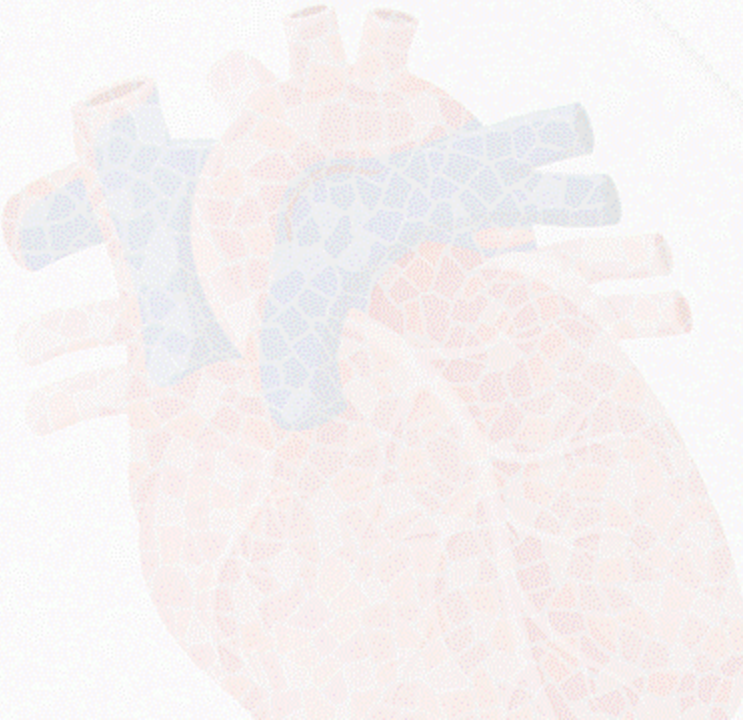


Infective Endocarditis after TAVI

A new and growing clinical entity with surgical challenges



Ander Regueiro, MD PhD
Interventional Cardiologist
Cardiology Department
Hospital Clínic de Barcelona



IE after TAVI

A new and growing clinical entity with surgical challenges

- 1 Evolution of TAVI (evidence and indications) over time
- 2 What do we now so far about IE after TAVI?
- 3 Future perspectives



1

Evolution of TAVI over time

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

1

Evolution of TAVI over time

First percutaneous aortic valve implantation

Special Report

Percutaneous Transcatheter Implantation of an Aortic Valve Prosthesis for Calcific Aortic Stenosis

First Human Case Description

Alain Cribier, MD; Helene Eltchaninoff, MD; Assaf Bash, PhD; Nicolas Borenstein, MD;
Christophe Tron, MD; Fabrice Bauer, MD; Genevieve Derumeaux, MD; Frederic Anselme, MD;
François Laborde, MD; Martin B. Leon, MD

Circulation. 2002;106:3006-3008

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

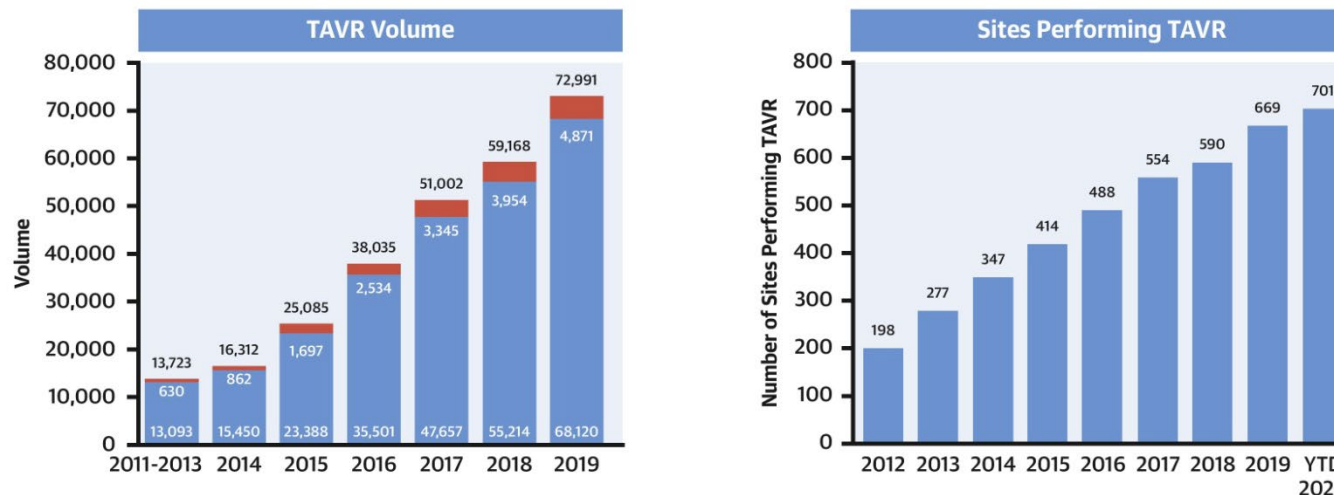


1

Evolution of TAVI over time

The use of TAVI has grown exponentially

CENTRAL ILLUSTRATION: The State of Transcatheter Aortic Valve Replacement: Trends in the United States From 2011 to 2019



Carroll, J.D. et al. J Am Coll Cardiol. 2020;76(21):2492-516.



1

Evolution of TAVI over time

Evidence of safety/efficacy with several RCT

The **NEW ENGLAND**
JOURNAL *of* **MEDICINE**

ESTABLISHED IN 1812

JUNE 9, 2011

VOL. 364 NO. 23

Transcatheter versus Surgical Aortic-Valve Replacement in High-Risk Patients

Craig R. Smith, M.D., Martin B. Leon, M.D., Michael J. Mack, M.D., D. Craig Miller, M.D., Jeffrey W. Moses, M.D.,
Lars G. Svensson, M.D., Ph.D., E. Murat Tuzcu, M.D., John G. Webb, M.D., Gregory P. Fontana, M.D.,
Raj R. Makkar, M.D., Mathew Williams, M.D., Todd Dewey, M.D., Samir Kapadia, M.D., Vasilis Babaliaros, M.D.,
Vinod H. Thourani, M.D., Paul Corso, M.D., Augusto D. Pichard, M.D., Joseph E. Bavaria, M.D.,
Howard C. Herrmann, M.D., Jodi J. Akin, M.S., William N. Anderson, Ph.D., Duolao Wang, Ph.D.,
and Stuart J. Pocock, Ph.D., for the PARTNER Trial Investigators*

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

1

Evolution of TAVI over time

Consolidated treatment for aortic stenosis



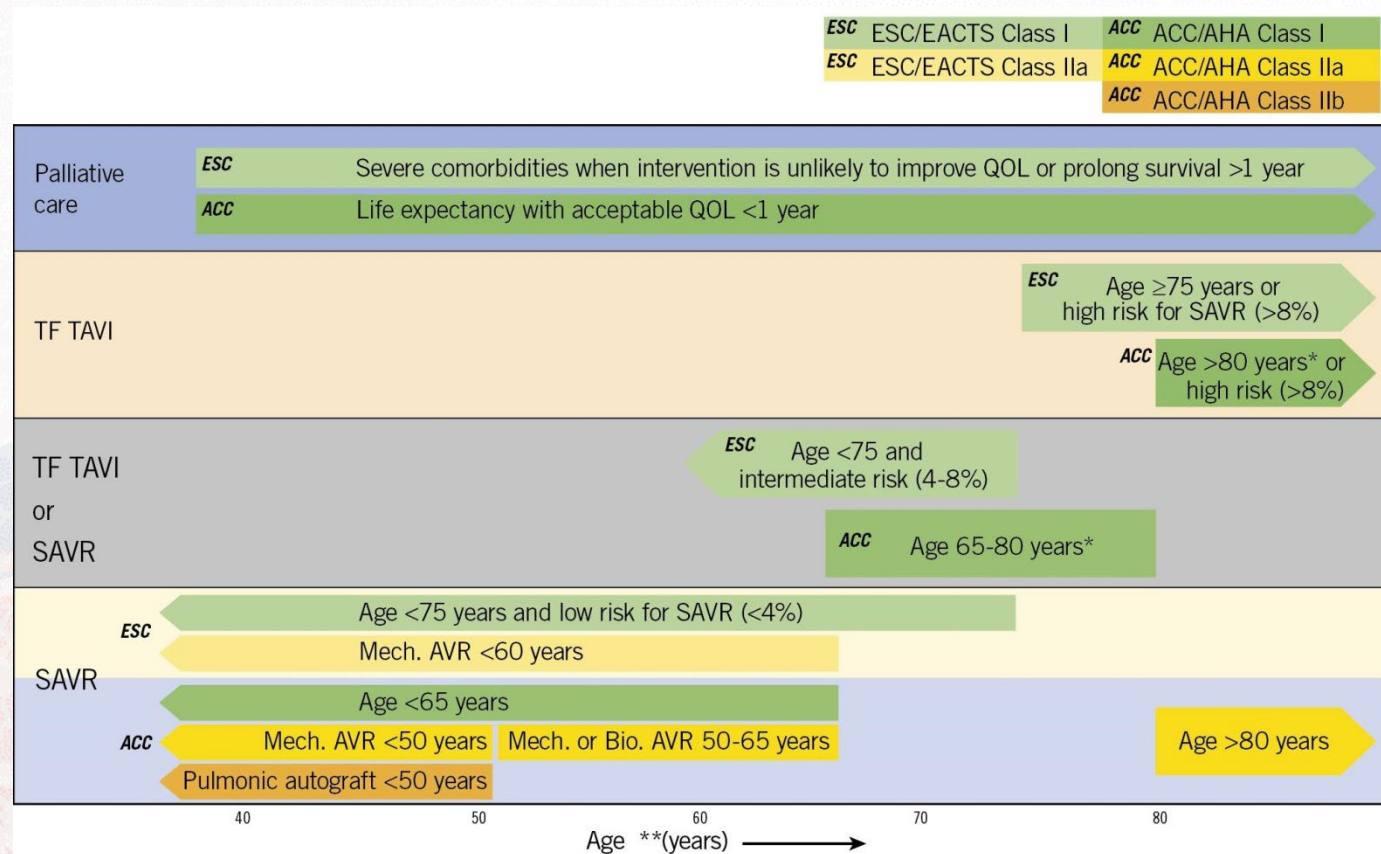
Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



1

Evolution of TAVI over time

Current guidelines



EuroIntervention 2022;17:e1123

Session I: Evolving epidemiology of infective endocarditis
 IE after TAVI. A new and growing clinical entity with surgical challenges

1

Evolution of TAVI over time

Patient characteristics

TAVI patients = high surgical risk or inoperable

1

Evolution of TAVI over time

Patient characteristics

~~TAVI patients = high surgical risk or inoperable~~

1

Evolution of TAVI over time

Patient characteristics



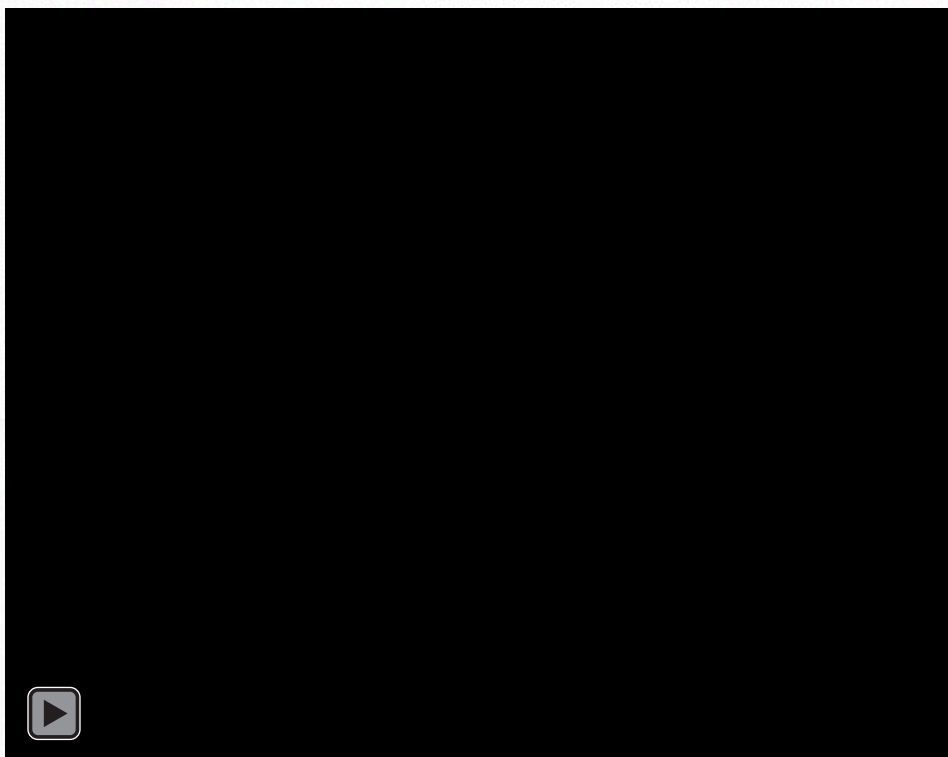
Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



1

Evolution of TAVI over time

Patient characteristics



Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



2

What do we now so far about IE after TAVI?

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI? First reports

doi:10.1510/icvts.2010.239517

INTERACTIVE
CARDIOVASCULAR AND
THORACIC SURGERY

Interactive CardioVascular and Thoracic Surgery 11 (2010) 252-253

www.icvts.org

Proposal for bail-out procedures - Valves Transapical aortic valve prosthetic endocarditis

Manuel Carnero-Alcázar*, Luis Carlos Maroto Castellanos, Javier Cobiella Carnicer,
José Enrique Rodríguez Hernández

Department of Cardiac Surgery, Hospital Clínico San Carlos, Madrid, Spain

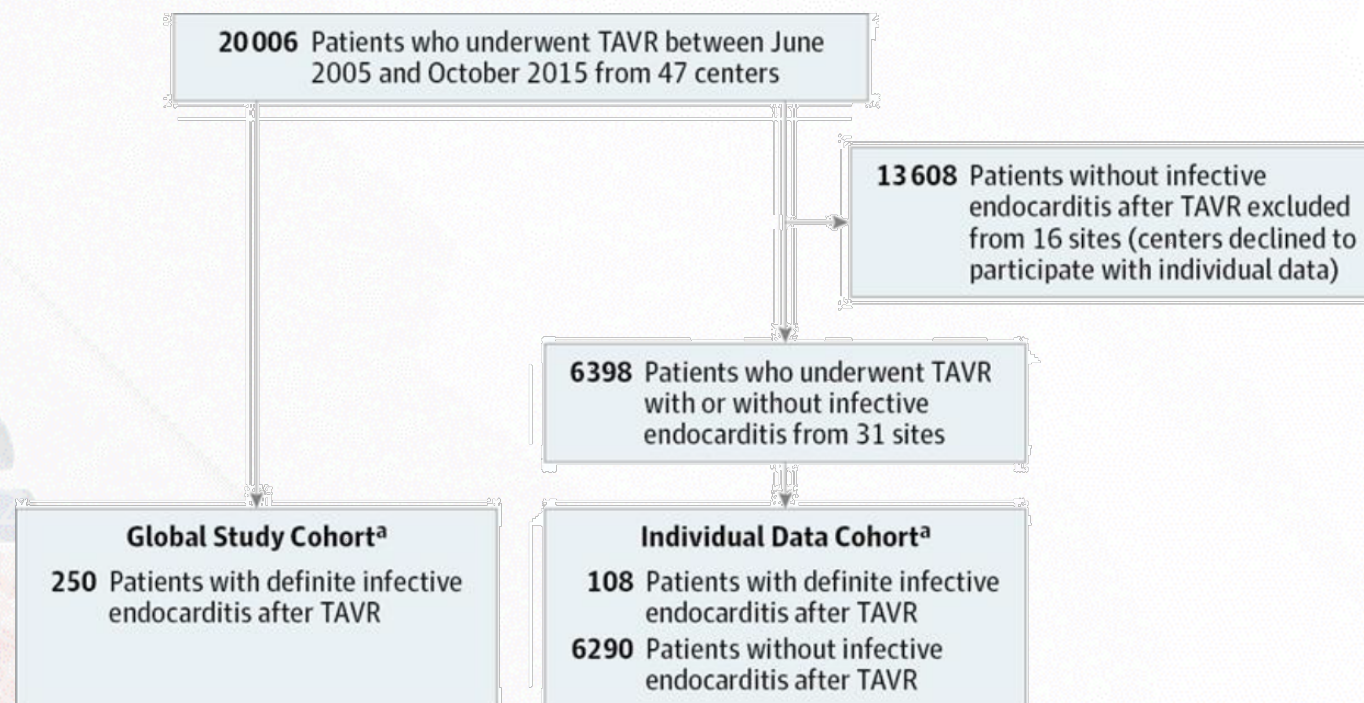
Received 5 April 2010; received in revised form 29 May 2010; accepted 1 June 2010

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



2

What do we now know so far about IE after TAVI? First case series

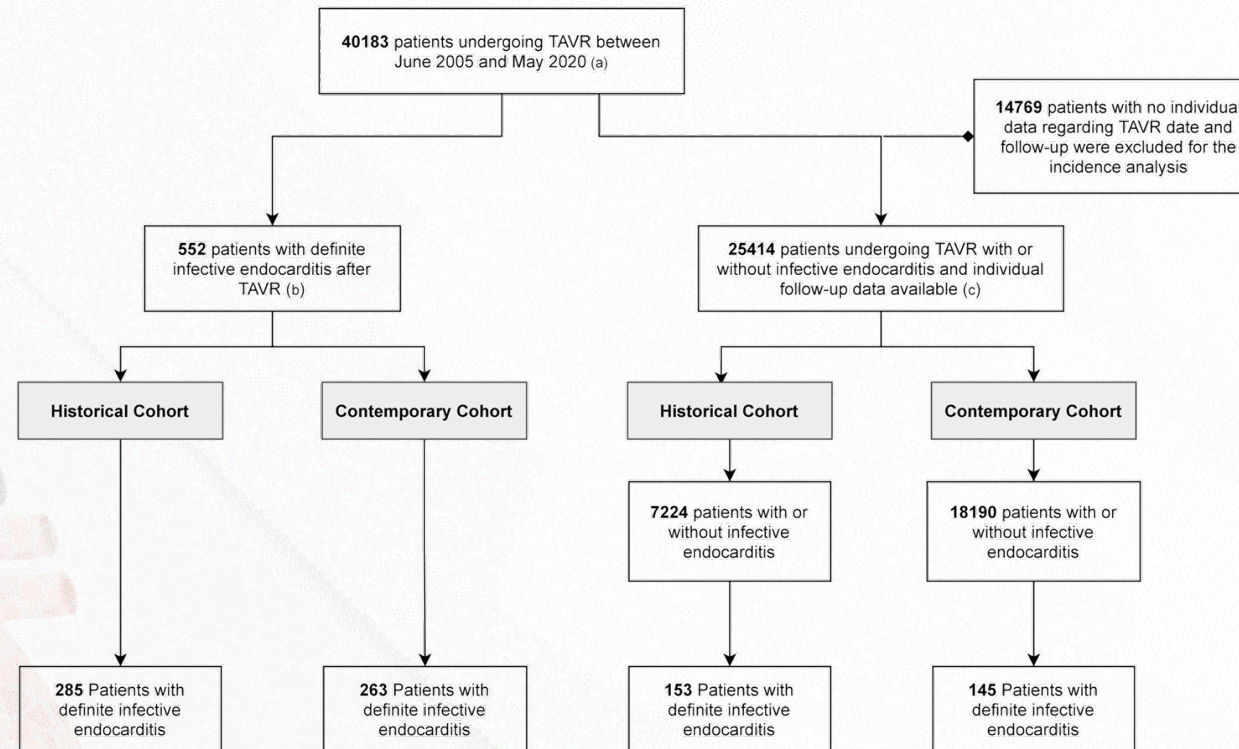


Regueiro A, et al. *JAMA*. 2016;316:1083-92



2

What do we now know so far about IE after TAVI? Contemporary series



Clin Infect Disease 2021;73:e3740



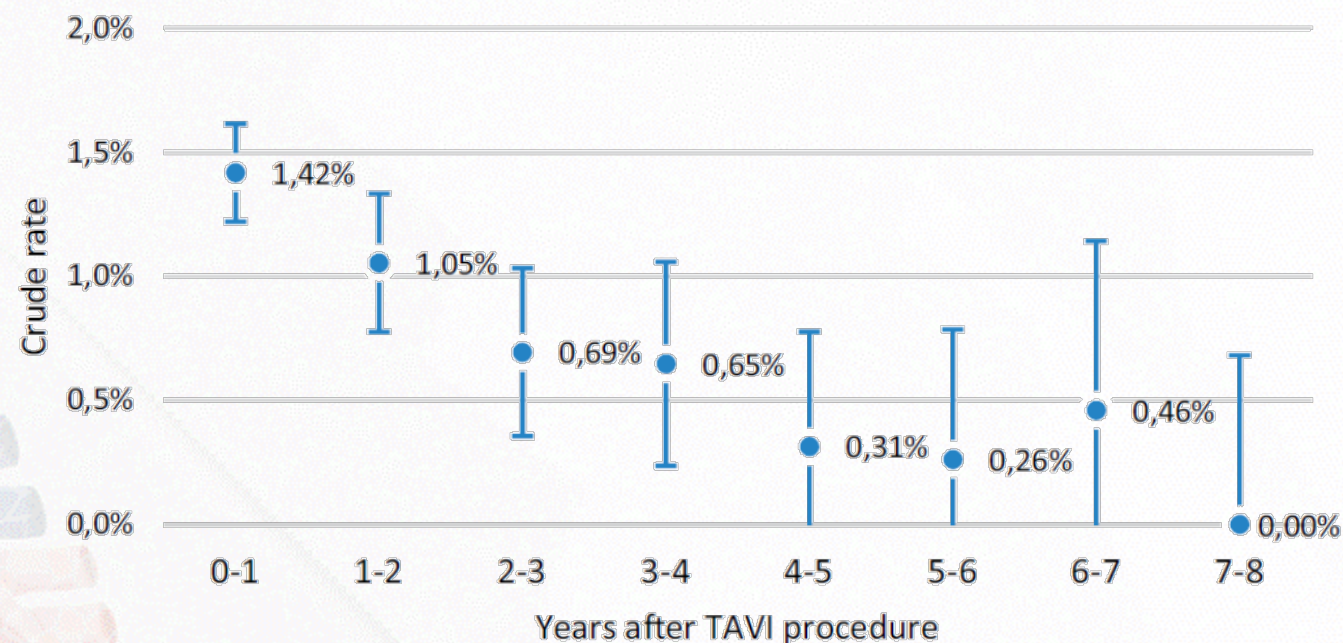
2

What do we now so far about IE after TAVI? **Incidence**

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now know so far about IE after TAVI? Incidence

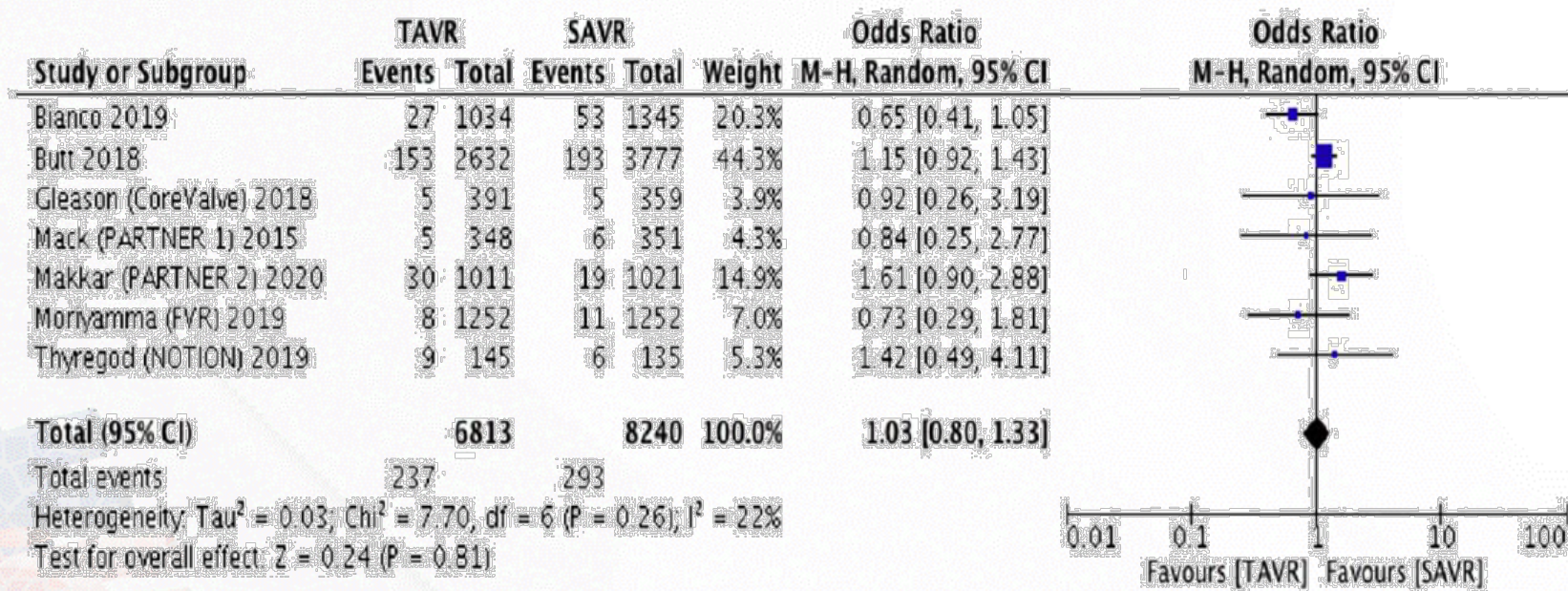


Björsten H et al. Eur Heart J 2019

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now know so far about IE after TAVI? Incidence. Surgery vs. TAVI



Ullah W, et al. Cardiovasc Revasc Med 2020



2

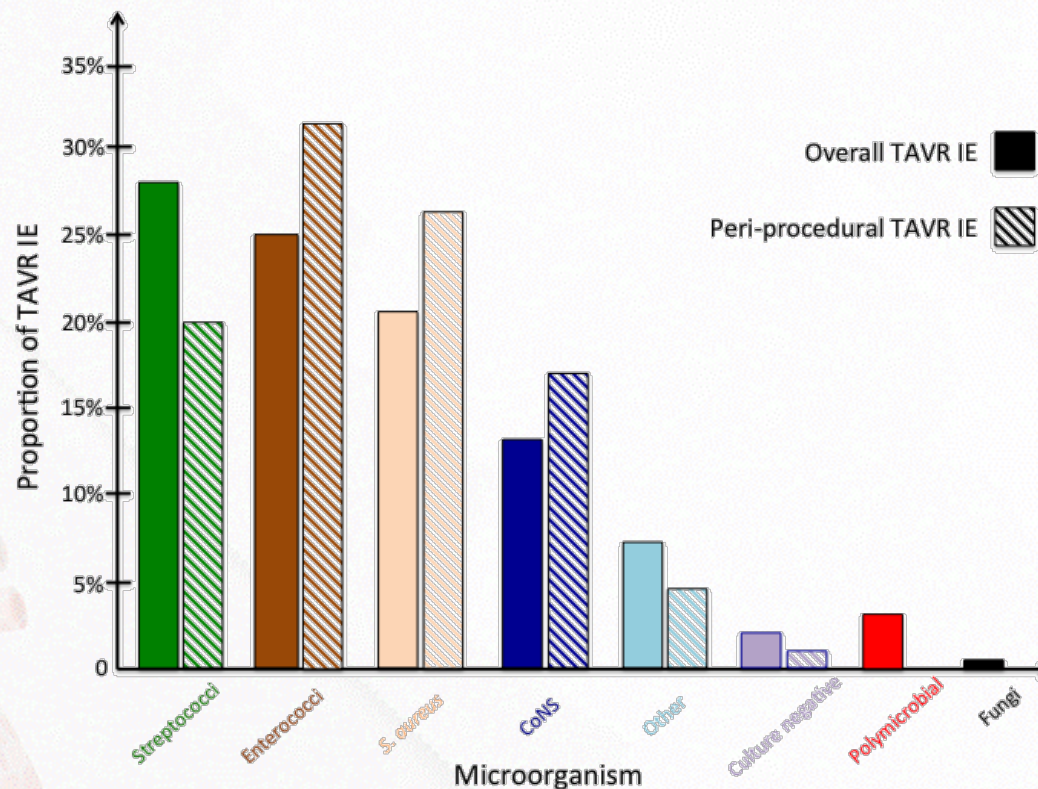
What do we now so far about IE after TAVI? **Microbiology**

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



2

What do we now know so far about IE after TAVI? **Microbiology**



Courtesy of Dr. A Dahl and Dr. J.M Pericas

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now know so far about IE after TAVI? **Microbiology**



2

What do we now so far about IE after TAVI? **Antibiotic prophylaxis during TAVI**

- 90% of TAVI IE patients received antibiotic prophylaxis¹
- Only 50% were theoretically sufficiently covered against microorganism that caused IE¹
- Antibiotic should cover Enterococci
- In a setting of high prevalence antibiotic should also cover methicillin-resistant staphylococci and vancomycin-resistant enterococci

¹JACC 2020;75:3020-3030



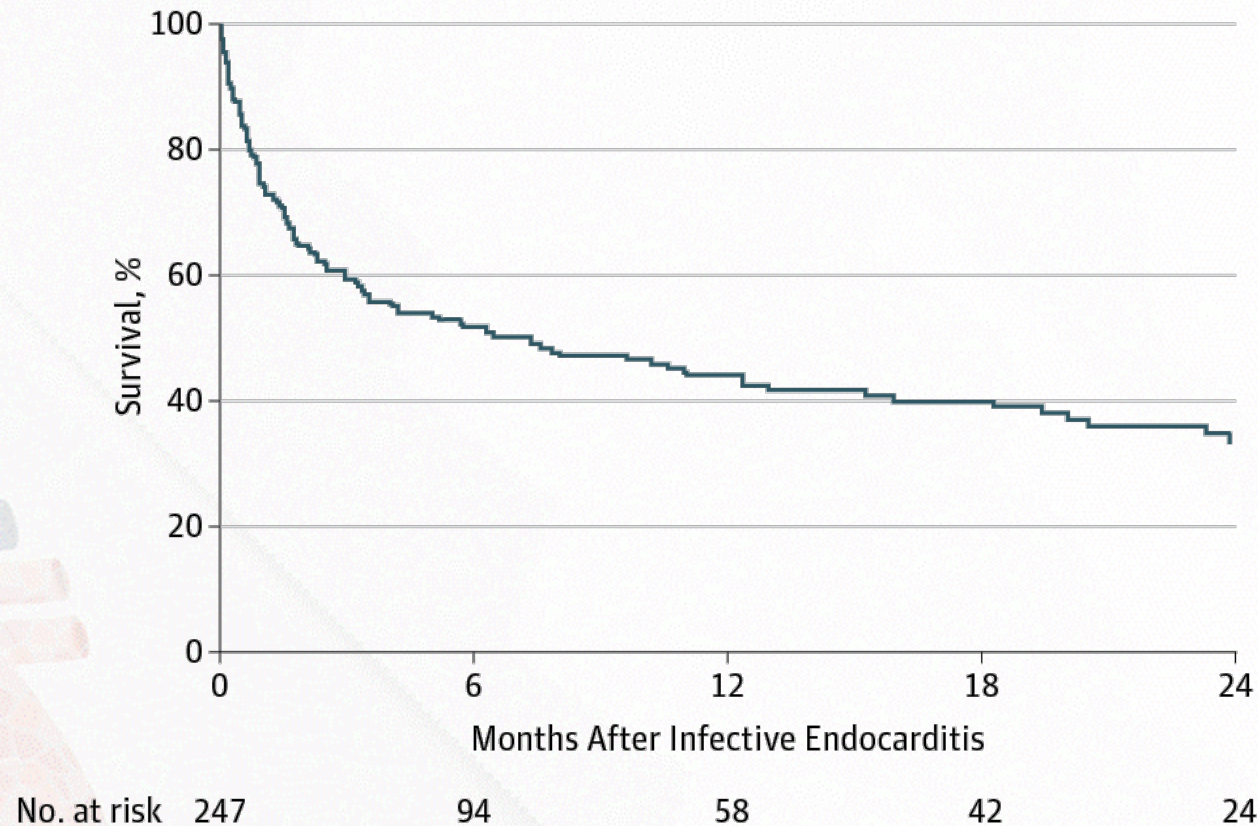
2

What do we now so far about IE after TAVI? **Prognosis**

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now know so far about IE after TAVI? Prognosis

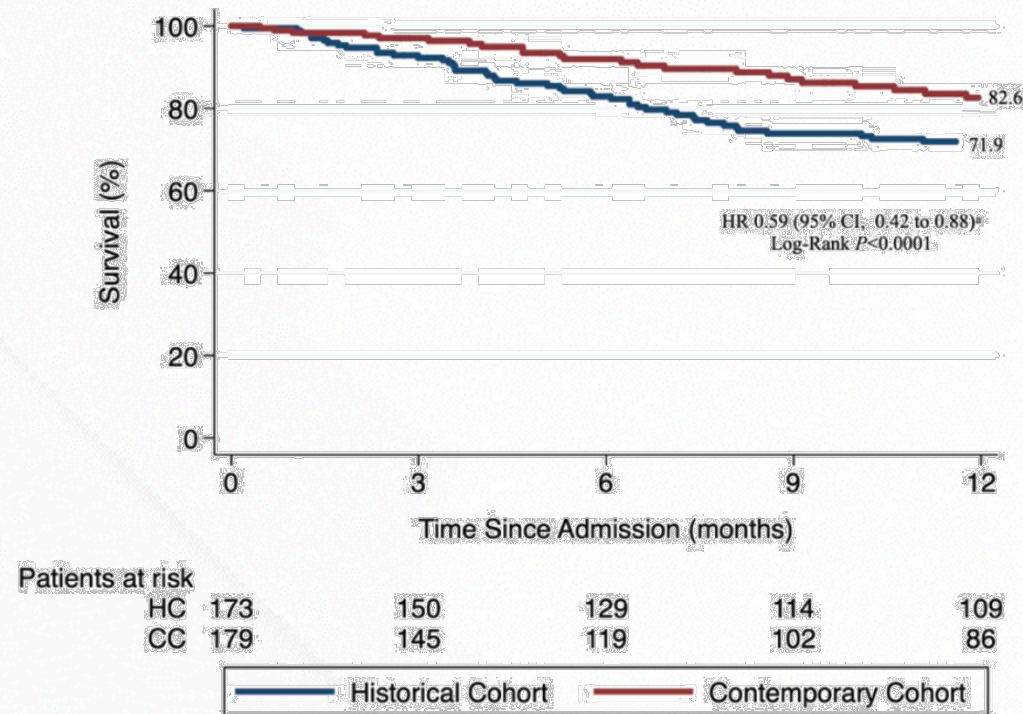


JAMA 2016;316:1083-1092

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now know so far about IE after TAVI? Prognosis



Del Val, et al. Clin Infect Dis 2021

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



2

What do we now so far about IE after TAVI? **Diagnosis**

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI? **Diagnosis. Multimodality imaging**

Multimodality imaging approach

IE diagnosis diagnostic sensibility

Modified Duke criteria: 50%, $\kappa=0.21$

ESC 2015 multimodality criteria: 100%, $\kappa=0.66$

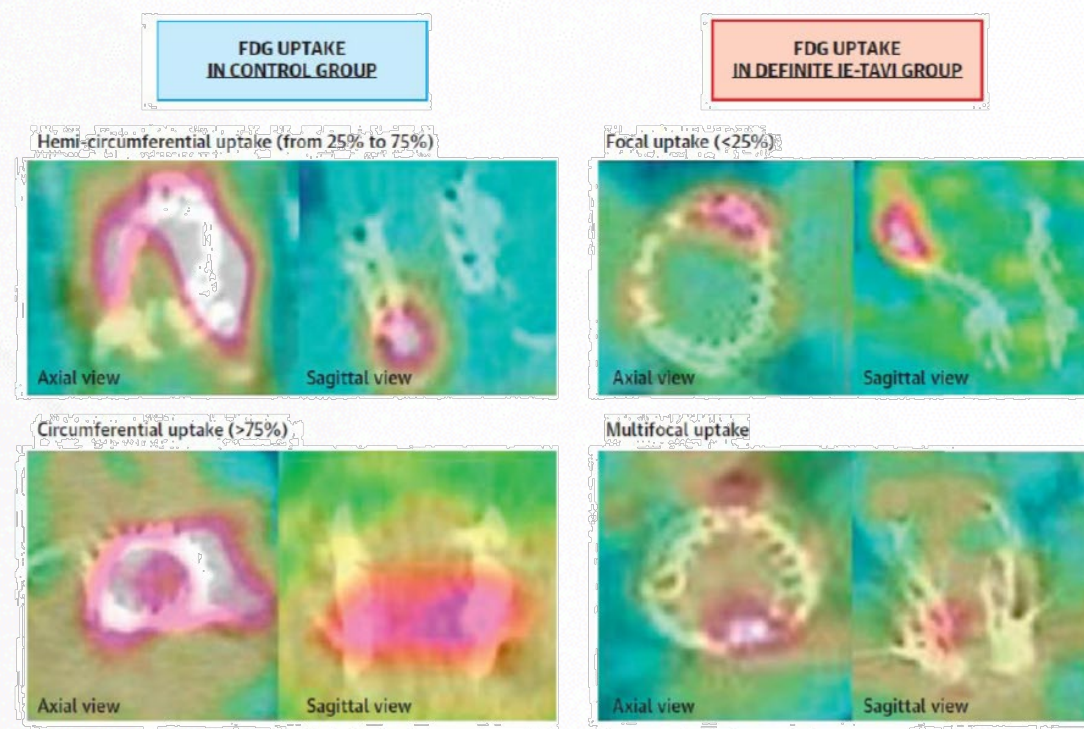
JACC Cardiovasc Imag 2018;11;143

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI? Diagnosis. Multimodality imaging

¹⁸F-FDG PET/CT Post-TAVI





2

What do we now so far about IE after TAVI? **Treatment**

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now know so far about IE after TAVI? **Treatment**

Complex patients

Multidisciplinary
Endocarditis Team

2

What do we now so far about IE after TAVI? **Surgery vs. medical treatment**

**Early surgery improves survival in surgical
prosthetic valve endocarditis**

2

What do we now so far about IE after TAVI? **Surgery vs. medical treatment**

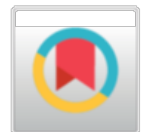
JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

© 2022 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION

PUBLISHED BY ELSEVIER

VOL. 79, NO. 8, 2022

Surgical Treatment of Patients With Infective Endocarditis After Transcatheter Aortic Valve Implantation



Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI? **Surgery vs. medical treatment**

- 584 IE after TAVI patients
- High risk cohort before TAVI
 - Mean age: 81 years
 - EuroSCORE 1: 14%
 - Prior cardiac surgery: 22%
- 111/584 (19%) underwent cardiac surgery
- In-hospital mortality 29% in cardiac surgery

JACC 2022;79:772

2

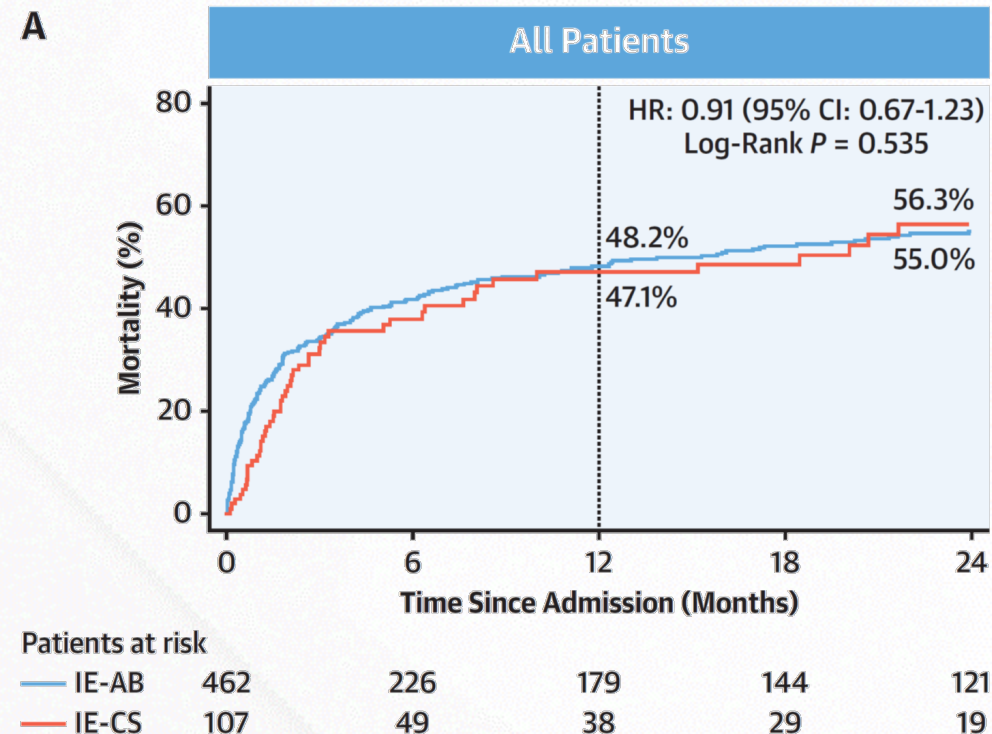
What do we now so far about IE after TAVI? Surgery vs. medical treatment

- CS was less likely performed in:
Older patients
Neurologic symptoms at admission
- CS more likely performed in:
TAVI platform involvement
Large vegetation (>10 mm)
Periannular complications, heart failure, persistent bacteremia, systemic embolization

JACC 2022;79:772

2

What do we now know so far about IE after TAVI? Surgery vs. medical treatment

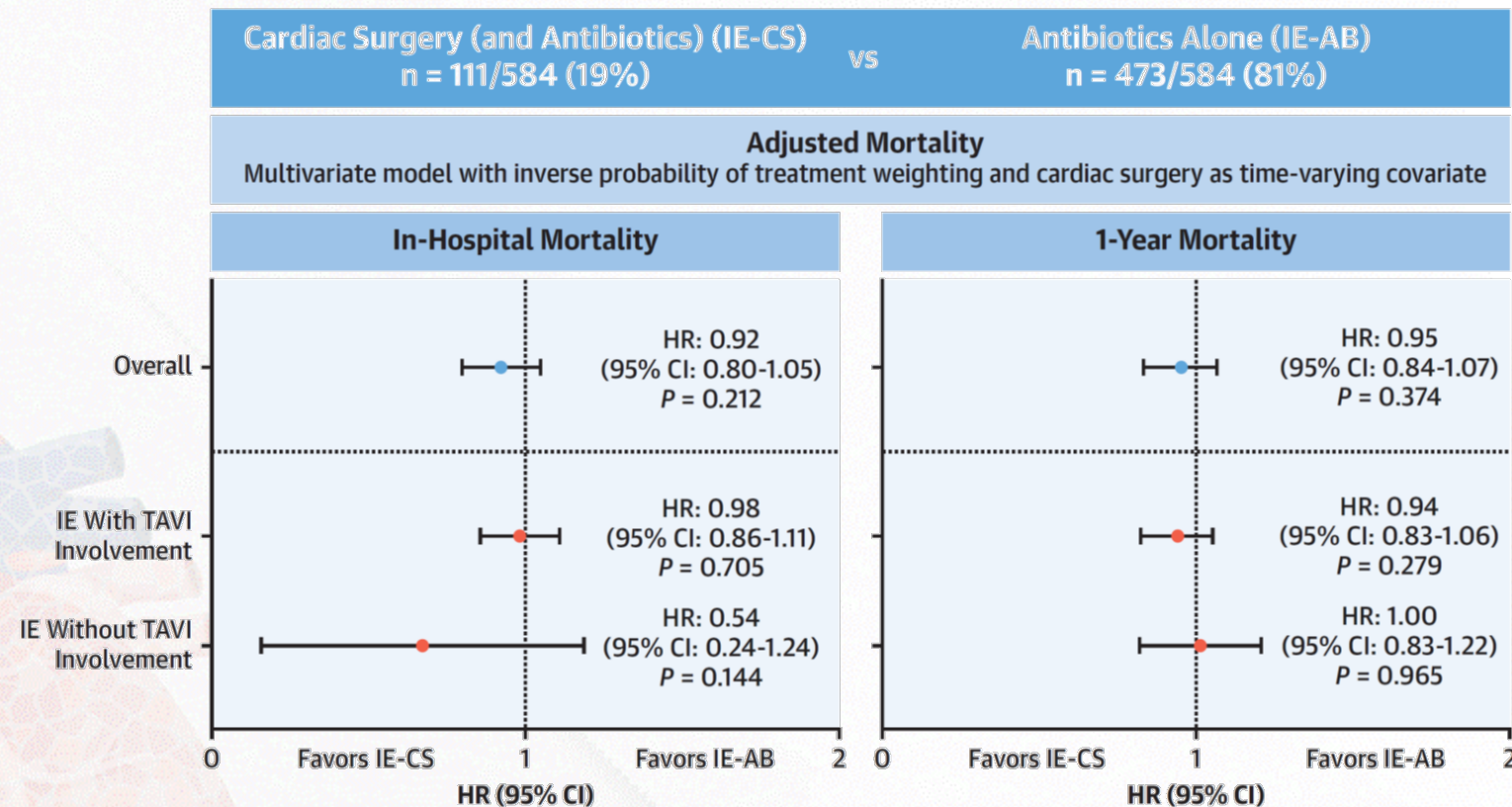


JACC 2022;79:772

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI? Surgery vs. medical treatment



JACC 2022;79:772

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI? **Surgery vs. medical treatment**

Limitations

Selection bias

No external monitorization in a retrospective registry

Not transferable to lower risk, younger patients

JACC 2022;79:772

2









What do we now so far about IE after TAVI? Surgery vs. medical treatment in intermediate and low risk patients

European Journal of Cardio-Thoracic Surgery 00 (2022) 1–8
<https://doi.org/10.1093/ejcts/ezac075>

ORIGINAL ARTICLE

Cite this article as: Saha S, Joskowiak D, Marín-Cuartas M, Diab M, Schwaiger BM, Sandoval-Boburg R et al. Surgery for infective endocarditis following low-intermediate risk transcatheter aortic valve replacement—a multicentre experience. Eur J Cardiothorac Surg 2022; doi:10.1093/ejcts/ezac075.

Surgery for infective endocarditis following low-intermediate risk transcatheter aortic valve replacement—a multicentre experience

Shekhar Saha ^{a,b,*}, Dominik Joskowiak^{a,b}, Mateo Marín-Cuartas ^c, Mahmoud Diab ^d,
Benedikt M. Schwaiger^e, Rodrigo Sandoval-Boburg^f, Aron-Frederik Popov ^f, Carolyn Weber^g, Sam Varghese^h,
Andreas Martens ⁱ, Serghei Cebotariⁱ, Maximilian Scherner^h, Walter Eichinger^e, David Holzhey^c,
Daniel-Sebastian Dohle^j, Thorsten Wahlers ^g, Torsten Doenst^d, Martin Misfeld^{c,k,l,m,n}, Julinda Mehilli ^{o,p},
Steffen Massberg ^o and Christian Hagl^{a,b}

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI?

Surgery vs. medical treatment in intermediate and low risk patients

9 German centers

69 patients (EuroSCORE II 5,4; STS 1,3) undergoing surgery for TAVI IE

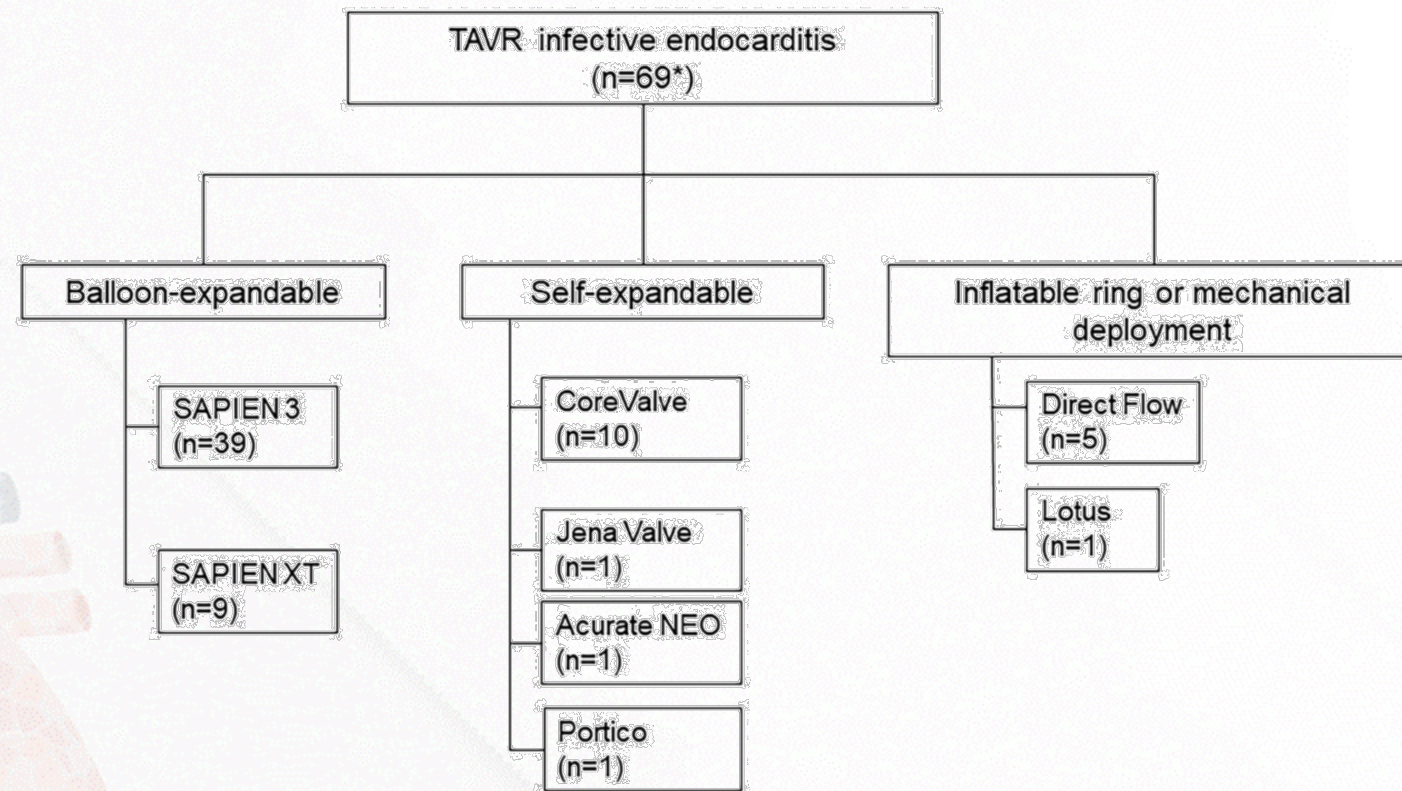
No info: Patients with IE after TAVI not undergoing cardiac surgery

Eur J Cardiothorac Surg 2022; doi:10.1093/ejcts/ezac075

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

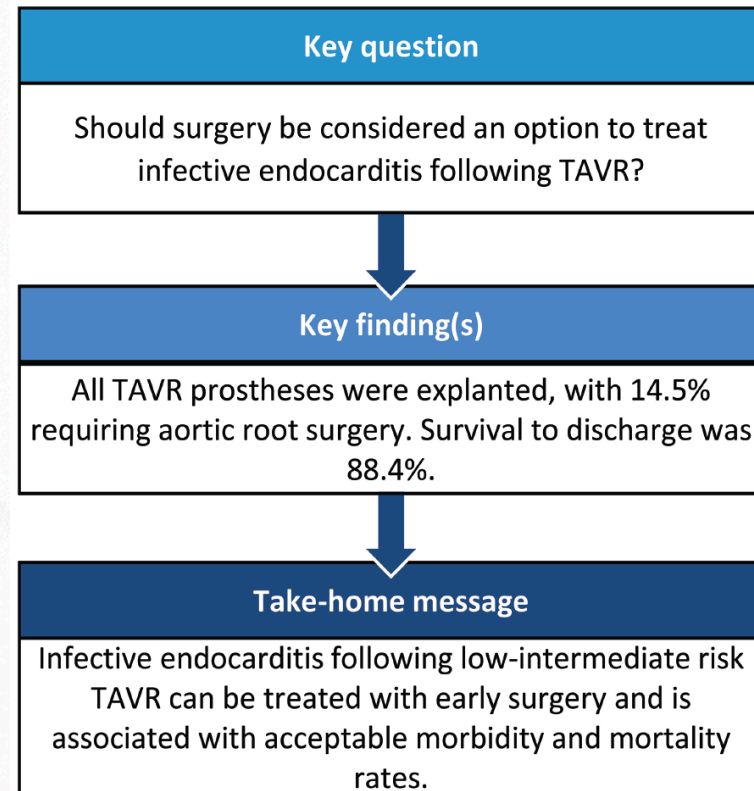
What do we now so far about IE after TAVI? Surgery vs. medical treatment in intermediate and low risk patients



Eur J Cardiothorac Surg 2022; doi:10.1093/ejcts/ezac075

2

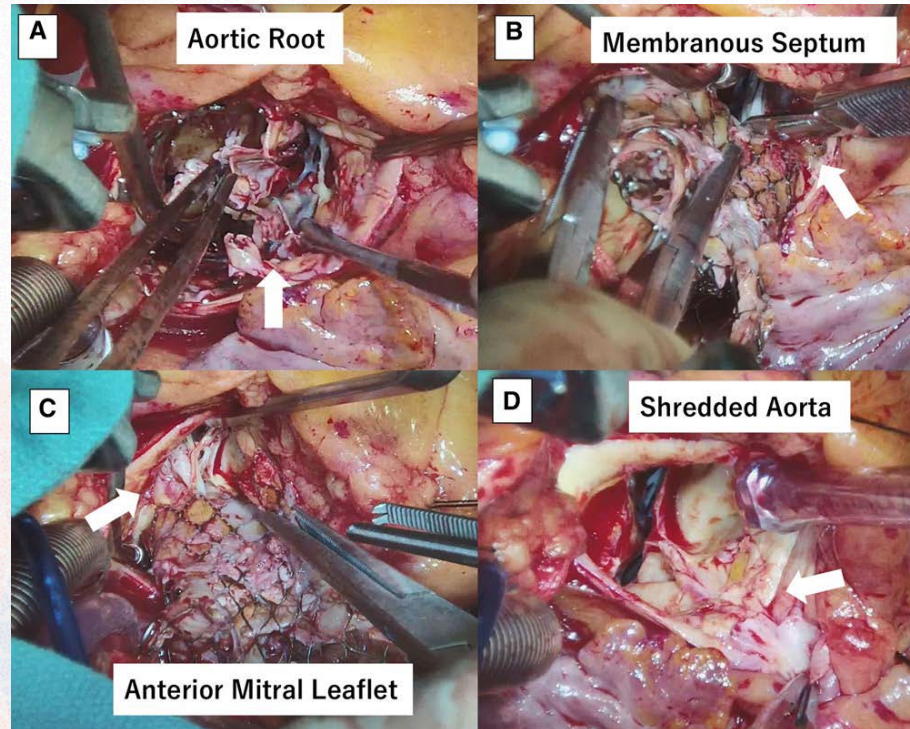
What do we now so far about IE after TAVI? Surgery vs. medical treatment in intermediate and low risk patients



Eur J Cardiothorac Surg 2022; doi:10.1093/ejcts/ezac075

2

What do we now know so far about IE after TAVI? Surgical explantation after TAVI

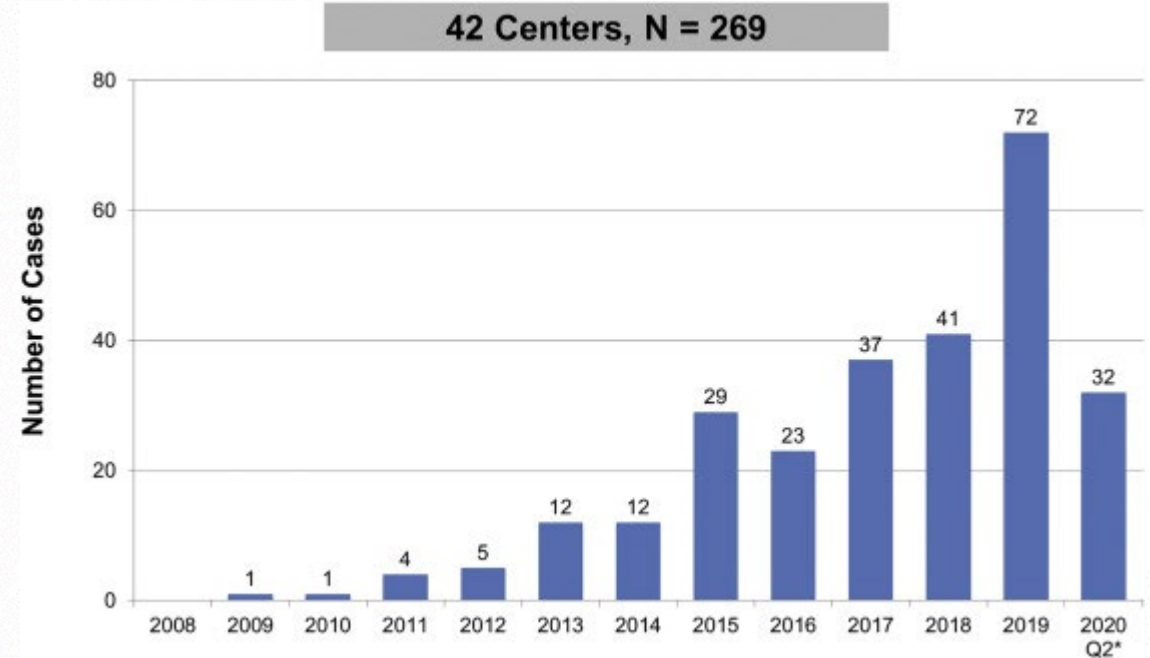
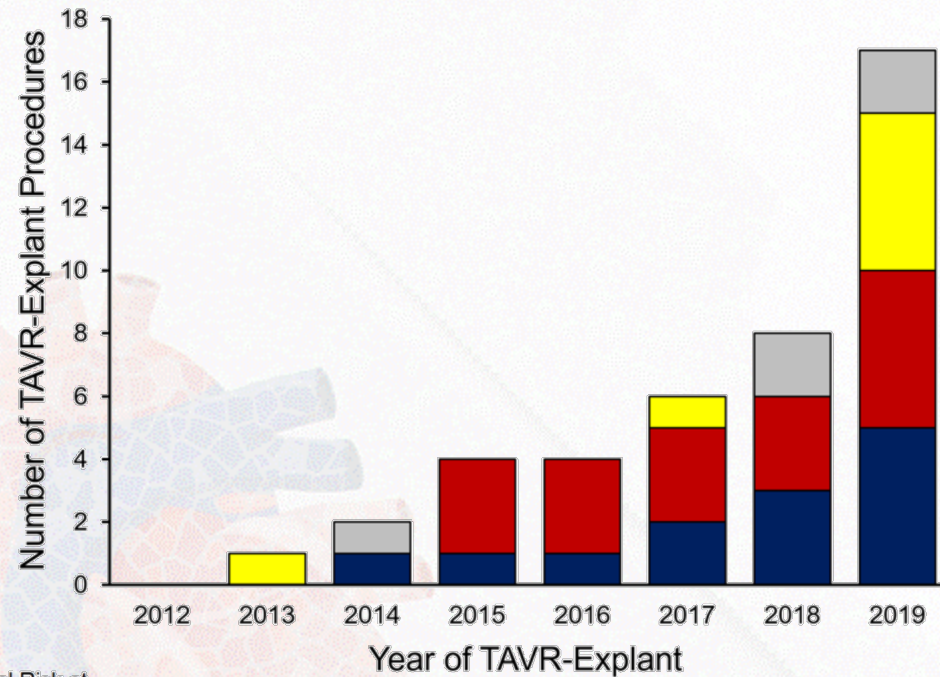


Eur J Cardiothorac Surg 2022; doi:10.1093/ejcts/ezac075
Circ Cardiovasc Interv. 2021;14:e009927

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now so far about IE after TAVI? Surgical explantation after TAVI

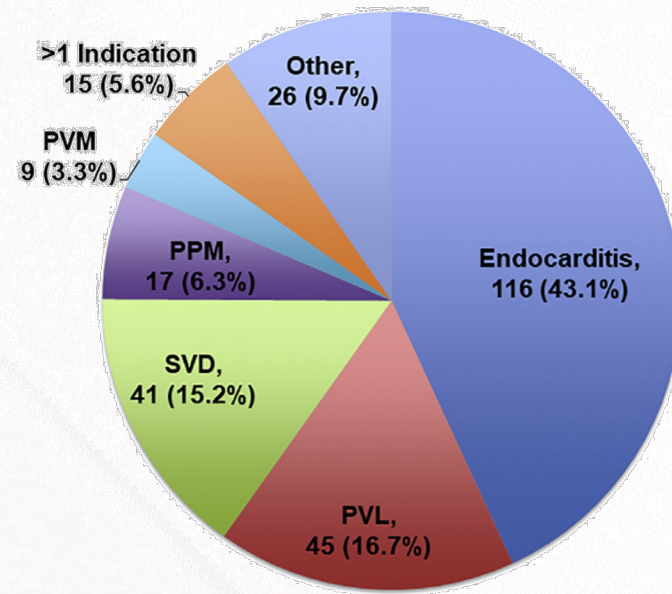


JACC Cardiovasc Interv 2021;14:1978
Circ Cardiovasc Interv. 2021;14:e009927

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

2

What do we now know so far about IE after TAVI? Surgical explantation after TAVI



JACC Cardiovasc Interv 2021;14:1978

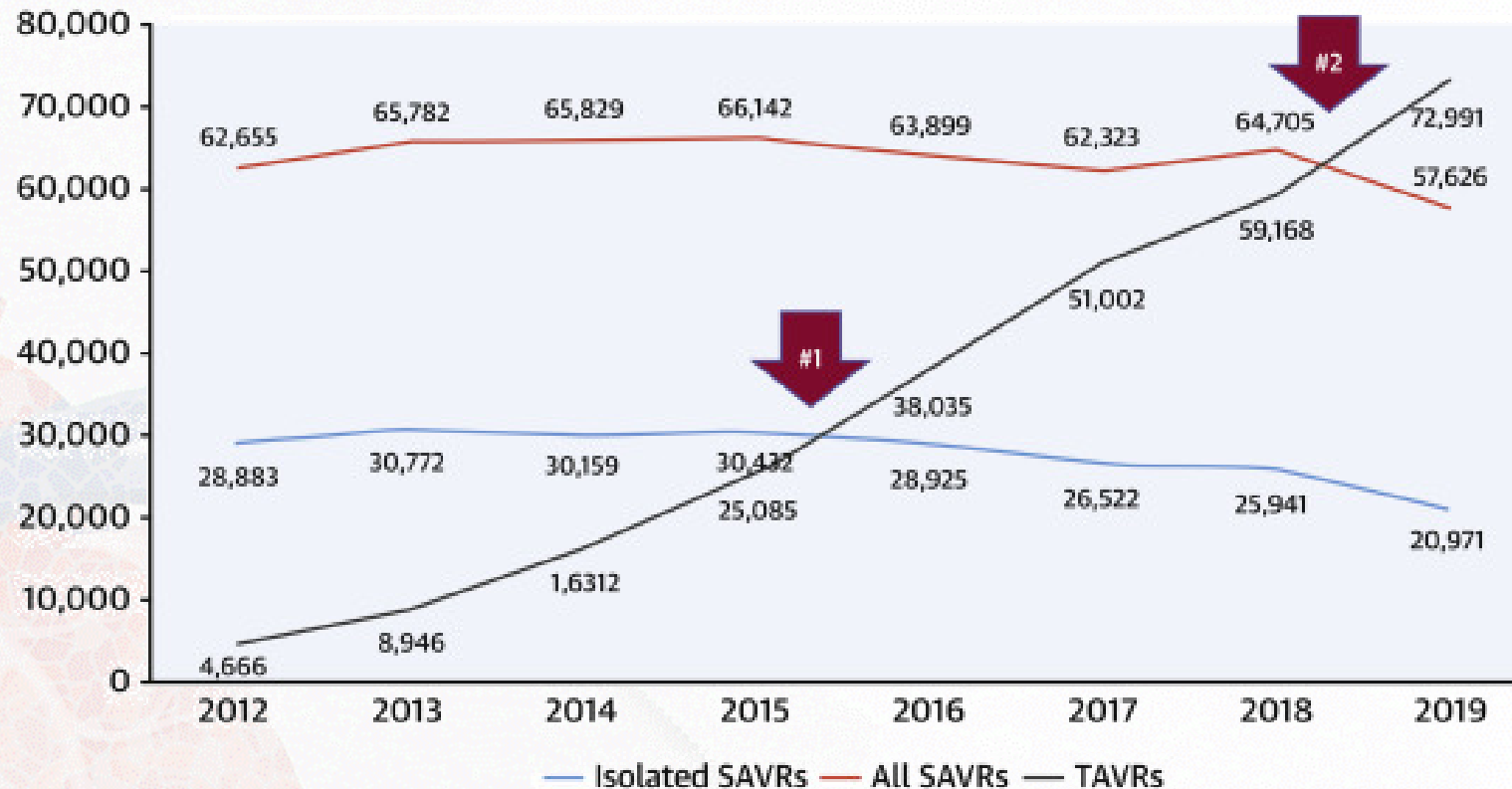
Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

3 Future perspectives

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges

3

Future perspectives More patients treated with TAVI



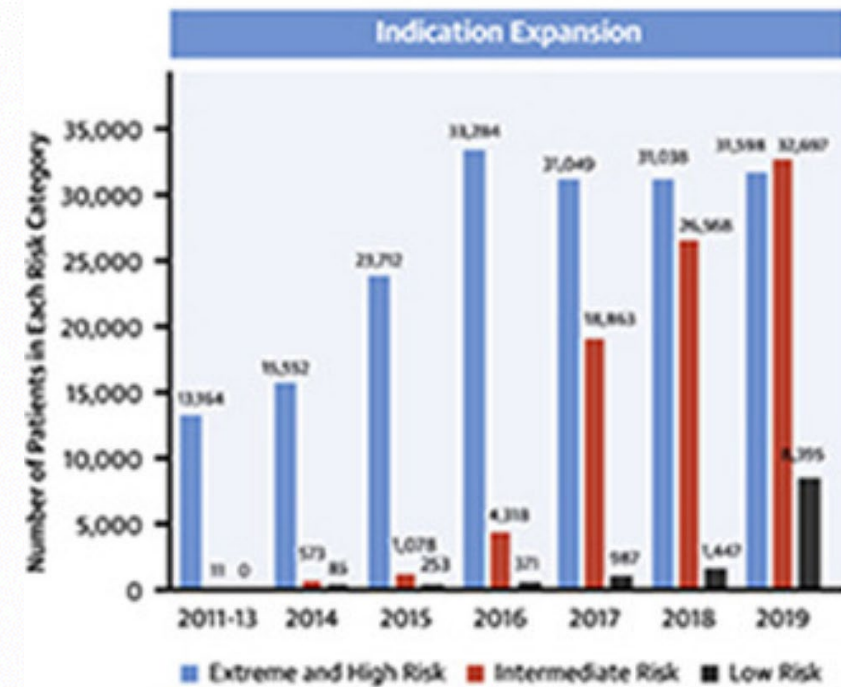
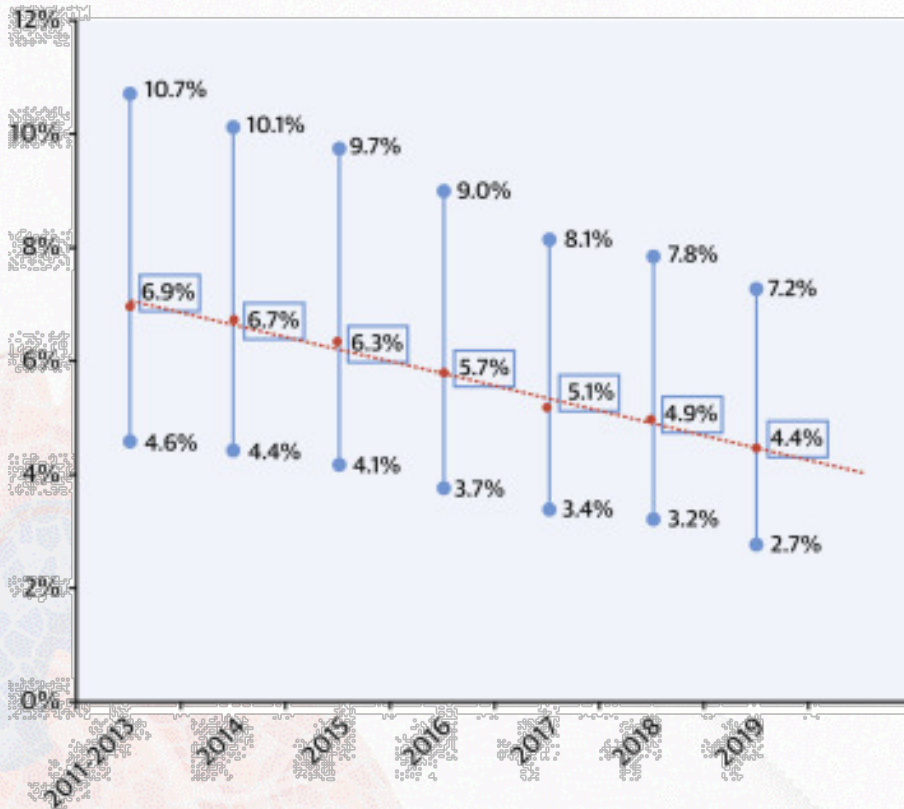
Ann Thorac Surg 2021; 111:701

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



3

Future perspectives Patient characteristics



Ann Thorac Surg 2021; 111:701

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges



3

Future perspectives **Prospective information**

Prospective registries

Reflect real treatment practices

Contemporary patient demographics

Complete information (microbiology)

✓ **TAKE HOME MESSAGES**

IE after TAVI is a rare but serious complication

Exponential growth in TAVI (low and high risk) → will become more and more frequent

Current information with limitations

- Mostly retrospective data from high surgical risk patients

- Prospective registries

Clarify the role of surgery in low-intermediate risk patients with IE after TAVI

Session I: Evolving epidemiology of infective endocarditis
IE after TAVI. A new and growing clinical entity with surgical challenges