

CARDIOPATIE VALVOLARI ED ENDOCARDITI: UPDATE 2026

Endocarditi: indicazioni alla terapia chirurgica. L'importanza delle reti integrate. Dati del mondo reale

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Endocarditis treatment: a team game



Additional endocarditis team members as required

←—————→
C O R E T E A M

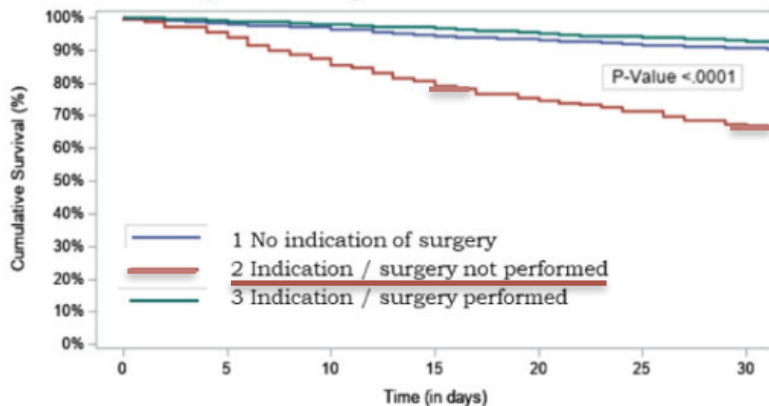


13.8 cases per
100.000
individuals
per year



In-hospital mortality in EURO-ENDO

adjusted Kaplan-Meier curves



Highest one-month mortality in patients with failure to undertake surgery despite a guideline recommended indication



Take home figure Prognosis of infective endocarditis is dismal when cardiac surgery is indicated but not performed (adjusted Kaplan-Meier curve).



ESC
European Society
of Cardiology
European Heart Journal (2019) 40, 3222–3233
doi:10.1093/eurheartj/ehz620

FASTTRACK CLINICAL RESEARCH
Valvular heart disease

Clinical presentation, aetiology and outcome of infective endocarditis. Results of the ESC-EORP EURO-ENDO (European infective endocarditis) registry: a prospective cohort study



Guidelines are like a surgical tool for a valve surgeon; a tool as effective as a scissor!



What's new?



ESC

European Society
of Cardiology

European Heart Journal (2023) **44**, 3948–4042

<https://doi.org/10.1093/eurheartj/ehad193>

ESC GUIDELINES

2023 ESC Guidelines for the management of endocarditis

**Developed by the task force on the management of endocarditis
of the European Society of Cardiology (ESC)**



***Endorsed by the European Association for Cardio-Thoracic Surgery
(EACTS) and the European Association of Nuclear Medicine (EANM)***



Endocarditis team

Diagnosis and management of patients with complicated IE are recommended to be performed at an early stage in a Heart Valve Centre, with immediate surgical facilities and an 'Endocarditis Team' to improve the outcomes.

I

B

For patients with uncomplicated IE managed in a Referring Centre, early and regular communication between the local and the Heart Valve Centre Endocarditis Teams is recommended to improve the outcomes of the patients.

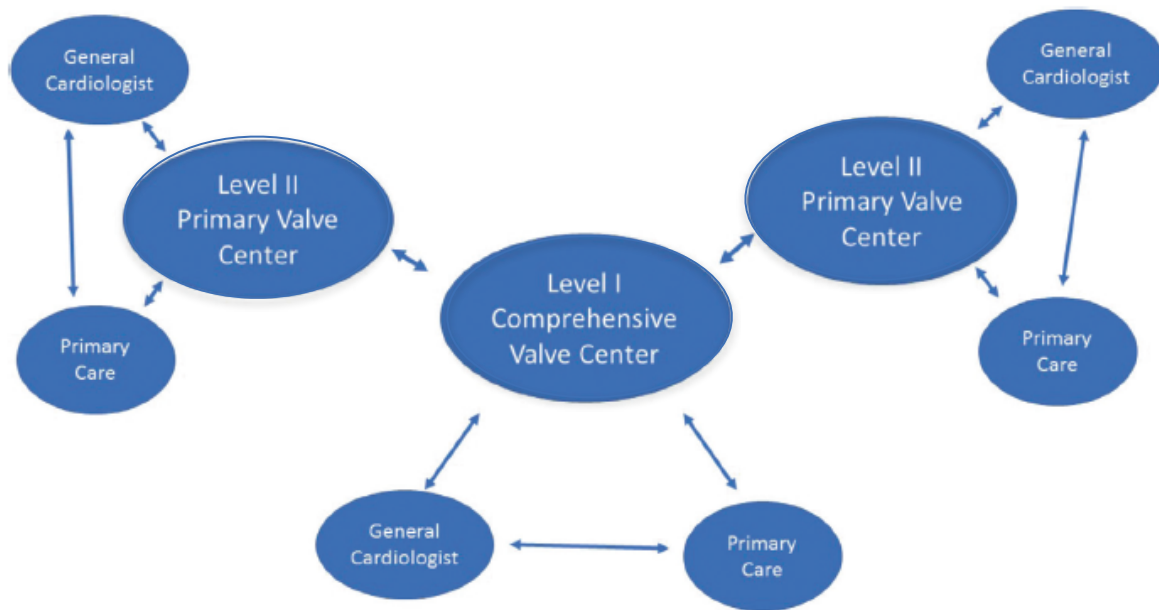
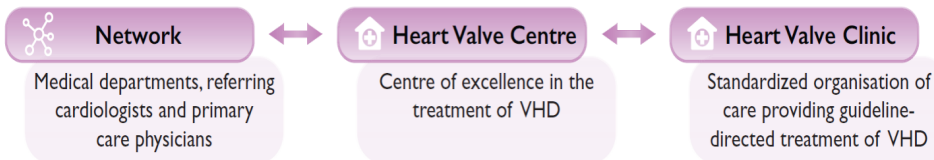
I

B

The guidelines strongly support a **patient-centred approach** with a **shared decision process by a multidisciplinary team** that should be implemented either in tertiary referral centres, becoming heart valve centres, and referral centres



Heart Valve Centre



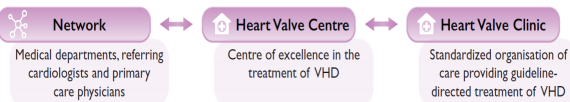
EXPERT CONSENSUS SYSTEMS OF CARE DOCUMENT

2019 AATS/ACC/ASE/SCAI/STS Expert Consensus Systems of Care Document: A Proposal to Optimize Care for Patients With Valvular Heart Disease

A Joint Report of the American Association for Thoracic Surgery, American College of Cardiology, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons



Heart Valve centre

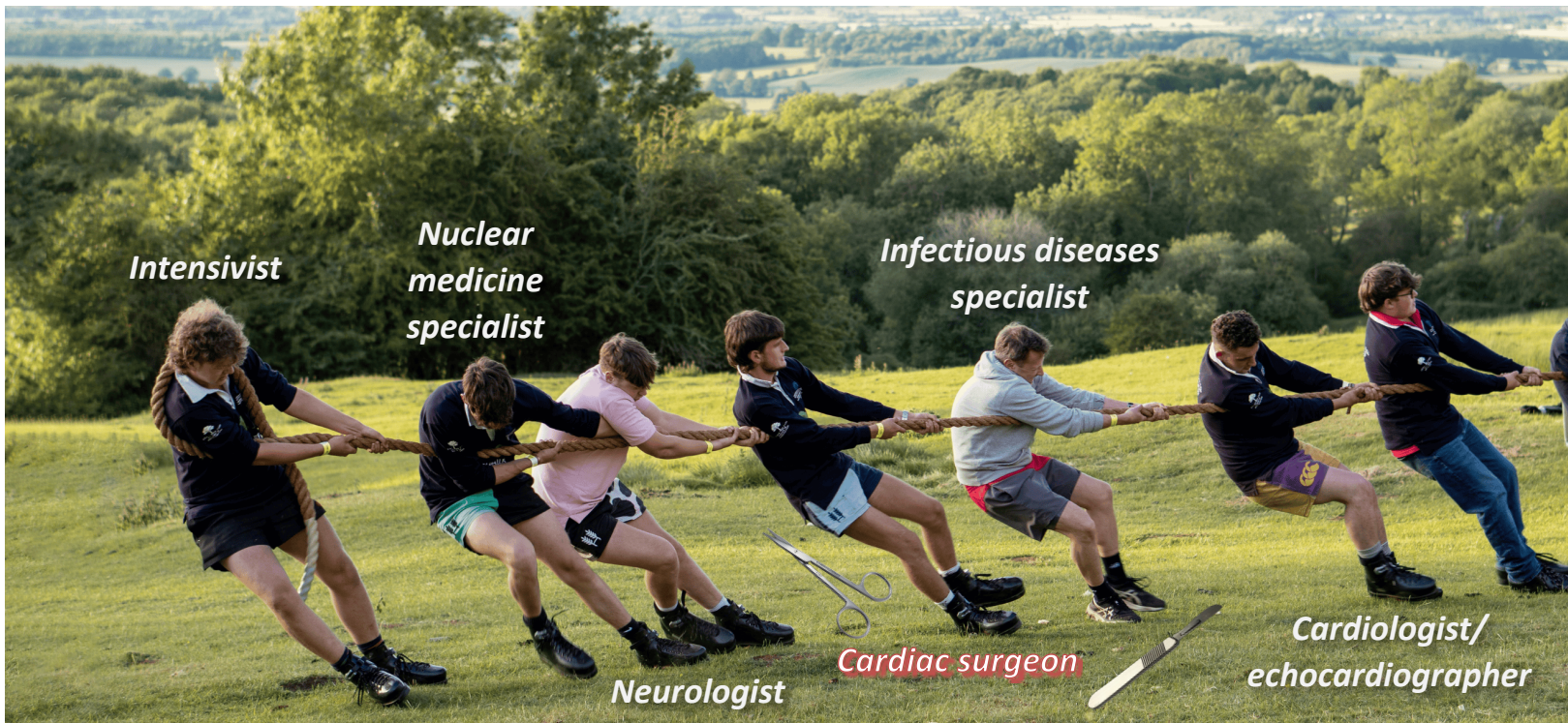


Comprehensive (Level I) valve center	
Interventional procedures*	
TAVR–transfemoral	
Percutaneous aortic valve balloon dilation	
TAVR–alternative access, including transthoracic (transaortic, transapical) and extrathoracic (eg, subclavian, carotid, caval) approaches	
Valve-in-valve procedures	
Transcatheter edge-to-edge mitral valve repair	
Paravalvular leak closure	
Percutaneous mitral balloon commissurotomy	
Surgical procedures*	
SAVR	
Valve-sparing aortic root procedures	★★★★★
Aortic root procedures for aneurysmal disease	
Concomitant septal myectomy with AVR	
Root enlargement with AVR	★★★★★
Mitral repair for primary MR	★★★★★
Mitral valve replacement‡	
Multivalve operations	★★★★★
Reoperative valve surgery	★★★★★
Isolated or concomitant tricuspid valve repair or replacement	

Primary (Level II) valve center
TAVR–transfemoral
Percutaneous aortic valve balloon dilation
SAVR
Mitral repair for posterior leaflet primary MR†
Mitral valve replacement‡
Concomitant tricuspid valve repair or replacement with mitral surgery



Endocarditis treatment: a team game



Additional endocarditis team members as required

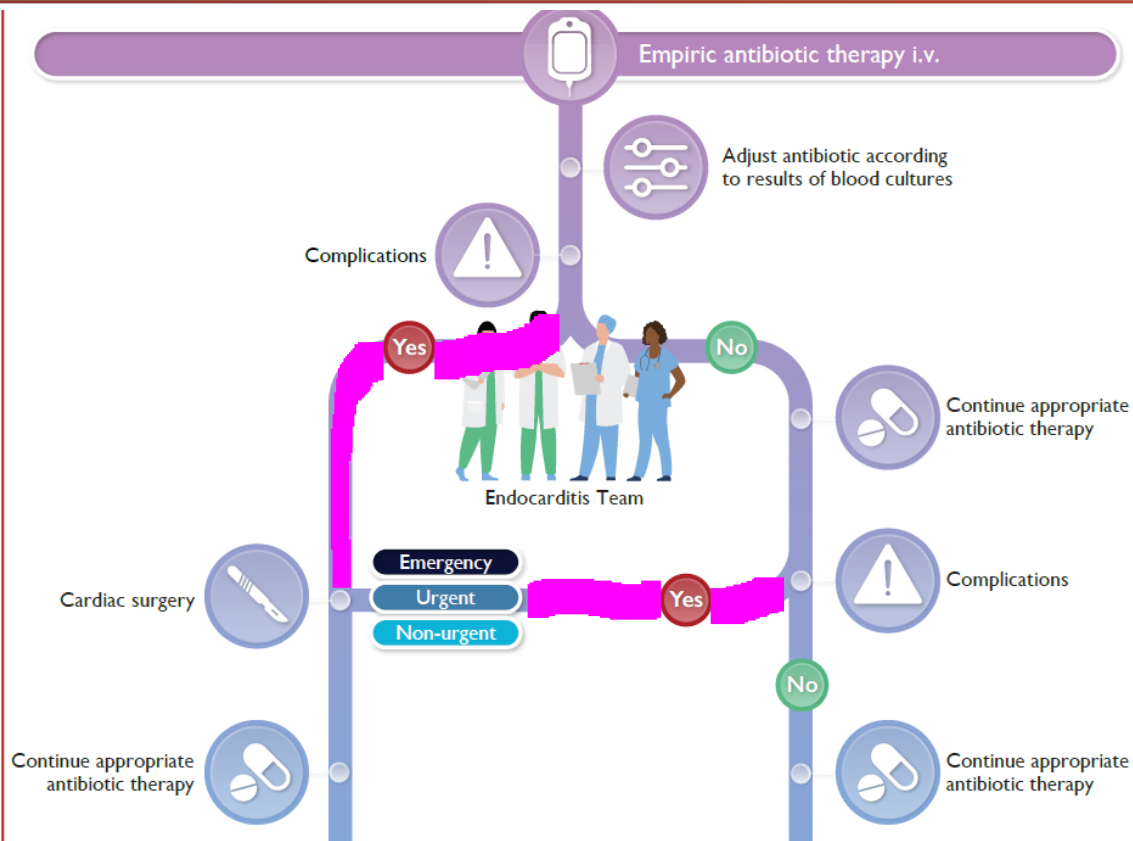


13.8 cases per
100.000
individuals
per year



Successful treatment of IE relies on microbial eradication by antimicrobial drugs

Surgery contributes by removing infected material



ESC TaskForce

**WHAT IS
TIME**



Urgent surgery

intervention within 3-5 days without any further delay

Emergency

intervention within 24 hours

irrespectively the pre-op duration of the antibiotic tx

Non-urgent surgery

within the same admission

It's important the urgent and emergent surgery meaning!



The decision making algorithm for surgery takes into account basically three elements:

- **Prevention of embolization**
- **Heart Failure**
- **Uncontrolled Infection**



Main indication for surgery

Aortic or mitral NVE with vegetations >10 mm, associated with severe valve stenosis or regurgitation, and low operative risk (urgent surgery should be considered).



B

Aortic or mitral NVE or PVE with isolated large vegetations (>15 mm) and no other indication for surgery (urgent surgery may be considered).

IIb

C

Urgent surgery is recommended in IE with vegetation ≥10 mm and other indications for surgery.
(i.e. severe valve regurgitation/stenosis/abscess)

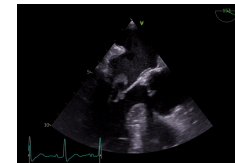
I

C

Urgent surgery may be considered in aortic or mitral IE with vegetation ≥10 mm and without severe valve dysfunction or without clinical evidence of embolism and low surgical risk.



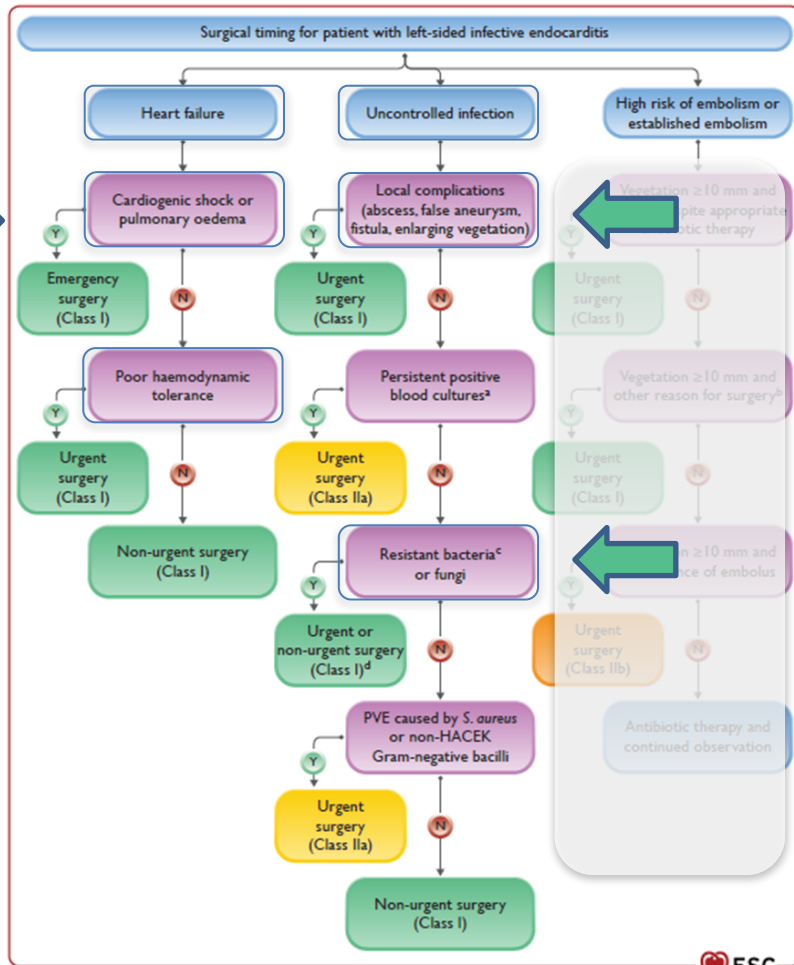
B



Emboic risk is highest the day after therapy initiation, and is 10–20 times higher on the day before and after the start of antibiotic treatment compared with 2 weeks before and after!

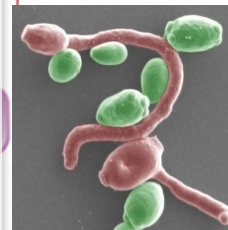


Acutely decompensated heart failure



Locally uncontrolled infection:

**paravalvular abscesses
fistulas
conduction blocks
pseudoaneurysms**



Heart
failure

Uncontrolled
infection

Embolism



surgery following a neurological event



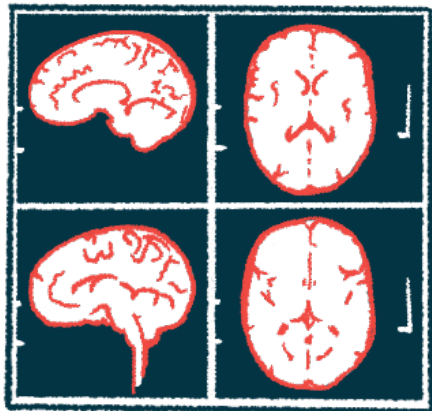
Worst Case Scenario

This is definitively the most
difficult scenario in the
decision making process!



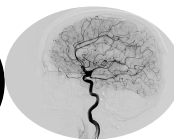
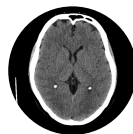
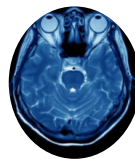
Pre-operative risk assessment

(surgical indication after a neurological event)



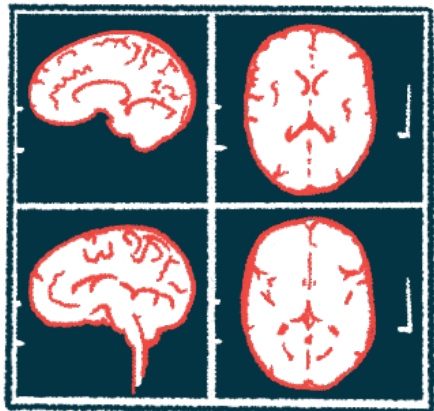
After a (TIA) transient ischemic attack, cardiac surgery, if indicated, is **recommended without delay** [I B]

After a stroke, surgery is recommended without any delay in presence of heart failure, uncontrolled infection, persistent high risk of embolism as long as coma is absent and intracranial hemorrhage has been excluded by CT or MRI [I B]



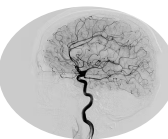
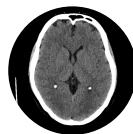
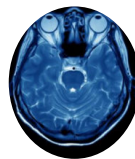
Pre-operative risk assessment

(surgical indication after a neurological event)

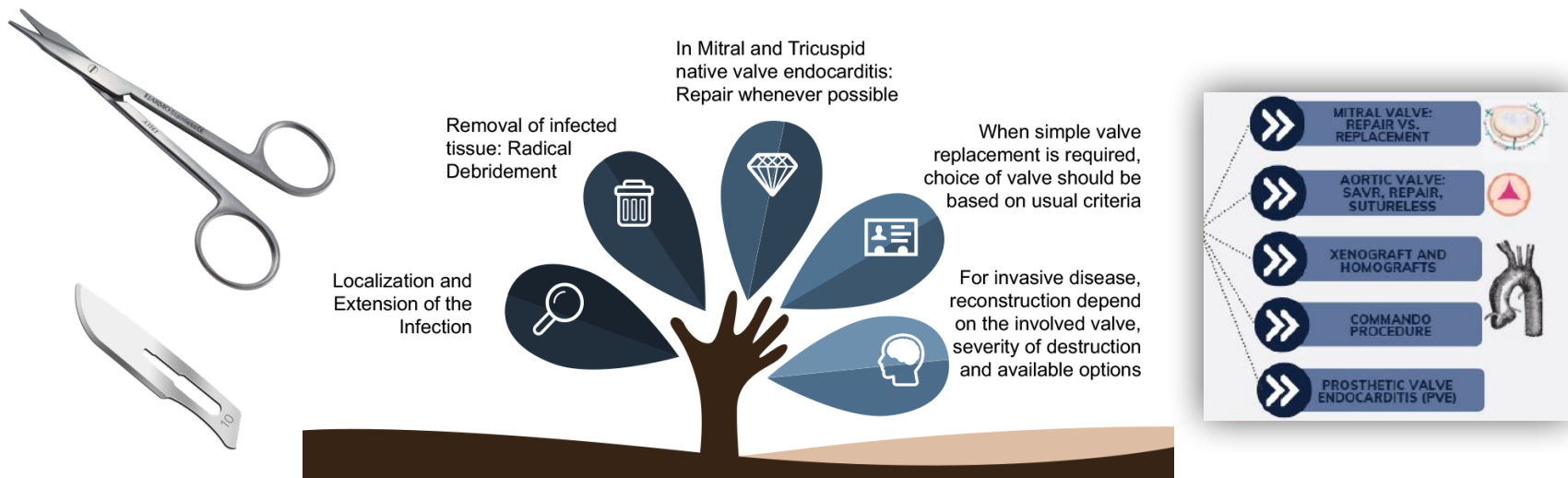


Following intracranial hemorrhage, **delaying cardiac surgery**, if possible, > 1 month. Frequent clinical re-assessment and imaging should be considered [IIa C]

Following intracranial hemorrhage, in presence of heart failure, uncontrolled infection, persistent high risk of embolism urgent/emergent surgery should be considered weighing the likelihood of a meaningful neurological outcome [IIa C]

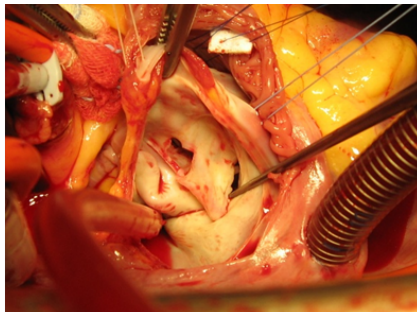


Surgical approaches to infective endocarditis

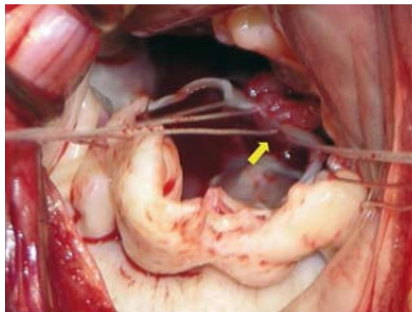


Despite the risks of surgery in these patients, current evidence suggests that surgical treatment may generate a survival advantage of up to 20% in the first year

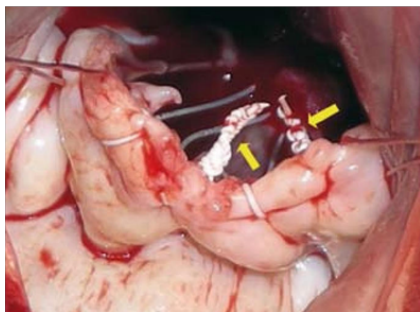
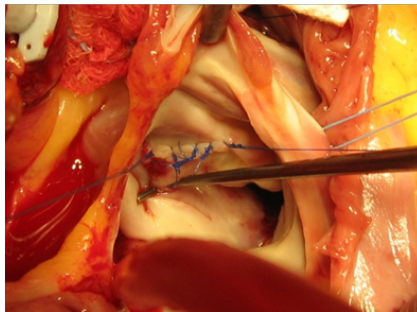




Mitral anterior leaflet repair

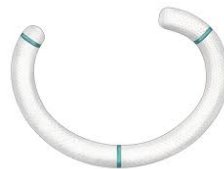


Ruptured chordal implant

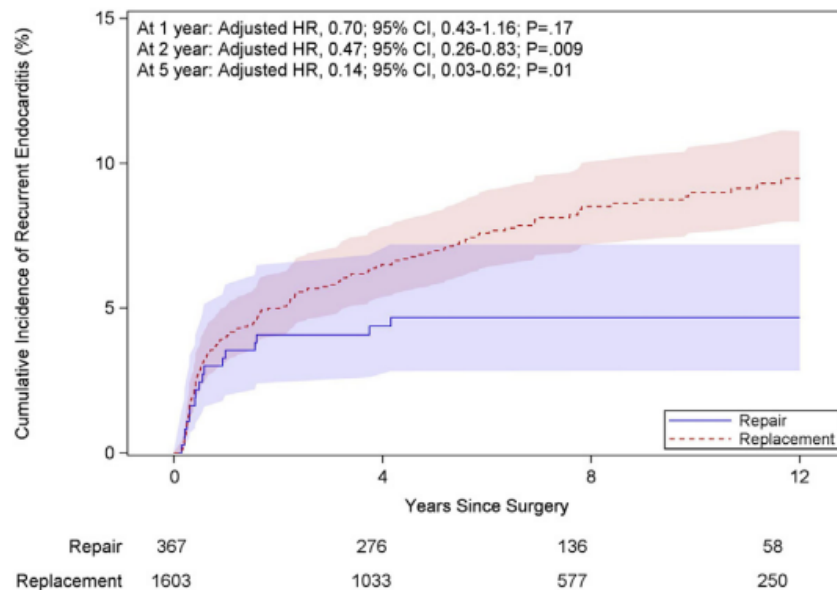
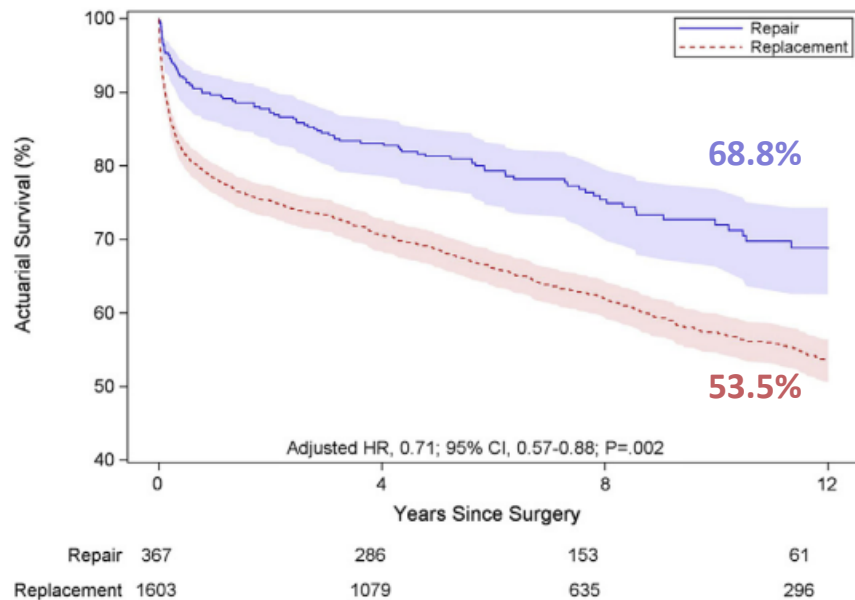


Annuloplasty is pivotal for achieving stable long-term surgical outcomes

The resection technique, a cornerstone of MV repair, demands the removal of sufficient leaflet tissue to ensure the complete eradication of the infectious process



Nana Toyoda, MD, PhD,^a Shinobu Itagaki, MD, MS,^a Natalia N. Egorova, PhD,^b Henry Tannous, MD,^{a,c}
Anelechi C. Anyanwu, MD,^a Ahmed El-Eshmawi, MD,^a David H. Adams, MD,^a and Joanna Chikwe, MD^{a,c}



Mitral Valve Repair and Replacement in Endocarditis: A Systematic Review of Literature

Harm H. H. Feringa, MD, Leslee J. Shaw, PhD, Don Poldermans, MD, PhD, Sanne Hoeks, MS, Ernst E. van der Wall, MD, PhD, Robert A. E. Dion, MD, PhD, and Jeroen J. Bax, MD, PhD

Departments of Cardiothoracic Surgery and Cardiology, Leiden University Medical Center, Leiden, the Netherlands; American Cardiovascular Research Institute, Atlanta, Georgia; and Department of Cardiology, Erasmus Medical Center, Rotterdam, the Netherlands

Background. Several observational studies have suggested a superior survival after mitral valve repair compared with replacement in patients undergoing surgery for infective endocarditis. The objective of this study was to systematically review the rate of morbidity and mortality associated with mitral valve repair or replacement in infective endocarditis.

Methods. A Medline search was conducted for literature and a systematic review of 24 studies, reporting prognosis of patients who underwent surgery for mitral valve endocarditis, was performed. Information on the patients, type of surgery, and follow-up was abstracted using standardized protocols.

Results. A total of 470 patients (39%) underwent mitral valve repair and 724 patients (61%) underwent valve replacement. Lower in-hospital mortality (2.3% versus 14.4%, relative risk: 0.16, 95% confidence interval: 0.09 to 0.30, $p < 0.0001$) and long-term mortality (7.8% versus 40.5%, relative risk: 0.19, 95% confidence interval: 0.13 to

0.29, $p < 0.0001$) were observed among patients undergoing mitral valve repair compared with replacement. In addition, the rates of early reoperation (2.2% versus 12.7%, $p < 0.0001$), early cerebrovascular events (4.7% versus 11.5%, $p = 0.045$), late reoperation (4.7% versus 8.7%, $p = 0.039$), late recurrent endocarditis (1.8% versus 7.3%, $p = 0.0013$), and late cerebrovascular events (1.6% versus 24.4%, $p < 0.0001$) were significantly lower after mitral valve repair. Meta-regression analysis demonstrated that mitral valve repair over replacement was associated with a better early and late prognosis after surgery. Male sex and acute surgery were (nonsignificantly) predictive of worse early outcome.

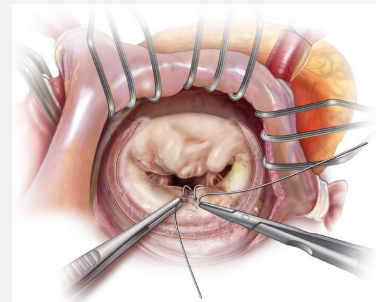
Conclusions. A systematic review of literature showed that mitral valve repair is associated with good clinical in-hospital and long-term results among patients undergoing surgery for infective endocarditis.

(Ann Thorac Surg 2007;83:564–71)

© 2007 by The Society of Thoracic Surgeons

Lower rates of:

- **In-hospital mortality**
(2.3% vs 14.4%)
- **Long-term mortality**
(7.8% vs 40.5%)
- **Early re-operation**
(2.2% vs 12.7%)
- **Cerebrovascular accidents**
(4.7% vs 8.7%)
- **Recurrent endocarditis**
(1.8% vs 7.5%)





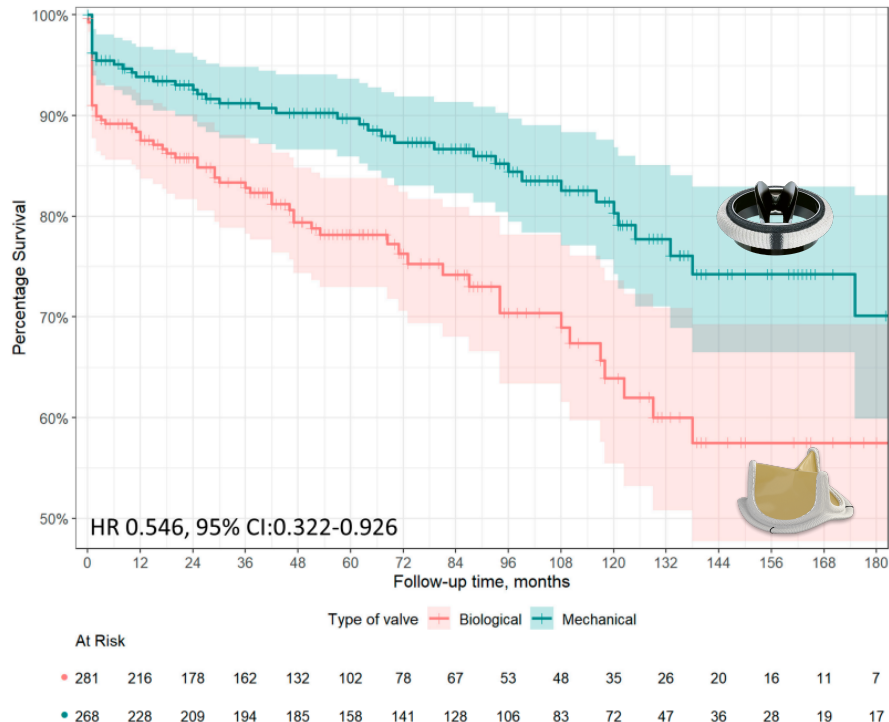
Article

Survival and Recurrence of Endocarditis following Mechanical vs. Biological Aortic Valve Replacement for Endocarditis in Patients Aged 40 to 65 Years: Data from the INFECT-Registry

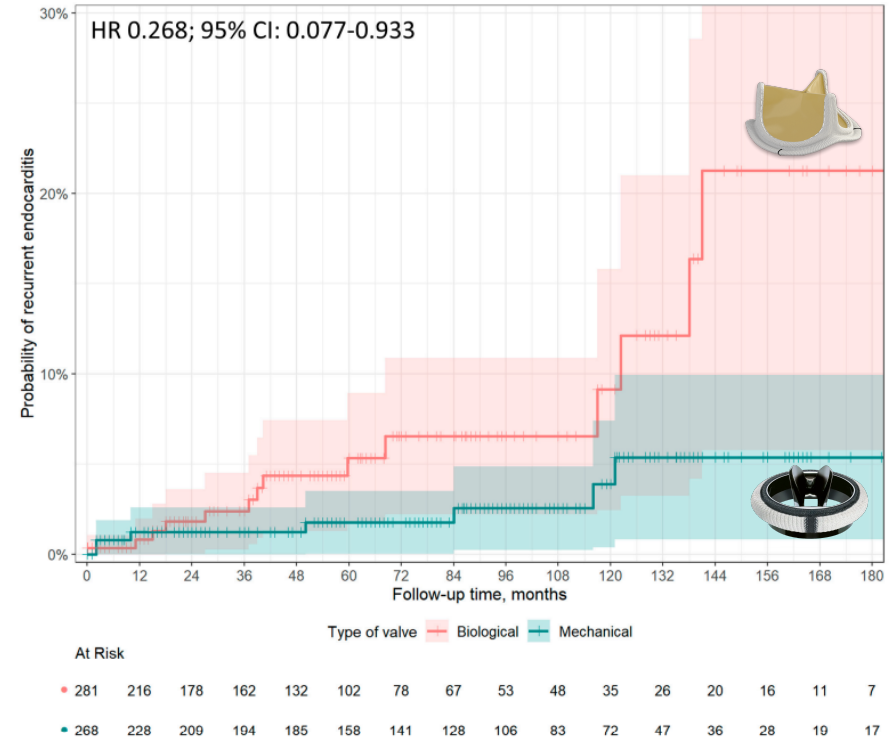
Antonio Salsano ^{1,2,*} , Michele Di Mauro ³ , Laura Labate ^{4,5}, Alessandro Della Corte ⁶, Federica Lo Presti ⁶, Michele De Bonis ⁷, Cinzia Trumello ⁷ , Mauro Rinaldi ⁸, Erik Cura Stura ⁸, Guglielmo Actis Dato ⁹ , Giuseppe Punta ⁹, Francesco Nicolini ¹⁰, Davide Carino ¹⁰, Carlo De Vincentiis ¹¹, Andrea Garatti ¹¹, Giangiuseppe Cappabianca ¹² , Andrea Musazzi ¹², Diego Cugola ¹³, Maurizio Merlo ¹³, Davide Pacini ¹⁴, Gianluca Folesani ¹⁴ , Sandro Sponga ¹⁵, Igor Vendramin ¹⁵, Alberto Piloizzi Casado ¹⁶, Francesco Rosato ¹⁶, Elisa Mikus ¹⁷ , Carlo Savini ¹⁷ , Francesco Onorati ¹⁸ , Giovanni Battista Luciani ¹⁸ , Roberto Scrofani ¹⁹ , Francesco Epifani ¹⁹, Francesco Musumeci ²⁰, Antonio Lio ²⁰, Andrea Colli ²¹, Giosuè Falcetta ²¹, Salvatore Nicolardi ²² , Salvatore Zaccaria ²², Enrico Vizzardi ²³ , Antonio Pantaleo ²⁴, Giuseppe Minniti ²⁴, Emmanuel Villa ²⁵ , Margherita Dalla Tomba ²⁵, Francesco Pollari ²⁶ , Fabio Barili ¹⁶ , Alessandro Parolari ^{27,28}, Roberto Lorusso ^{29,†}  and Francesco Santini ^{1,2,†} on behalf of Italian Group of Research for Outcome in Cardiac Surgery (GIROC)



Survival



IE recurrence



5. Conclusions

Among propensity-matched patients aged 40 to 65 years who underwent AVR for IE, the implantation of a mechanical prosthesis was associated with significant survival benefits and a reduction in IE recurrence. These findings suggest that mechanical valves are a reasonable choice for patients aged 40 to 65 years in this setting. Nonetheless, real-world data show that the majority of patients nowadays prefer a biological prosthesis.

Cite this article as: Kahrovic A, Herkner H, Angleitner P, Werner P, Kocher A, Ehrlich M *et al.* Automated titanium fastener for surgical aortic valve replacement—preventive role for infective endocarditis? *Eur J Cardiothorac Surg* 2024; doi:10.1093/ejcts/ezae236.

Automated titanium fastener for surgical aortic valve replacement—preventive role for infective endocarditis?

Amila Kahrovic ^{a,*}, Harald Herkner^b, Philipp Angleitner ^a, Paul Werner ^a, Alfred Kocher ^a,
Marek Ehrlich^a, Dominik Wiedemann ^a, Guenther Laufer ^a, Paul Simon^a and Martin Andreas ^a

Automated titanium fastener for surgical aortic valve replacement – preventive role for infective endocarditis ?

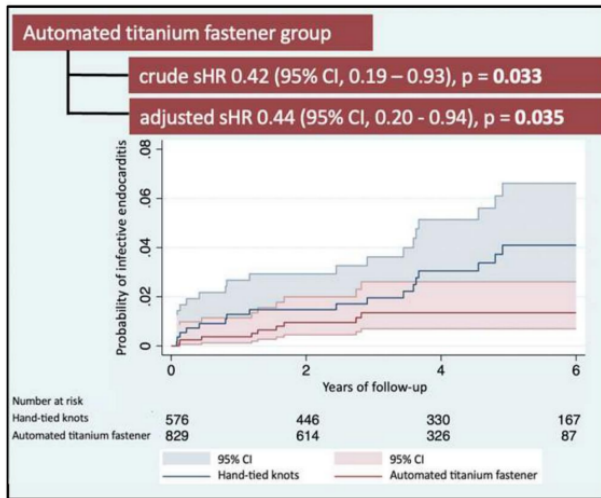
Summary

Study population: 1405 patients with SAVR were grouped based on the suture-securing technique:

- automated titanium fastener group: n= 829 (59%)
- hand-tied knots group: n= 576 (41%)

Primary study endpoint: Infective endocarditis during follow-up

Key finding: The use of an automated titanium fastener device was associated with a lower risk of infective endocarditis during follow-up.



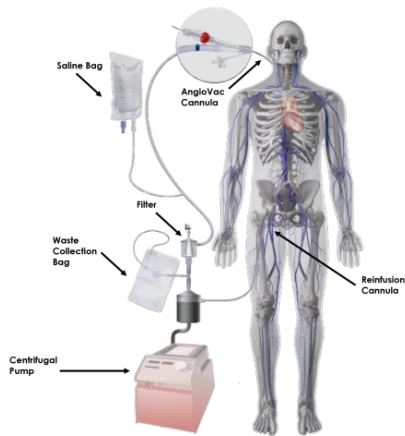
Surgery is indicated for patient presenting right-sided IE who are receiving appropriate antibiotic therapy (at least 1 week) when:

- Severe RV dysfunction secondary to severe tricuspid TR not responsive to diuretic therapy is present [I B]

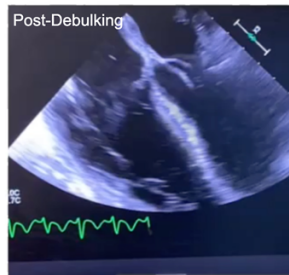
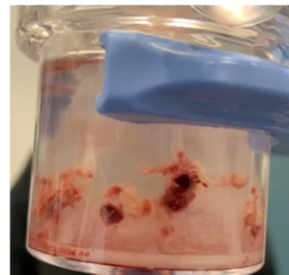
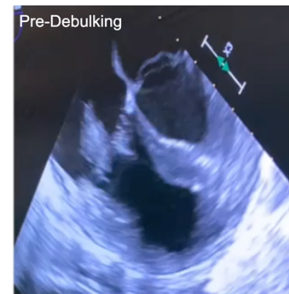
- Are present persisting vegetations with respiratory insufficiency requiring ventilatory support after recurrent pulmonary emboli [I B]

- Large tricuspid vegetations > 20 mm are present after recurrent septic pulmonary emboli [I C]

- There is a simultaneous involvement of left-heart structures [I C]



Percutaneous Debulking of Tricuspid Valve Endocarditis





Outcomes With Percutaneous Debulking of Tricuspid Valve Endocarditis

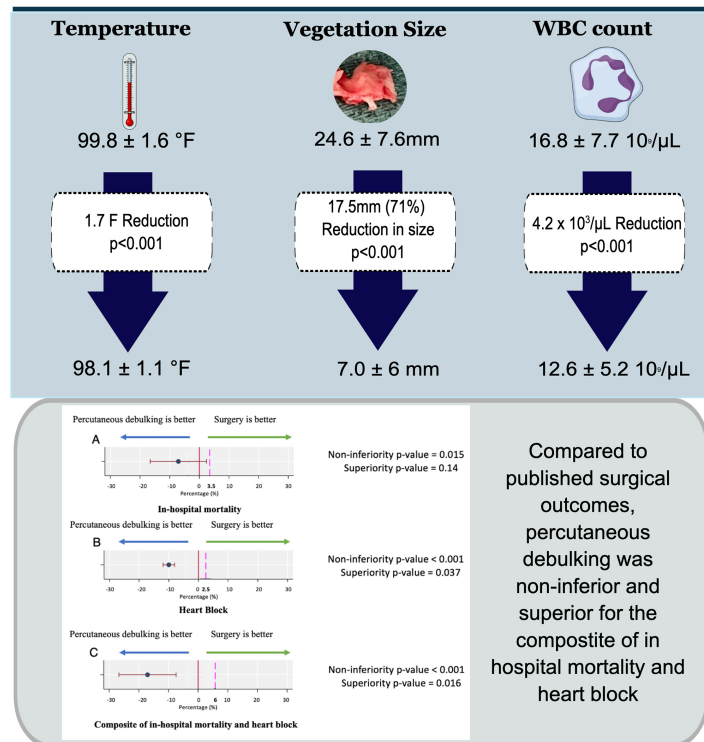
Robert S. Zhang , MD; Usman Alam, MD; Muhammad H. Maqsood , MD; Yuhe Xia , MS; Rafael Harari, MD; Norma Keller , MD; Lindsay Elbaum, MD; Sunil V. Rao , MD; Carlos L. Alviar, MD; Sripal Bangalore , MD, MHA

BACKGROUND: In patients with tricuspid valve infective endocarditis, percutaneous debulking is a treatment option. However, the outcomes of this approach are less well known.

METHODS: We performed a retrospective analysis of all patients who underwent percutaneous vegetation debulking for tricuspid valve infective endocarditis from August 2020 to November 2022 at a large academic tertiary care public hospital. The primary efficacy outcome was procedural success defined by clearance of blood cultures. The primary safety outcome was any procedural complication. For the composite outcome of in-hospital mortality or heart block, outcomes were compared (sequential noninferiority and superiority) with published surgical outcomes data.

RESULTS: Of the 29 patients with tricuspid valve infective endocarditis who underwent percutaneous debulking, the average age was 41.3 ± 10.1 years, all patients had septic pulmonary emboli with 27 (93.1%) patients having cavitory lung lesions before the procedure. For the efficacy outcomes, 28 patients (96.6%) had clearance of cultures after their procedure, mean white blood cell count significantly decreased from $16.8 \pm 1.4 \times 10^3$ to $12.6 \pm 1.0 \times 10^3$ per μL ($P < 0.01$), and mean body temperature significantly decreased from $99.8^\circ\text{F} \pm 0.30$ to $98.3^\circ\text{F} \pm 0.20$ ($P < 0.001$) post-procedure. For safety outcomes, there were no procedural complications (0%). Two patients (6.9%) died during the follow-up period, both during the index hospitalization due to severe necrotizing pneumonia. When compared with published data on surgical outcomes, percutaneous debulking was noninferior and superior for the composite of in-hospital death or heart block (noninferiority, $P < 0.001$; superiority, $P = 0.016$).

CONCLUSIONS: Percutaneous debulking is feasible, effective, and safe in treating patients with tricuspid valve infective endocarditis refractory to medical therapy.



TREATMENT OF SEVERE RIGHT-SIDED INFECTIVE ENDOCARDITIS WITH MECHANICAL ASPIRATION VERSUS VALVE SURGERY: COMPARISON OF OUTCOMES AND INSIGHTS FROM A UNITED STATES REAL-WORLD DATABASE

Moderated Poster Contributions
Moderated Poster Theater 4
Monday, March 31, 2025, 9:36 a.m.-9:43 a.m.

899
JACC April 1, 2025
Volume 85, Issue 12, Suppl A

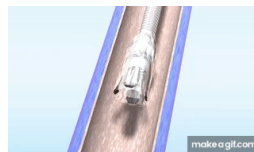
Authors: Alexander J. Didier, Tyler Canova, Alan Fahoury, Rochell Issa, Kyle Nelson, Maryam Saleem, Marc A. Miller, Vivek Yerrapu Reddy, The University of Toledo College of Medicine and Life Sciences, Toledo, OH, USA, Mount Sinai Fuster Heart Hospital, New York, NY, USA

Background: Incidence of right sided infective endocarditis (RSIE) has been rising in the United States. Recently, percutaneous mechanical aspiration (PMA) has gained attention as a potential alternative to tricuspid valve surgery (TVS) for patients with severe RSIE and large vegetations. However, there is a paucity of data comparing the two treatment modalities. We sought to compare outcomes in patients who underwent PMA compared with TVS.

Methods: We queried the TriNetX database, a real-world database consisting of over 100 million patient records in the United States, for cases of RSIE who underwent either PMA or TVS between 2015 and 2023. Cases were identified using ICD-10 codes identifying infective endocarditis and linked with surrogate markers of right-sided activity. CPT codes were used to identify receipt of PMA or TVS. Propensity score matching utilizing demographic characteristics and medical history was used to create two cohorts of 206 patients. Survival analysis was used to compare risk of outcomes [all-cause mortality, 3-point major adverse cardiovascular event (MACE, defined as a composite of acute heart failure (AHF), acute myocardial infarction (AMI), and stroke), cardiac arrest, atrial fibrillation/flutter, and ventricular fibrillation/tachycardia] at 30 days and 1 year.

Results: The analysis included 182,757 patients with RSIE. All-cause mortality at 30 days (PMA: 7.9% vs TVS: 6.1%, $p=0.46$) and at 1 year (PMA: 19.3% vs TVS: 18.1%, $p=0.71$) were similar. Risk of developing MACE was similar between cohorts at 30 days (PMA: 8.9% vs TVS: 12.0%, $p=0.45$). Risk of CVA (PMA: 0% vs TVS: 5.3%, $p=0.0014$) and cardiac arrest (PMA: 0% vs TVS: 4.9%, $p=0.0015$) within 30 days were higher in the TVS cohort. Patients who underwent TVS had higher risk of acute HF (PMA: 6.6% vs TVS 20.5%, $p=0.0007$) and MACE (PMA: 10.7% vs TVS: 23.3%, $p=0.0135$) at 1 year.

Conclusion: Patients who underwent PMA and TVS had similar mortality, however patients undergoing PMA had lower risk of cardiac arrest and CVA at 30 days, as well as MACE at 1 year. These results provide rationale for prospective studies comparing both treatment modalities.



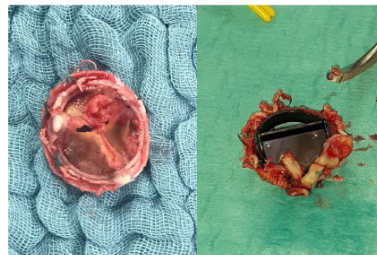
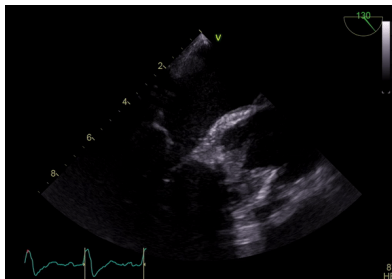
PMA Percutaneous Mechanical Aspiration Vs Tricuspid Valve Surgery

**Similar mortality at 30 days and 1 y
Lower risk of acute HF and MACE at 1 y**



Specific situations (prosthetic valve IE)

- Surgery for PVE follows the general indication for IE on native valves

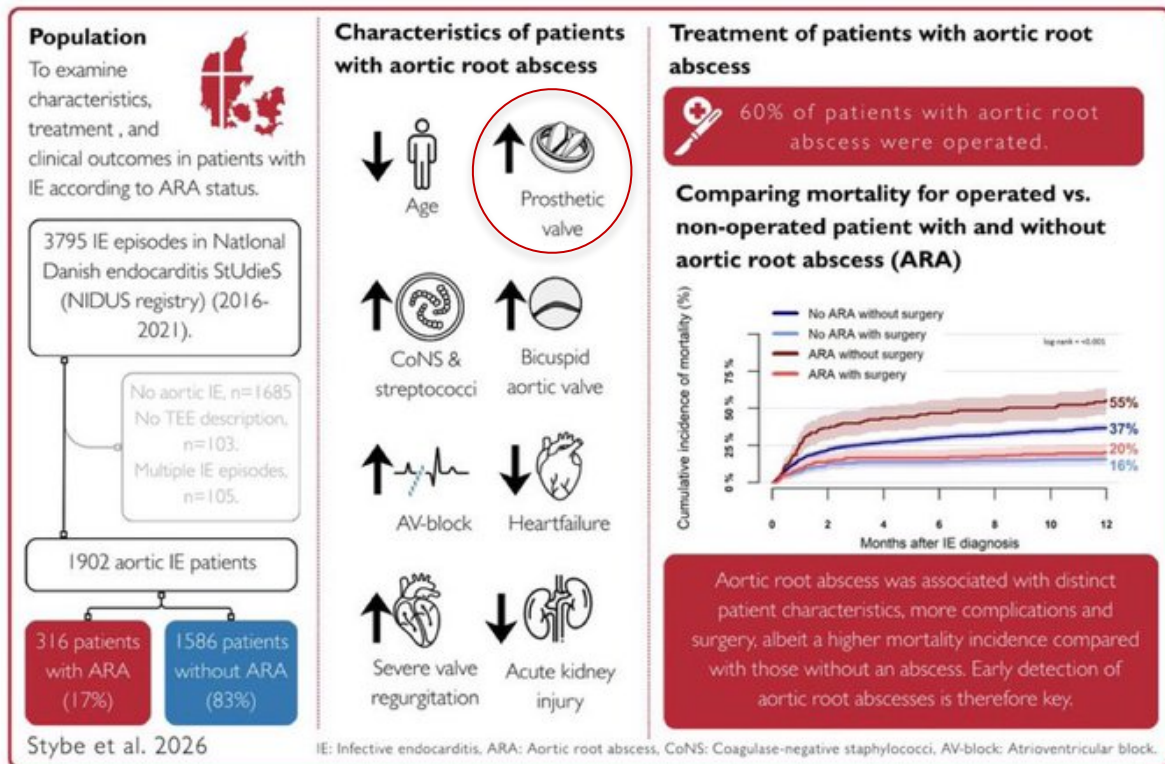


- Early PVE following prosthetic valve replacement is a separate entity:

Surgery is indicated for early PVE (within 6 months of valve implantation) with new valve placement and complete debridement [I C]



Aortic Root Abscess in Infective Endocarditis



From 3,795 IE episodes
(NIDUS registry, Denmark 2016-2021):
17% had aortic root abscess (ARA)

60% required surgery

1-year mortality:

- ARA without surgery: 55%
- ARA with surgery: 37%
- No ARA without surgery: 20%
- No ARA with surgery: 16%

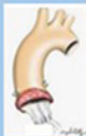
Surgery saves lives — but mortality remains high!

Aortic Homografts for Native and Prosthetic Aortic Valve and Root Endocarditis: Results of 544 Patients from the European Registry of Cryopreserved Aortic Homografts (EURECAH)

Methods



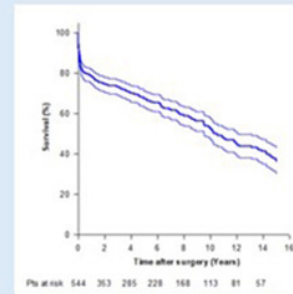
544 adult patients enrolled in registry



Treated with aortic homograft



Complex native and prosthetic aortic valve endocarditis

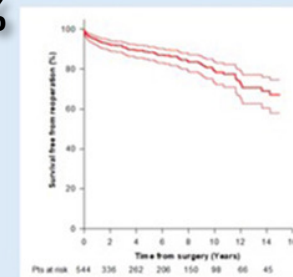


Results



Periprocedural and early mortality 21%

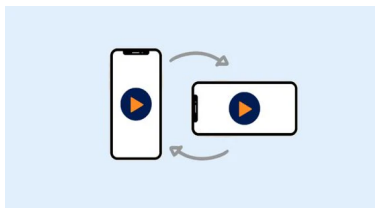
Overall median survival time was 10.2 [1.9-19.8] years. Survival rates were 87.9% at 30 days, 78.5% at 1 year, 67.1% at 5 years and 52.8% at 10 years. Stroke was recorded in 31 (6%) patients. Median survival free from reoperation was 20 years. Recurrent infective endocarditis developed in 28 (5%) patients.



IMPLICATIONS: The results of the EURECAH registry support the use of aortic homograft for complex native and prosthetic aortic valve endocarditis. Aortic valve and root replacement with aortic homograft is safe and provides satisfactory early and late survival despite the complexity of the condition, with good long-term durability and low rates of recurrent endocarditis.

Conclusions I

- Medical management and surgical indication in IE are challenge and the decision-making process is not easy



- Horizontal rather than vertical paradigm of cure



dedicated co-ordinator



Conclusions II

- We, as surgeons, are taking care of the mechanical complications of IE like embolic risk, valve dysfunction and extension of the infective process to the heart



- The real weapon against IE is the antimicrobial therapy



In this Multidisciplinary Team the Surgeon is the one taking into account a huge responsibility offering or not surgery to these unfortunate patients

A LONG WAY TO GO

EVIDENCE SUGGESTS THAT
ENDOCARDITIS TEAM MAY
IMPROVE OUTCOMES

