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Feb. 2018

BIOPROSTHESIS, MECHANICAL VALVE OR HOMOGRAFT? SURGICAL MANAGEMENT OF INTERVALVULAR FIBROSA

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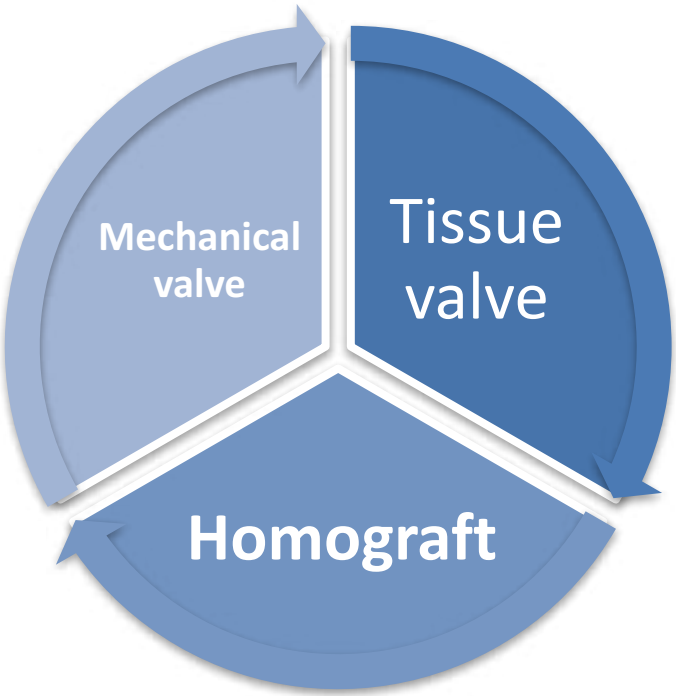
1 Valve Choice in Endocarditis?



AHA Scientific Statement

Infective Endocarditis in Adults: Diagnosis, Antimicrobial Therapy, and Management of Complications

A Scientific Statement for Healthcare Professionals From the American Heart Association

Circulation. 2015;132:1435-1486. DOI: 10.1161/CIR.0000000000000296.

Recommendations

1. Surgical intervention is reasonable for patients with certain complications (*Class IIa; Level of*

2. **Valve repair rather than replacement should be performed when feasible (*Class I; Level of Evidence C*).**

3. **If valve replacement is performed, then an individualized choice of prosthesis by the surgeon is reasonable (*Class IIa; Level of Evidence C*).**

in patients who are IDUs (*Class IIa; Level of Evidence C*).

doi:10.1510/icvts.2010.234450

INTERACTIVE CARDIOVASCULAR AND THORACIC SURGERY

Interactive CardioVascular and Thoracic Surgery 11 (2010) 784-788

www.icvts.org

Best evidence topic - Valves

What type of valve replacement should be used in patients with endocarditis?

Sophie Newton[a,*], Steven Hunter[b]

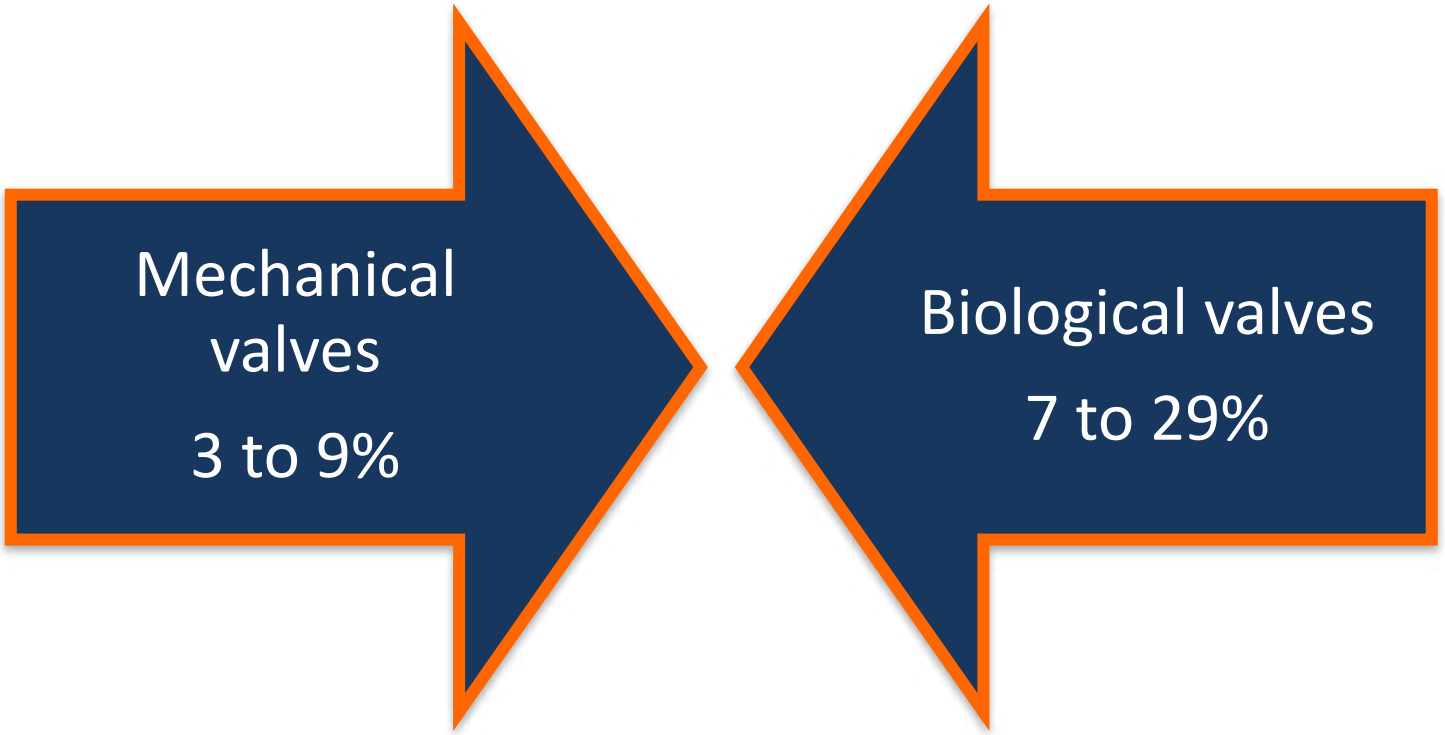
[a]St George's University of London, London, UK

Sweeney et al., (1985), J Thorac Cardiovasc Surg, USA, [2] Retrospective cohort study (level 2b)	185 patients who had undergone valve replacement for life-threatening active valvular native or prosthetic endocarditis	Actuarial rate for freedom from reoperation at four years Actuarial survival rate at four years	– Mechanical: 94.6% – Bioprosthetic: 75% ($P<0.01$) – Mechanical: 87.4% – Bioprosthetic: 78.7% ($P<0.05$)	This paper concludes that mechanical valve replacement leads to a reduced reoperation rate and rate of recurrent endocarditis compared to bioprosthesis valve replacement

Medline 1950–August 2009 using OVID interface
9 manuscript from 41 related article

Wos et al., (1996), J Cardiovasc	71 patients were reviewed who	Four-year mortality	– Mechanical: 20% – Bioprosthetic: 28.6%	This review recommends the use of mechanical valve
Moon et al., (2001), Ann Thorac Surg, USA, [6] Randomised prospective	306 patients were identified who underwent valve replacement for Randomised to receive either a bioprosthetic or	Linearised rate of recurrent or residual endocarditis 15-year mortality	– Mechanical valves: 0.5±0.5% – Bioprosthetic valves: 1.1±0.4% – Bioprosthesis: 66±3% – Mechanical: 79±3% (P=0.02)	This review demonstrated that the use of bioprosthetic valves in older patients (>60) led to a greater freedom from It found that the advantages of using a mechanical valve
Edwards et al., (1998), Eur J Cardiothorac Surg, UK, [4] Retrospective cohort study (level 2b)	322 patients with valve replacement for prosthetic valve endocarditis between 1986 and 1996	Significant determinants of 30-day mortality	No evidence that the type of prosthesis used for reoperation determines survival or freedom from reoperation. Age was the only significant determinant (P=0.04)	The conclusions to be made from this study are that using either a mechanical or bioprosthetic valve replacement makes no difference to short-term survival or reoperation in cases of prosthetic valve endocarditis. The main limitation of this study is that it researched only the first 30 days following surgery
Fedoruk et al., (2009), J Thorac Cardiovasc Surg, Canada, [9] Retrospective cohort study (level 2b)	358 patients having had valve replacement for native valve endocarditis between 1975 and 2000	Unadjusted survival at 20 years Prosthesis type as predictor of reoperation	– Mechanical: 56.5±8.1% – Bioprosthetic: 26.4±4.9% (P=0.007) Not predictive when separated from IV drug use/HIV (hazard ratio 3.268, P 0.088)	This paper concludes that the type of prosthesis implanted does not influence long-term outcome, however, the unadjusted survival rates would suggest that this study provides evidence for better long-term survival with mechanical prostheses

Average endocarditis
Recurrence rate



50% concluded

no significant difference

when separated from other risk factors

50% recommended

a mechanical valve

for lower recurrence and higher survival rates

They concluded that

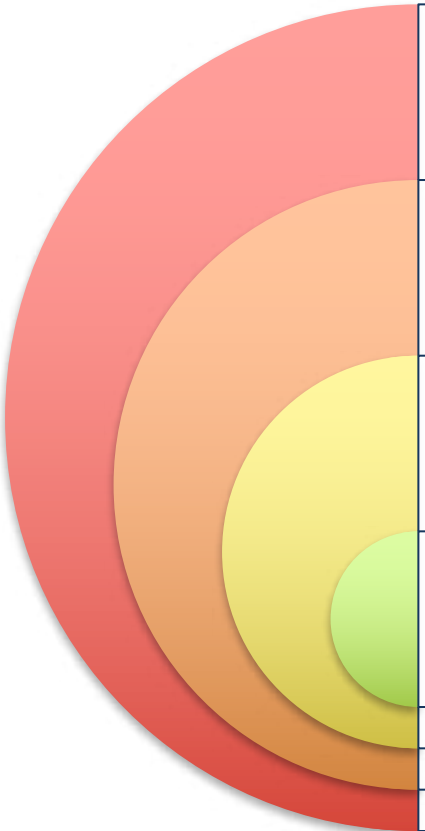
-for patients under 65 years old, a mechanical valve may offer

Greater freedom from reoperation and increased long-term survival when compared to a bioprosthetic valve

Published in final edited form as:
Circulation. 2013 July 23; 128(4): . doi:10.1161/CIRCULATIONAHA.113.002365.

Long-Term Survival of Dialysis Patients with Bacterial Endocarditis Undergoing Valvular Replacement Surgery in the United States

Maxwell D. Leither, MD[1], Gautam R. Shroff, MBBS[1,2], Shu Ding, MS[3], David T. Gilbertson, PhD[3], and Charles A. Herzog, MD, FAHA[1,2,3]

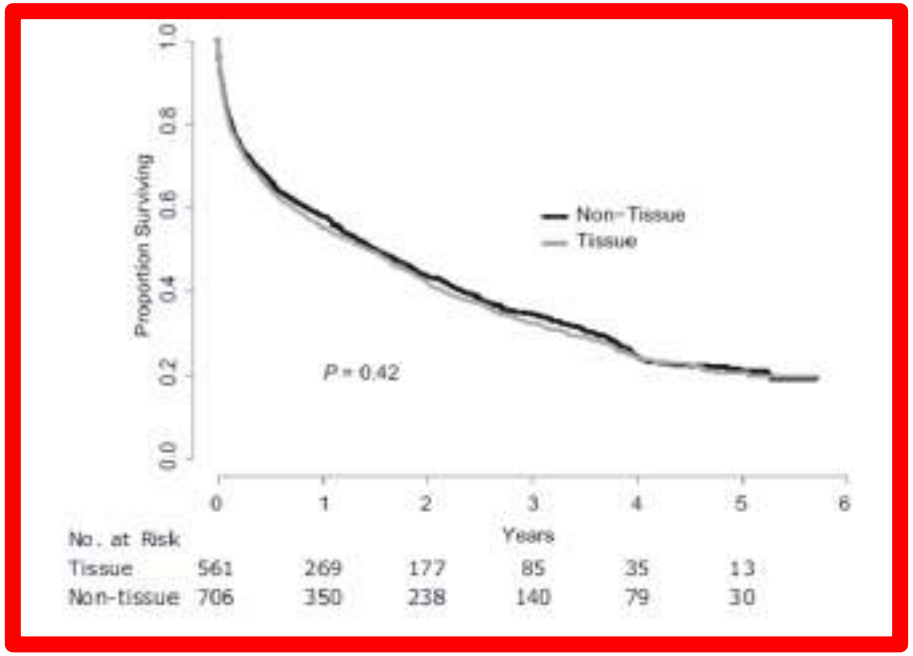


2004-2007
Using data from the US Renal Data System 11,156 dialysis patient
hospitalized for bacterial endocarditis and 1267 (11.4%)
Tissue valve 44.3%, non-tissue valve 55.7%

Overall 30 days Mortality 19%

SIMILAR IN BOTH GROUP

	0 yr	1 yr	2yr	3yr
Tissue valve	59%	50%	37%	25%
Non-tissue valve	60%	35%	37%	30%



Available online at www.sciencedirect.com

ScienceDirect

Journal of the Chinese Medical Association xx (2017) 1–8

www.jcma-online.com

Original Article

Surgical treatment of active native mitral infective endocarditis: A meta-analysis of current evidence

Jian-Zhou Liu, Xiao-Feng Li, Qi Miao, Chao-Ji Zhang*

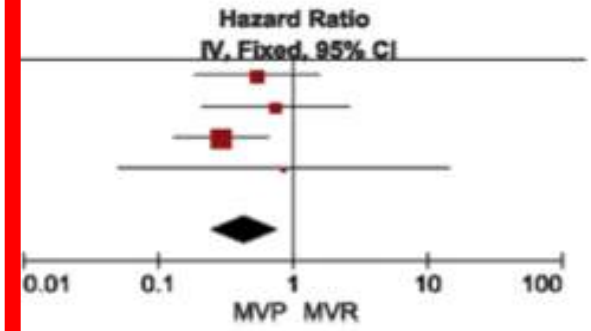
665 patient with Native Mitral valve endocarditis

All studies were observational

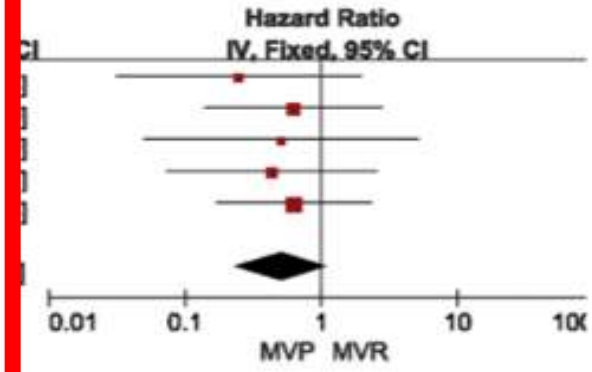
MV repair may have

Better post-op outcome

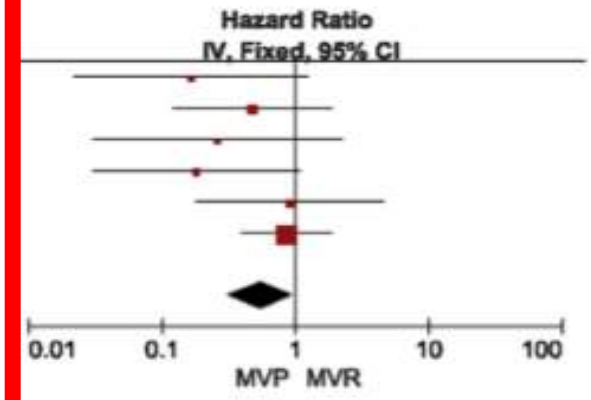
Superior Survival rate



nt-free survival rate of ANMIE.



r survival rate of ANMIE.



Treatment of Endocarditis With Valve Replacement: The Question of Tissue Versus Mechanical Prosthesis

Marc R. Moon, MD, D. Craig Miller, MD, Kathleen A. Moore, BS, Phillip E. Oyer, MD, PhD, R. Scott Mitchell, MD, Robert C. Robbins, MD, Edward B. Stinson, MD, Norman E. Shumway, MD, and Bruce A. Reitz, MD

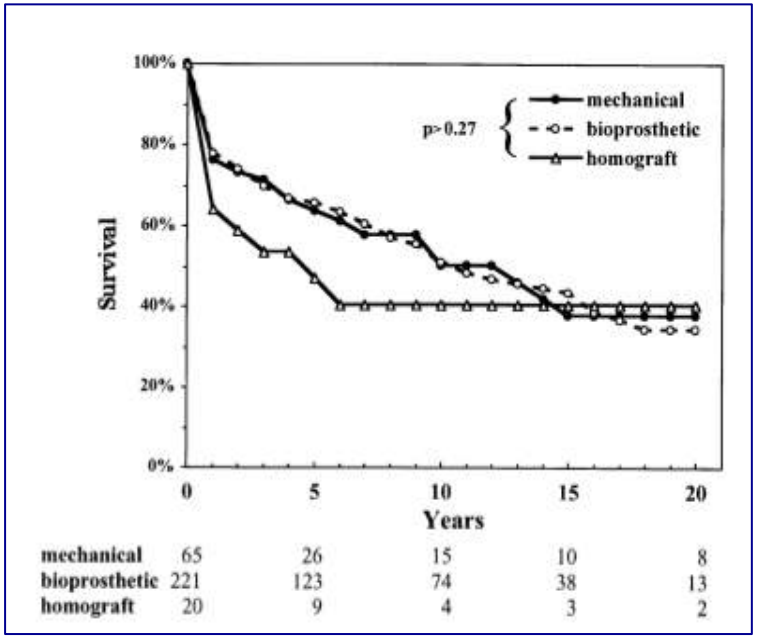
Department of Cardiovascular and Thoracic Surgery, Stanford University School of Medicine, Stanford, California

Ann Thorac Surg
2001;71:1164–71

-Between 1964 and 1995, 306 patients

-NVE(209 patients) or PVE (97 patients)

-Mechanical valves in 65, bio- prostheses in 221, and homografts in 20 patients



Operative mortality was 18%

and independent of replacement valve type ($p > 0.74$)

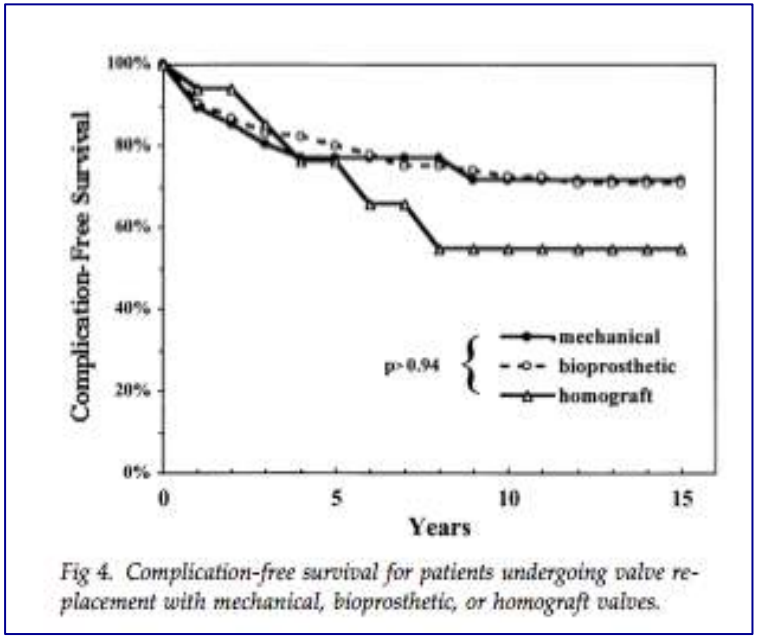
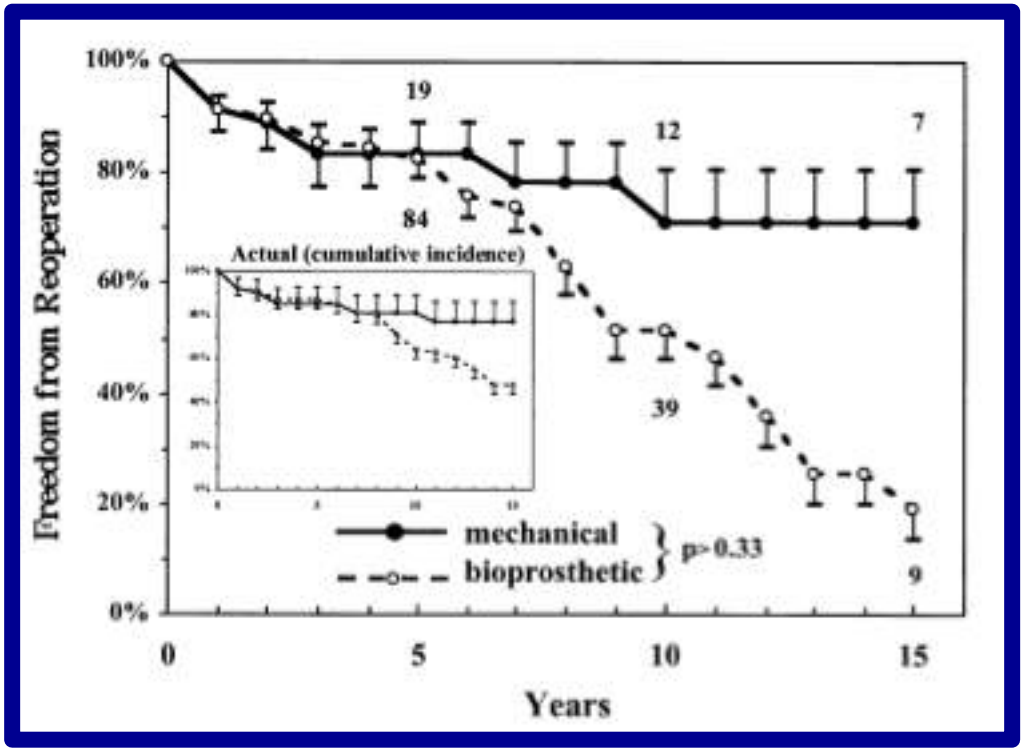


Fig 4. Complication-free survival for patients undergoing valve replacement with mechanical, bioprosthetic, or homograft valves.

Survival was independent of valve type ($p>0.27$)



The long-term freedom from reoperation for patients who received a biologic valve who were younger than 60 years of age was low(51% at 10years, 19% at 15 years).

For patients older than 60 years, however, freedom from reoperation with a biological valve (84 % at 15 years) was similar to that for all patients with mechanical valves (74 % at 15 years) ($p > 0.64$).

Mechanical valves are most suitable for younger patients with native valve endocarditis

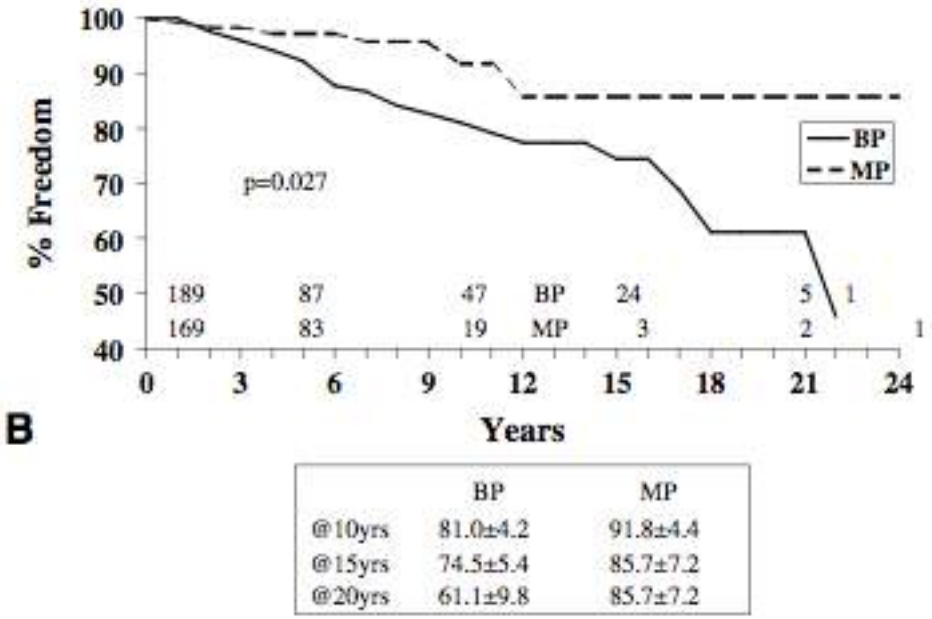
Tissue valves are acceptable for patients greater than 60 years of age with native or prosthetic valve infections

For selected younger patients with prosthetic valve infections because of their limited life expectancy

The Journal of Thoracic and Cardiovascular Surgery • February 2009

Predictors of recurrence and reoperation for prosthetic valve endocarditis after valve replacement surgery for native valve endocarditis

Lynn M. Fedoruk, MD, W. R. Eric Jamieson, MD, Hilton Ling, MD, Joan S. MacNab, Eva Germann, MSc, Shahzad S. Karim, MD, and Samuel V. Lichtenstein, MD, PhD



	BP	MP
@10yrs	81.0±4.2	91.8±4.4
@15yrs	74.5±5.4	85.7±7.2
@20yrs	61.1±9.8	85.7±7.2

The type of prosthesis implanted does not influence long-term outcome

RESEARCH ARTICLE

The prognosis of infective endocarditis treated with biological valves versus mechanical valves: A meta-analysis

Ende Tao[1¤], Li Wan[1]*, WenJun Wang[1], YunLong Luo[2], JinFu Zeng[1], Xia Wu[1]

1 Department of Cardiovascular Surgery of the First Affiliated Hospital of Nanchang University, Nanchang, Jiangxi, China, **2** Department of Neurosurgery of the First Affiliated Hospital of Nanchang University, Nanchang, Jiangxi, China

PLOS ONE | https://doi.org/10.1371/journal.pone.0174519 April 13, 2017

A total of 11 publications

10,754 cases were selected,
6776 cases of biological valves
3,978 cases of mechanical valves.

All-cause mortality

Higher in Bioprosthesis

(HR = 1.22, 95% CI 1.03 to 1.44, *P* = 0.023)

Postoperative embolism was less in the biological valve

but this difference was not statistically significant

(RR = 0.90, 95% CI 0.76 to 1.07, *P* = 0.245)

The risk of reoperation

Higher in Bioprosthesis

(HR = 1.79, 95% CI 1.15 to 2.80, *P* = 0.010)

2015 ESC Guidelines for the management of infective endocarditis

The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC)

Success rate of repair

Mitral valve : 61–80%

Aortic valve: 33%

valve repair is favored whenever possible

particularly when IE affects the mitral or tricuspid valve without significant destruction

More extensive destruction of a single leaflet or the presence of an abscess is not necessarily a contraindication for valve repair

The need for a patch to achieve a competent valve has not been associated with worse results in terms of recurrence of IE

Mechanical and biological prostheses have similar operative mortality.

Therefore the Task Force does not favor any specific valve

but

recommends a tailored approach for each individual patient and clinical situation.

It is expert opinion and standard strategy in many institutions that the use of a homograft is to be favoured over valve prostheses, particularly in the presence of root abscess.

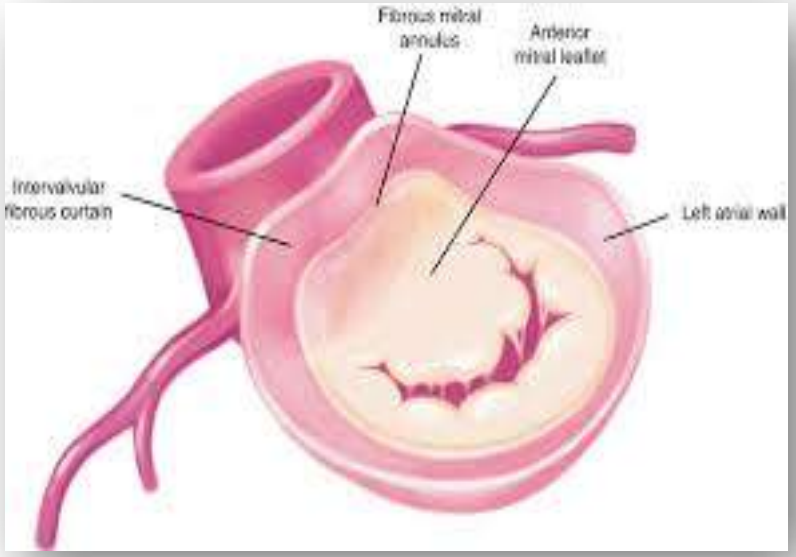
However, mechanical prostheses and xenografts have led to similar results in terms of persistent or recurrent infection and survival if associated with complete debridement of annular abscesses.

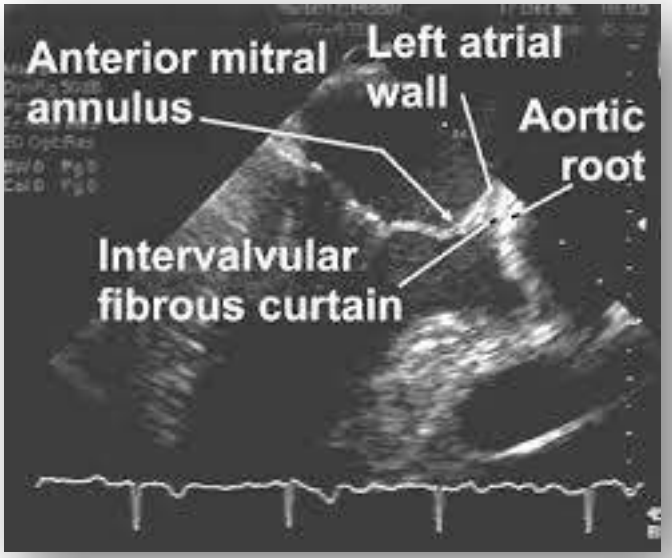
Homografts or stentless xenografts may be preferred in PVE or in cases where there is extensive aortic root de- struction with aorto-ventricular discontinuity.

but their application is limited by poor long term durability and difficulty of the surgical technique, and the results have not been consistent.

2

Surgical management of intervalvular fibrosa





MAIVF is an avascular structure be- tween the non-, left coronary cusps and AML. It plays an important role in maintaining the geometry and function of both valves, but can be easily infected by bacte- ria and lead to abscess formation.

In rare cases, the bacteria spread from AV to nearby MAIVF and leads to serious complication including abscess or aneurysm formation, perforation into the LA, AML aneurysm and perforation.

Afridiet et al.4 reported a total of 20 cases (2%) of P-MAIVF out of 818 cases suspected of infective endocarditis over a 5-year period.
(Af(ridi I, Apostolidou MA, Saad RM, Zoghbi WA. Pseudoaneu- rysms of the mitral-aortic intervalvular fibrosa: dynamic charac- terization using transesophageal echocardiographic and doppler techniques. *J Am Coll Cardiol* 1995;25:137-45.

Pseudoaneurysms of the MAIVF may enlarge, causing mitral valve regurgitation and angina pectoris, or rupture into the left atrium, left ventricular outflow tract, or very rarely into the pericardium, causing hemopericardium.

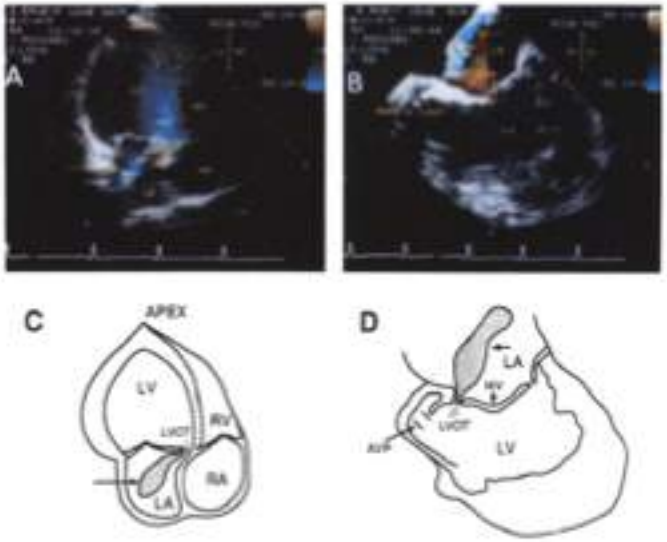


Figure 2. *Case 1.* Transthoracic apical four chamber echocardiographic view (A) and its schematic (C) show an eccentric, high velocity systolic jet (**arrow**) from the left ventricular outflow tract (LVOT) to the left atrium (LA). This view is oriented with the apex up and the left ventricle (LV) on the left side. Transesophageal four chamber with outflow view (**B**) and schematic (**D**) show clearly that the mitral valve (MV) apparatus is intact and the systolic signal (**arrow**) originates in the left ventricular outflow tract (LVOT) just below the aortic valve prosthesis (AVP). I = inferior; L = left; R = right; RA = right atrium; RV = right ventricle; S = superior. Calibration marks are 1 cm apart.

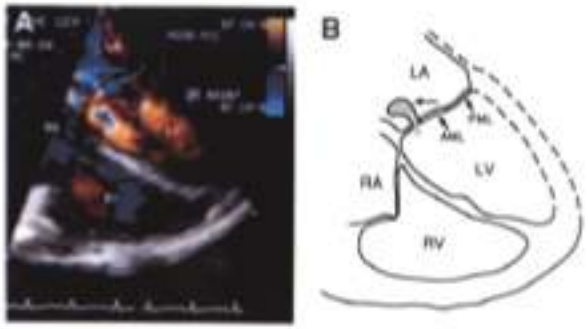


Figure 3. *Case 2.* Transesophageal echocardiographic four chamber view (A) and its schematic (B) showing a thin anterior mitral leaflet and a small systolic, mosaic color signal originating between the mitral and aortic annuli. A small aneurysm noted in real time in the subaortic region is not seen in this figure. This subaortic aneurysm communicated with the left atrium. This represents an aneurysm of the left ventricular outflow tract from the mitral-aortic intervalvular fibrosa with subsequent rupture and communication with the left atrium. AML = anterior mitral leaflet; PML = posterior mitral leaflet; other abbreviations as in Figure 2.

Pseudoaneurysms of the Mitral–Aortic Intervalvular Fibrosa: Dynamic Characterization Using Transesophageal Echocardiographic and Doppler Techniques

IMRAN AFRIDI, MD, MARIA A. APOSTOLIDOU, MD, ROBERT M. SAAD, MD, WILLIAM A. ZOGHBI, MD, FACC

Houston, Texas

JACC Vol. 25, No. 1
January 1995:137–45

Surgical repair consisted of excision of the abscess or pseudoaneurysm and aortic valvereplacement. In five patients, the pathologic condition neces- sitated an aortic root replacement with a composite graft (n = 4 or a homograft (n -- 1).

CASE REPORT J CARDIOVASC ULTRASOUND 2015;23(4):257-261

MITRAL-AORTIC INTERVALVULAR FIBROSA PSEUDOANEURYSM

MARIA BONOU, MD, PHD[1], EVA D PAPADIMITRAKI, MD, PHD[1], SOPHIA VAINA, MD, PHD[2], GLAFKOS KELEPESHIS, MD[1], KOSTAS TSAKALIS, MD[1], NIKOLAOS ALEXOPOULOS, MD, PHD[3], AND JOHN BARBETSEAS, MD, PHD[1]

[1]*DEPARTMENT OF CARDIOLOGY, LAIKO GENERAL HOSPITAL, ATHENS, GREECE*

Al- though the majority of MAIVF-Ps are operated, conservative management with watchful waiting and serial imaging may be a valid option in uncomplicated cases or high risk surgical patients.

Double-Valve Endocarditis Homograft and Patch Repair

Morteza Tavakkoli Hosseini, MD, Antonios Kourliouros, MRCS, and Mazin Sarsam, FRCS, EBCTS

Department of Cardiothoracic Surgery, St. Georges Hospital, London, United Kingdom

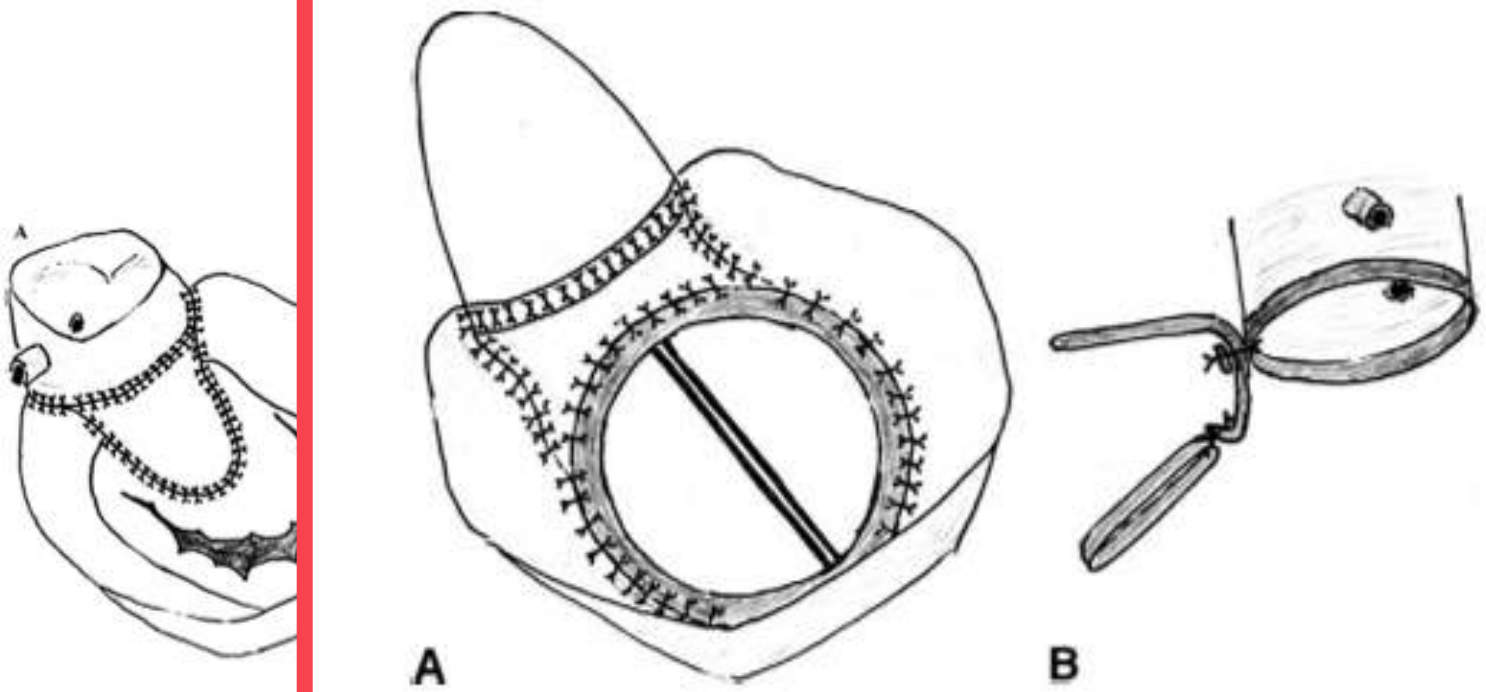


Fig 3. Mitral valve replacement. (A) Posterosuperior view of the left atrium. (B) Coronal view of mitral valve prosthesis, pericardial patch, and aortic homograft.

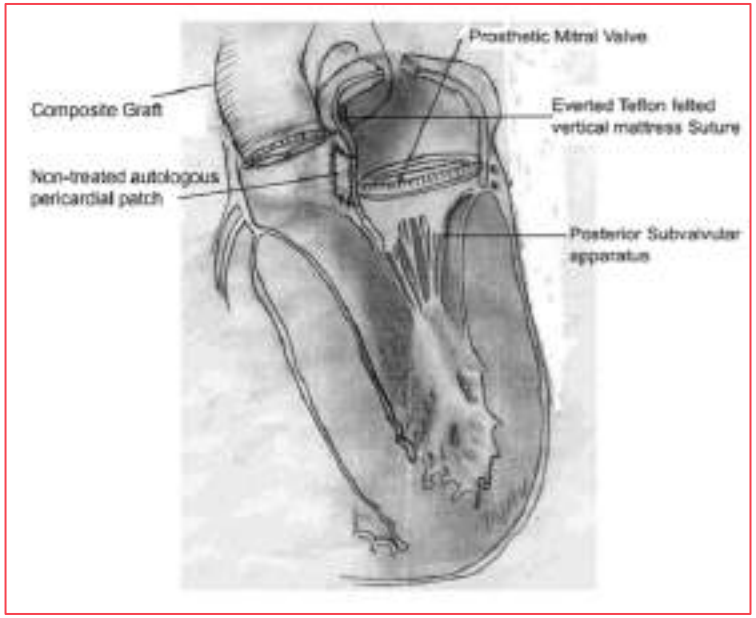
erosuperior view of um. (A) Aortic ho- d repair of anterior tive mitral using the leaflet. (B) Repair of flet of native mitral ovine pericardial Left atrial dome the bovine pericar-

Modified Aortic Root Replacement Technique in Destructive Ventricular-Aortic Discontinuity

Alireza Alizadeh Ghavidel, MD, Hoda Javadikasgari, MD, Anita Sadeghpour, MD, and Ziae Totonchi, MD

Heart Valve Disease Research Center; Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Science, Tehran, Iran

(Ann Thorac Surg 2014;97:347–9)



Advantage of Autograft and Homograft Valve Replacement for Complex Aortic Valve Endocarditis

Kazuo Niwaya, MD, Christopher J. Knott-Craig, MD, Kathylee Santangelo, MD, Mary M. Lane, PhD, Krishnaswamy Chandrasekaran, MD, and Ronald C. Elkins, MD

Sections of Thoracic and Cardiovascular Surgery, and Cardiology, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma

(Ann Thorac Surg 1999;67:1603–8)

Autografts and homografts are the preferred replacement aortic valves for these patients even if concomitant mitral valve replacement is required, and risk of valve-related death or recurrent endocarditis is low at

medium-term follow-up.

Surgical Treatment of Active Native Aortic Valve Endocarditis With Allografts and Mechanical Prostheses

Loes M. A. Klieverik, MD, Magdi H. Yacoub, MD, PhD, Sue Edwards, BS, Jos A. Bekkers, MD, Jolien W. Roos-Hesselink, MD, PhD, A. Pieter Kappetein, MD, PhD, Johanna J. M. Takkenberg, MD, PhD, and Ad J. J. C. Bogers, MD, PhD

Departments of Cardio Thoracic Surgery and Cardiology, Erasmus Medical Center Rotterdam, the Netherlands; and Harefield Heart Science Center, National Heart and Lung Institute, Harefield, United Kingdom

(Ann Thorac Surg 2009;88:1814–21)

Allograft reoperation rates increase with time.

Fig 4. Freed
tion with a
(MP, dashe

The importance of the mechanical prosthesis in NVE might be established in the coming years

Graft Selection for Aortic Root Replacement in Complex Active Endocarditis: Does It Matter?

Arminder Singh Jassar, MBBS, Joseph E. Bavaria, MD, Wilson Y. Szeto, MD, Patrick J. Moeller, BS, Jon Maniaci, Rita K. Milewski, MD, PhD, Joseph H. Gorman III, MD, Nimesh D. Desai, MD, PhD, Robert C. Gorman, MD, and Alberto Pochettino, MD

Division of Cardiovascular Surgery, University of Pennsylvania Medical Center, Philadelphia, Pennsylvania

Major complications and late mortality

similar among Mechanical valves, Bioprosthesis & Homografts

(Ann Thorac Surg 2012;93:480–8)

Durability of Homografts Used to Treat Complex Aortic Valve Endocarditis

Willem Flameng, MD, PhD, Willem Daenen, MD, Ramadan Jashari, MD, Paul Herijgers, MD, PhD, and Bart Meuris, MD, PhD

Department of Cardiac Surgery, KU Leuven, University Hospitals Leuven, Leuven, and European Homograft Bank, Brussels, Belgium

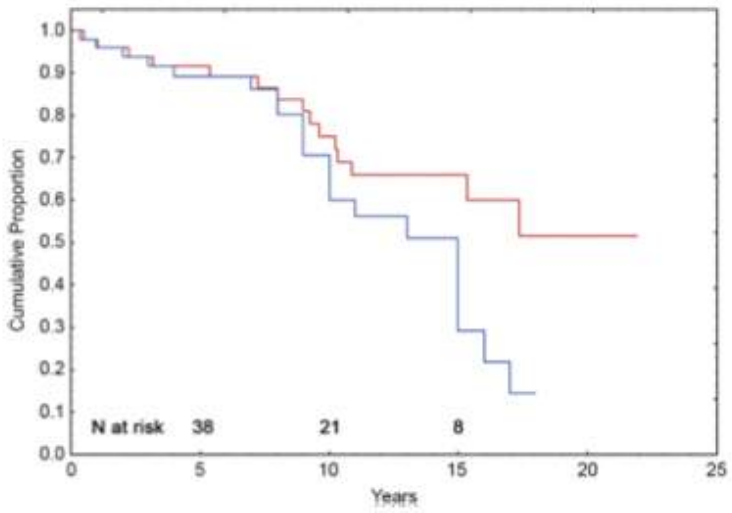


Fig 1. Freedom from structural valve degeneration (SVD) and reoperation. Kaplan-Meier curves showing freedom from SVD (blue line) and reoperation (red line) in homografts used to treat complex aortic valve endocarditis. Note that not all patients experiencing SVD underwent reoperation.

low recurrence of endocarditis

But

high incidence of SVD

(Ann Thorac Surg 2015;99:1234–8)

European Journal of Cardio-Thoracic Surgery 50 (2016) 1158–1164
doi:10.1093/ejcts/ezw175 Advance Access publication 26 May 2016

ORIGINAL ARTICLE

Cite this article as: Solari S, Mastrobuoni S, De Kerchove L, Navarra E, Astarci P, Noirhomme P et al. Over 20 years experience with aortic homograft in aortic valve replacement during acute infective endocarditis. Eur J Cardiothorac Surg 2016;50:1158–64.

Over 20 years experience with aortic homograft in aortic valve replacement during acute infective endocarditis†

Silvia Solari[a,b], Stefano Mastrobuoni[a,b], Laurent De Kerchove[a,b], Emiliano Navarra[a,b], Parla Astarci[a,b], Philippe Noirhomme[a,b], Alain Poncelet[a,b], Ramadan Jashari[c], Jean Rubay[a,b] and Gebrine El Khoury[a,b,*]

Low risk of relapsing infection and very acceptable long-term survival.

The risk of reoperation due to SVD is significant after one decade especially in young patients

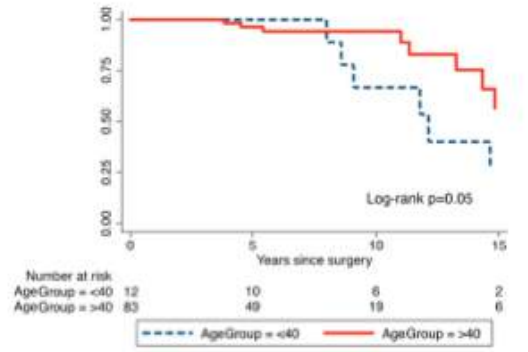
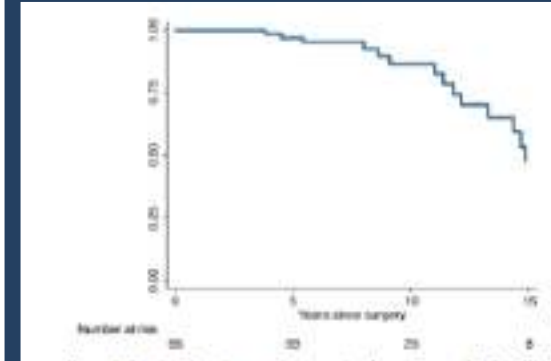
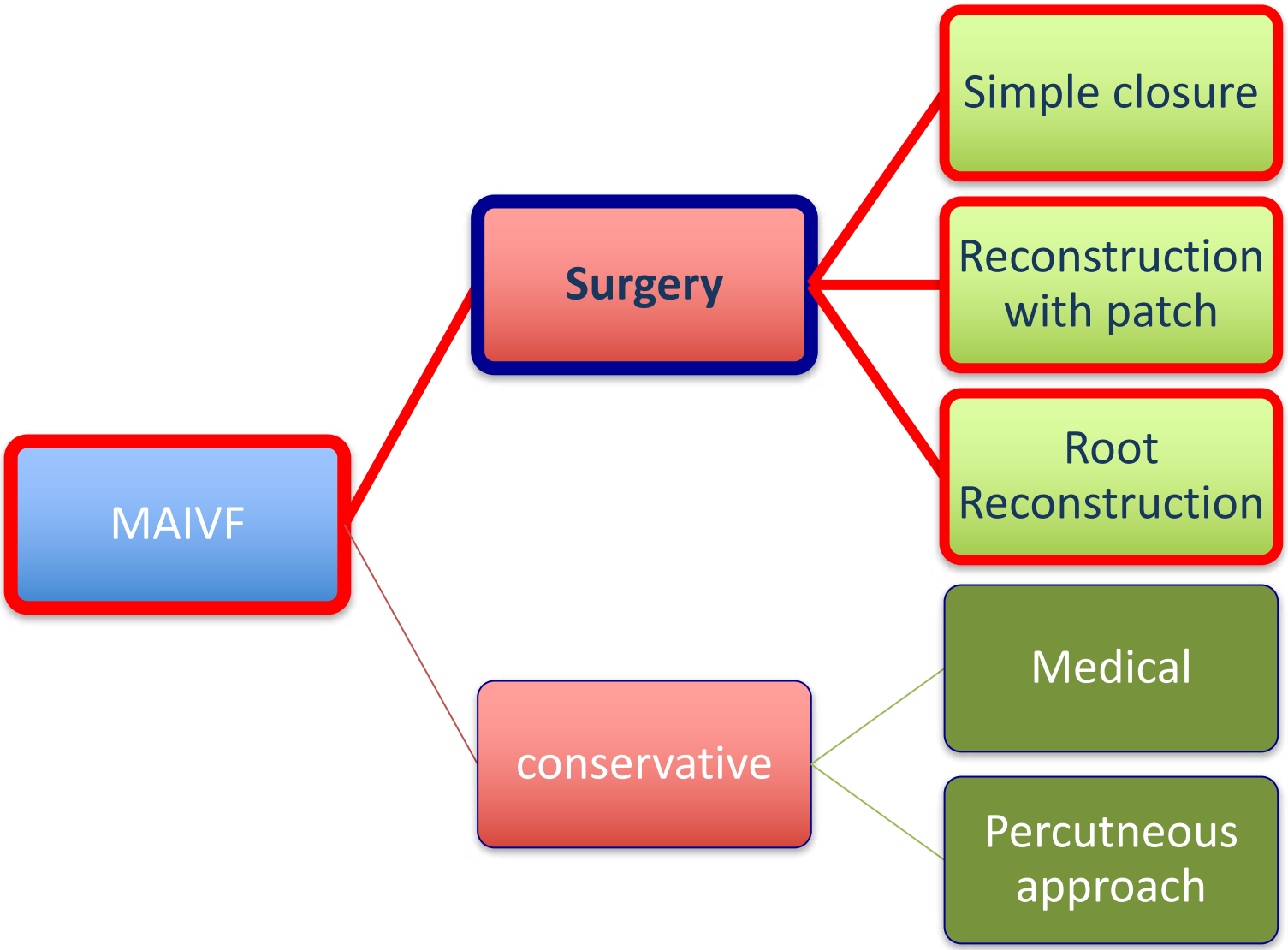


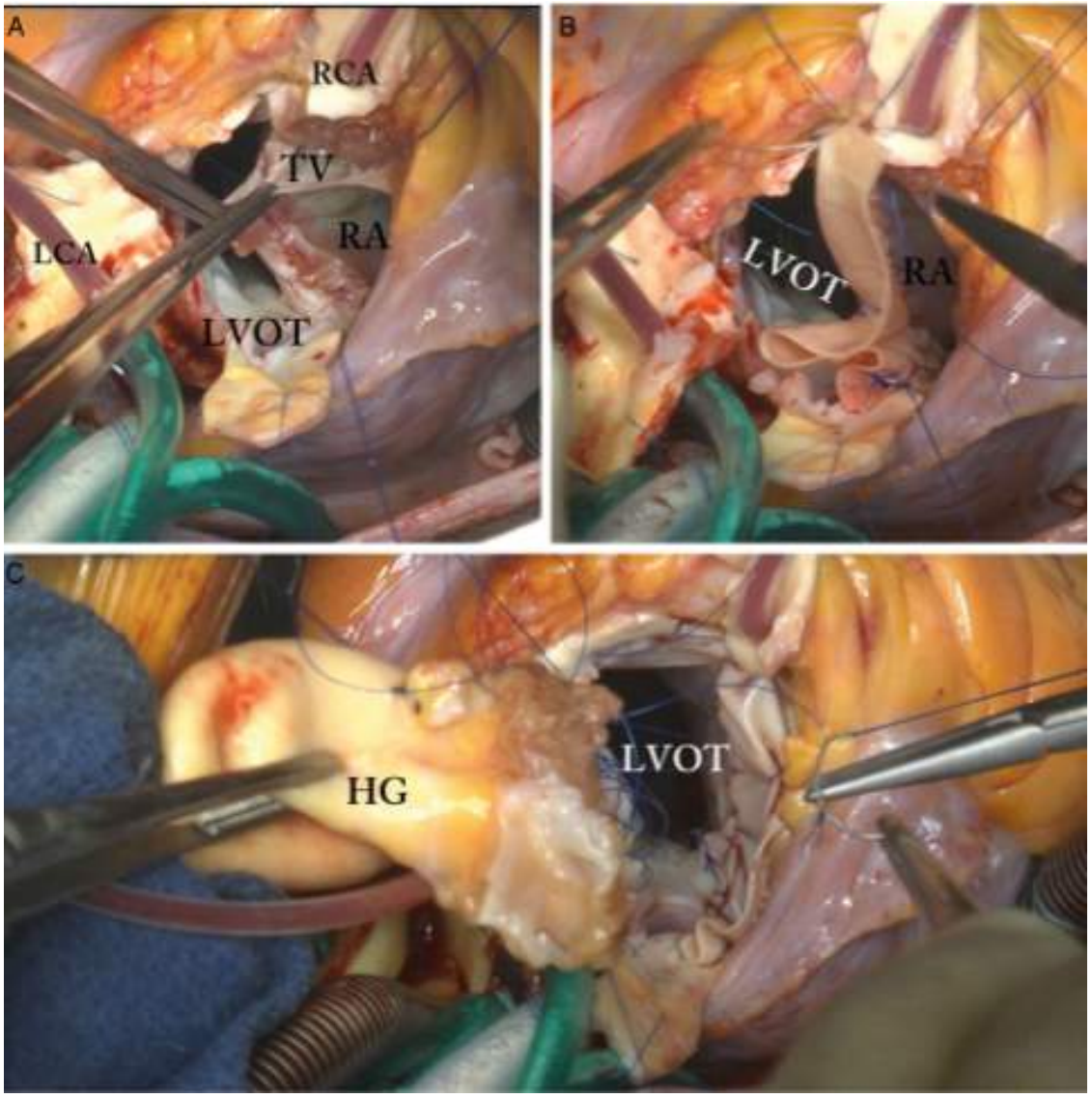
Figure 5: Freedom from homograft reoperation for any cause stratified by age (≤40 vs >40).




MAIVF
Surgery
Simple closure
Reconstruction with patch
Root Reconstruction
conservative
Medical
Percutneous approach

Over 20 years experience with aortic homograft in aortic valve replacement during acute infective endocarditis[†]

Silvia Solari[a,b], Stefano Mastrobuoni[a,b], Laurent De Kerchove[a,b], Emiliano Navarra[a,b], Parla Astarci[a,b], Philippe Noirhomme[a,b], Alain Poncelet[a,b], Ramadan Jashari[c], Jean Rubay[a,b] and Gebrine El Khoury[a,b,*]



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Pseudoaneurysm of the mitral–aortic intervalvular fibrosa

A new comprehensive review

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imenez Valero S, Garcia E, Gonzalez Pinto A, Del- can JL (2005) Percutaneous closure of pseudoa- neurysm of the mitral-aortic intervalvular fibro- sa. Rev Esp Cardiol 58(12):1473–1475