COMPARISON OF
DAVID'S PROCEDURE vs BENTALL'S PROCEDURE
A SINGLE CENTER 20-YEAR OUTCOME ANALYSIS

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Health New Zealand
Te Whatu Ora

HAS 2026

GREEN LANE

DISCLOSURES

- None to declare

AORTIC VALVE SPARING PROCEDURE vs COMPOSITE VALVE GRAFT SURGERY

VALVE SPARING PROCEDURES

- Reduced Cardiac Mortality
- Avoidance of Prosthetic Valve Complications
- Lower risk of re-operation compared to bioprosthetic CVG
- Reduced risk of endocarditis
- Preservation of native valve function
- Comparable or better long-term survival

COMPOSITE VALVE GRAFT PROCEDURE

- Technical simplicity and safety in complex cases
- Durability and elimination of native valve failure risk
- Good long-term survival
- Procedure of choice if valve repair is not feasible
- Versatility

- Ouzounian et al JACC 2016: 1838-47
- Beckmann E, EJCTS 2021: 642–648
- David TE, Ann Cardiothorac Surg 2013;2(1):24-29
- Kunihara JTCVS 2019;158:1501-11
- Iannacone ACS Vol 12, No 3 May 2023
- Kunihara JTCVS 2019;158:1501-11
- Pompeu J Am Heart Assoc. 2023;12:e030629

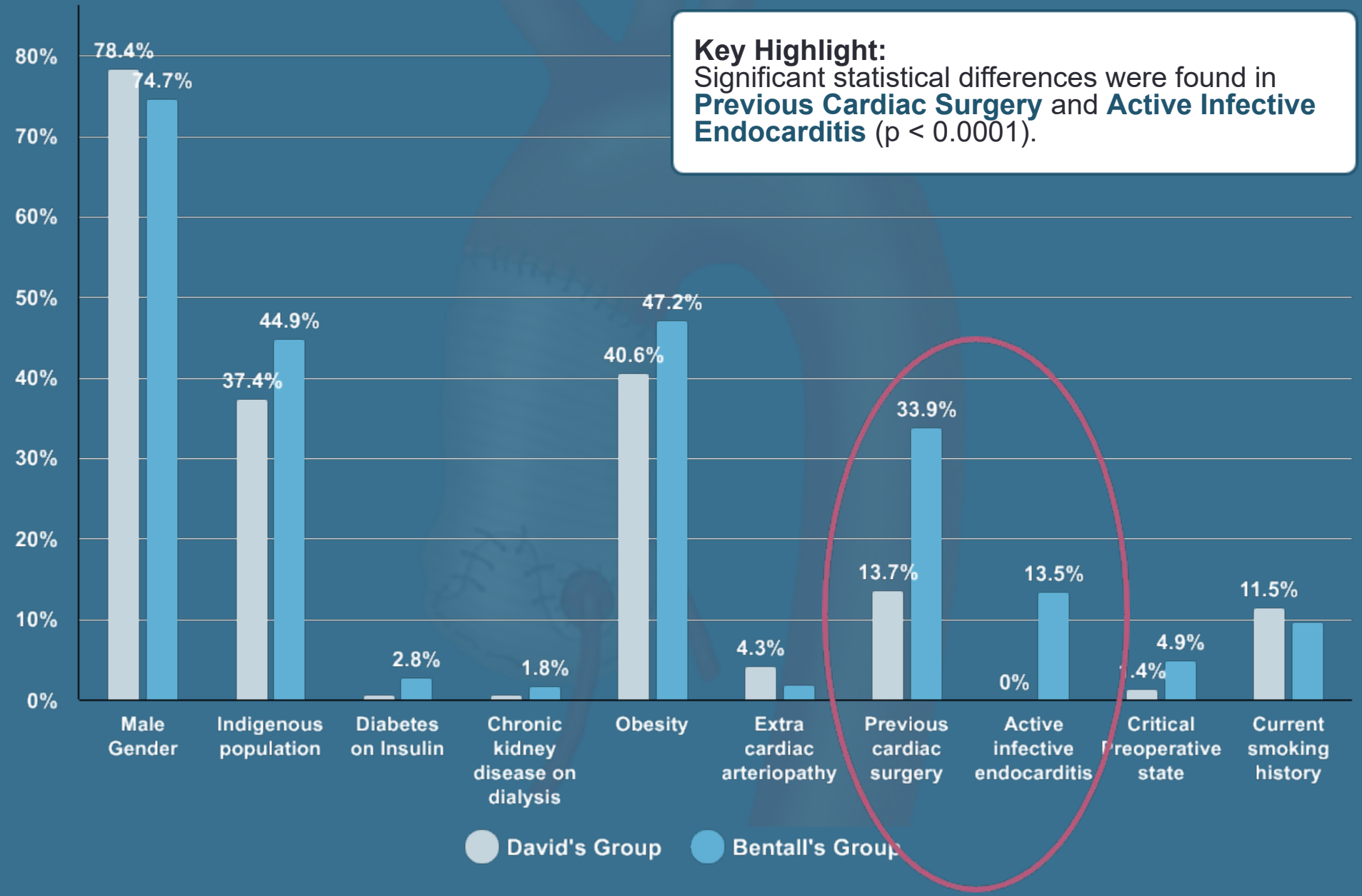
OBJECTIVE

- To compare the outcomes of David's procedure and Bentall's procedure in our centre over 20 years

PATIENTS, METHODS & STUDY DESIGN

- Study period: 2003 - 2023
- Study population: 742 patients underwent root replacement
- **Inclusion Criteria:** David's procedure (n=139) & Bentall's procedure (n=542)
- **Exclusion Criteria:** Yacoub's procedure (n=8), Ross procedure (n=23)
- Patients with Infective Endocarditis (n=77) were excluded for the survival analysis as there were no patients in David's group with IE
- Retrospective analysis
- Hospital ethics committee
- Data recorded from electronic database - Mortality data recorded from death registry
- Statistical Analysis - SAS 9.4 (SAS Institute Inc., Cary, NC, USA.)

BASELINE CHARACTERISTICS



Key Highlight:
Significant statistical differences were found in **Previous Cardiac Surgery** and **Active Infective Endocarditis** ($p < 0.0001$).

BASELINE CHARACTERISTICS

	Total study population n (%) = 711 (100)	David's Group n (%) = 139 (19.55)	Bentall's group n (%) = 572 (80.45)	p value
Disease Etiology Bicuspid Aortic valve Marfan's Disease TAAD LD ED Idiopathic	 158 (22.22) 49 (6.89) 66 (9.28) 2 (0.28) 1 (0.14) 435 (61.18)	 8 (5.75) 33 (23.74) 26 (18.70) 1 (0.72) 0 (0) 71 (51.08)	 150 (26.22) 16 (2.80) 40 (6.99) 1 (0.17) 1 (0.17) 364 (63.64)	**<.0001**
NYHA III/IV	157 (22.08)	9 (6.47)	148 (25.87)	**<.0001**
Preop Grade 3 AR	349 (49.15)	34 (24.46)	315 (55.17)	**<.0001**
Elective Surgery	470 (66.1)	104 (74.82)	366 (63.99	**<.0001**
Age at admission Mean (SD) **N**	52.6 (16.4) 711	46.0 (15.6) 139	54.2 (16.2) 572	**<.0001**
Euroscore Mean (SD) **N**	7.15 (9.80) 296	3.84 (3.02) 87	8.53 (11.2) 209	**0.0002**
Plasma Creatinine Mean(SD) **N**	99.6 (72.6) 318	87.3 (26.9) 88	104.3 (83.3) 230	**0.0621**

VALVE / GRAFT CHARACTERISTICS & CONCOMITANT PROCEDURES

	Type of Procedure	David's Group n (%) = 139 (19.55)	Bentall's group n (%) = 572 (80.45)
David's Procedure	Valsalva Graft Straight Graft	31 (22.3) 108 (77.7)	
Bentall's Procedure	Bioprosthetic Freestyle Homograft Mechanical		110 (19.26) 94 (16.46) 21 (3.68) 346 (60.6)

	Total study population n (%) = 711 (100)	David's Group n (%) = 139 (19.55)	Bentall's group n (%) = 572 (80.45)
Mitral valve Repair Replacement	 24 (3.38) 46 (6.48)	 5 (3.6) 0(0)	 19 (3.33) 46 (**8.06**)
Tricuspid valve Repair Replacement	 36 (5.07) 5 (0.7)	 2 (1.44) 0 (0)	 34 (**5.95**) 5 (0.88)
Pulmonary valve Replacement	4 (0.56)	1 (0.72)	3 (0.53)
Coronary artery bypass graft	98 (13.8)	15 (10.79)	83 (14.54)

COMPARISION OF CPB & CROSS CLAMP TIME

	Procedure	N	Mean (SD)	p value
Cardiopulmonary bypass time (minutes)	**Bentall's**	382	197.0 (86.8)	0.0597
	David's	95	179.4 (51.8)	
Aortic cross clamp time (minutes)	**Bentall's**	382	148.9 (52.2)	0.3175
	David's	95	143.2 (36.4)	

POSTOPERATIVE OUTCOMES

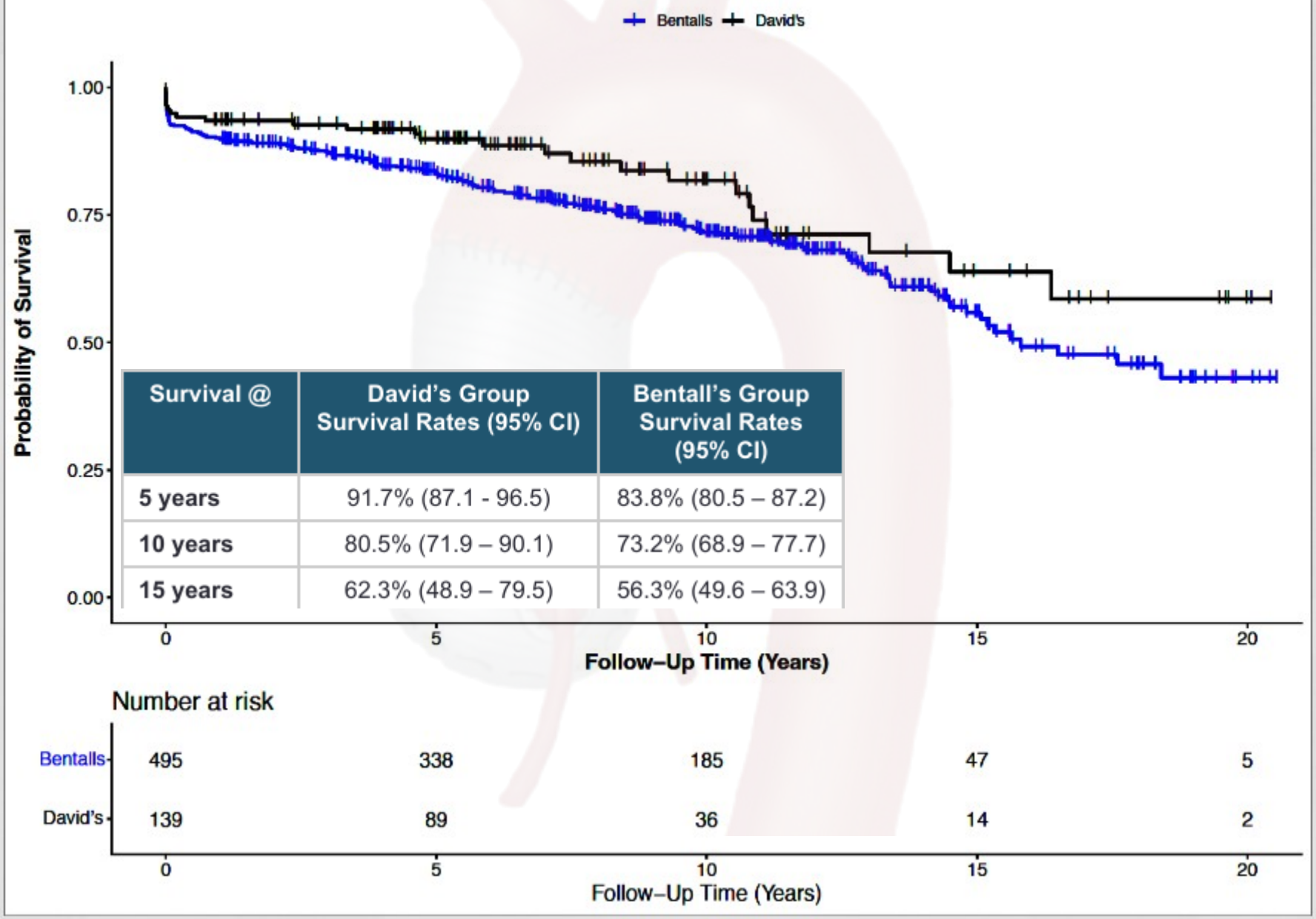
	Total study population n (%) = 711 (100)	David's Group n (%) = 139 (19.55)	Bentall's group n (%) = 572 (80.45)	p value
Return to Theatre	122 (17.35)	15 (10.79)	107 (18.97)	**0.0240**
Renal replacement therapy	37 (5.26)	2 (1.44)	35 (6.19)	**0.0197**
Neurologic complications	35 (4.97)	9 (6.47)	26 (4.6)	0.3833
Mesenteric ischemia	14 (1.99)	3 (2.16)	11 (1.95)	0.7454
ICU LOS, days Mean (SD)	3.84 (6.08)	2.65 (4.2)	4.78 (7.1)	**0.0023**
Hospital LOS, days Mean (SD)	11.3 (10.6)	9.85 (10.1)	11.7 (10.66)	0.0785
Mortality	178 (25.04)	21 (15.11)	157 (27.45)	**0.0022**
Early mortality	51 (7.17)	7 (5.04)	44 (7.69)	0.3597
Late Mortality	127 (17.86)	14 (10.07)	113 (19.76)	**0.0065**
Re-intervention to valve	31 (4.36)	5 (3.6)	26 (4.55)	0.8173
Mortality or Re-intervention to valve	202 (28.41)	25 (17.99)	177 (30.94)	**0.0023**

HAZARD RATIO & CUMULATIVE INCIDENCE OF DEATH

	Group	HR (95% CI)	p value
Time to death, years	**Bentall's**	1.00	**0.037**
	David's	0.61 (0.39 - 0.97)	

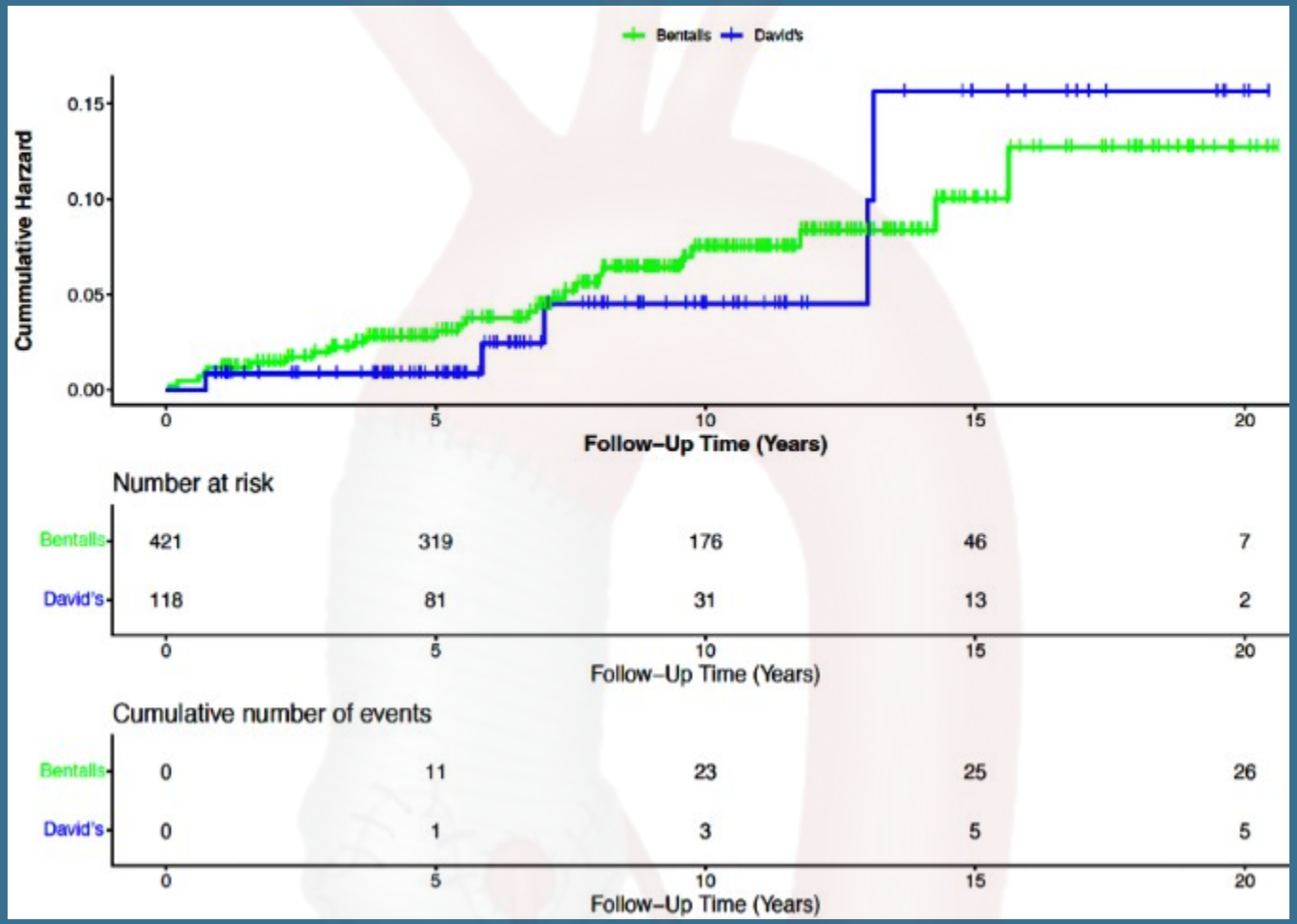
Cumulative Incidence of death	David's group	Bentall's group	p value
1-year	5.8% (2.7% - 11%)	9.5% (7.1% - 12%)	**0.037**
5-year	9.3% (5.0% - 15%)	16% (13% - 19%)	
10-year	17% (9.9% - 26%)	26% (22% - 31%)	
15-year	33% (20% - 47%)	43% (36% - 49%)	
20-year	43% (25% - 59%)	70% (55% - 81%)	

KAPLAN MEIR SURVIVAL ANALYSIS



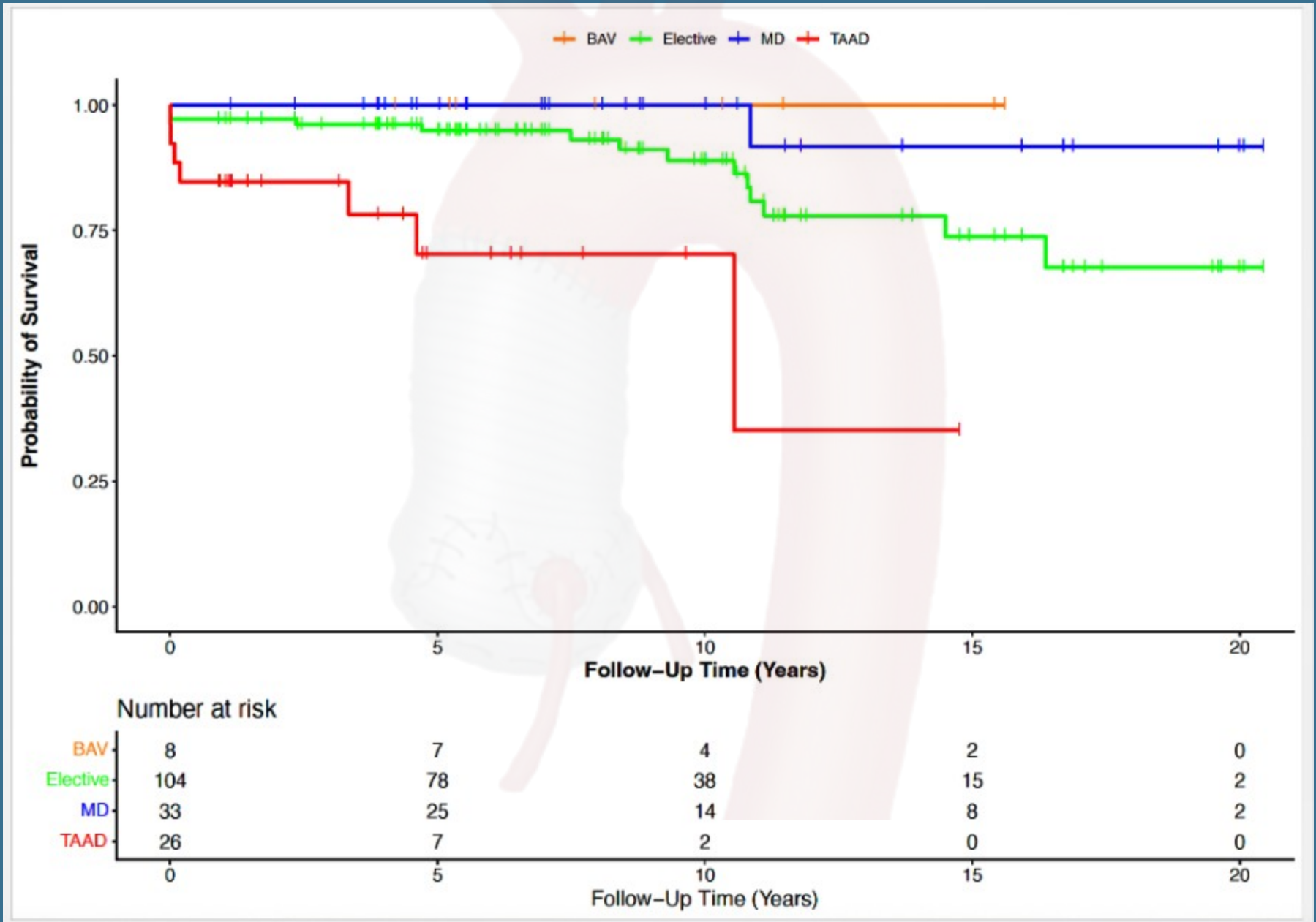
Survival @	David's Group Survival Rates (95% CI)	Bentall's Group Survival Rates (95% CI)
5 years	91.7% (87.1 - 96.5)	83.8% (80.5 – 87.2)
10 years	80.5% (71.9 – 90.1)	73.2% (68.9 – 77.7)
15 years	62.3% (48.9 – 79.5)	56.3% (49.6 – 63.9)

CUMULATIVE INCIDENCE OF REINTERVENTION

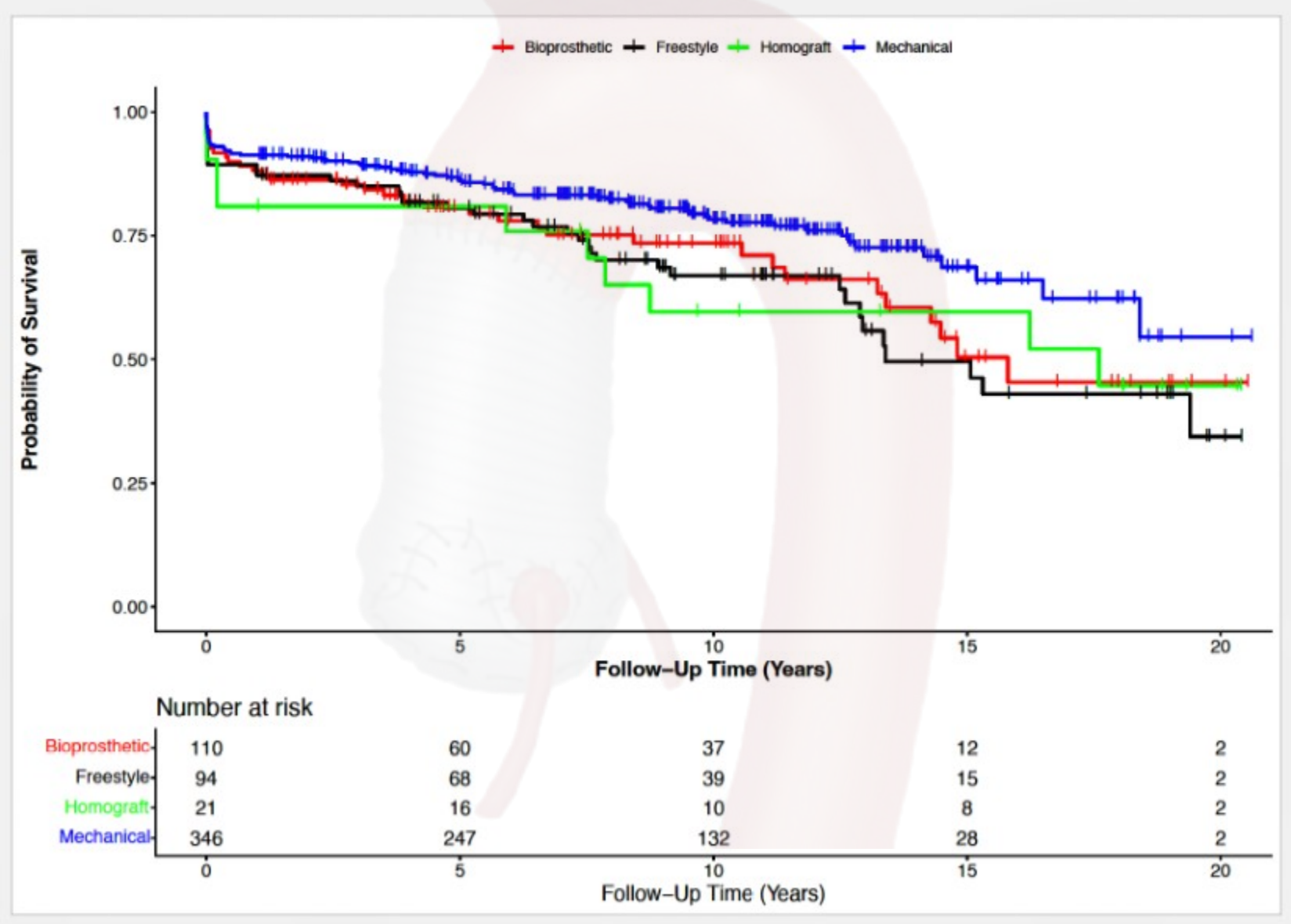


Events @	David's group	Bentall's group	p value
1-year	0.85% (0.08% - 4.20%)	1.2% (0.5% - 2.6%)	0.702
5-year	0.85% (0.08% - 4.20%)	2.8% (1.5% - 4.7%)	
10-year	4.4% (1.1% - 12.0%)	7.2% (4.6% - 11.0%)	
15-year	14.0% (4.0% - 31.0%)	9.5% (5.7% - 15.0%)	
20-year	14.0% (4.0% - 31.0%)	12.0% (6.5% - 19.0%)	

KAPLAN MEIR SURVIVAL ANALYSIS FOR MORTALITY IN DAVID'S GROUP BASED ON ETIOLOGY AND ELECTIVE SURGERY



KAPLAN MEIR SURVIVAL ANALYSIS FOR MORTALITY IN BENTALLS GROUP BASED ON TYPE OF VALVE



MULTIVARIATE ANALYSIS

	N (%)	Time to Reintervention or Mortality in David's group			
		Univariate Analysis		Multivariate Analysis	
		HR (95% CI)	p value	HR (95% CI)	p value
Male Gender	109 (78.99)	2.32 (0.69 - 7.79)	0.172	2.60 (0.76 – 8.89)	0.129
Indigenous	52 (37.68)	2.43 (1.09 – 5.43)	**0.031**	2.12 (0.90 – 4.98)	0.086
Age Mean (SD)	46.2 (15.5)	1.02 (0.99 - 1.05)	0.169	1.02 (0.99 - 1.05)	0.282
Etiology					
BAV	8 (5.93)	1.52 (0.16 – 14.8)	0.717	1.27 (0.13 – 12.5)	0.840
Idiopathic	68 (50.37)	3.29 (0.94 – 11.5)	0.063	1.85 (0.45 – 7.68)	0.395
TAAD	26 (19.26)	7.84 (1.93 - 31.9)	**0.004**	6.44 (1.45 - 28.6)	**0.014**
MD	33 (24.44)	1.00		1.00	

Valve-Sparing Root Replacement Compared With Composite Valve Graft Procedures in Patients With Aortic Root Dilation

Maral Ouzounian, MD, PhD, Vivek Rao, MD, PhD, Cedric Manlhiot, PhD, Nachum Abraham, MSc, Carolyn David, RN, Christopher M. Feindel, MD, MSc, Tirone E. David, MD

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FIGURE 1 All-Cause Mortality

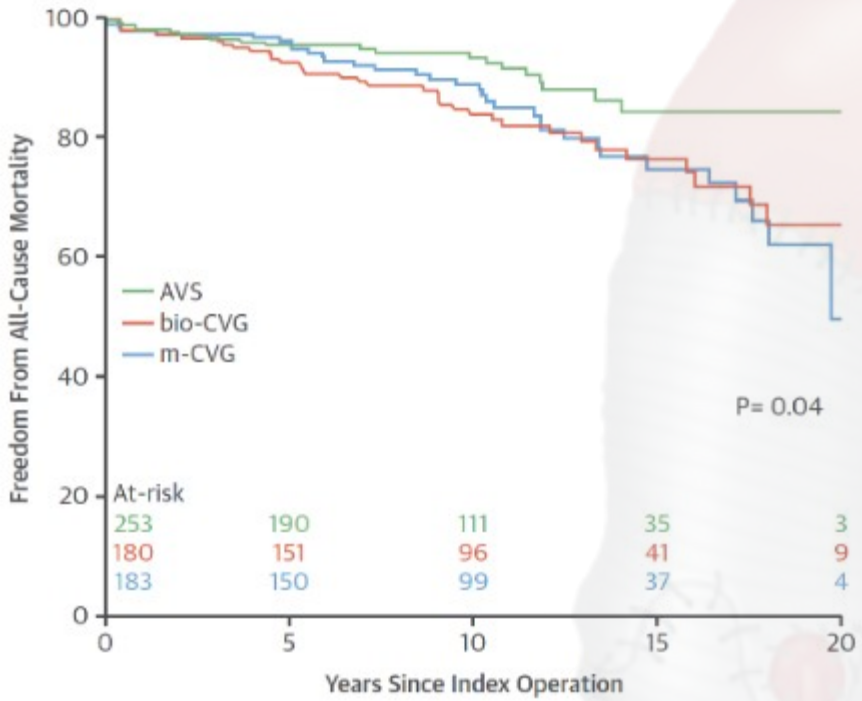
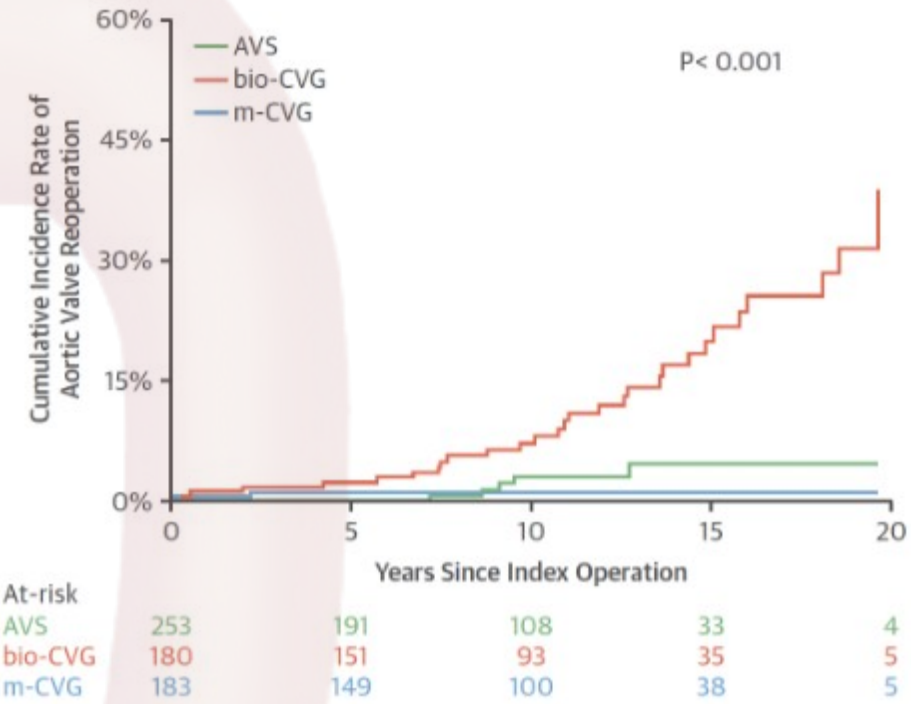


FIGURE 3 Prevalence of Aortic Valve Reoperation



Survival @ years	Greenlane CTSU		Tirone David et al	
	David's	Bentall's	David's	Bentall's
5 years	91.7% (87.1-96.5)	83.8% (80.5 – 87.2)	96%	92-96%
10 years	80.5% (71.9 – 90.1)	73.2% (68.9 – 77.7)	93%	84-89%
15 years	62.3% (48.9 – 79.5)	56.3% (49.6 –63.9)	84%	75%
20 years	62%	50%	80%	70%

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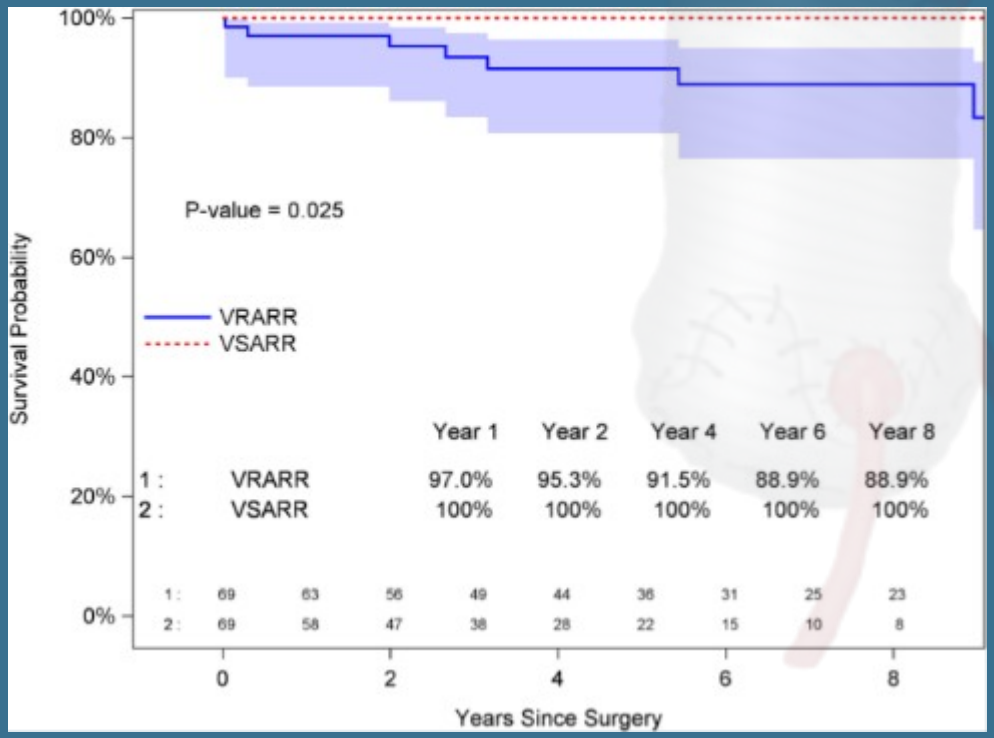
ORIGINAL ARTICLE

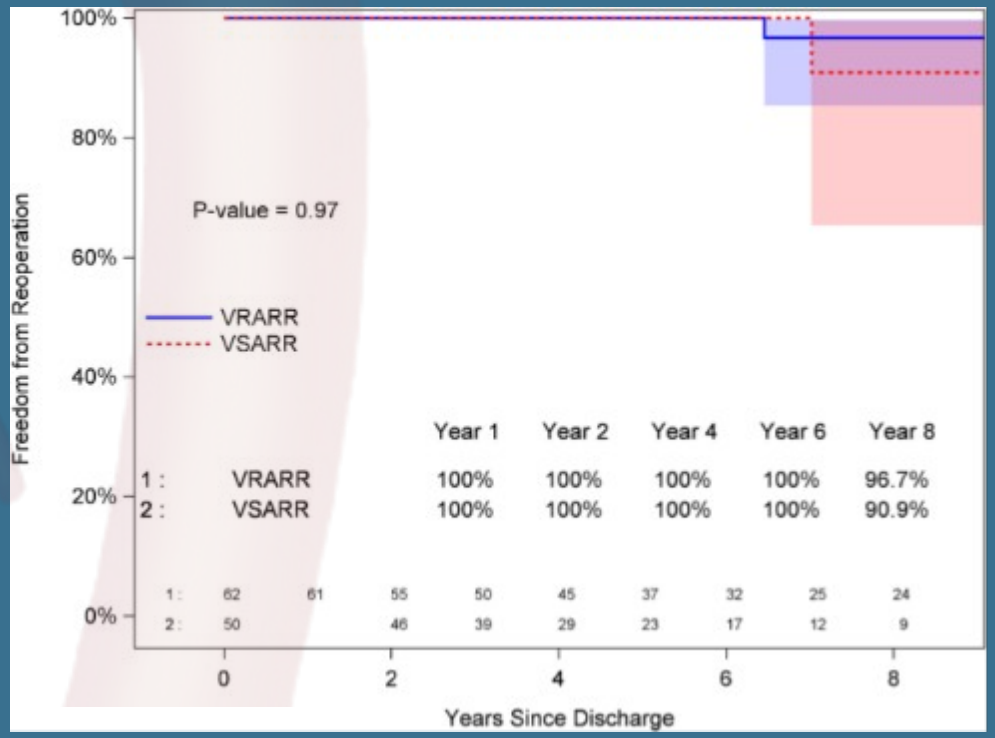
JOURNAL OF CARDIAC SURGERY WILEY

Valve-sparing versus valve-replacing aortic root replacement in patients with aortic root aneurysm

S. Chris Malaisrie MD[1] | Olga N. Kislitsina MD[2] | Lisa Wilsbacher MD[2] | Marla Mendelson MD[2] | Jyothy J. Puthumana MD[2] | Patricia Vassallo MD[2] | Jane Kruse BSN[1] | Adin-Cristian Andrei PhD[3] | Patrick M. McCarthy MD[1]

Survival @ years	Greenlane CTSU		Chris Malaisrie et al	
	David's	Bentall's	David's	Bentall's
5 years	91.7% (87.1-96.5)	83.8% (80.5 – 87.2)	100%	89%
10 years	80.5% (71.9 – 90.1)	73.2% (68.9 – 77.7)	100%	88%
15 years	62.3% (48.9 – 79.5)	56.3% (49.6 – 63.9)		
20 years	62%	50%		

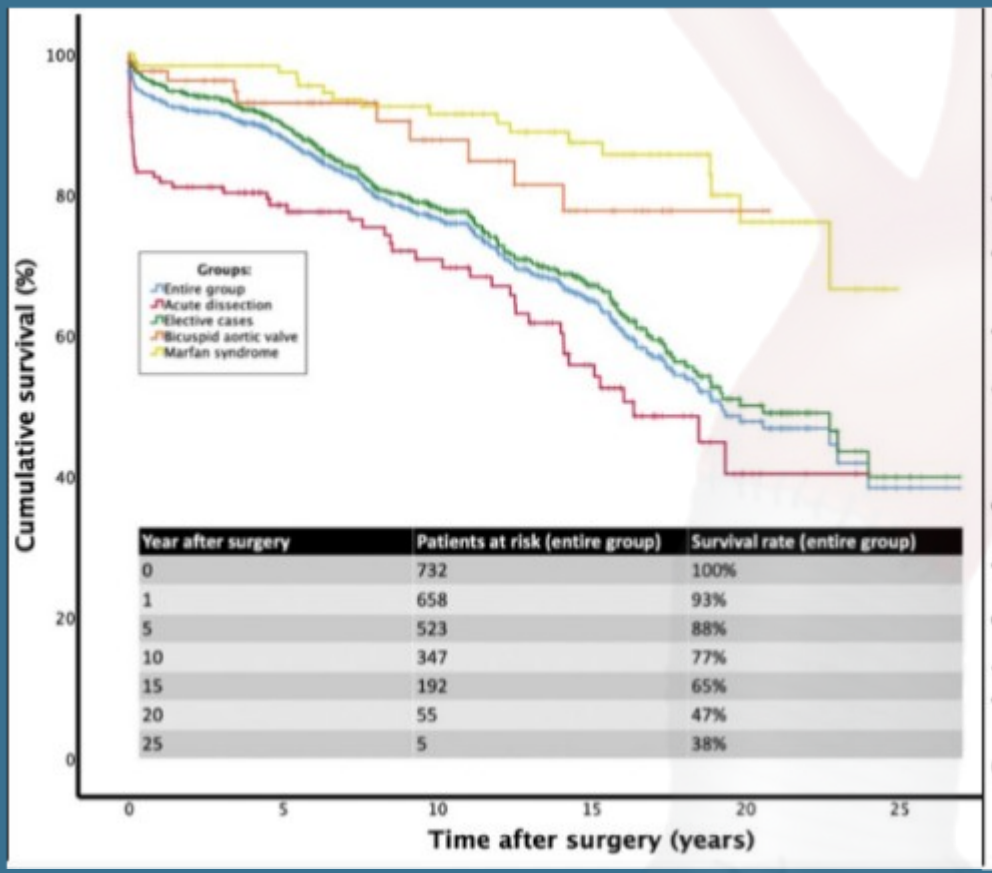




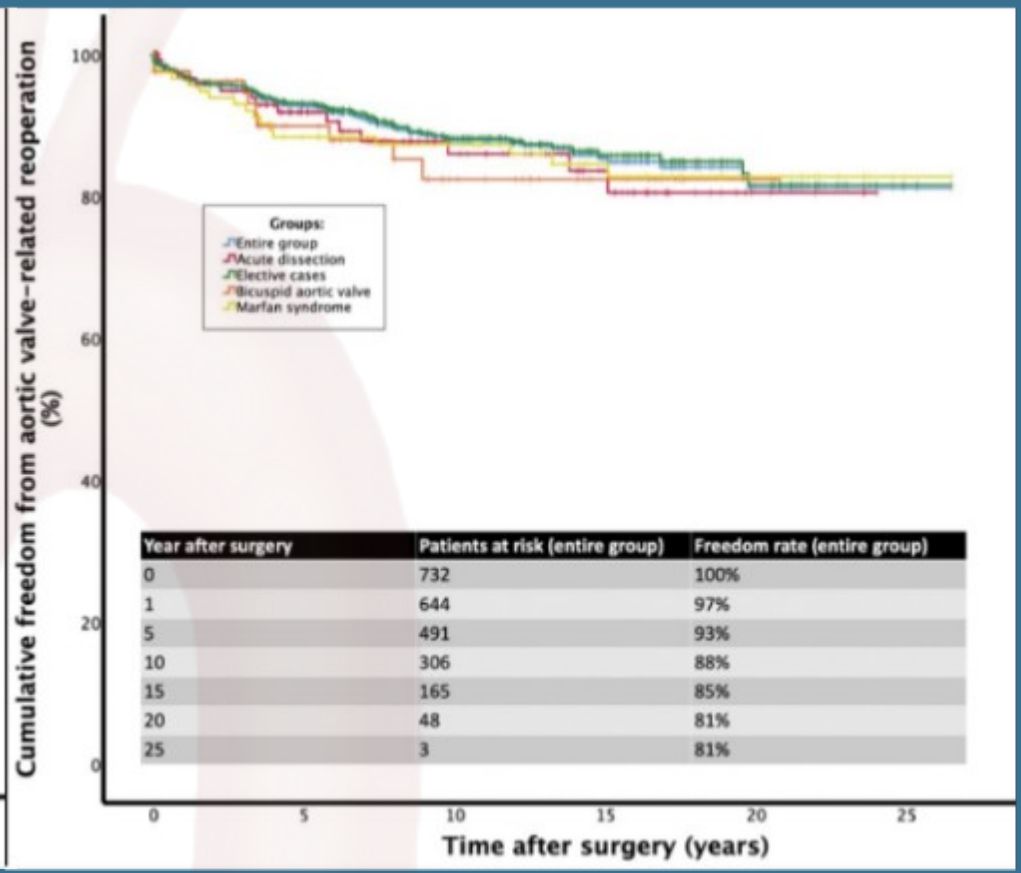
ORIGINAL ARTICLE

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



Year after surgery	Patients at risk (entire group)	Survival rate (entire group)
0	732	100%
1	658	93%
5	523	88%
10	347	77%
15	192	65%
20	55	47%
25	5	38%



Year after surgery	Patients at risk (entire group)	Freedom rate (entire group)
0	732	100%
1	644	97%
5	491	93%
10	306	88%
15	165	85%
20	48	81%
25	3	81%

Survival @	David's Group Survival Rates (95% CI)
5 years	91.7% (87.1 - 96.5)
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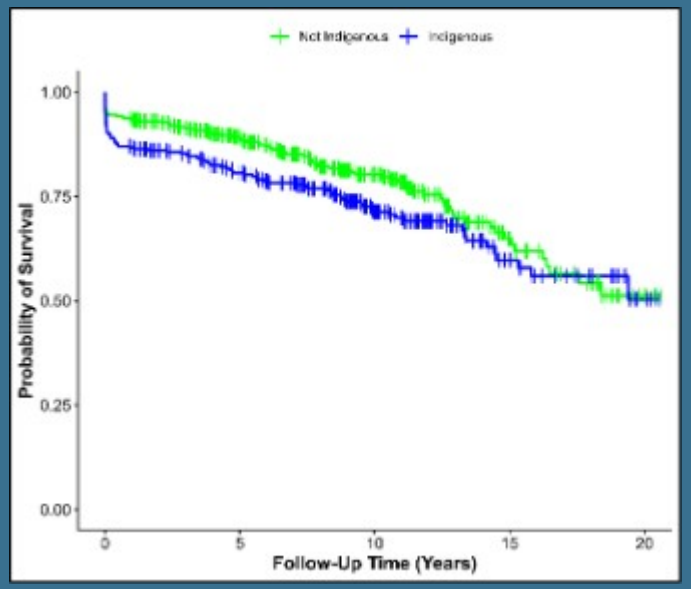
MAORI & PASIFIKA POPULATION



	Group	HR (95% CI)	p value
Time to death, years	Indigenous	**1.33** (0.99 - 1.79)	**0.057**
	Non indigenous	1.00	

Cumulative Incidence of death	Indigenous population	Non Indigenous population	p value
1-year	13% (9.8% - 17%)	6.7% (4.5% - 9.4%)	**0.057**
5-year	19% (15% - 24%)	11% (8.3% - 15%)	
10-year	29% (23% - 34%)	20% (15% - 24%)	
15-year	40% (32% - 49%)	35% (27% - 43%)	
20-year	50% (35% - 63%)	49% (37%, 60%)	

Comparison of characteristics and outcomes for type A aortic dissection surgery by Māori, Pasifika or other ethnicities

Tom Kai Ming Wang, Danting Wei, Thomas Evans, Thaurmenthiran Ramanathan, David Haydock

ELSEVIER
Current Problems in Cardiology
Volume 48, Issue 5, May 2023, 101594

Acute Aortic Syndrome in Aotearoa New Zealand: What Does It Mean for Māori?

Steve W F R Waqanivavalagi

CONCLUSION

- Long term results - David's procedure > Bentall's procedure
- Bentall's procedure - High risk surgical group
- Acute Type A aortic dissection & David's procedure
- Mechanical valves & Bentall's procedure
- Ethnicity & Outcomes
- Future - Study on ethnicity and aortic diseases

Thank you