

Surgical Aspects of Heart Transplantation and Ventricular Assist Devices in New Zealand

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Mechanical Circulatory Support



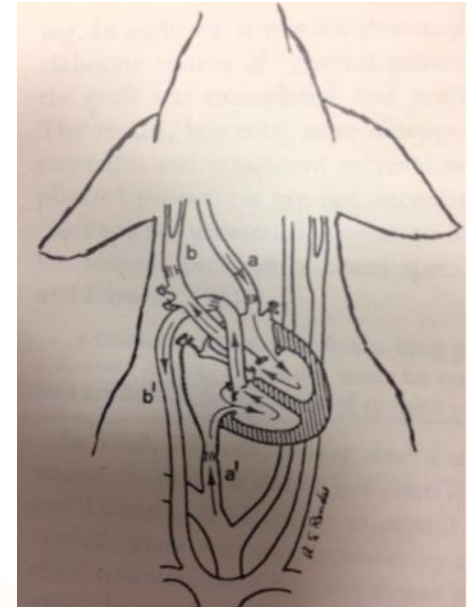
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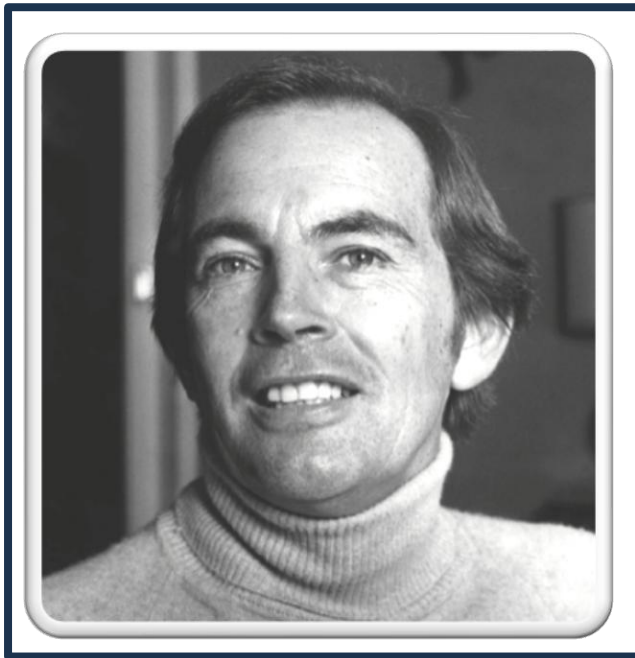
ASSASSINATION OF A PRESIDENT AND BIRTH OF TRANSPLANTATION



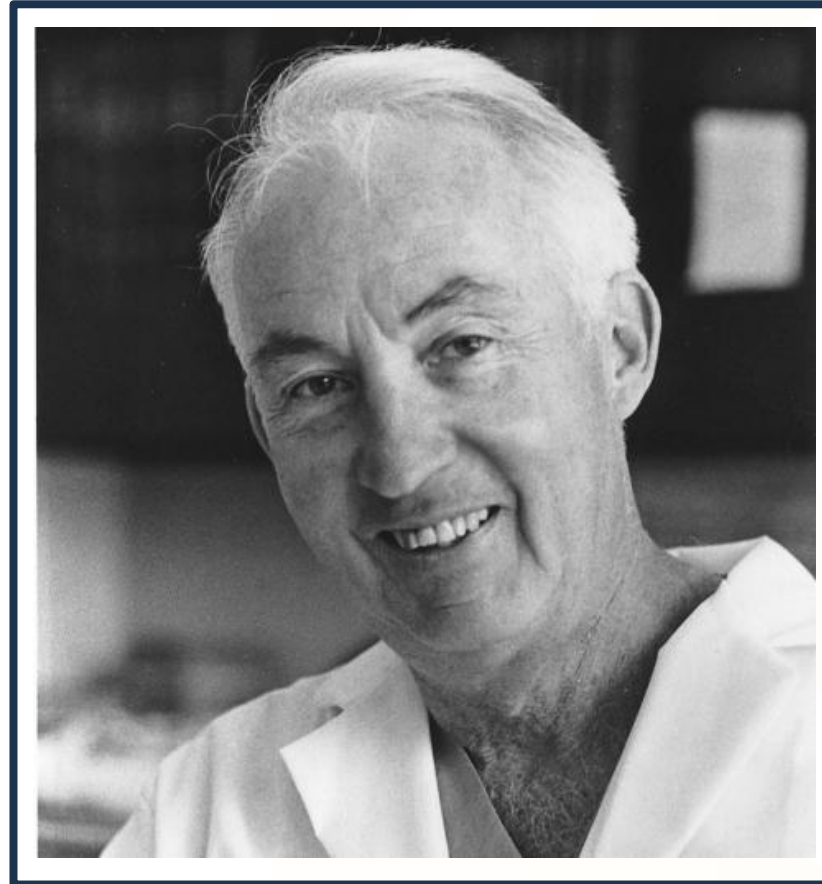
Alexis Carrel- Father of Transplantation
Nobel Prize in Physiology and Medicine 1912



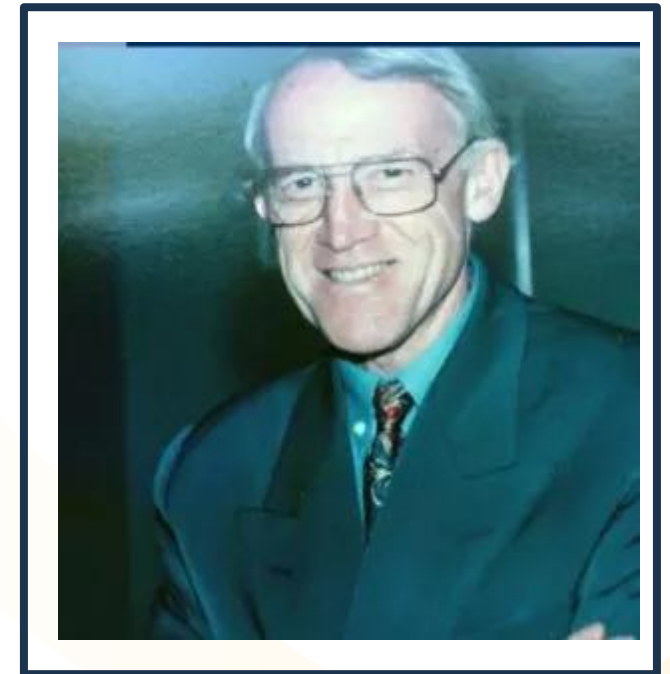
THE HISTORY: HUMAN HEART TRANSPLANTATION



Christian Bernard
1967 First Heart Transplant



Norman Shumway
The Stanford Group



Ken Graham
1987: First in NZ



THE WAIT LIST-DYNAMIC

Avg: 12-14 patients

Adult and Pediatric

Increasing complexity

- 40% on VADs/ BiVADs
- Previous operations
- Sensitized patients
- Re-Transplants
- Combined transplants
- Urgent Transplants
- Tx off ECMO

NAME, AGE O BLOOD GROUP	Accepted	Diagnosis	Inter Macs (1-7)	ABO O +	WT +/- 20%	Ht	Hb	Cr	PVR TPG	Hep B Abs	PRA%	Previous Cardiac Op	Last Admission:	LVAD Candidate (Yes/No/Maybe) EYESWL, PASP LVAD mths	Comments
	08.03.24	Inch CM	4	O Pos	80 (64- 96)	169	145	85	2.94 WU TPG 12 18.11.24	POS	25	LVAD 19.01.24	Jan 2024	LVAD mths Warfarin	Whangarei
	09.01.25	Severe Bi Vent Failure Italy genetic	3	O pos	77 (67- 91)	182	132	69		NEG	32	LVAD 06.08.24	13 Oct 2024	BiVADS in situ Warfarin	TEPUKE
	24.02.25	Arrhythmogenic Right Ventricular Cardiomyopathy	4	O Pos	73.5 (59- 88)	190	147	71	1.4 WU TPG 6 04.11.24	Pos	96	Nil	26.01.25	NO - Due to RV Failure	Auckland
	10.06.24	DCM + Non-sustained VT	5	O pos	64 (49- 73)	167	136	54	1.34 WU TPG 7 24.04.24 RMC 13/01/25	Neg	0	Marxotomy and suture RV ant wall perforation 2020 Thoracotomy 2023	15.12.23	Maybe	Auckland

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NAME, AGE A BLOOD GROUP	Accepted	Diagnosis	Inter Macs (1-7)	ABO A Pos	WT +/- 20%	Ht	Hb	Cr	PVR TPG	Hep B Abs	PRA%	Previous Cardiac Op	Last Admission:	LVAD Candidate (Yes/No/Maybe) EYESWL, PASP	Comments
	21.02.25	Giant Cell Myocarditis	5	A Pos	66 (55- 103)	167	126	99	2.58 WU TPG 8 06.11.24	NEG	0	ICD Feb 2023	July 2024 Meds	On Warfarin	Auckland
	10.05.24	Heart Transplant 2003 ESRF - on HD Severe CMV	5	A Neg	81 (64- 97)	167	94	834 on dialysis	TPG 7 06.05.24 RMC 10/02/25	NEG	39	Heart transplant 2003	2023	FOR HYPERKALEMIC crisis TX NPPA APPROVED	Renal Physician to be notified DANABU
	23.12.24	Familial DCM	3	A Pos	80 (66 - 95)	187	115	78	1.56 WU TPG 8 17/10/24	POS	0	LVAD implant 16.09.24	03.10.24 Discharged	LVAD mths On Warfarin	Tauranga On Warfarin
	29.03.25	Severe Ischaemic DCM	A	Pos	79 (63- 94)	160	111	62	3.57 WU TPG 10 26/01/25	NEG	38			Yes	Northland
	06.05.24	Cardiac transplant 2009 Severe TB Severe TAV	5	A Pos	72 (62- 86)	165	101	74	2.2WU TPG 12 06/12/24	POS	94	Heart transplant 2009	July 2024	No	Auckland

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NAME/AGE B BLOOD GROUP	Accepted	Diagnosis	Inter Macs (1-7)	ABO B Pos	WT +/- 20 %	Ht	Hb	Cr	Hep B Abs	PVR TPG	PRA %	Previous Cardiac Op	Last Admission:	LVAD Candidate (Yes/No/May be) EYESWL, PASP	Comments
	23.03.25	Bioprost Aortic Valve with severe LV dysfunt ion	3	B Neg	88 (72- 104)	180	157	40	Pos	1.39 WU 7mmHg 13/01/25	15	LVAD implant 16.02.24	Feb 2024	In Situ	Wellington On warfarin
	05.09.24	DCM	5	B Pos	76 (61- 91)	176	153	128	Neg	1.3 WU 6mmHg 16/12/24	5	ICD mths 04.09.24	Dec 2023	Yes	Auckland On Warfarin
	15.12.23	DCM	3	B Pos	63 (76- 50)	172	144	124	4.91 WU 14 mmHg 16.10.23	Pos	51	BiVAD's 20.10.23	Nov 2023	In Situ	Felding - Palmerston North On Warfarin Must use XYYO.



DONORS FOR HEART TRANSPLANT

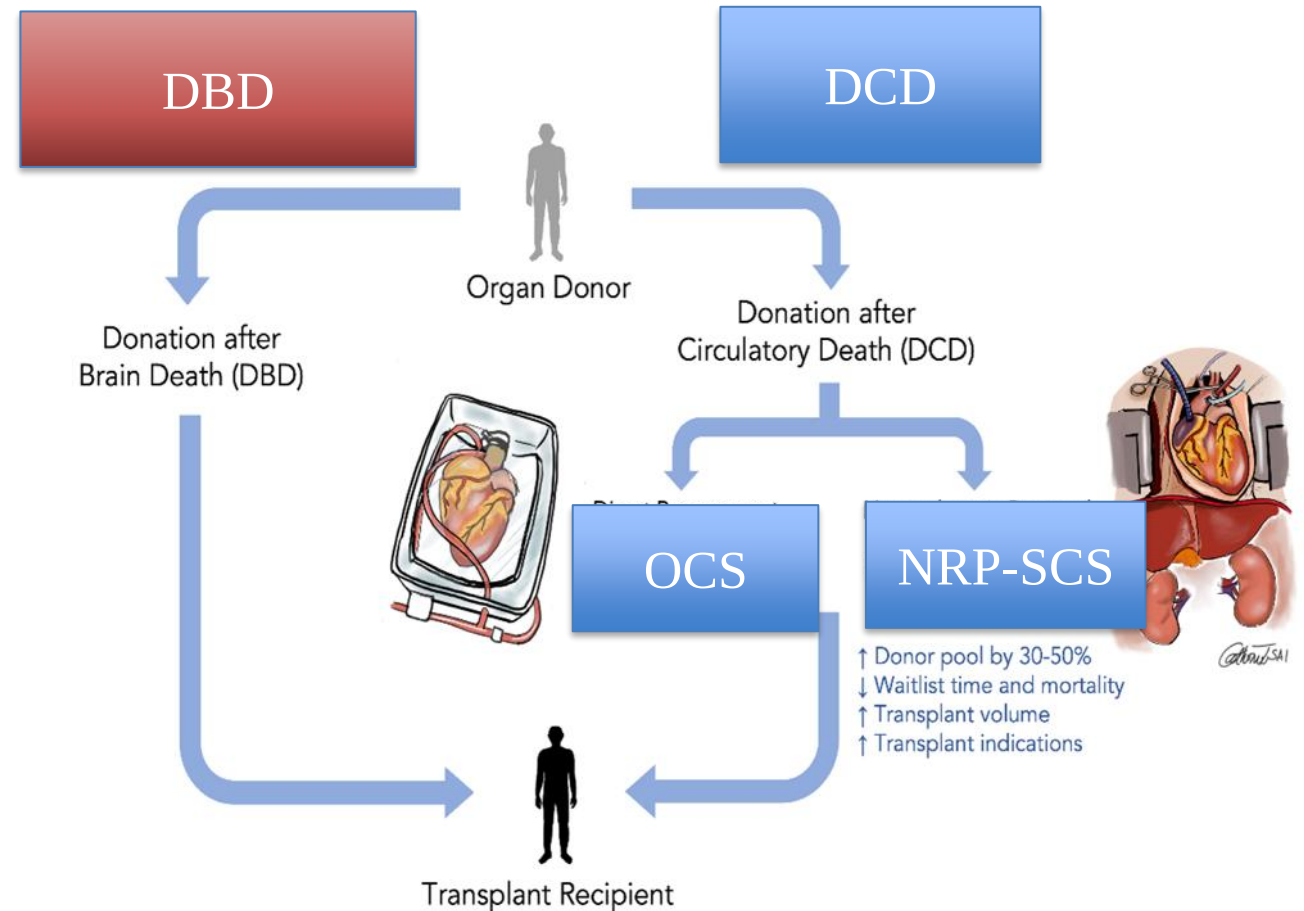
NZ DONOR RATES



Organ Donation New Zealand
New Zealand's official donor agency

Organs transplanted	2018	2019	2020	2021	2022	2023
Hearts	20	17	13	14	16	16
Lungs	28	26	24	26	16	25

- 12.2/ million
- 63 Deceased donors/yr
- Only DBD donors for Heart Tx





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SURGICAL TECHNIQUE FOR HEART TRANSPLANT

ORTHOTOPIC

BI-ATRIAL TECHNIQUE (Shumway & Lower 1960)

BI-CAVAL TECHNIQUE (Yacoub 1989)

HETEROTOPIC



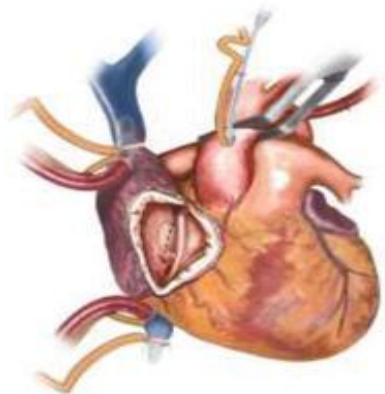
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RECIPIENT CARDIECTOMY

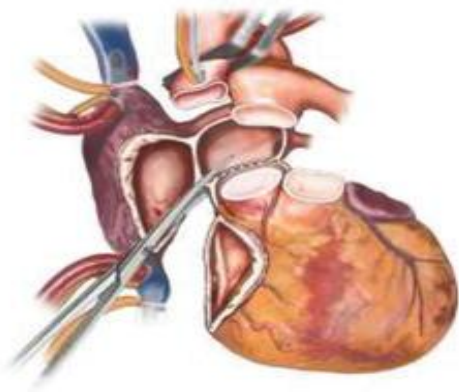
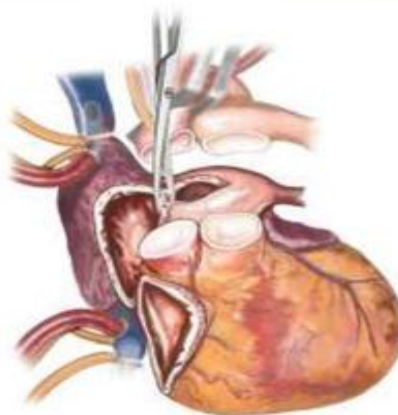
Cardiectomy of the recipient Heart



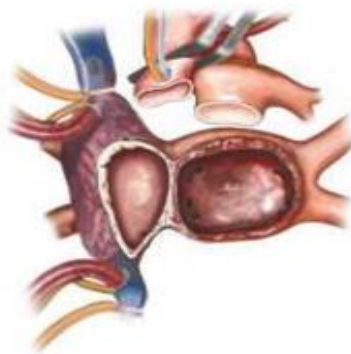
(a)



(b)

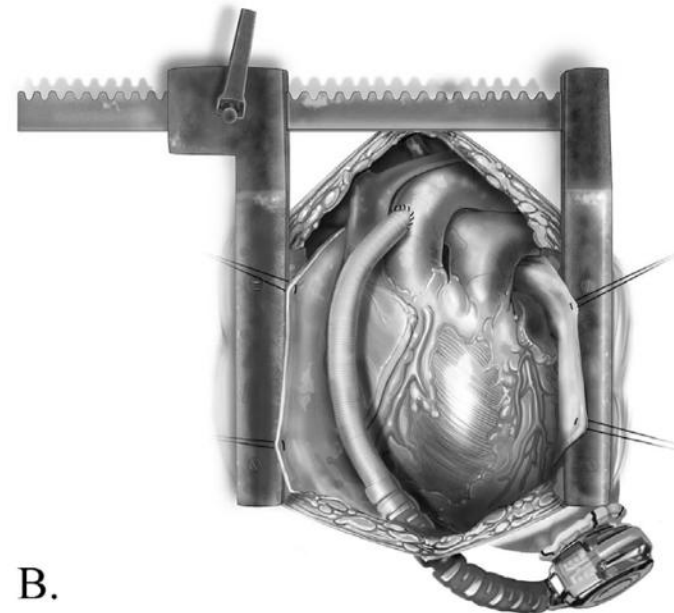


(c)



(d)

LVAD EXPLANT RECIPIENT CARDIECTOMY



B.



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BI-ATRIAL ORTHOTOPIC TRANSPLANT

LA-LA

PA-PA

Aorta- Aorta

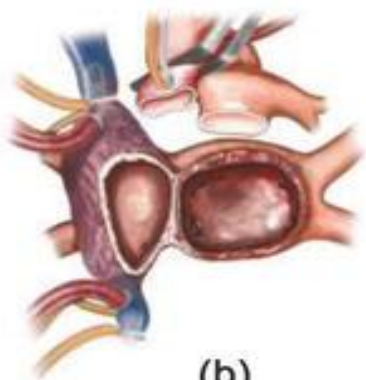
RA-RA

Donor Heart Preparation



(a)

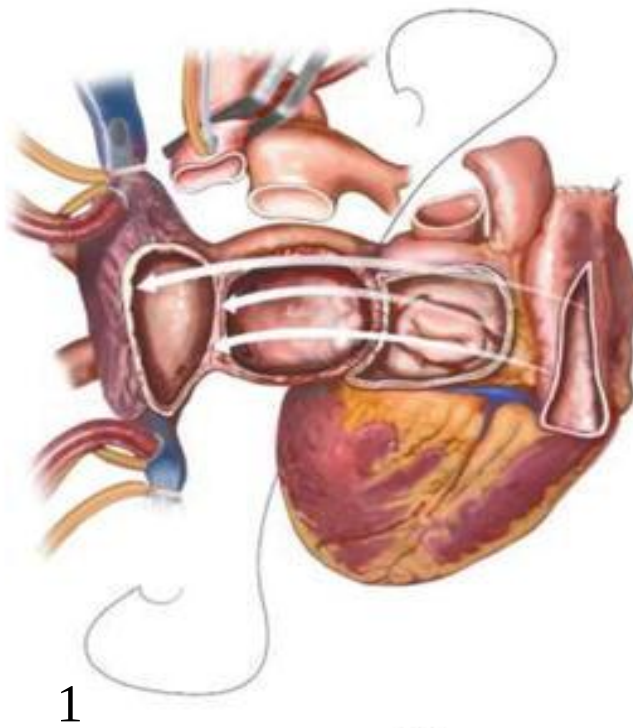
Recipient Post Cardiectomy



(b)

Bi-atrial Heart Transplant Technique

LA then RA Anastomosis



(c)

Completed implant

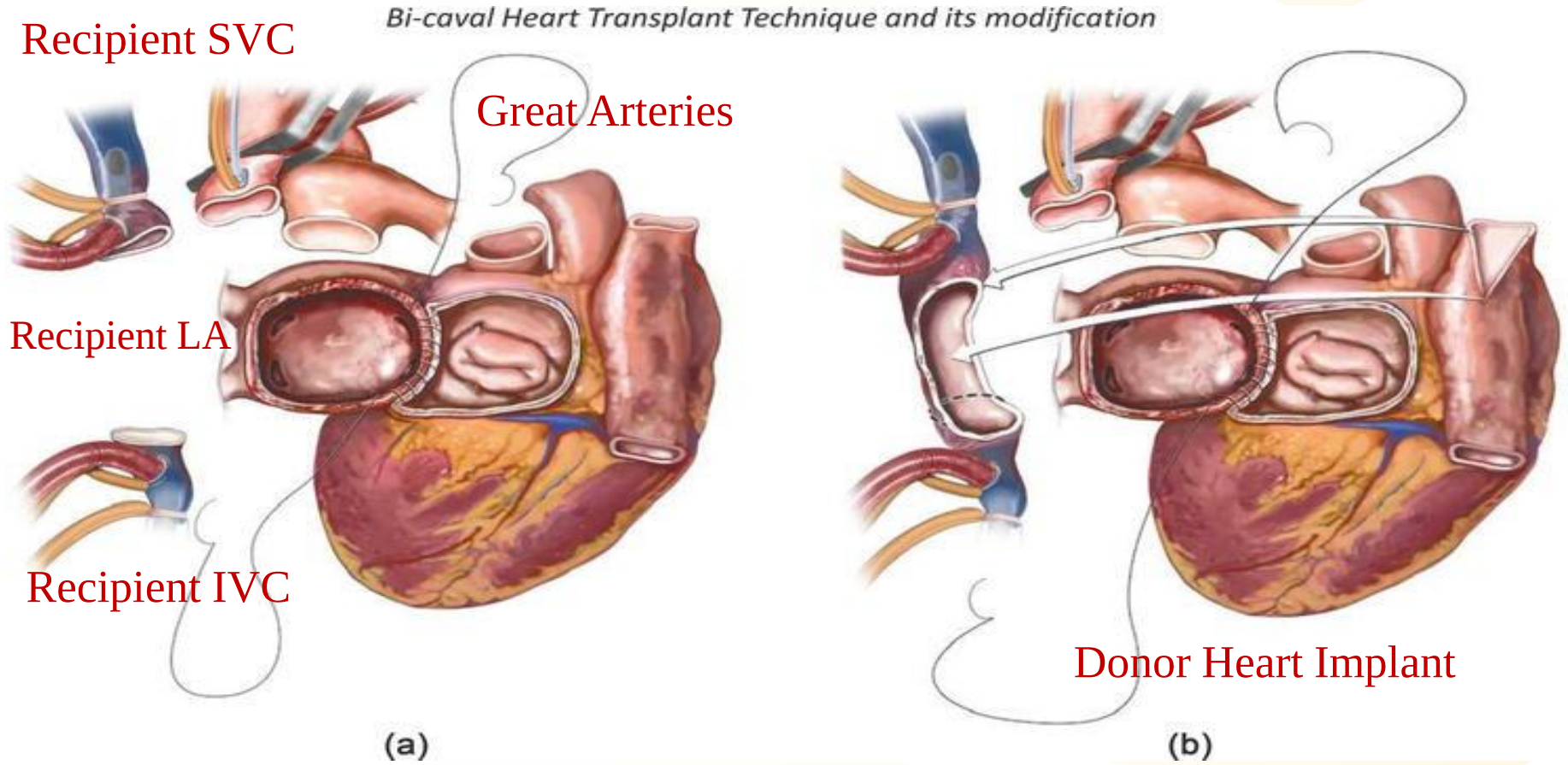


(d)



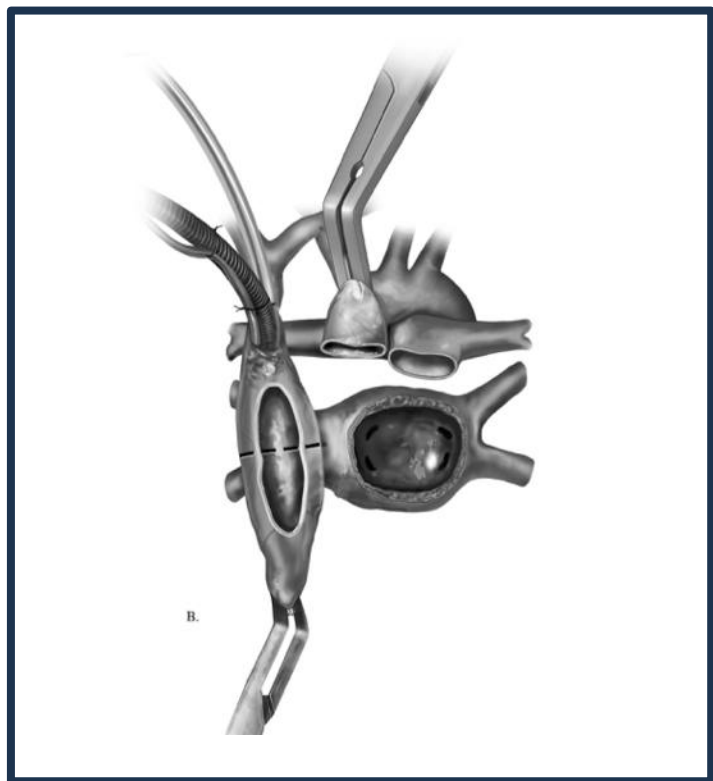
BI-CAVAL ORTHOTOPIC HEART TRANSPLANT

LA-LA
IVC-IVC
PA-PA
AORTA-AORTA
SVC-SVC





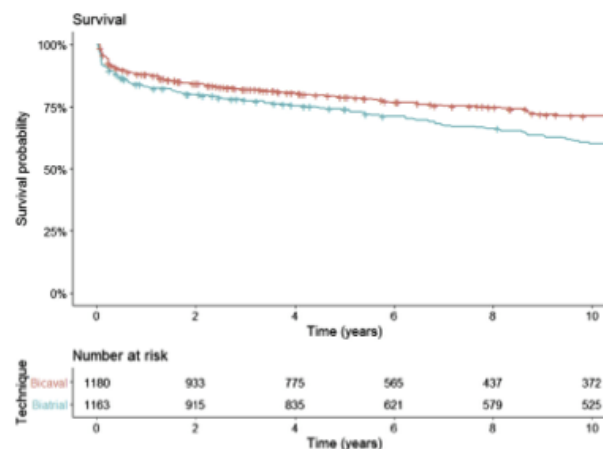
BI-ATRIAL OR BI-CAVAL



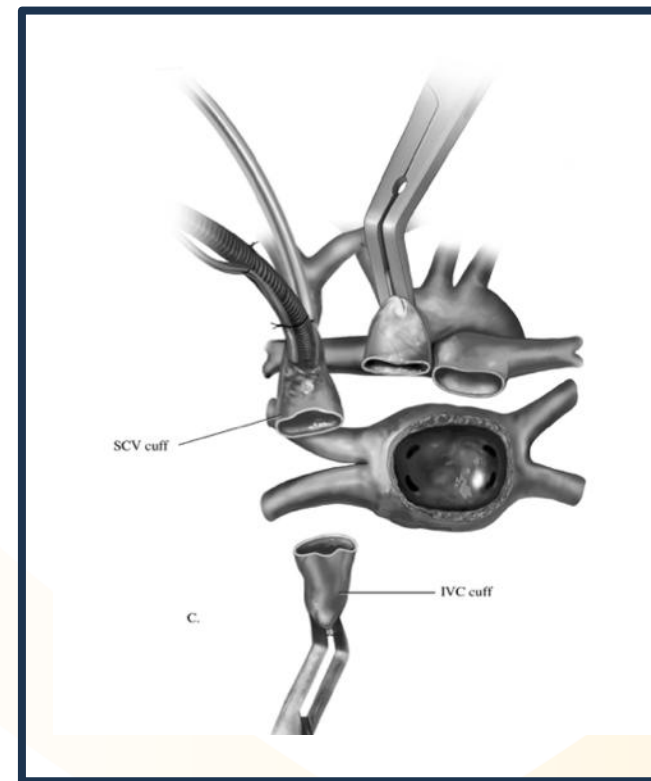
690 REVIEW ZIJDERHAND ET AL
ORTHOTOPIC HEART TRANSPLANTATION

Ann Thorac Surg
2020;110:684-91

Figure 3. Pooled Kaplan-Meier curve of patient survival after bicaval (red) or biatrial (green) heart transplantation.



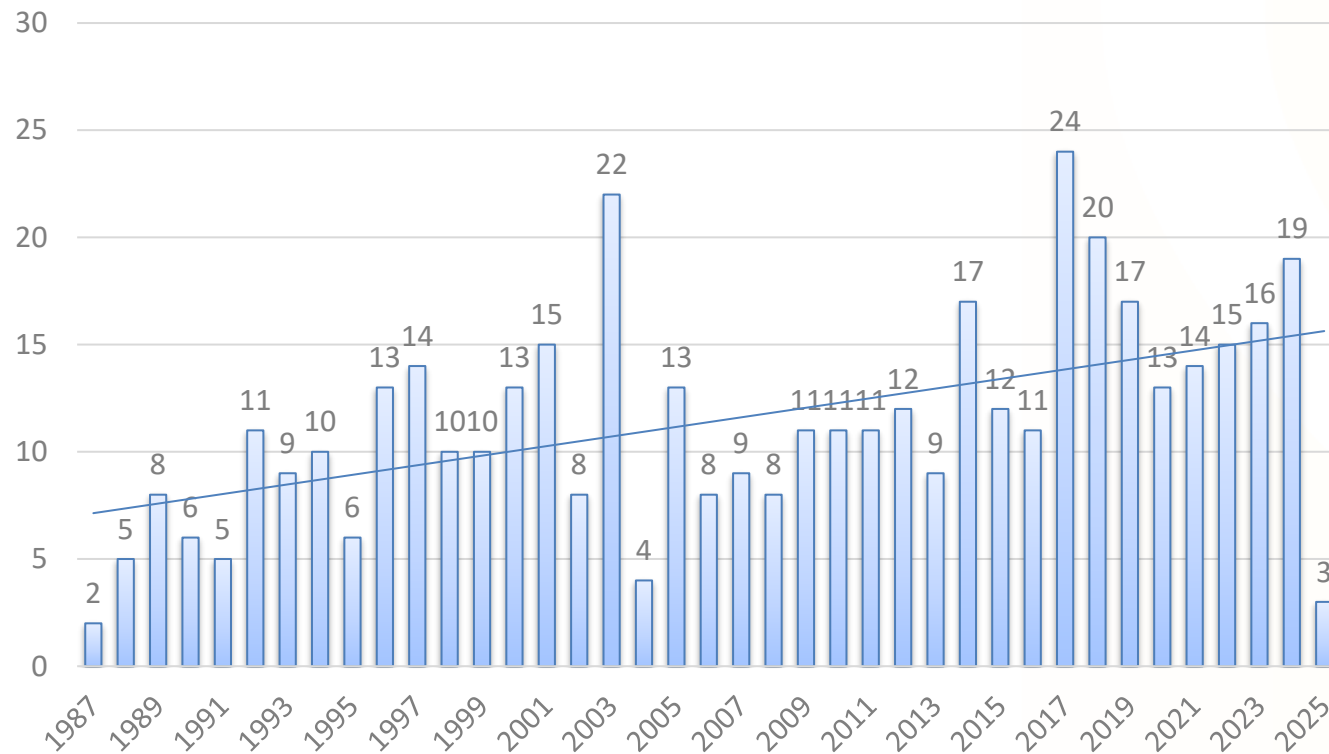
- Mortality
- Atrial Arrhythmias
- Early Pacemaker
- Mod-Severe MR & TR



NEW ZEALAND HEART TRANSPLANT PROGRAMME

1987-2025

NZ Heart Transplant numbers 1987-2025



- N = 445
- Adult: 435
- Pediatric: 10
- Off VAD: 32
- Re Transplants: 3
- Heart-Lung Transplants: 5*



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DONOR HEART TRANSPORT



Eskey



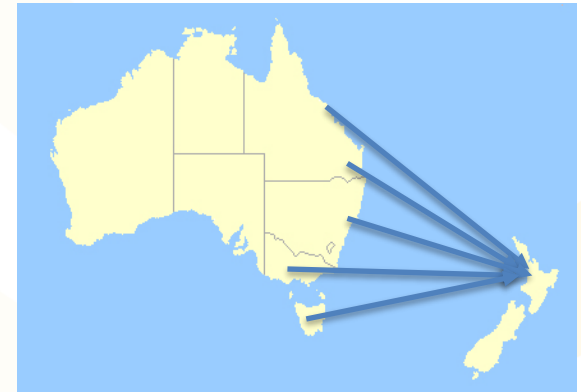
Paragonix- SherpaPak



Transmedics OCS



XVIVO-HOPE



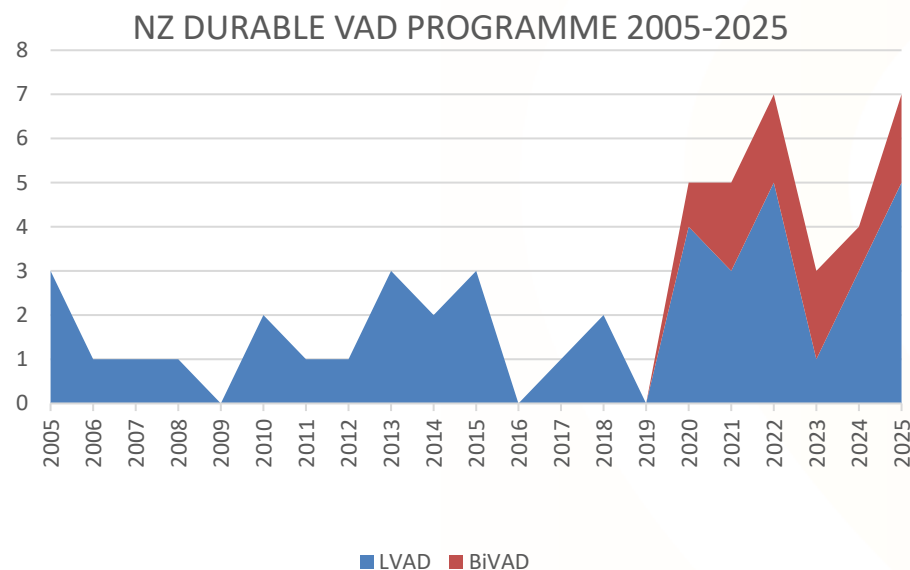
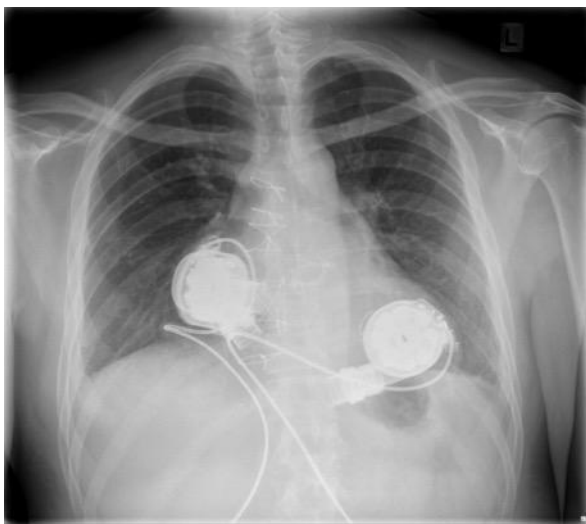


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VENTRICULAR ASSIST DEVICES: LVAD & Bi-VAD



- 2005- Ventrassist Trial
- 53 Patients implanted
10 BiVADs
- BTT & BTC/BTD
- Transplanted: 32
- Explanted: 1
- Deaths: 10

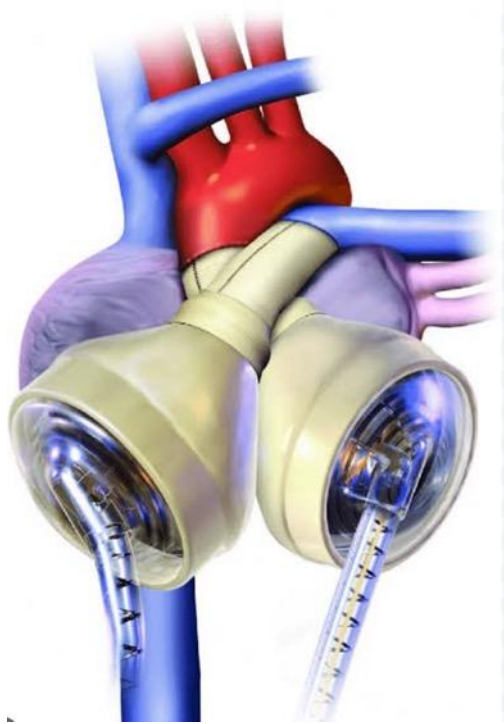


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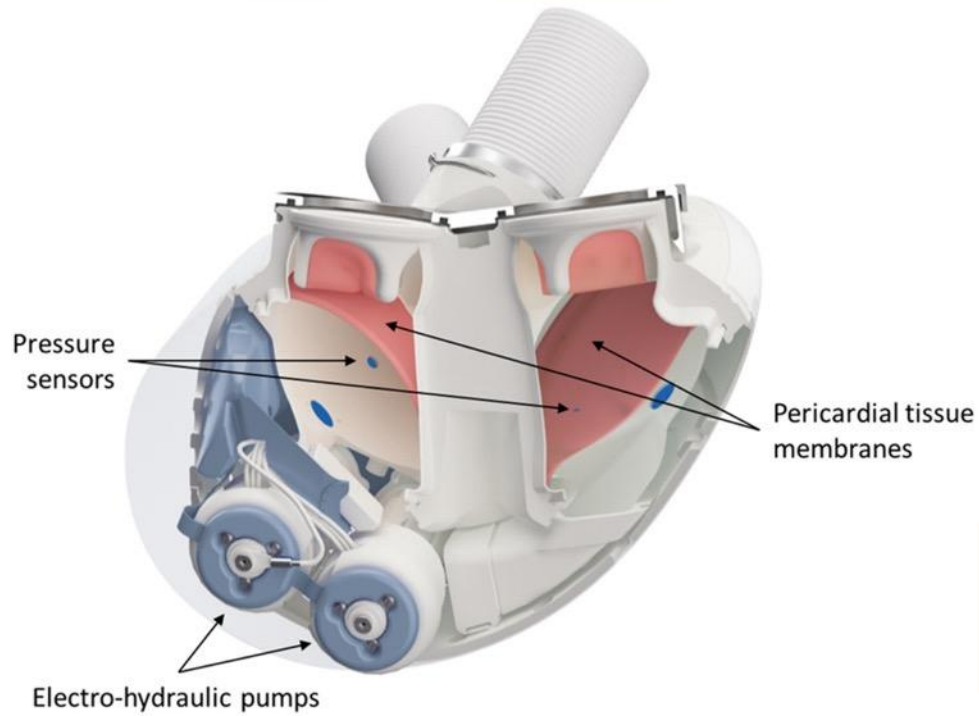
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TOTAL ARTIFICIAL HEARTS



SYNCARDIA TAH.



AESON CARMAT

BiVACOR TAH

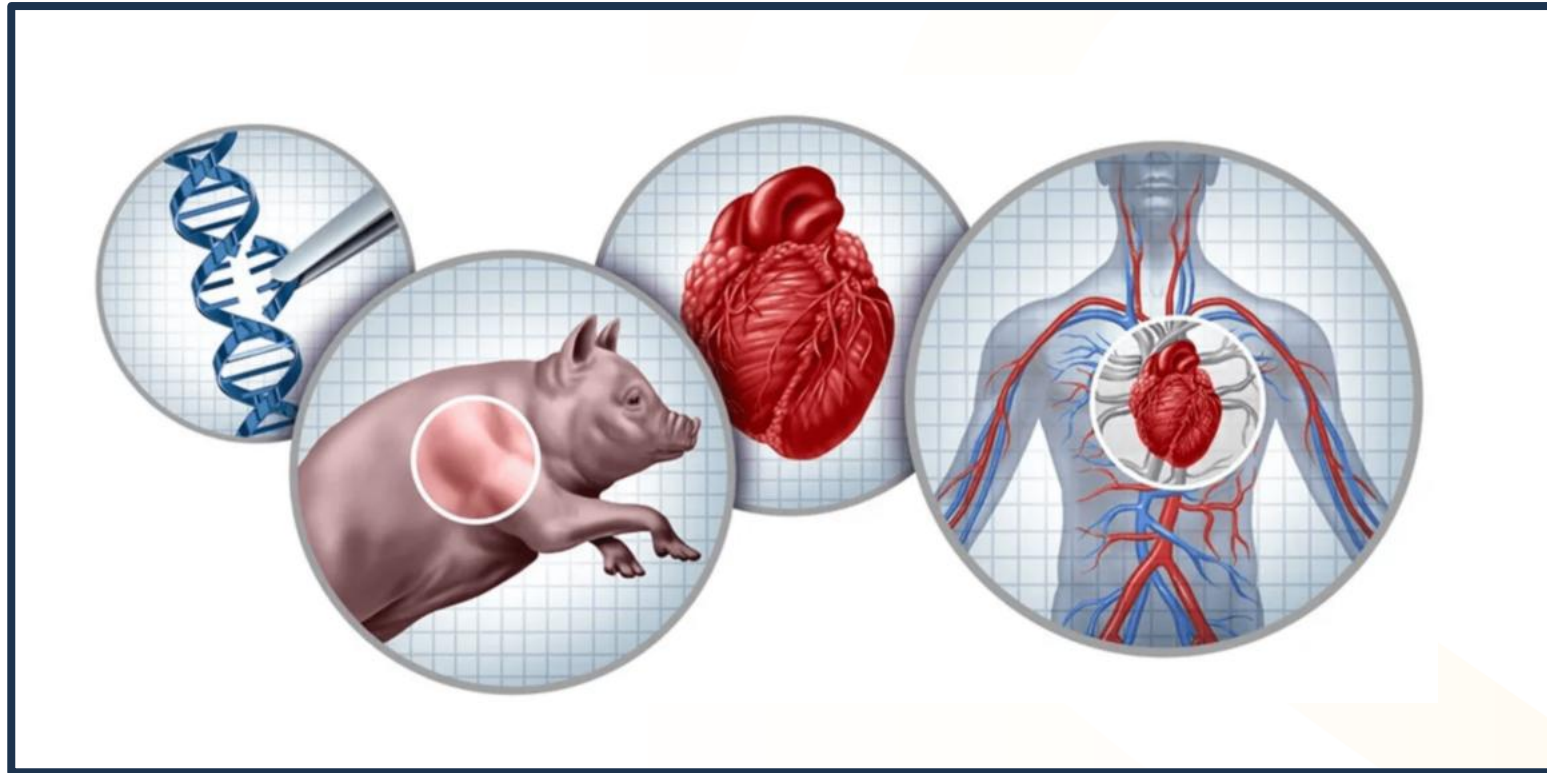


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XENO-TRANSPLANTATION





Pat - ARVC

- Medical therapy
- AICD
- Ambulatory Inotropes
- LVAD
- BiVAD
- TAH
- Orthotopic Heart Transplant

