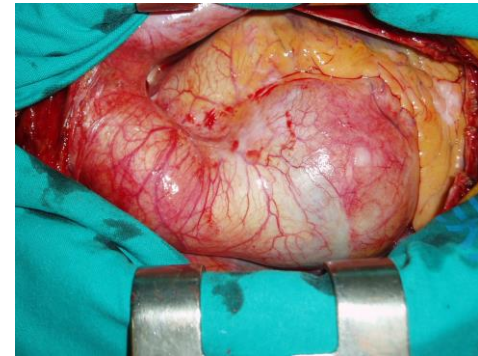


Reconstruction of the Aortic Valve and Root: A practical approach

Aortic valve reimplantation Technique and results

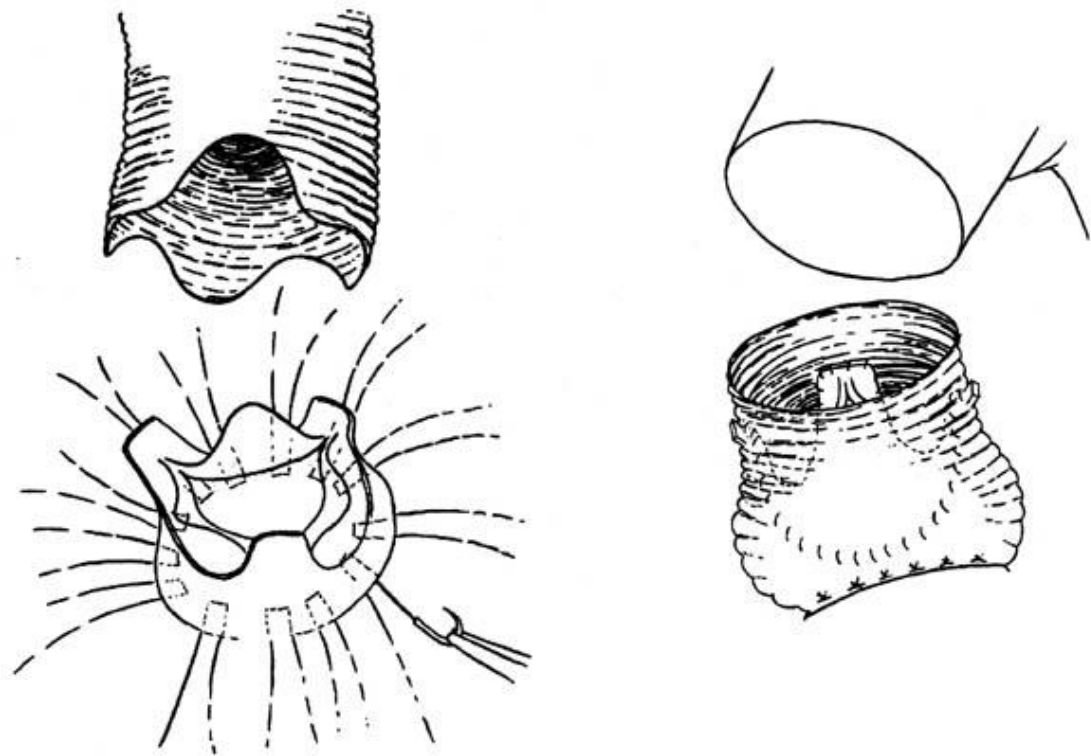


Dr. Alberto Forteza

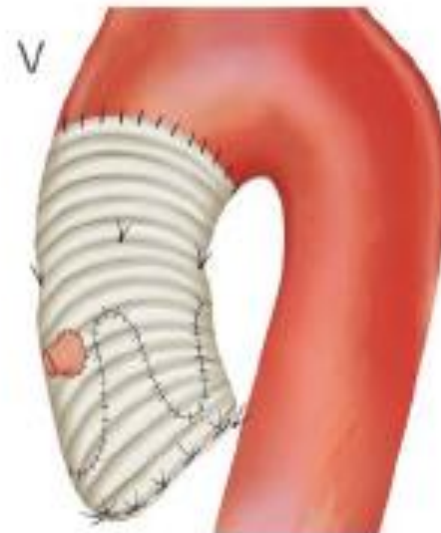
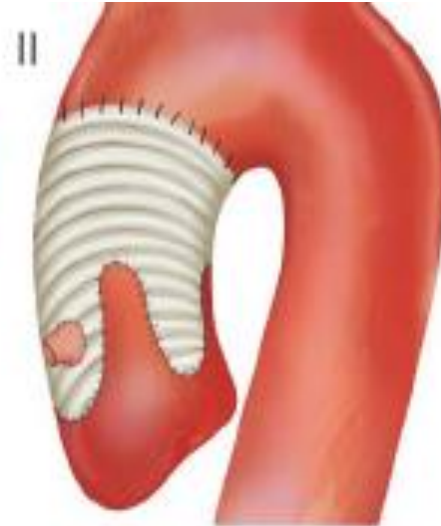
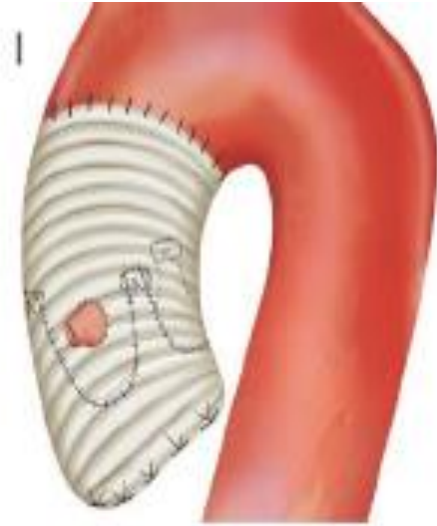
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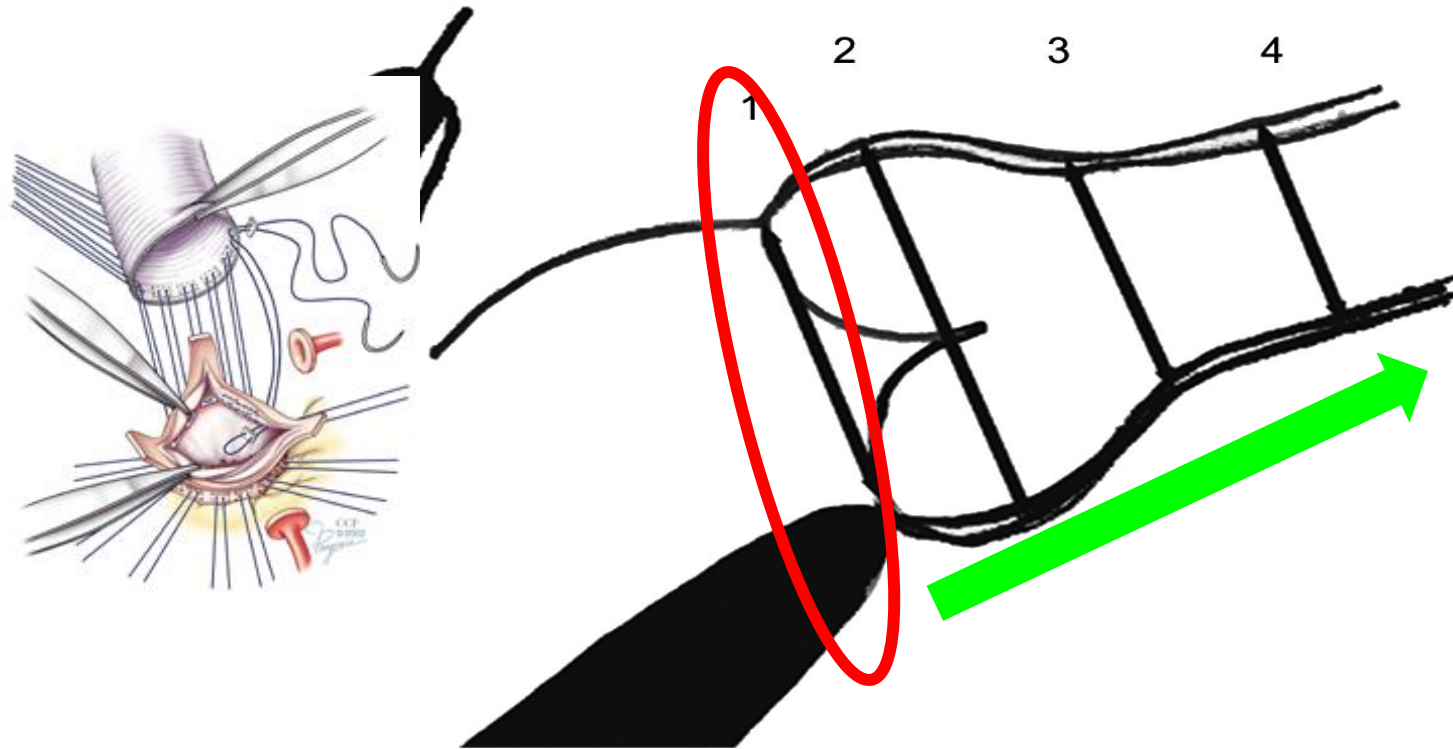
Reimplantation technique



An aortic valve-sparing operation for patients with aortic incompetence and aneurysm of the ascending aorta. JTCS 1992;103:617-22



Reimplantation



2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease



Guía ESC/EACTS 2017 sobre el tratamiento de las valvulopatías

Grupo de Trabajo de la Sociedad Europea de Cardiología (ESC) y la *European Association for Cardio-Thoracic Surgery* (EACTS) sobre el tratamiento de las valvulopatías

Marfan Syndrome

cantly improved with medical and surgical management of the aortic disease (76,92,93). The David valve sparing reimplantation operation for suitable patients undergoing elective aortic root surgery at centers with a high volume of these cases has become standard practice (76,92–99), although some have reported less-optimal long-term results with valve-sparing procedures (100,101).

CLASS III

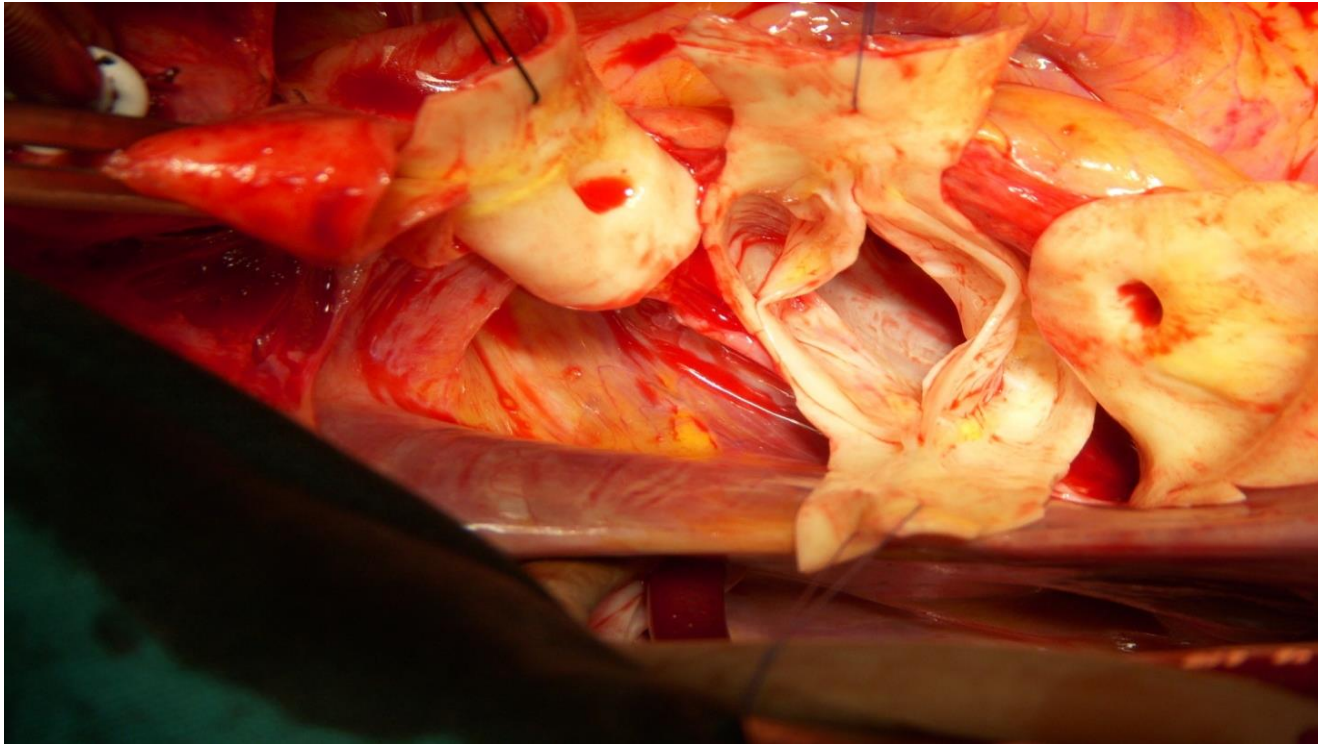
1. Root remodeling should be avoided in patients with connective tissue disorders. (Level of evidence C)

Se recomienda la reparación de válvula aórtica mediante la técnica de reimplante o remodelado con anuloplastia aórtica para pacientes jóvenes con dilatación de la raíz aórtica y válvula aórtica tricúspide, siempre que cirujanos con experiencia realicen la intervención

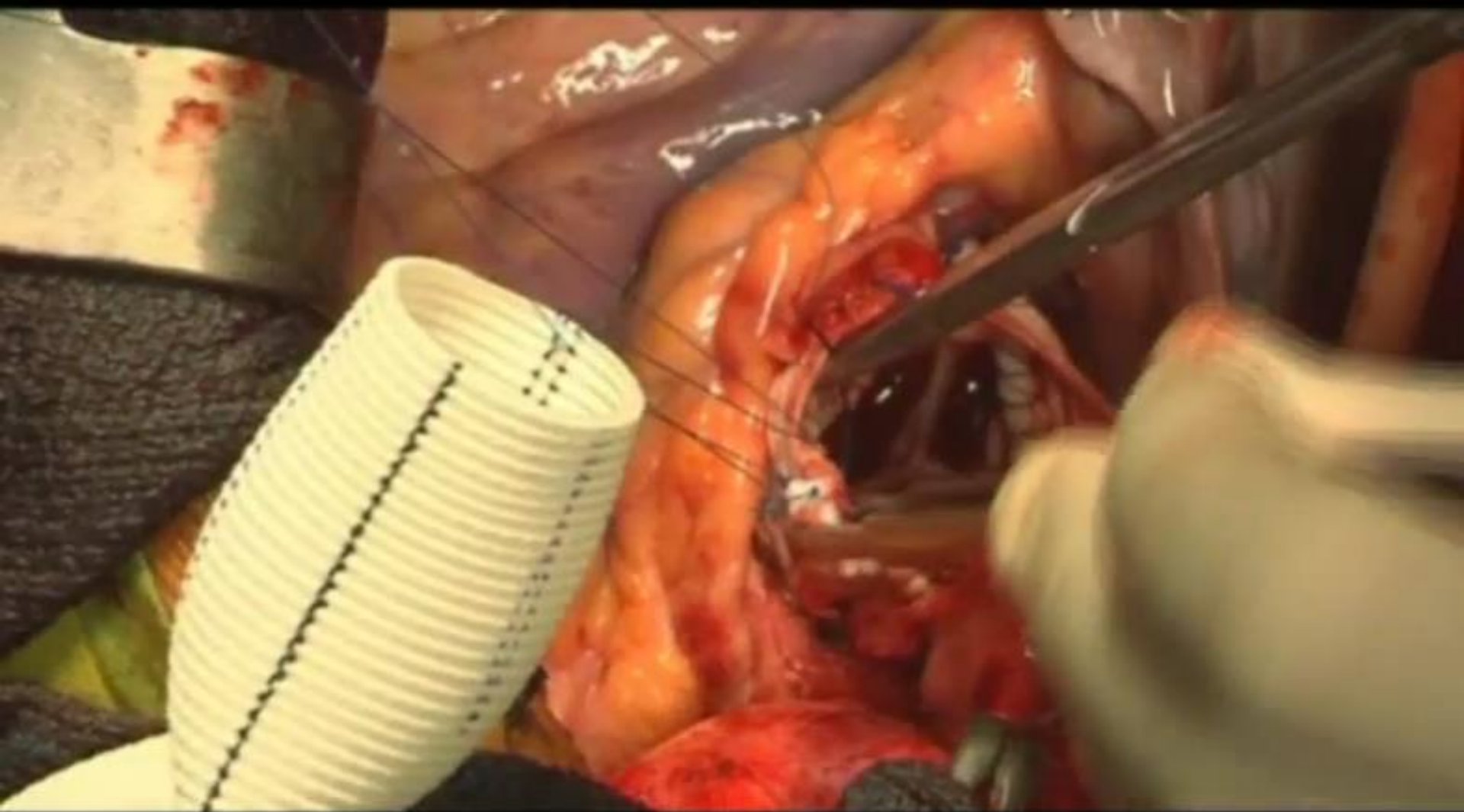
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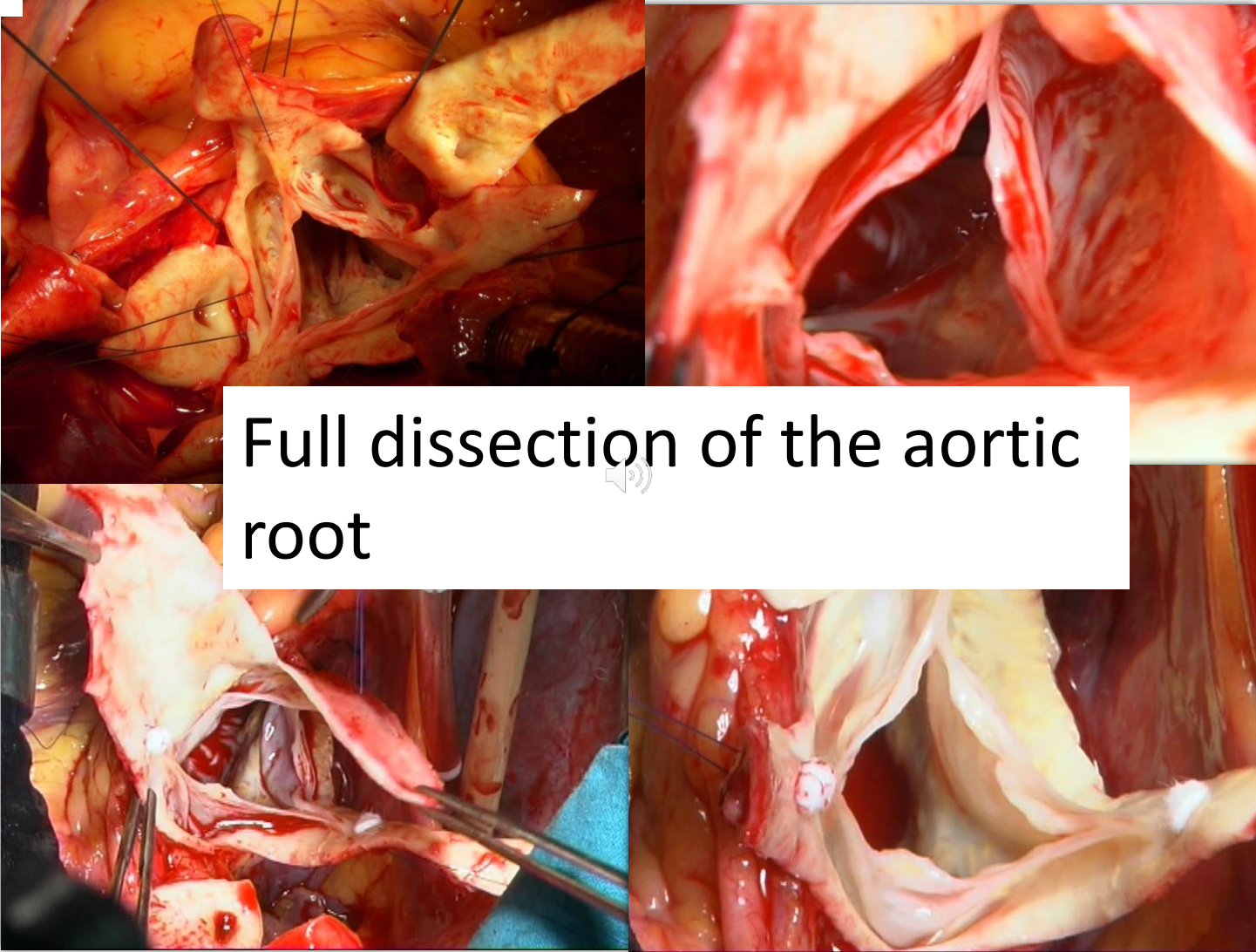
C

Technique









Full dissection of the aortic root

Diameter of the graft should not be a problem



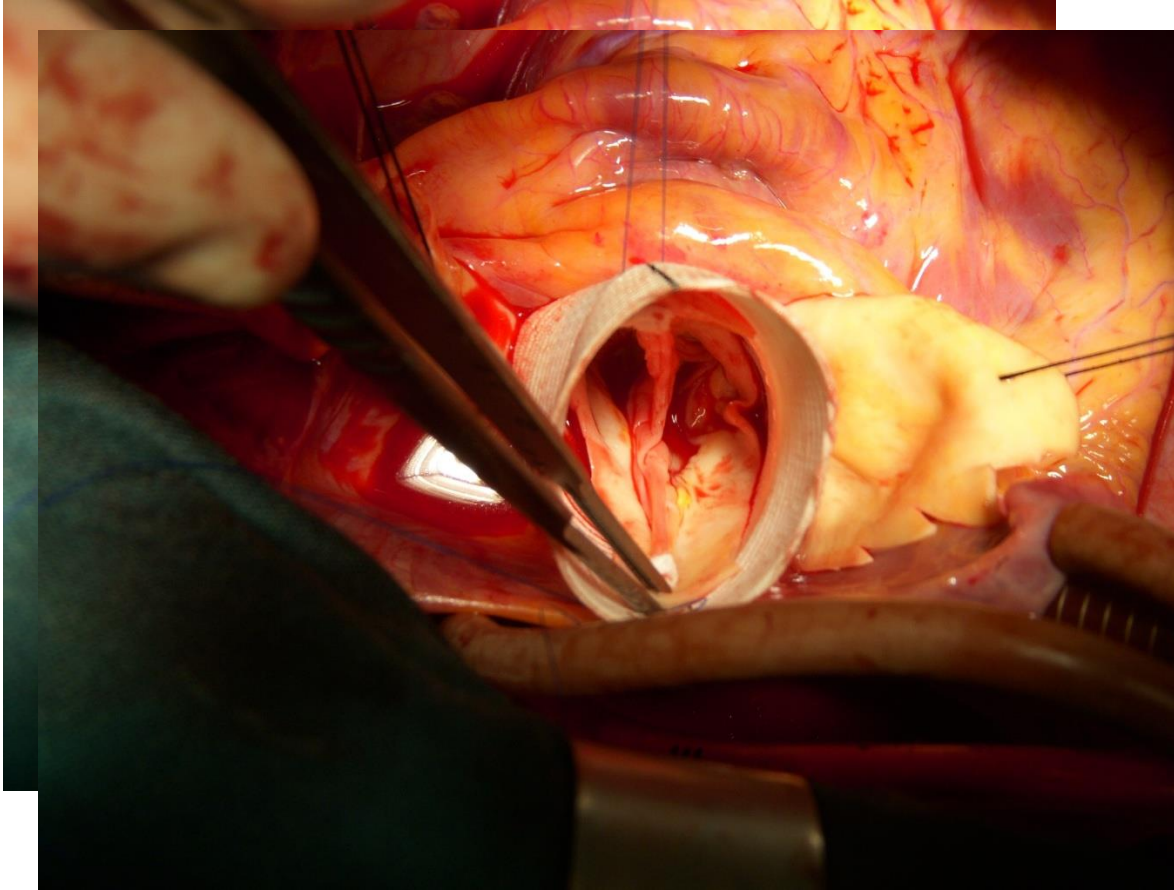
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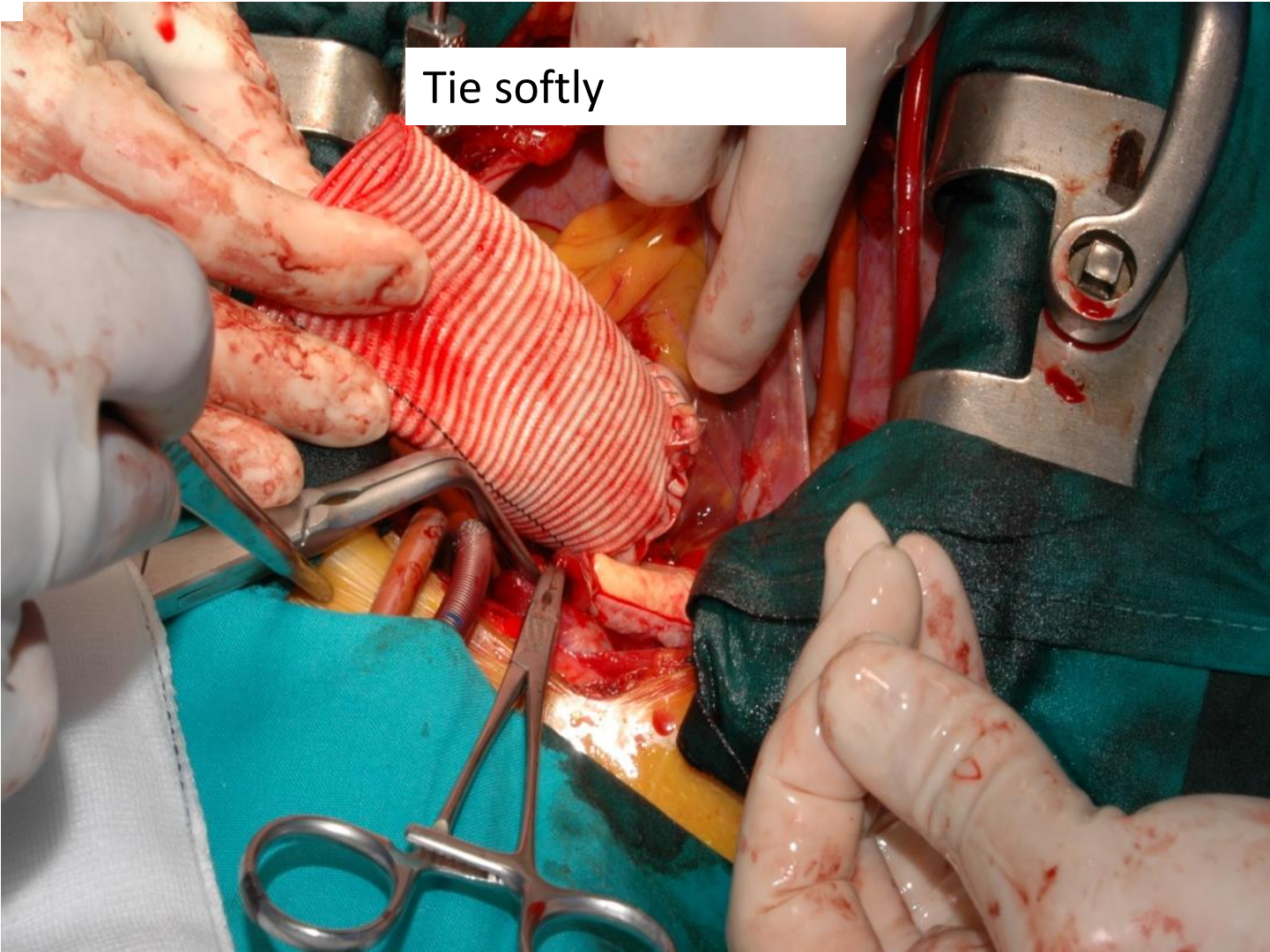
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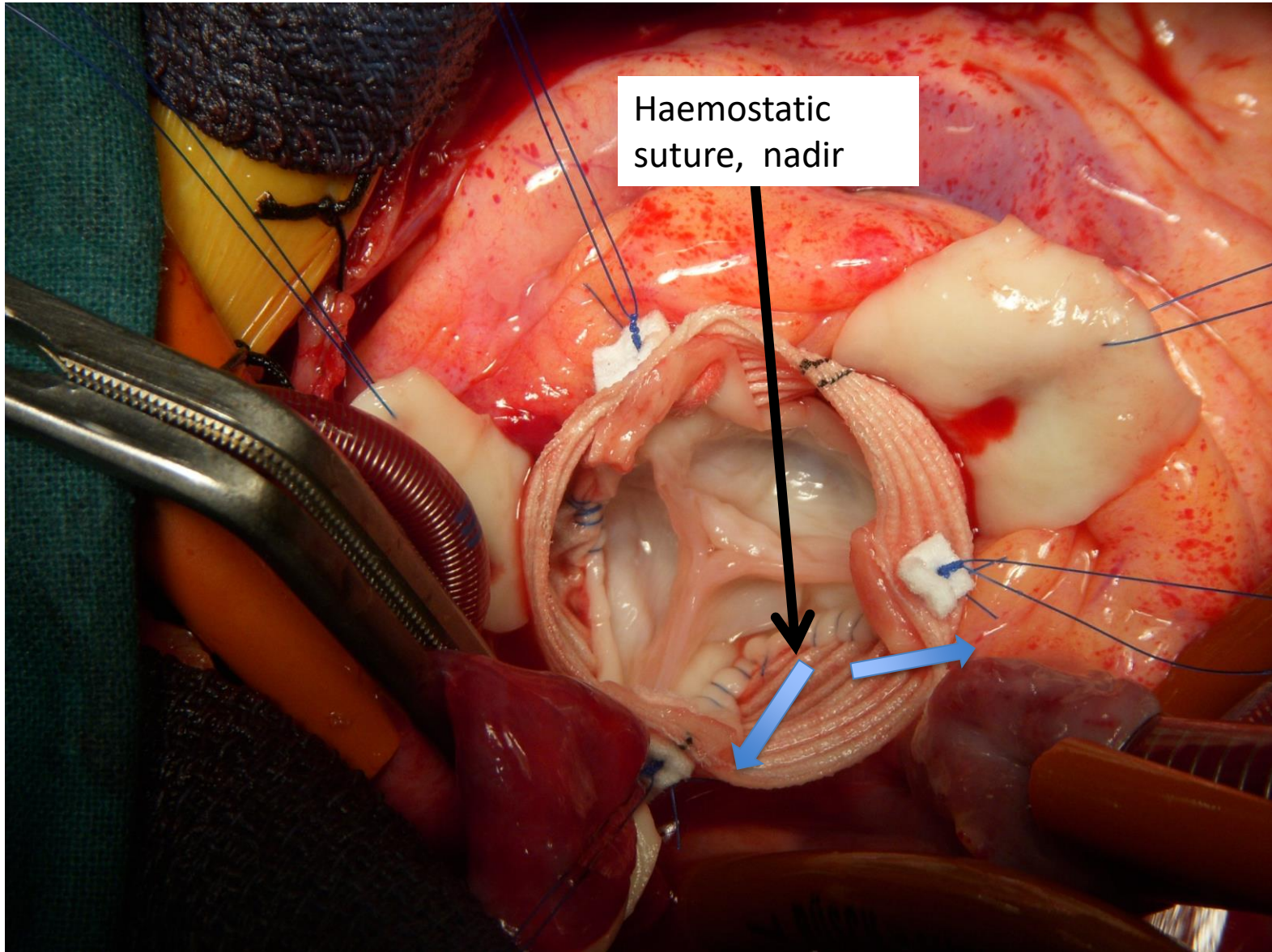


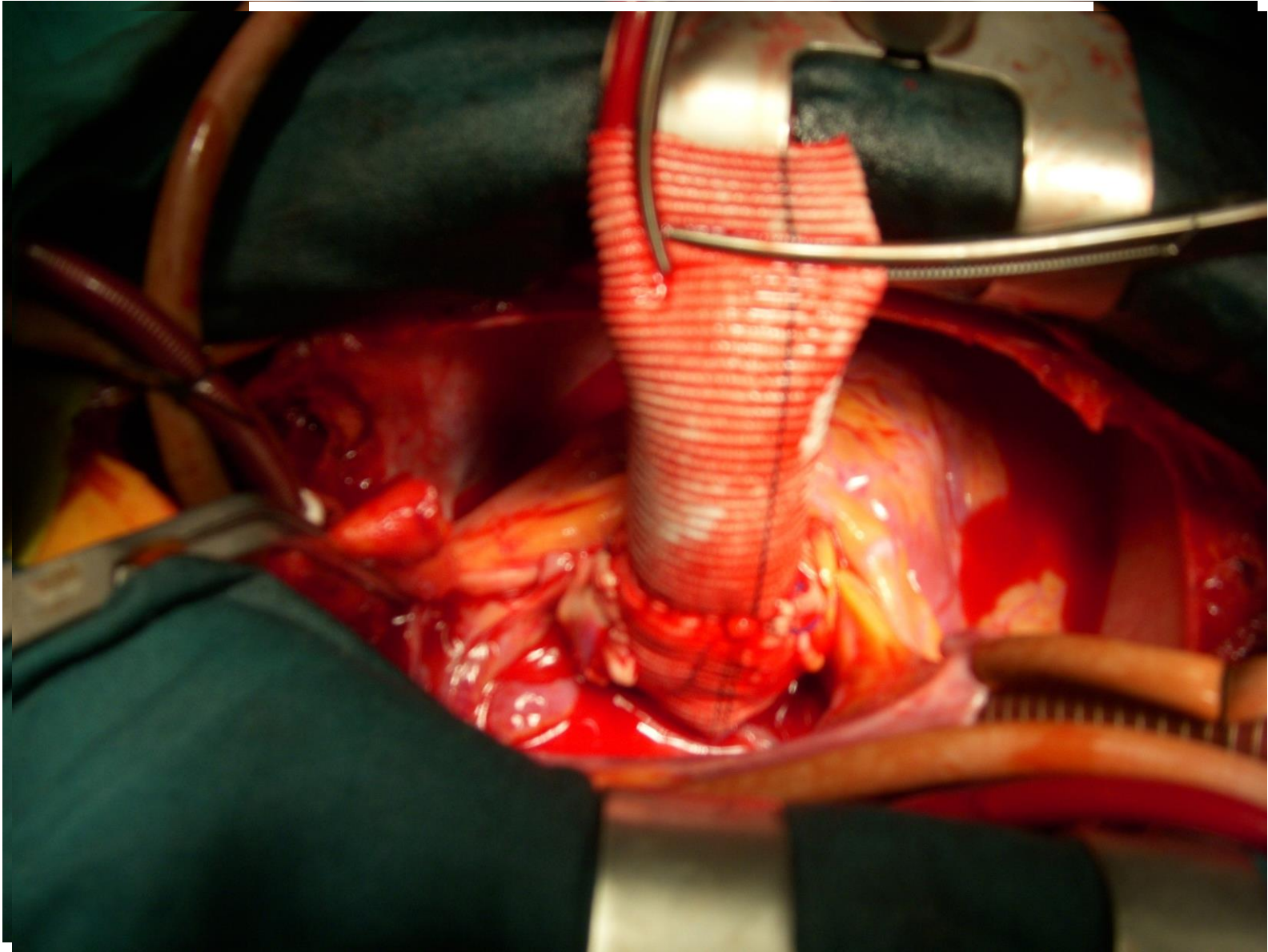
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Commisures high



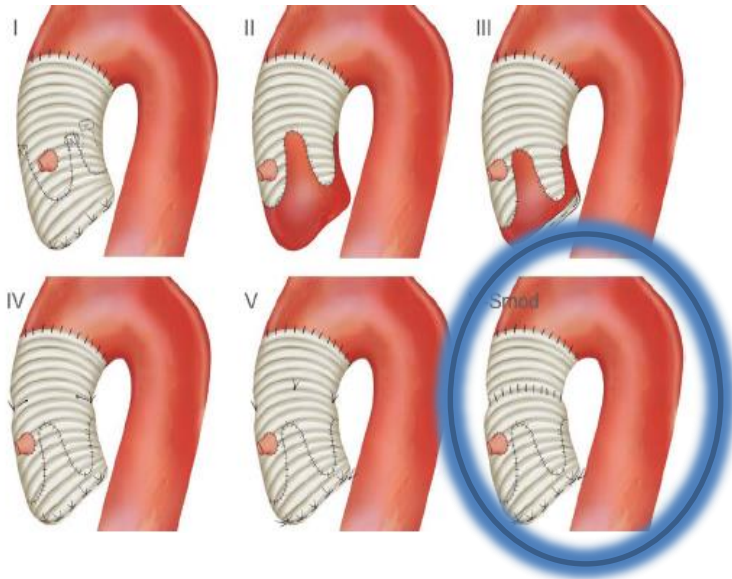




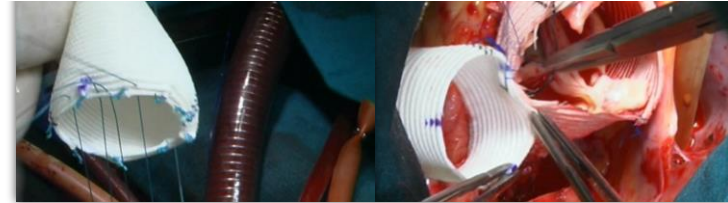


David V

David V Procedure (Stanford)



David V, 517 patients



- Facilitate reimplantation
- Preserve STJ
- Conform Valsalva sinuses

Results

ORIGINAL ARTICLE

WILEY | *Journal of Thoracic and Cardiovascular Surgery*

ORIGINAL ARTICLE

The influence of Marfans and bicuspid valves on outcomes

The role of following aortic Valve reimplantation surgery

Carlos E. Martín MD¹ | Carlos García Montero MD, PhD¹ |

Mario Gaudino | Santiago-Fiz Serrano MD, PhD¹ | Ana González MD, PhD² |

Umberto Benedetto | Susana Mingo MD, PhD³ | Vanessa Moñivas MD³ | Jorge Centeno MD⁴ |

Ruggero De Pau | Alberto Forteza MD, PhD¹

The Cornell Inte

European Journal of Cardio-Thoracic Surgery
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Indian Journal of Thoracic and Cardiovascular Surgery
https://doi.org/10.1007/s12055-019-0190-0

REVIEW ARTICLE

Aortic valve reimplantation

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Key Message
What are the long-term outcomes of aortic valve reimplantation in a single-centre 25-year experience?

Key Message
732 patients; Overall mortality 1.9%; Freedom from reoperation 93% at 5 years, 88% at 10 years

Take-home message
David's procedure provides excellent and sustainable functional outcomes in patients almost 3 decades after surgery

A progress report

Tirone E. David, MD, and Myriam Lafreniere

Long-term experience with aortic valve reimplantation surgery in tricuspid aortic valve disease

Saadallah Tamer¹ · Stefan Philippe Noirhomme¹ · Parkashdeep Singh¹ ·

ABSTRACT

Objective: To examine the long-term outcomes of aortic valve reimplantation (RAV) in patients following

Methods: All 465 patients who underwent RAV between 1995 and 2020 were included in this study. The mean age was 60.1 ± 6.6 years and 98% were male.

Results: Patients' mean age at the time of RAV was 60.1 ± 6.6 years and 98% were male. Aortic insufficiency (AI) was present in 100% of patients. The cumulative probability of survival was 92 ± 2% and 75 ± 2% at 10 and 20 years, respectively. The cumulative probability of freedom from reoperation was 93 ± 1% and 88 ± 1% at 10 and 20 years, respectively. The cumulative probability of freedom from reoperation and aortic regurgitation >II was 99 ± 1% and 94 ± 2% at 10 and 20 years, respectively. The cumulative probability of freedom from reoperation and aortic regurgitation >II was 99 ± 1% and 94 ± 2% at 10 and 20 years, respectively. The cumulative probability of freedom from reoperation and aortic regurgitation >II was 99 ± 1% and 94 ± 2% at 10 and 20 years, respectively.

Conclusions: RAV provides excellent and sustainable functional outcomes in patients almost 3 decades after surgery.

Received: 19 March 2019 / Revised: 20 August 2019 / Accepted: 15 October 2020
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Abstract

Objective To analyze our long-term experience with aortic valve reimplantation (RAV) in patients following aortic valve reimplantation surgery in tricuspid aortic valve disease.

Methods Between March 1995 and October 2020, 465 patients underwent RAV at our institution. The mean age was 60.1 ± 6.6 years and 98% were male. Aortic insufficiency (AI) was present in 100% of patients. The cumulative probability of survival was 92 ± 2% and 75 ± 2% at 10 and 20 years, respectively. The cumulative probability of freedom from reoperation was 93 ± 1% and 88 ± 1% at 10 and 20 years, respectively. The cumulative probability of freedom from reoperation and aortic regurgitation >II was 99 ± 1% and 94 ± 2% at 10 and 20 years, respectively. The cumulative probability of freedom from reoperation and aortic regurgitation >II was 99 ± 1% and 94 ± 2% at 10 and 20 years, respectively.

Conclusions Aortic valve reimplantation (RAV) provides excellent and sustainable functional outcomes in patients almost 3 decades after surgery.

Abstract

Background: We analyzed our early and midterm results with aortic valve reimplantation surgery to determine the influence of Marfan syndrome and bicuspid valves on outcomes with this technique.

Methods: Between March 2004 and December 2015, 267 patients underwent aortic valve reimplantation operations. The mean diameter of the sinuses of Valsalva was 50 ± 3 mm and moderate/severe aortic regurgitation was present in 34.4% of these patients. A bicuspid aortic valve was present in 21% and 40% had Marfan syndrome.

Results: Overall 30-day mortality was 0.37% (1/267). Mean follow-up was 59.7 ± 38.7 months. Overall survival at 1, 3, and 5 years was 98 ± 8%, 98 ± 1%, and 94 ± 2%, respectively. Freedom from reoperation and aortic regurgitation >II was 99 ± 5%, 98 ± 8%, 96.7 ± 8%, and 99 ± 6%, 98 ± 1%, 98 ± 1%, respectively at 1, 3, and 5 years follow-up, with no differences between Marfan and bicuspid aortic valve groups. (p = 0.94 and p = 0.96, respectively). No endocarditis or thromboembolic complications were documented, and 93.6% of the patients did not receive any anticoagulation therapy.

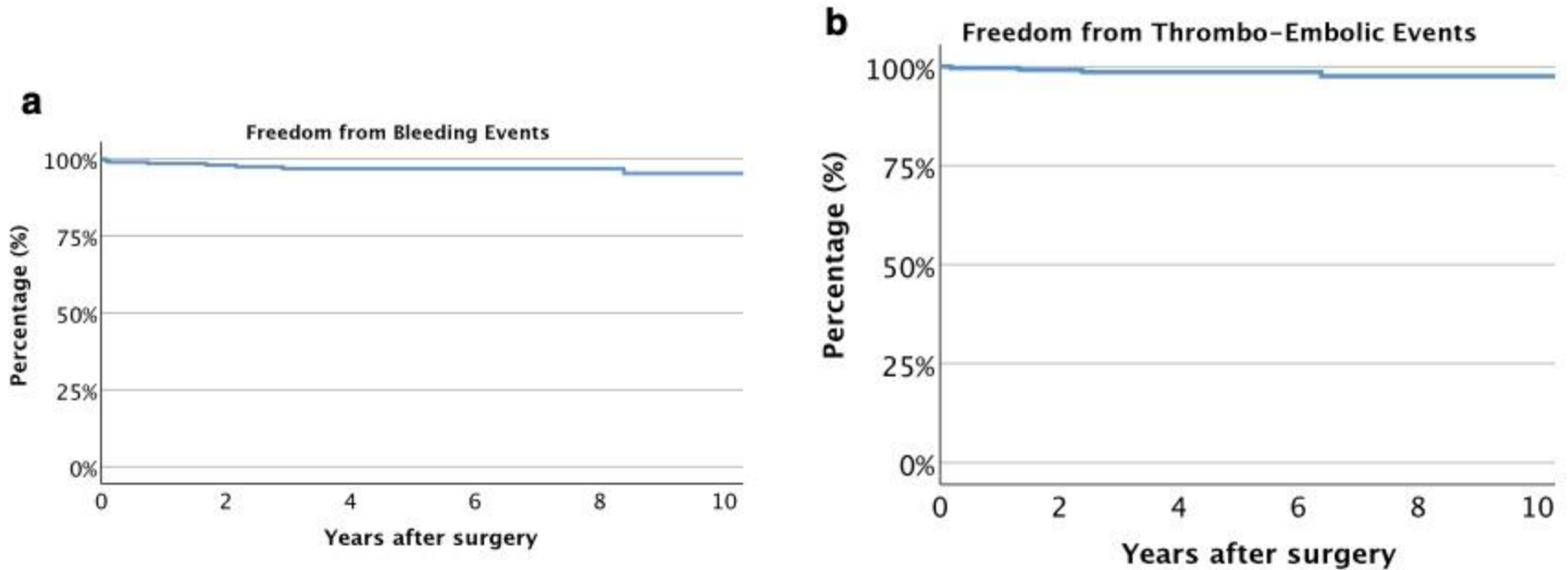
Conclusions: The reimplantation technique for aortic root aneurysms is associated with excellent clinical and functional outcomes at short and mid-term follow-up.

KEYWORDS

aortic regurgitation, aortic root repair, aortic valve repair, aortic valve sparing surgery, Bicuspid aortic valve, Marfan syndrome




AUTHOR	Technique	N	Marfan	BAV	Follow-up	Mortality	Survival	Freedom from reint.	No AR > II
Reimplantation techniques									
David TE, et al. [28] (Toronto)	DAVID I (412) DAVID V (153)	465	177 (38%)	67 (14%)	10 ± 6 a.	5 (1%)	20a: 75.2%	20a: 94%	20a: 89.8%
Tamer S et al. [30] (Bruselas)	DAVID I	303	42 (14%)	-	5.81 a.	3 (1%)	10a: 75%	10a: 94%	10a: 91%
Lau C et al. [31] (Nueva York)	DAVID I	327	63 (19%)	66	51.6 ± 40.8m.	0	5a: 100%	5a: 100%	5a ~92 %
Bethancourt CN et al. [32] (Lepizig)	DAVID V	329	23	-	4,4 a.	0,2 %	10a: 87%	10a: 94,1 %	-
Beckmann E et al. [33] (Hannover)	DAVID I	732	117 (16%)	81 (11%)	10 ± 6,7 a.	11 (1,9%)**	10 a: 77% 15 a: 65%	10a: 88% 20 a.: 85%	98%
Martens et al. [29] (Hanover)	DAVID I	104	104	-	12 ± 5.4 a.	0.96%	10 a.: 77% 20 a.: 65%	10 a.: 86% 20 a.: 80%	98%
Martin CE et al. [34] (Madrid)	DAVID V	267	107	57	4,9 ± 3,2 a.	1 (0,37 %)	3a: 98% 5a: 94%	3a: 98% 5a: 97%	3a: 98% 5a: 98%
Forteza A et al. (Madrid) *	DAVID V	157	157	-	7.3 ± 1.2 a.	0 (0%)	5a: 99% 10a: 98% 15a: 98%	5a: 96% 10a: 96% 15a: 96%	5a: 95% 10a: 92% 15a: 90%

Brussels group



Cite this article as: Beckmann E, Martens A, Krüger H, Korte W, Kaufeld T, Stettinger A et al. Aortic valve-sparing root replacement with Tirone E. David's reimplantation technique: single-centre 25-year experience. Eur J Cardiothorac Surg 2021; doi:10.1093/ejcts/ezab136.

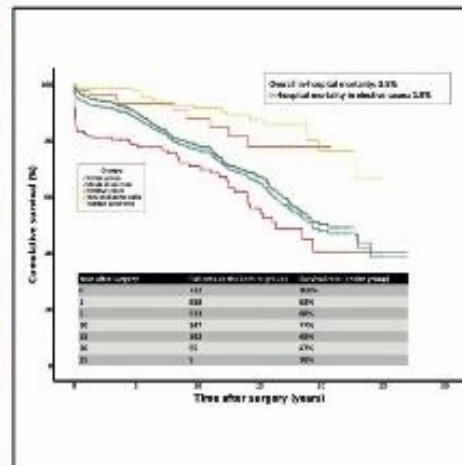
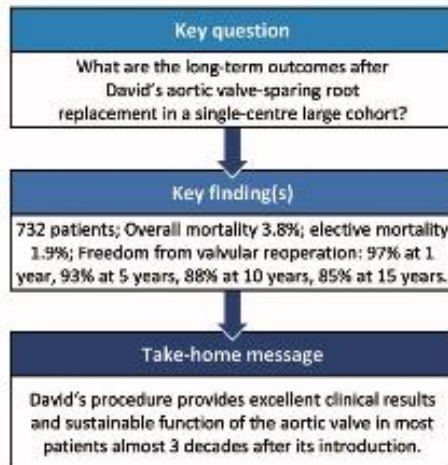
Aortic valve-sparing root replacement with Tirone E. David's reimplantation technique: single-centre 25-year experience

Erik Beckmann *, Andreas Martens , Heike Krüger, Wilhelm Korte, Tim Kaufeld , Alissa Stettinger, Axel Haverich and Malakh Lal Shrestha

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n = 732
 53 ± 15 años
 71 % varones
 117 Marfan (16%)
 81 BAV (11%)
 144 disecciones tipo A (20%)
 25 exitus precoces (11 en electivos)
 Mediana seguimiento 10 ± 6,7 años
 78 reintervenciones




Table 4: Risk factor analysis

Variable	OR	95% CI	P-value
Risk factors for reoperation/ aortic insufficiency >II°			
Age	0.975	0.955-0.995	0.016
Hyperlipidaemia	1.980	1.175-3.335	0.010
Postoperative residual aortic insufficiency	1.880	1.532-2.308	<0.001
Preoperative LVEF	1.749	1.024-2.987	0.041

CI: confidence interval; LVEF: left ventricular ejection fraction; OR: odds ratio.

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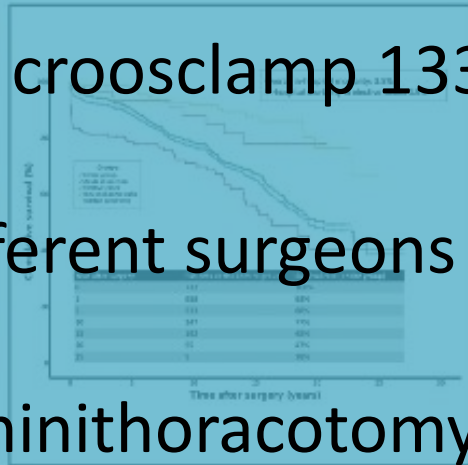
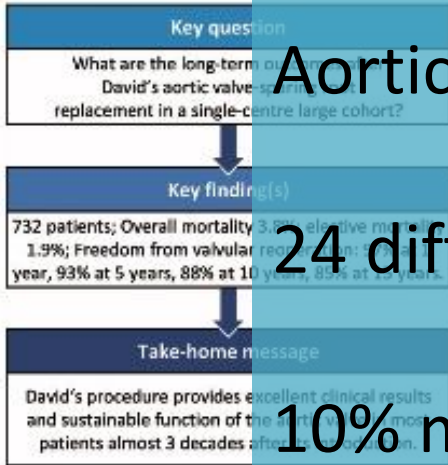
Aortic valve-sparing root replacement with Tirone E. David's reimplantation technique: single-centre 25-year experience

Erik Beckmann *, Andreas Martens , Heike Krüger, Wilhelm Korte, Tim Kaufeld , Alissa Stettinger, Axel Haverich and Malakh Lal Shrestha

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Received 31 August 2020; received in revised form 7 February 2021; accepted 14 February 2021




Central plication 11%

Aortic croosclamp 133', CPB 197'

24 different surgeons

10% minithoracotomy

The influence of Marfans and bicuspid valves on outcomes following aortic Valve reimplantation

Carlos E. Martín MD¹  | Carlos García Montero MD, PhD¹ |
Santiago-Fiz Serrano MD, PhD¹ | Ana González MD, PhD² |
Susana Mingo MD, PhD³ | Vanessa Moñivas MD³ | Jorge Centeno MD⁴ |
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Funding Information

None

Abstract

Background: We analyzed our early and midterm results with aortic valve reimplantation surgery to determine the influence of Marfan syndrome and bicuspid valves on outcomes with this technique.

Methods: Between March 2004 and December 2015, 267 patients underwent aortic valve reimplantation operations. The mean diameter of the sinuses of Valsalva was 50 ± 3 mm and moderate/severe aortic regurgitation was present in 34.4% of these patients. A bicuspid aortic valve was present in 21% and 40% had Marfan syndrome.

Results: Overall 30-day mortality was 0.37% (1/267). Mean follow-up was 59.7 ± 38.7 months. Overall survival at 1, 3, and 5 years was $98 \pm 8\%$, $98 \pm 1\%$, and $94 \pm 2\%$, respectively. Freedom from reoperation and aortic regurgitation $>II$ was $99 \pm 5\%$, $98 \pm 8\%$, $96.7 \pm 8\%$, and $99 \pm 6\%$, $98 \pm 1\%$, $98 \pm 1\%$, respectively at 1, 3, and 5 years follow-up, with no differences between Marfan and bicuspid aortic valve groups. ($p = 0.94$ and $p = 0.96$, respectively). No endocarditis or thromboembolic complications were documented, and 93.6% of the patients did not receive any anticoagulation therapy.

Conclusions: The reimplantation technique for aortic root aneurysms is associated with excellent clinical and functional outcomes at short and mid-term follow-up.

KEYWORDS

aortic regurgitation, aortic root repair, aortic valve repair, aortic valve sparing surgery, Bicuspid aortic valve, Marfan syndrome

n = 267 (2004-2015)

329 DAVID V –S

58,4 ± 14 años

84% varones

40% Marfan

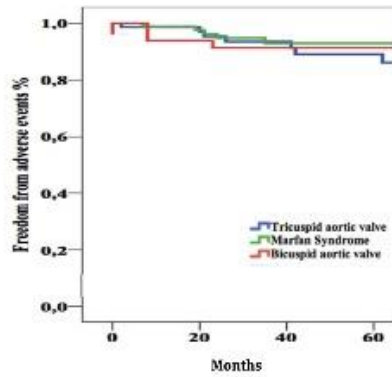
21% BAV

Mediana seguimiento 4,9 ± 3,2 años

Mortalidad del 0,37%

TABLE 3 Post-operative complications

	All patients (n = 267)	Tricuspid aortic valve (n = 103)	Marfan syndrome (n = 107)	Bicuspid aortic valve (n = 57)	p value
Reoperation for bleeding, n(%)	9 (3.4)	4 (3.9)	4 (3.7)	1 (1.8)	>0.20
Myocardial infarction, n (%)	2 (0.75)	1 (1.0)	1 (0.93)	0 (0)	>0.20
Permanent pacemaker, n (%)	1 (0.4)	1 (1.0)	0 (0)	0 (0)	>0.20
Post-operative new atrial fibrillation, n (%)	62 (23.2)	41 (39.8)	8 (7.5)	13 (22.8)	0.097
Transient neurological dysfunction, n (%)	3 (1.1)	3 (2.9)	0 (0)	0 (0)	>0.20
Renal failure with need for dialysis, n (%)	0 (0)	0 (0)	0 (0)	0 (0)	>0.20
Mediastinitis, n (%)	1 (0.4)	1 (1.0)	0 (0)	0 (0)	>0.20
Mortality, n (%)	1 (0.4)	1 (1.0)	0 (0)	0 (0)	>0.20



Patients at risk:

Tricuspid valve

Marfan Syndrome

Bicuspid valve

59

43

31

73

46

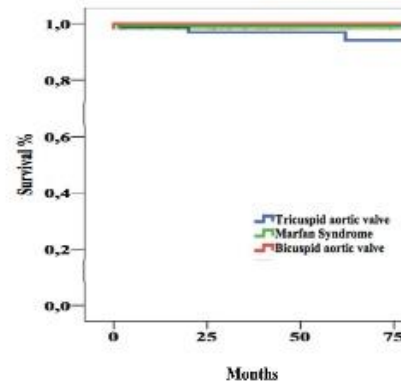
37

36

20

11

FIGURE 1 Kaplan-Meier curves for the composite endpoint (survival, freedom of reoperation, and AR>II) in the three subgroups



Patients at risk:

Tricuspid valve

Marfan Syndrome

Bicuspid valve

55

35

20

77

52

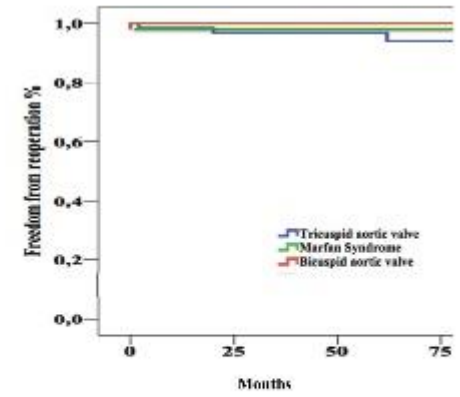
39

17

18

10

FIGURE 2 Kaplan-Meier curves for survival in the three subgroups



Patients at risk:

Tricuspid valve

Marfan Syndrome

Bicuspid valve

44

25

20

85

39

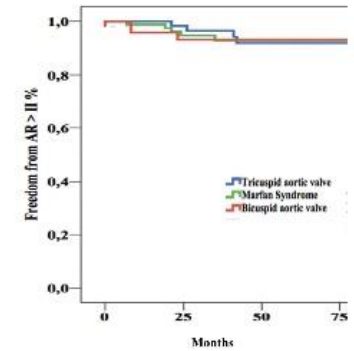
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25

15

5

FIGURE 3 Kaplan-Meier curves for freedom from reoperation in the three subgroups



Patients at risk:

Tricuspid valve

Marfan Syndrome

Bicuspid valve

55

34

20

85

35

28

26






13

9

FIGURE 4 Kaplan-Meier curves for freedom from AR>II in the three subgroup

Cite this article as: Forteza Gil A, Martínez-Lopez D, Centeno J, Rivas Oyarzabal J, García Suarez J, de Villarreal Soto JE et al. Aortic valve reimplantation in patients with connective tissue syndromes: A 15-year follow-up. *Eur J Cardiothorac Surg* 2022; doi:10.1093/ejcts/ezac149.

Aortic valve reimplantation in patients with connective tissue syndromes: A 15-year follow-up

Alberto Forteza Gil ^{a,b,†}, Daniel Martínez-Lopez ^{a,†}, Jorge Centeno^b, Jorge Rivas Oyarzabal^b,
Jessica García Suarez ^c, Juan Esteban de Villarreal Soto ^a, Elsa Carolina Ríos Rosado^a,
Beatriz Vera Puente^a, Susana Villar García^a, Víctor Manuel Ospina Mosquera^a, Susana Mingo ^d,
Vanesa Moñivas^d, Santiago Serrano-Fiz^a and Carlos Esteban Martín López^{a,b,*}

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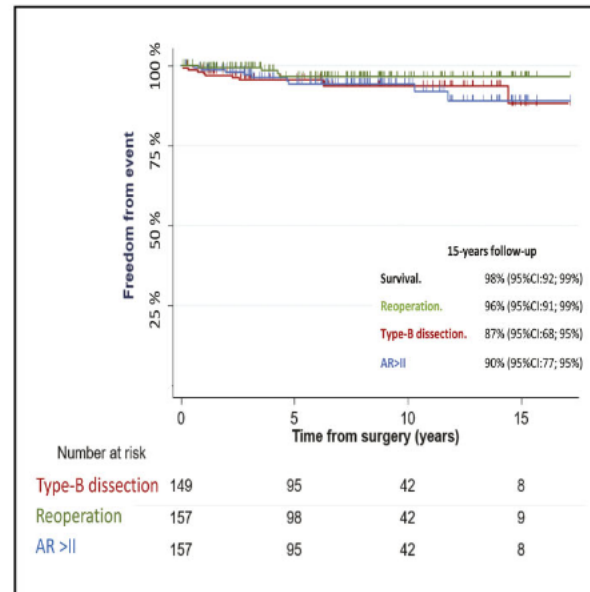
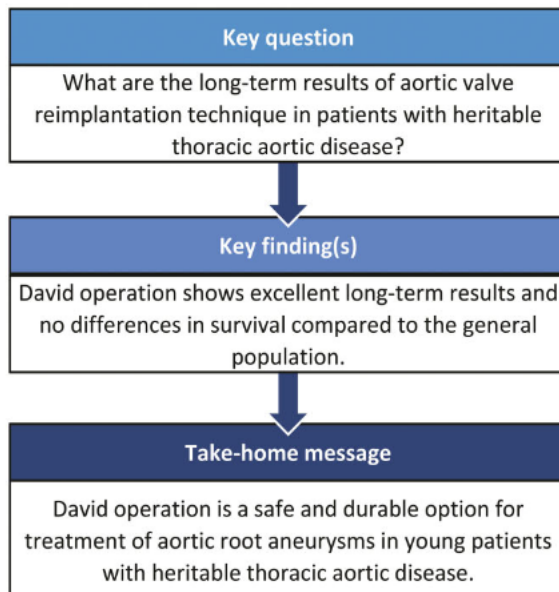
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Received 20 September 2021; received in revised form 7 February 2022; accepted 21 February 2022



OBJECTIVES: The goal of this study was to analyse early- and long-term outcomes of aortic valve reimplantation (David operation) in patients with heritable thoracic aortic disease.

METHODS: This is a retrospective observational analysis using data from a prospectively maintained surgical database from March 2004 to April 2021. Patients with heritable thoracic aortic disease were included in the study.

RESULTS: A total of 157 patients with aortic root aneurysm with the diagnosis of heritable thoracic aortic disease received the David procedure. Marfan syndrome was found in 143 (91.1%) patients, Loeys-Dietz in 13 and Ehler-Danlos in 1 patient. The median age was 35.0 (IQR: 17.5) years and the median ascending aorta diameter in the Valsalva sinuses was 48 mm (IQR: 4). A Valsalva graft was used in 8 patients; the David V technique was performed in the rest of the cases. The median follow-up time was 7.3 years [standard deviation: 0.58, 95% confidence interval (CI): 6.12–8.05]. Only 2 patients died during the follow-up period. The overall survival was 99% (95% CI: 95%; 99%); 98% (95% CI: 92%; 99%); and 98% (95% CI: 92%; 99%) at 5, 10 and 15 years. Freedom from significant aortic regurgitation (AR> II), reintervention and postoperative type-B dissection was 90% (95% CI: 77%; 95%), 96% (95% CI: 91%; 99%) and 87% (95% CI: 68%; 95%) at 15 years, respectively. No differences were found in any outcome between Marfan syndrome and Loeys-Dietz syndrome. No statistically significant differences in survival were found when we compared expected gender- and age-specific population survival values.

CONCLUSIONS: The David operation is an excellent option for the treatment of patients with heritable thoracic aortic disease and dilated aortic root. Surgical expertise in referral centres is essential to achieve the best long-term results.

157 patients (MS 91%). Median age 35 y, VS 48 mm
Median follow up : 7 years
Reimplantation (David): 100%
Hospital mortality: 0%

Table 1. Baseline characteristics of the patients with connective tissue syndromes

	Connective tissue syndromes N = 157
Age (years)	35.0 (17.5)
Gender	
Female	51 (32.5 %)
Male	106 (67.5 %)
BSA (m ²)	1.9 (0.4)
EuroSCORE II (%)	1.6 (1.8)
Hypertension	12 (7.6%)
Diabetes	6 (3.8%)
Dyslipidemia	9 (5.7%)
Connective tissue disease	
Marfan syndrome	143 (91.1%)
Loeys-Dietz syndrome	13 (8.3%)
Ehler-Danlos type IV syndrome	1 (0.6%)
LVEF	
>55%	149 (94.9%)
35-55%	8 (5.1%)
Aortic regurgitation	
Grades I–II	133 (84.7%)
Grades III-IV	24 (15.3%)
NYHA functional class	
I	147 (93.7%)
II	9 (5.7%)
III	1 (0.6%)
Aortic type-A dissection	7 (4.5%)
Ascending aorta diameter in the Valsalva sinuses (mm)	48.0 (4)

Data are presented as n (%) or median and interquartile range (IQR).

Table 2. Surgical characteristics of the analysed patients

	Connective tissue syndromes N = 157
Valve-sparing procedure	
David V	149 (94.9%)
David I Valsalva graft	8 (5.1%)
Aortic leaflet valve repair (central plication)	47 (29.7%)
Valsalva graft (mm)**	32 (28-34)
Ascending aorta graft (mm)**	26 (24-32)
Associated surgery	
Atrial septal defect	21 (26.6%)
Mitral valve repair	30 (38%)
Tricuspid valve repair	7 (8.9%)
Combined mitral and tricuspid valve repair	9 (11.4%)
Aortic arch surgery	12 (15.2%)
CPBP time (min)	120 (40)
Cross-clamping time (min)	106 (33)
Intraoperative echocardiographic results	
Effective height (mm)*	1.0 (0.2)
Residual prolapse*	8 (5.1%)
Low coaptation*	1 (0.6%)
Residual aortic regurgitation	
AR 0-I (none-trace)	153 (97.5%)
AR II (mild)	4 (2.5%)

Data are presented as n (%) or median and interquartile range (IQR).

*Results of over 78 records available.

**For the grafts, data are presented as median and minimal and maximum graft sizes.

AR: aortic regurgitation; CPBP: cardiopulmonary bypass perfusion.

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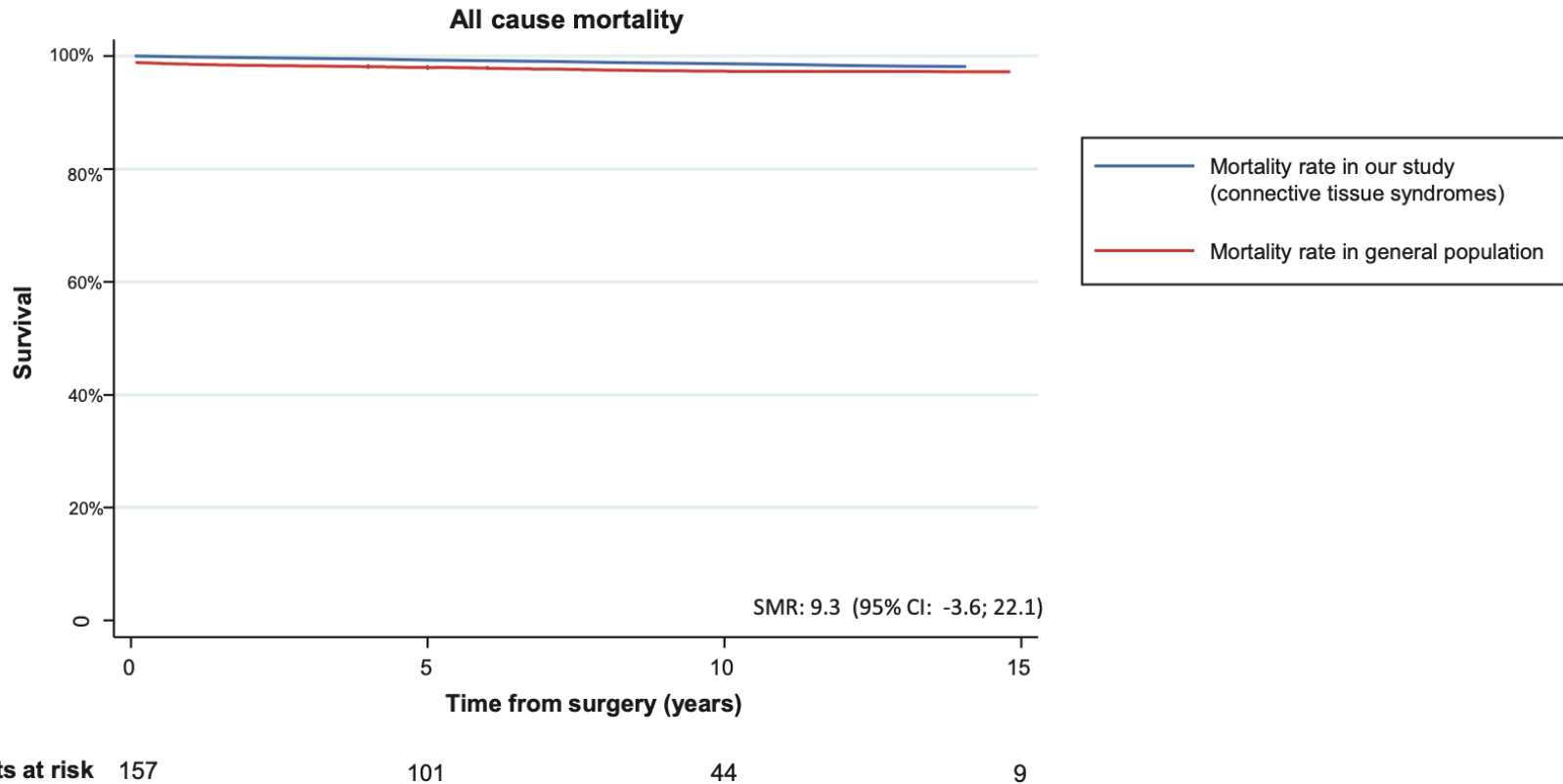


Figure 1: The ratio of the observed number of deaths in our cohort is compared to the mortality rates expected in the general population (life tables from the Spanish Health Ministry between 2004 and 2018 matched for age and gender). No statistically significant differences between the 2 groups were found (SMR 9.3; 95% CI: -3.6; 22.1).

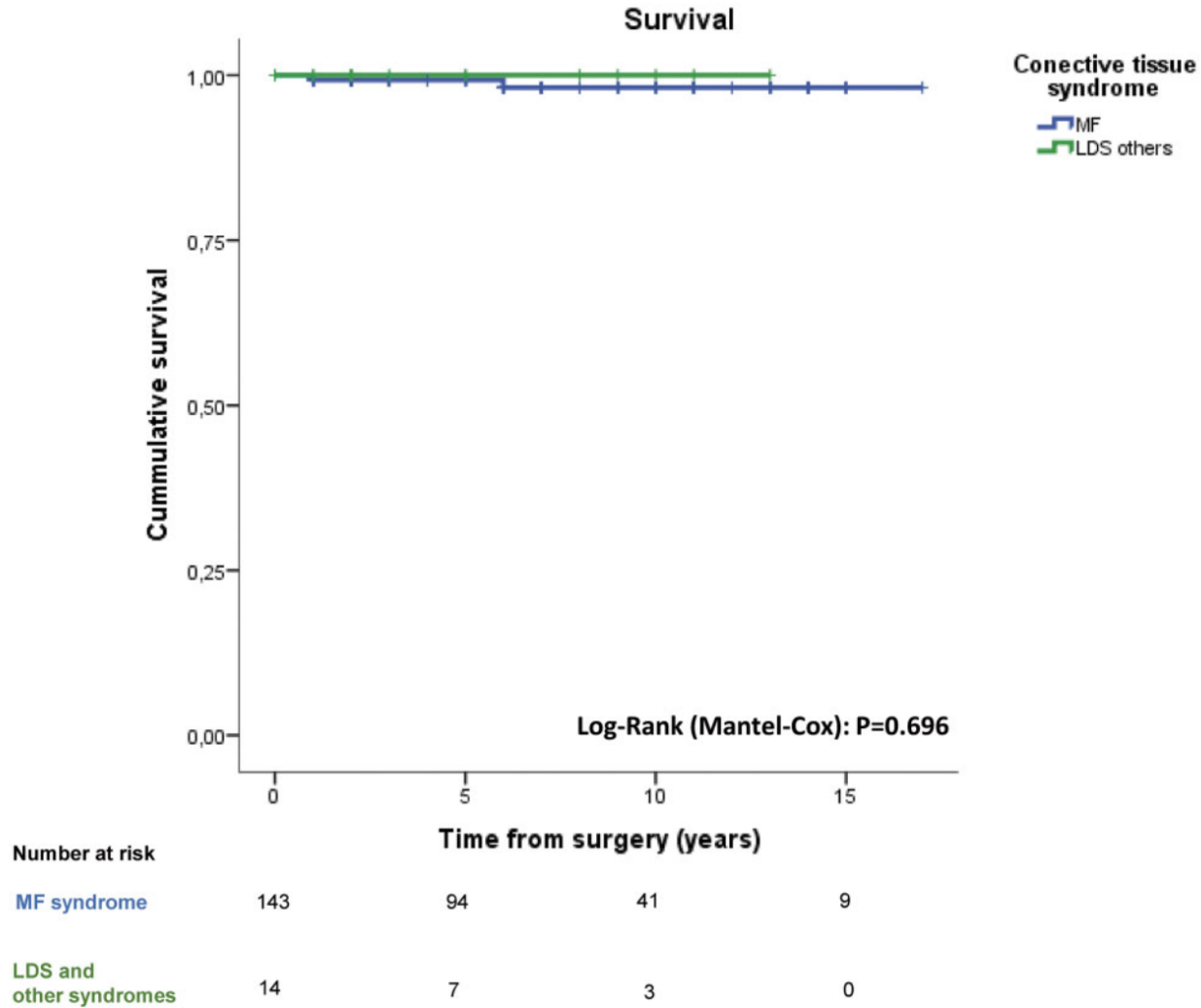
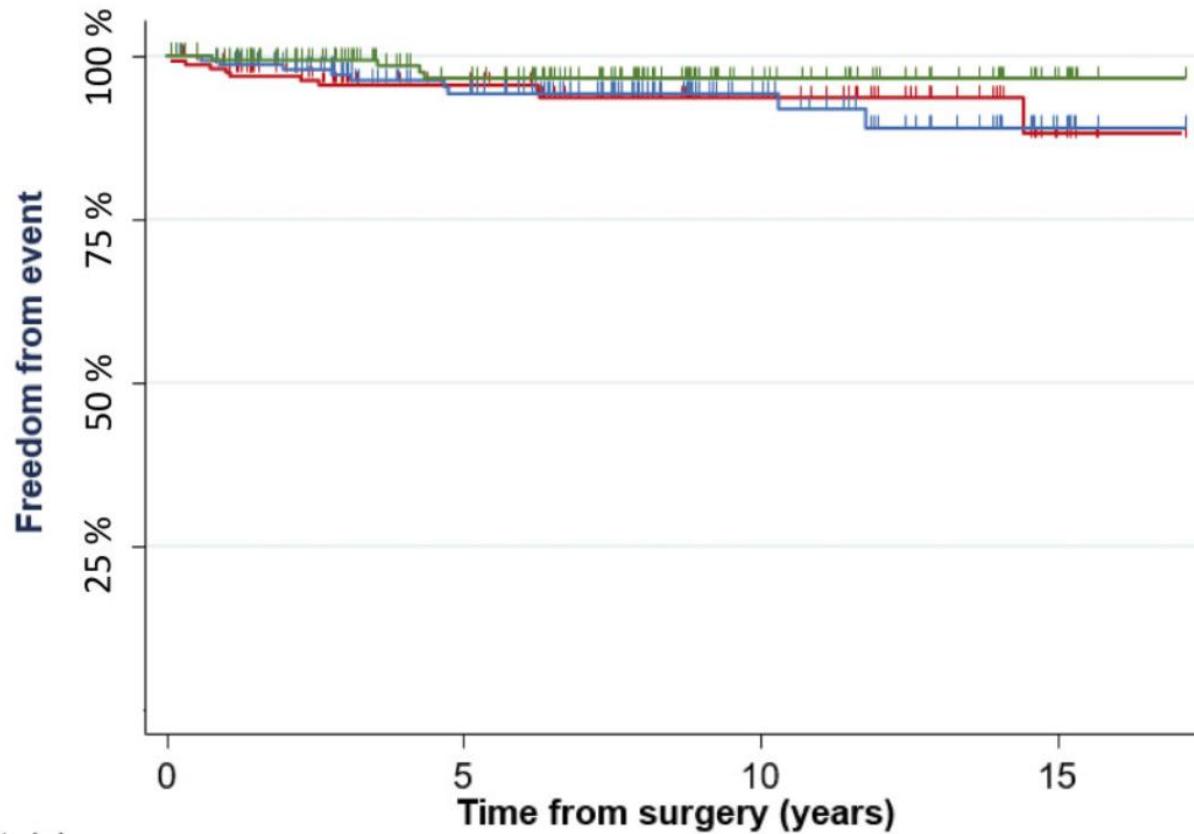


Figure 2: Kaplan-Meier estimates for survival after valve-sparing intervention. The log-rank test is used to compare survival of patients with MS and other connective tissue syndromes. There were no differences in survival regarding the connective tissue syndrome (log-rank: $P = 0.696$).

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Number at risk

Type-B dissection	149	95	42	8
Reoperation	157	98	42	9
AR >II	157	95	42	8

In Summary

Reimplantation is safe, reproducible, durable and with very low morbidity and mortality

In Summary

- ✓ Full dissection of the aortic root
- ✓ Pull upwards the commissures
- ✓ Tie softly the graft (annulus >22-24 mm)
- ✓ Haemostatic suture. Stiches close together
- ✓ Check competence and haemostasis.



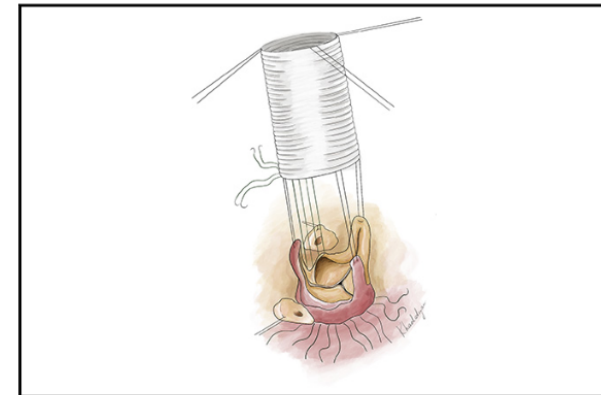
Valve-sparing aortic root replacement can be done safely and effectively in acute type A aortic dissection



Zara Khachatryan, MD, Johanna Herajärvi, MD, PhD, Sergey Leontyev, MD, PhD, and Michael A. Borger, MD, PhD

▶ Video clip is available online.

Feature Editor's Introduction—Despite a multitude of advancements in surgical technique and perioperative care, repair of an acute type A aortic dissection (ATAAD) is still associated with disappointingly high mortality and morbidity. Although operative mortality from higher-volume centers and surgeons may be <10%, large datasets such as *The International Registry of Aortic Dissection* and *the German Registry for Acute Aortic Dissection Type A* are more representative of real-world outcomes with 30-day and in-hospital mortality still approaching 20%. For those fortunate survivors, late aortic root dilatation and aortic valve insufficiency, in addition to downstream aortic dilatation, leads to the need for additional high-risk operations



Valve-sparing procedure using reimplantation technique.

CENTRAL MESSAGE

The David procedure, when performed by experienced surgeons in appropriately selected patients, is a safe and effective treatment option in patients with acute type A aortic dissection

TABLE 1. Perioperative data and early postoperative outcomes after David procedure in acute type A dissection (n = 55)

Variable	Result
Preoperative characteristics	
Age (y)	51.4 ± 12.1
Male	42 (76)
Connective tissue disorders	5 (9)
Bicuspid aortic valve	1 (2)
Cardiopulmonary resuscitation	1 (2)
Inotropic support	5 (9)
Ventilation	6 (11)
Pericardial tamponade	11 (20)
Preoperative critical state	9 (16)
Malperfusion	16 (29)
Cerebral	11 (20)
Coronary	4 (7)
Visceral	3 (5)
Extremity	6 (11)
David procedure type	
David I	34 (62)
David V	21 (38)
Concomitant procedures	
GFR glue around the coronary buttons	5 (9)
Coronary artery patch plasty or bypass	9 (16)
Mitral valve replacement	1 (2)
Extent of distal aortic resection	
Isolated ascending aortic replacement	4 (7)
Hemiarch	34 (62)
Total arch	5 (9)
Elephant trunk	12 (22)

Operative data	
Cardiopulmonary bypass time (min)	205 ± 55
Aortic crossclamp time (min)	148 ± 38
Circulatory arrest time (min)	28 ± 12
Operative time (min)	319 ± 78
Circulatory arrest body temperature (°C)	25 ± 3
Complications	
Low cardiac output syndrome	6 (11)
Perioperative myocardial infarction	1 (2)
Permanent neurologic deficit	6 (11)
Temporary neurologic deficit	9 (16)
Re-exploration for bleeding	15 (27)
Sepsis	4 (7)
Gastrointestinal complications	5 (9)
Pulmonary complications	19 (35)
Renal failure requiring dialysis	10 (18)
Death	
Intraoperative death	0
Hospital mortality	2 (4)
30-d mortality	5 (9)
Causes of hospital mortality	
Intractable low cardiac output syndrome	1 (2)
Major brain damage	1 (2)

Values are presented as n (%), median (range) or mean ± standard deviation. *GFR*, Gelatin-Resorcin-Formalin.

The David procedure is associated with good perioperative safety and long-term efficacy in select ATAAD patients, in particular young patients and those with connective tissue disorders. The David operation is associated with decreased risk of long-term prosthetic-valve-related complications, and therefore should be considered the procedure of choice in younger, lower-risk ATAAD patients when performed by experienced surgeons.

Is it safe Reimplantation in acute type A aortic dissection ?

Valve-sparing aortic root replacement may be reasonable in selected patients with ATAAD.

IIb

C

- Technically demanding procedure.
- Prolonged myocardial ischemia and CPB times
- Hostile aortic root (haematoma, coagulopathy...)



0.6% of the patients in Japanese Registry
6.2% of the patients in German Registry

	In Hospital			Follow-up	
	Mortality	Stroke	Bleeding	Stroke	5y- Survival
Bentall	8% (5.9-10.3)	5.1 (3-7.9)	10 (6.9-13.6)	4.8 (2.3-8.2)	81%(78.5–83.9)
David	2% (0.1-6.5)	2.7 (0.1-8.4)	11.6 (3.4-23.8)	0.5 (0-2.5)	98.8% (91.7–100)

Not in all patients.
Not in all centres.

May be an option... But careful selection.

A progress report on reimplantation of the aortic valve

Tirone E. David, MD, Carolyn M. David, BN, Maral Ouzounian, MD, PhD, Christopher M. Feindel, MD, and Myriam Lafreniere-Roula, PhD

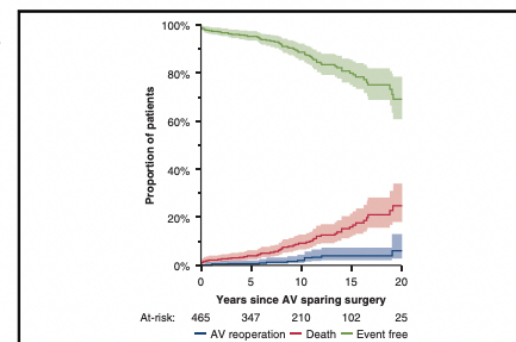
ABSTRACT

Objective: To examine the late outcomes of reimplantation of the aortic valve (RAV) in patients followed prospectively since surgery.

Methods: All 465 patients who had RAV from 1989 to 2018 were followed prospectively with periodic clinical and echocardiographic assessments. Mean follow-up was 10 ± 6 years and 98% complete.

Results: Patients' mean age was 47 ± 5.1 years, and 78% were men. The aortic root aneurysm was associated with Marfan syndrome in 164 patients, Loeys–Dietz syndrome in 13, bicuspid aortic valve (BAV) in 67, and type A aortic dissection in 33. Aortic insufficiency (AI) was greater than mild in 298 patients. Concomitant procedures were performed in 105 patients. There were 5 operative and 51 late deaths. At 20 years, 69.1% of patients were alive and free from aortic valve reoperation, and the cumulative probability of aortic valve reoperation with death as a competing risk was 6.0%, and the cumulative probability of developing moderate or severe AI was 10.2%. Only time per 1-year interval was associated with the development of postoperative AI by multivariable analysis (hazard ratio, 1.06; 95% confidence interval, >1.02 -1.10; $P = .006$). Gradients across preserved BAV increased in 5 patients, and 1 required reoperation for aortic stenosis. Distal aortic dissections occurred in 22 patients, primarily in those with associated genetic syndromes.

Conclusions: RAV provides excellent long-term results, but there is a progressive rate of AI over time, and patients with BAV may develop aortic stenosis. Patients with genetic syndromes have a risk of distal aortic dissections. Continued surveillance after RAV is necessary. (J Thorac Cardiovasc Surg 2020; ■:1-10)



Estimates of pertinent events after reimplantation of the aortic valve.

CENTRAL MESSAGE

Reimplantation of the aortic valve to treat patients with aortic root aneurysm provides excellent long-term results with slow but progressive aortic valve dysfunction.

PERSPECTIVE

This study provides new insights on late events after reimplantation of the aortic valve. Aortic valve function deteriorates slowly over the years and it may be worse in patients with bicuspid aortic valves. Furthermore, there is a risk of distal aortic dissections in patients with associated genetic syndromes and continued surveillance is necessary.

See Commentary on page XXX.

TABLE 4. Cumulative proportions of adverse events over time shown as percentages and 95% confidence intervals inside the brackets

Variable/time	10 y	15 y	20 y
Death from any cause	9.2 [6.5-12.9]	16.0 [11.9-21.5]	24.8 [18.1-34.1]
Event-free survival*	88.7 [85.3-92.2]	80.1 [75.1-85.4]	69.1 [60.9-78.5]
Aortic valve reoperation	2.1 [1.0-4.5]	4.0 [2.2-7.5]	6.0 [2.8-12.9]
Cumulative proportion with death or aortic valve reoperation as a competing risk			
Thromboembolism	5.1 [3.3-8.0]	5.9 [3.7-9.3]	8.8 [5.0-15.5]
Endocarditis	0.5 [0.1-1.8]	0.5 [0.1-1.8]	2.5 [0.5-12.3]
Pacemaker implantation	5.0 [3.2-7.7]	6.0 [3.9-9.3]	6.0 [3.9-9.3]
Distal aortic dissection	2.1 [0.9-4.7]	6.1 [3.5-10.6]	13.8 [7.6-25.1]
Estimates of moderate/severe AI using generalized estimating equations			
Moderate/severe AI	5.3 [3.7-7.4]	7.3 [4.7-11.2]	10.2 [5.7-17.4]

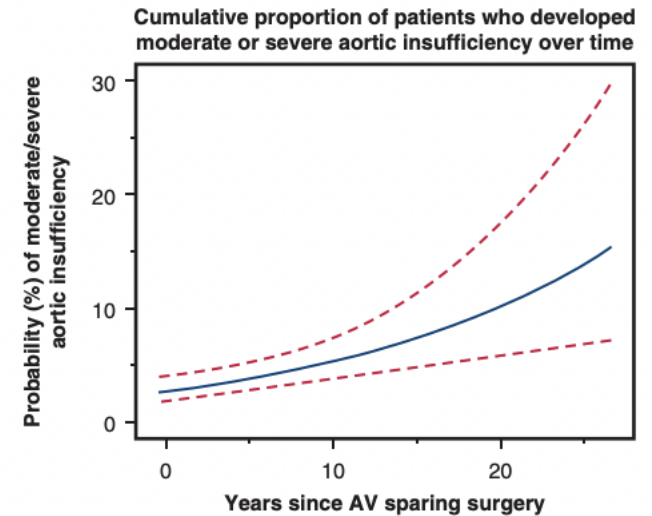
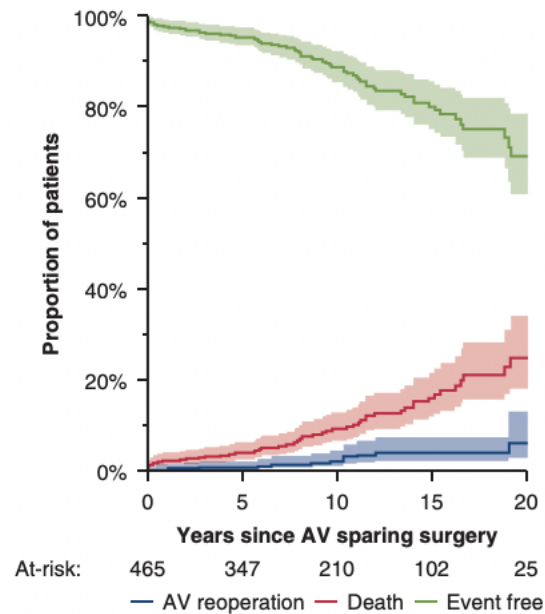
AI, Aortic insufficiency. *Alive and free from reoperation.

A progress Report on Reimplantation of the Aortic Valve

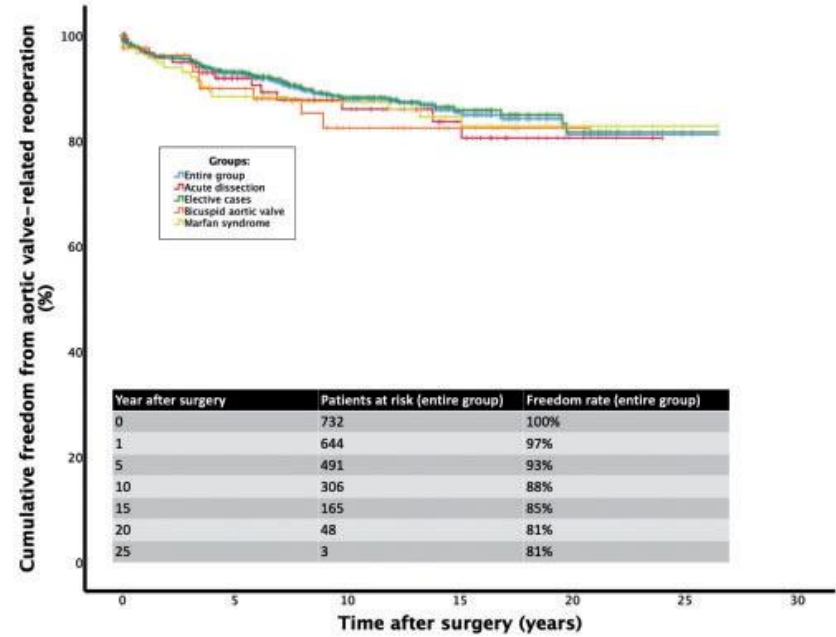
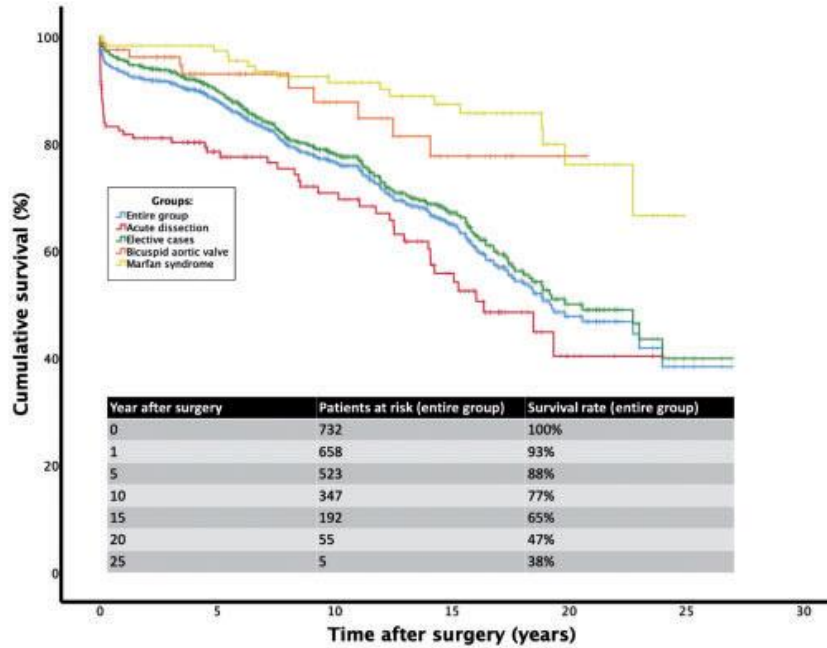
A series of 465 patients who had reimplantation of the aortic valve were followed prospectively with clinical and echocardiographic assessment. Patients mean age was 47 ± 5.1 years, and 164 had Marfan syndrome, 67 had bicuspid aortic valve and 33 type A aortic dissection.

At 20 years, patients' survival was 69.1% and cumulative probability of aortic valve reoperation was 6.0%, and the cumulative probability of developing moderate or severe aortic insufficiency was 10.2%.

This operation has provided excellent long-term result, but there is a progressive rate of aortic valve dysfunction over time.



David TE et al. The Journal of Thoracic and Cardiovascular Surgery 2020



AUTHOR	Technique	N	Marfan	BAV	Follow-up	Mortality	Survival	Freedom from reint.
Beckmann E et al. [33] (Hannover)	DAVID I	732	117 (16%)	81 (11%)	11 (1,9%)*	10 a: 77% 15 a: 65%	10a: 88% 20 a.: 85%	98%

Beckmann E, Eur J Cardiothorac Surg 2021

Aortic Valve Syndrome: I

Alberto Forteza, MD,
Enrique Pérez, MD,
and Jose Cortina, MD

Departments of Cardiac Surg

534 aortic valve sparing operations

157 Marfan syndrome

Background. We reviewed our experience with aortic valve-sparing operations in Marfan syndrome during last 5 years.

Methods. Between March 2004 and June 2009, 94 patients with aortic root aneurysms underwent valve-sparing operations. Of these, 37 (68% male) were diagnosed with Marfan syndrome, according to the Ghent diagnostic criteria. Mean age was 30 ± 10 years (range, 11 to 59 years). Moderate/severe aortic regurgitation was present in 13%, and the mean diameter of the Valsalva sinuses was 50 ± 4 mm (range, 42 to 62 mm). The David V modification was performed in the last 28 patients. Additional procedures were mitral valve repair in 6, tricuspid valve repair in 3, closure of septal atrial defect in 2, and closure of a patent foramen ovale in 13. Mean follow-up was 27 ± 16 months (range, 1 to 61 months).

Results. There were no in-hospital deaths and no major adverse outcomes. One patient required implantation of a mechanical prosthesis during the same procedure because of moderate aortic regurgitation. One late death occurred. No patients required reoperation. In the last follow-up, 23 patients did not have aortic regurgitation, 12 had grade I, and 1 had grade II. No thromboembolic complications have been documented, and 97% of the patients are free from anticoagulation.

Conclusions. Short-term and midterm results with the reimplantation technique for aortic root aneurysms in Marfan patients are excellent. If long-term results are similar, this technique could be the treatment of choice for these patients.

(Ann Thorac Surg 2010;89:93–6)

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Mortalidad hospitalaria 0,4%
> 90% libres de IAO > II y de reoperación