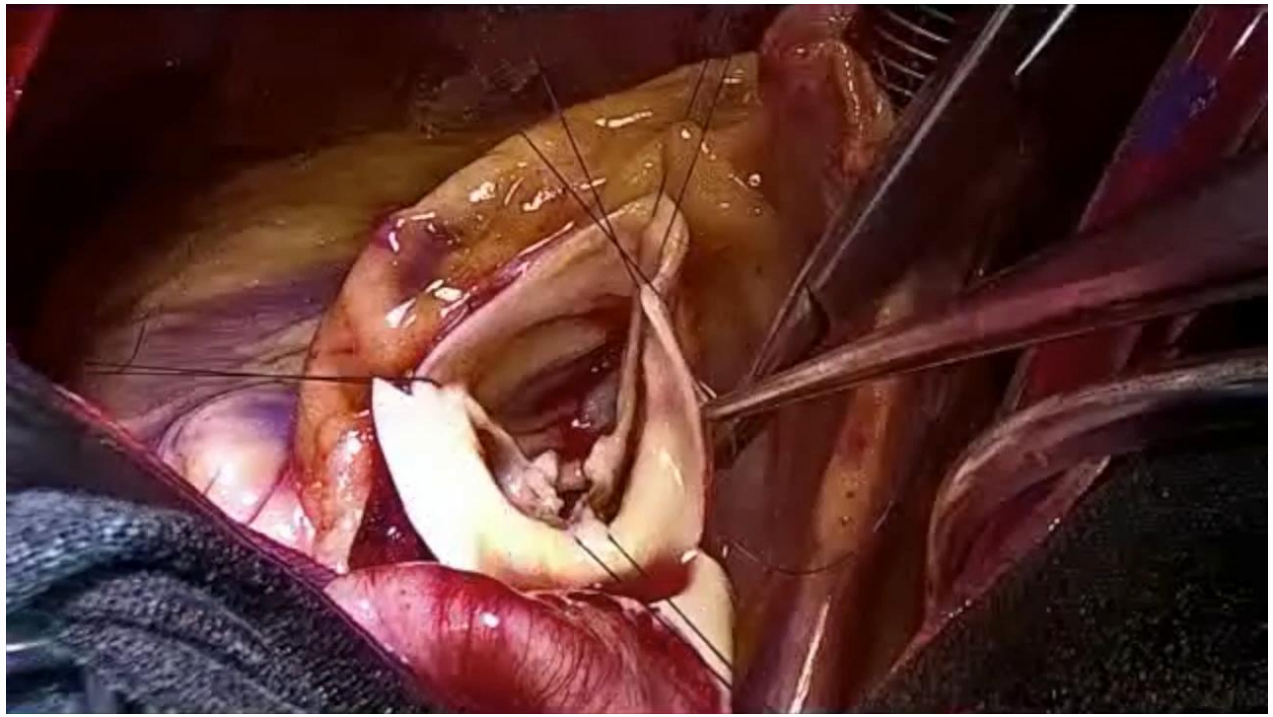




HAART 300 IMPLANTATION



HAART 200 IMPLANTATION



ΩΝΑΣΕΙΟ
ΝΟΣΟΚΟΜΕΙΟ

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