TAVR Infective Endocarditis in Adults

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TAVR IE in adults

- TAVR background
- Why TAVR is not SAVR
- What do we know about TAVR IE
- Specific recommendations for TAVR IE
- Future perspectives TAVR IE

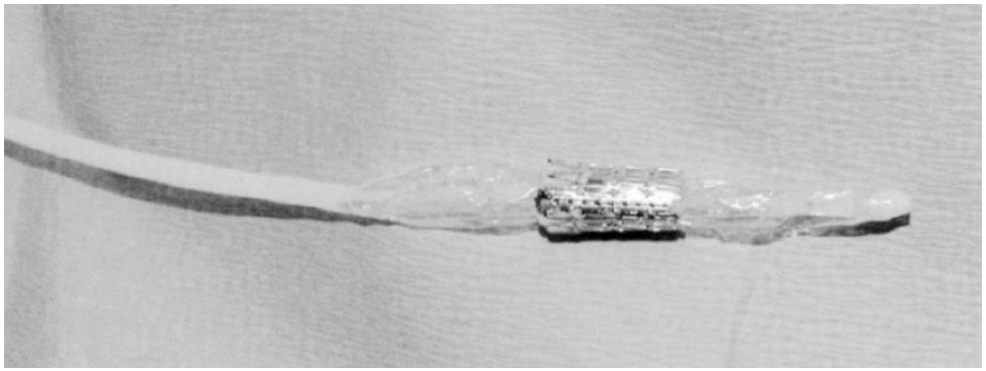
First-in-human TAVR

Special Report

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

First Human Case Description

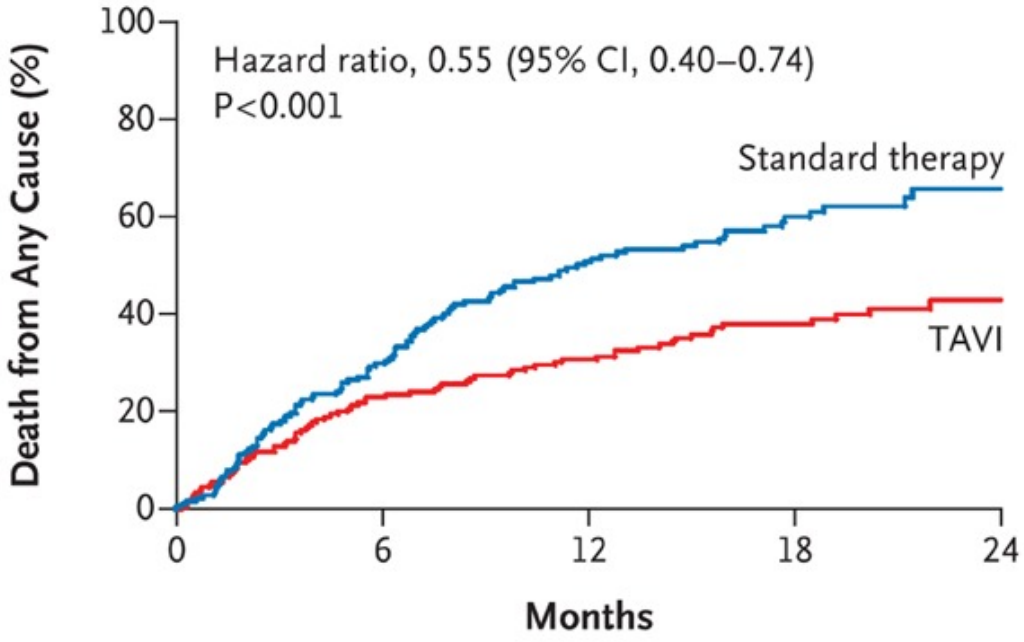
Alain Cribier, MD; Helene Eltchaninoff, MD; Assaf Bash, PhD; Nicolas Borenstein, MD; Christophe Tron, MD; Fabrice Bauer, MD; Genevieve Derumeaux, MD; Frederic Anselme, MD; François Laborde, MD; Martin B. Leon, MD



Circulation 2002; 106:3006-3008

TAVR for inoperable severe aortic stenosis

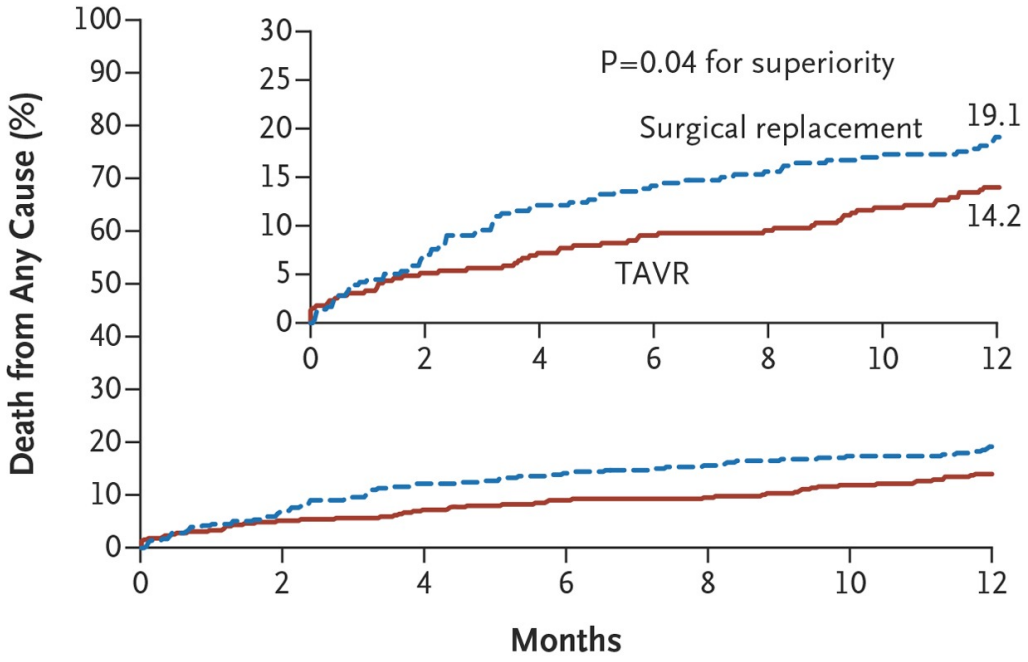
A



No. at Risk					
TAVI	179	138	122	67	26
Standard therapy	179	121	83	41	12

PARTNER Cohort B. Leon M, Smith C, et al. NEJM 2010;363:1597-1607

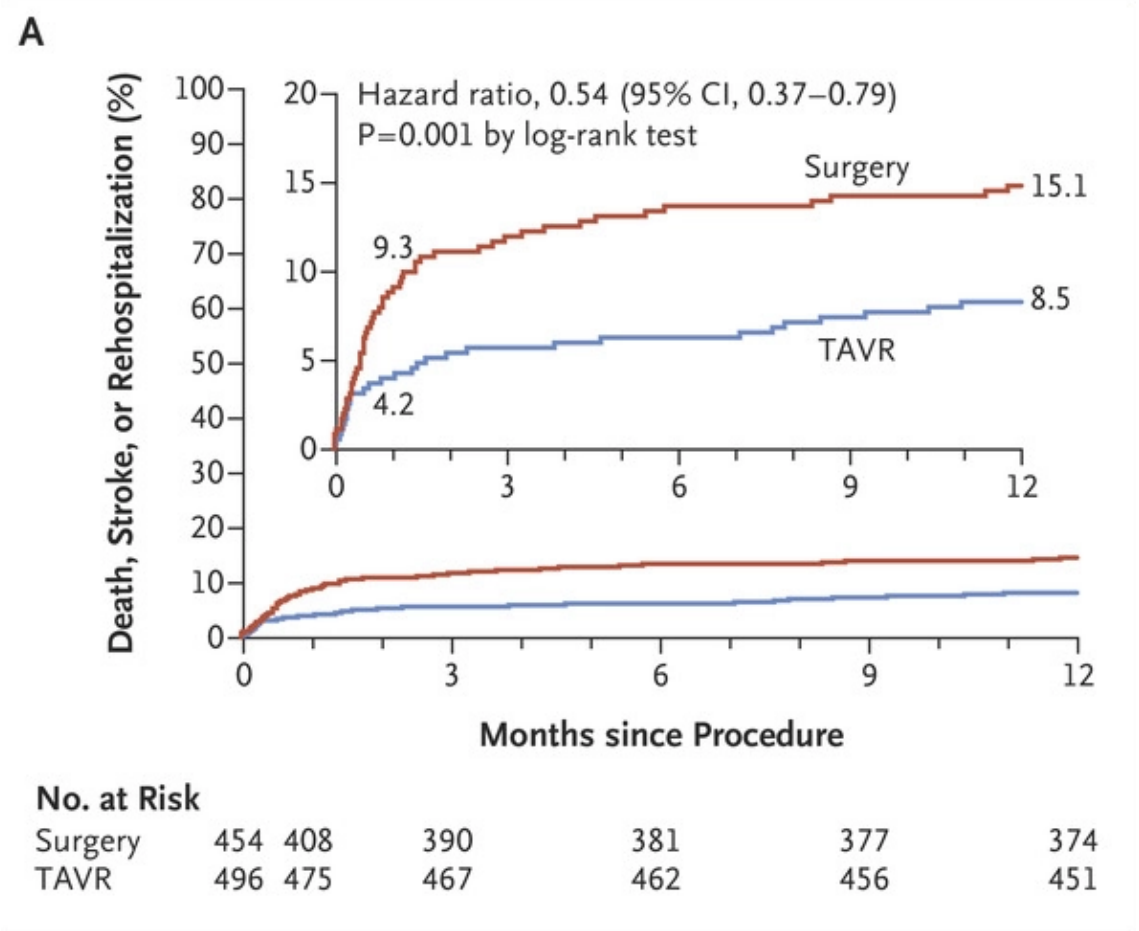
TAVR in high surgical risk patients



No. at Risk				
TAVR	390	377	353	329
Surgical replacement	357	341	297	274

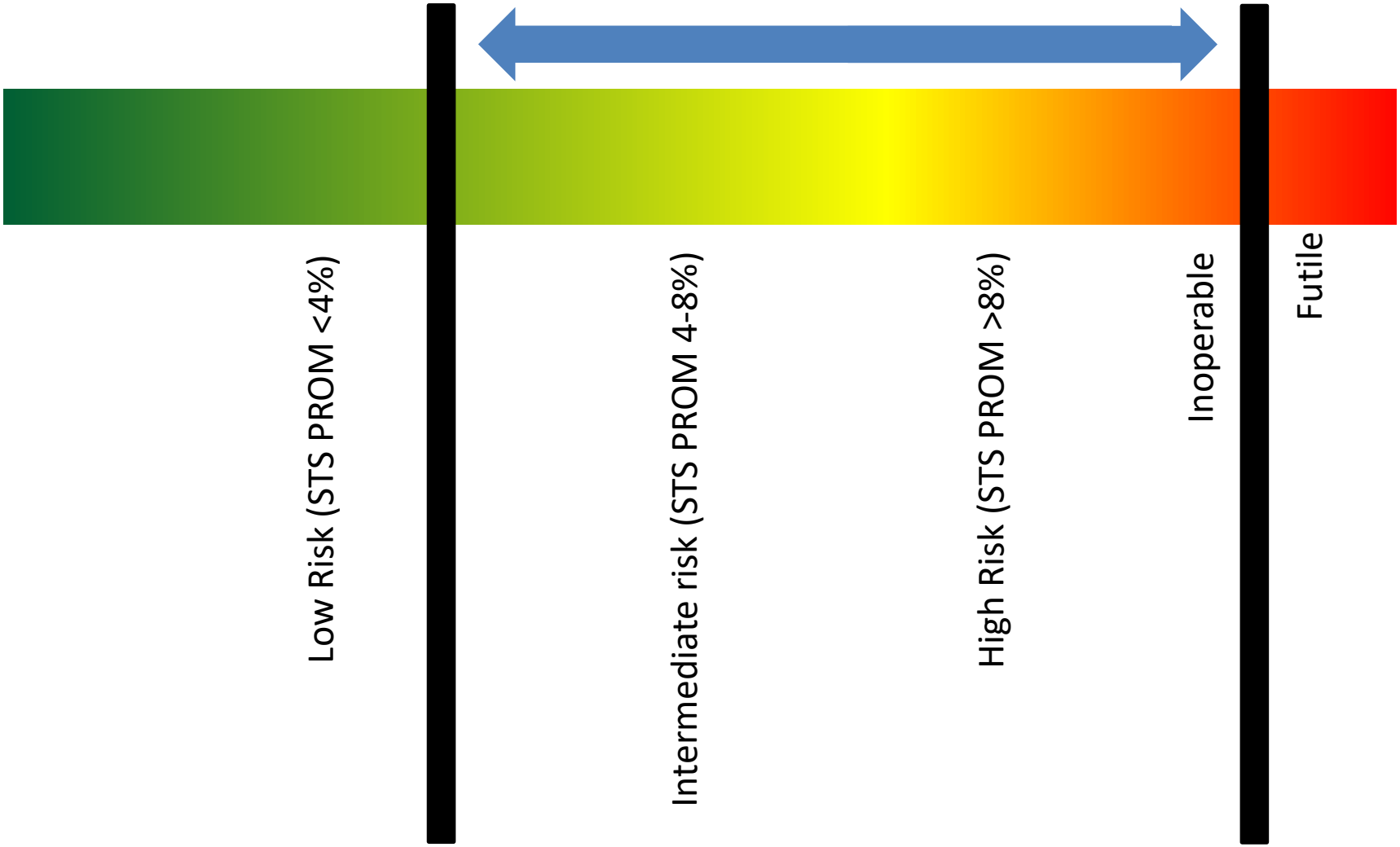
US CoreValve Pivotal Trial. NEJM 2014;370:1790-1798

TAVR in low surgical risk patients

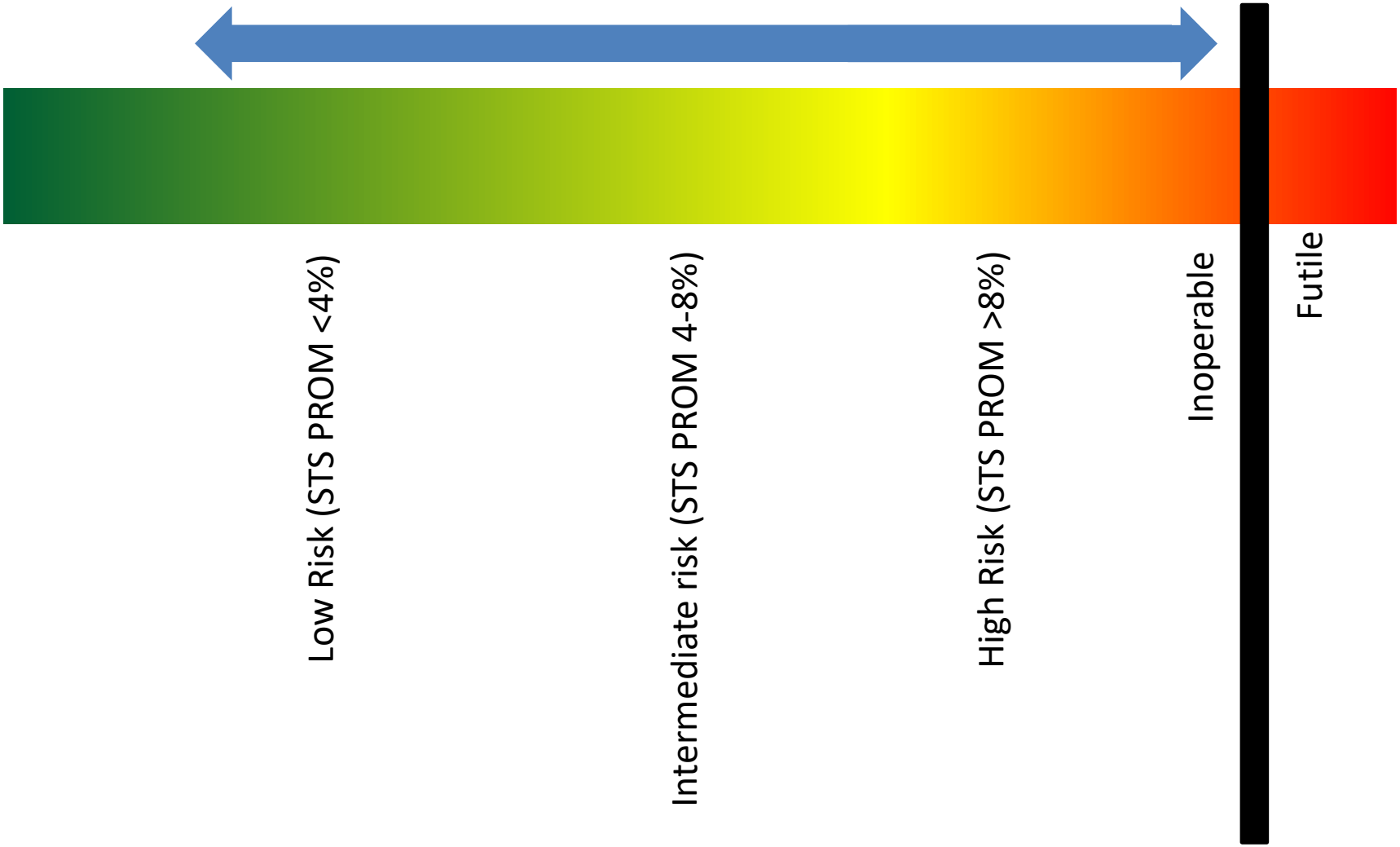


PARTNER 3. NEJM 2019;380:1695-1705

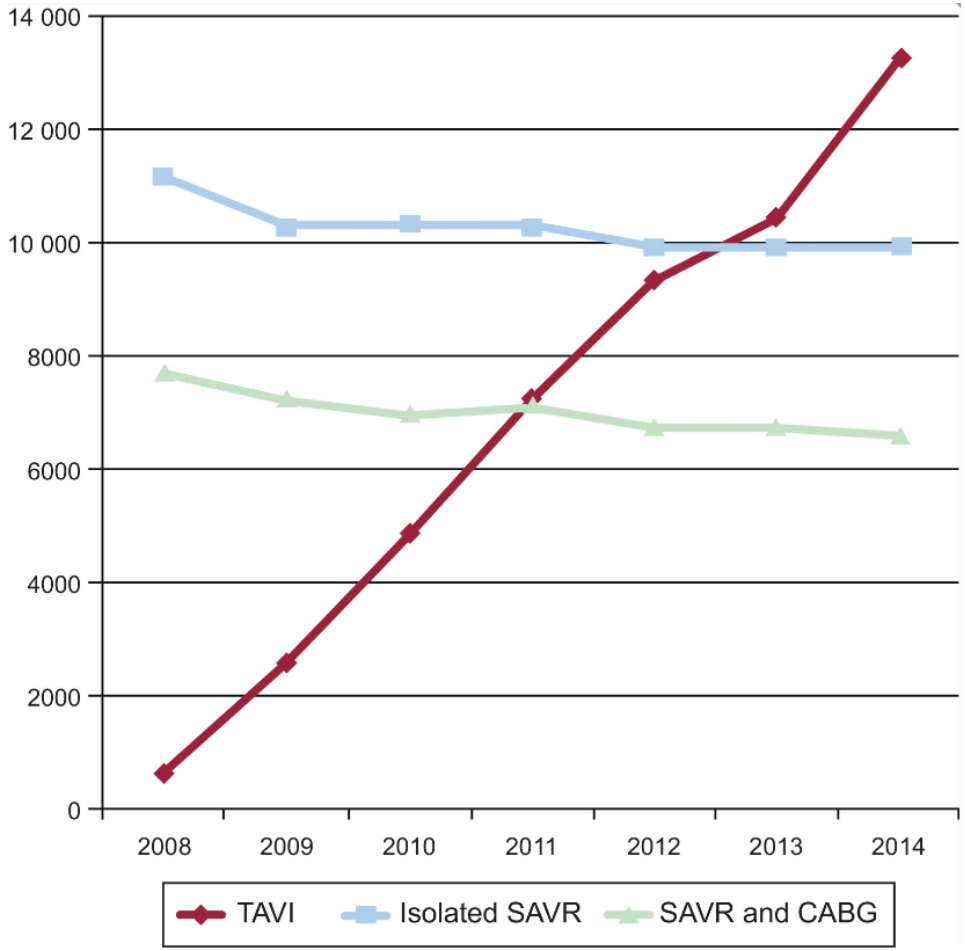
TAVR Indication according to risk profile



TAVR Indication according to risk profile



Procedures TAVR vs. SAVR



Rev Esp Cardiol 2016;69:1131

TAVR is not the same than SAVR

Patient

Procedure

TAVR is not the same than SAVR

TAVR patients

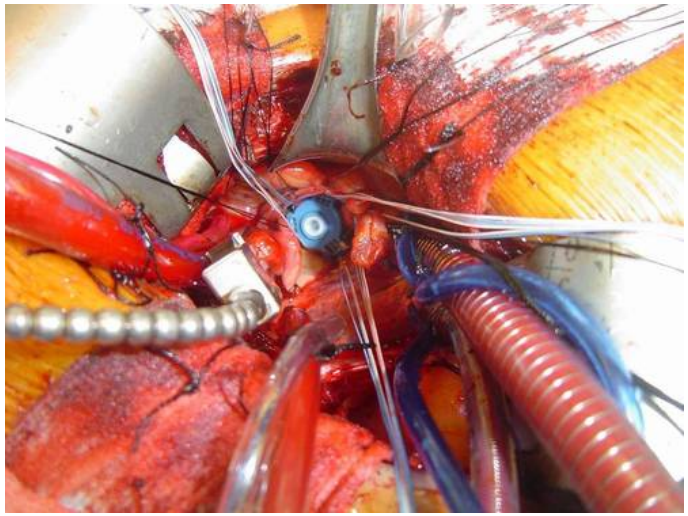
More comorbidities and older age

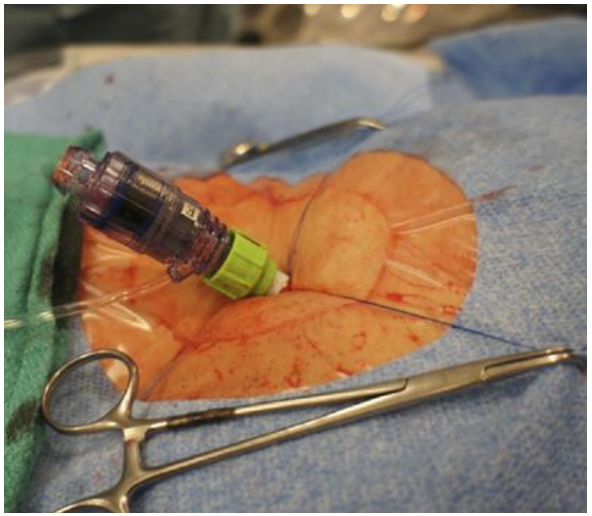
- Inoperable patients
- More invasive procedures post TAVR
- More health care related infections

TAVR is not the same than SAVR

TAVR procedure

- Less invasive





TAVR is not the same than SAVR

TAVR procedure

- Performed in cath lab (mostly)

TAVR is not the same than SAVR

TAVR procedure

- Valve prosthesis is different
- Large stent frame

What do we know about TAVR IE

Incidence

Associated factors

TAVR IE characteristics

- Causative organisms
- Clinical characteristics
- Echocardiographic findings
- Management
- Outcomes

What do we know about TAVR IE

Incidence

IE after TAVR International Registry. Definite IE

- 20 006 TAVR patients, 250 IE episodes
- Incidence of 1.1% patient-year
- 71.2% of patients had early endocarditis
- 28.8% in less than 2 months following TAVI
- 52.8% of patients had health care related infection

Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE

Incidence

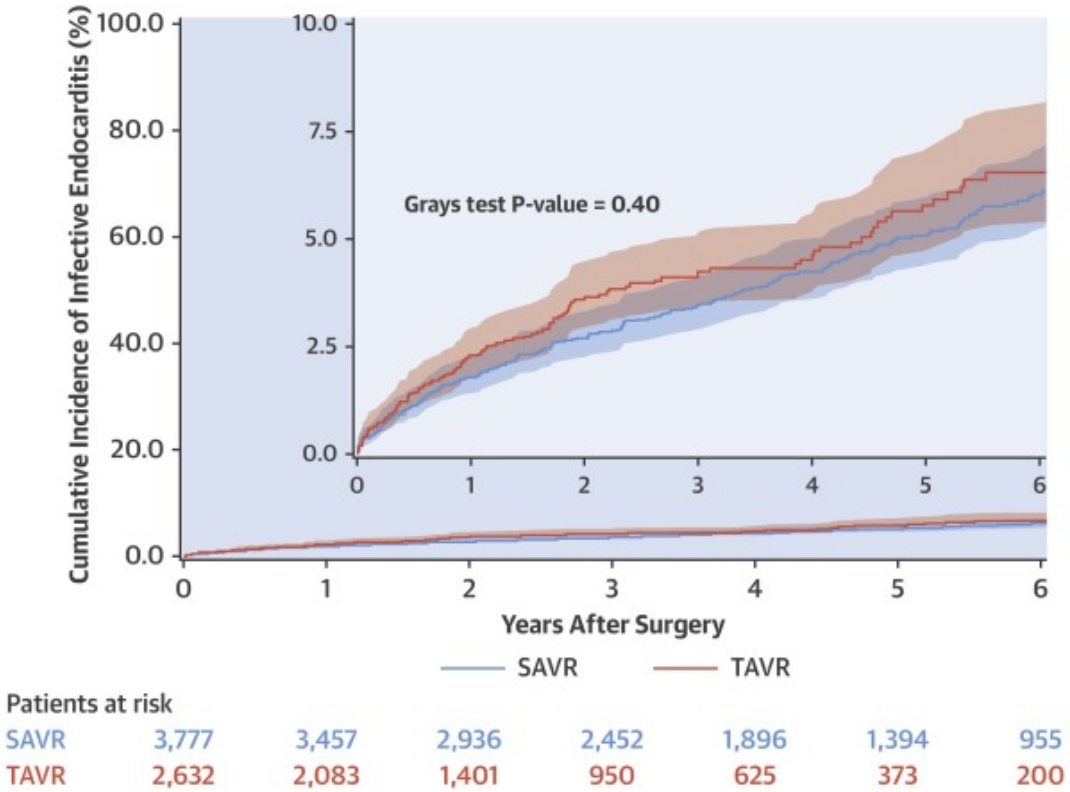
No difference between SAVR and TAVR (per 100 person-year)

Meta-analysis of RCT[1]:	0.9 TAVR vs. 0.8 SAVR
NRDatabase US[2]:	1.7 TAVR vs. 1.9 SAVR
Danish registry[3]:	1.6 TAVR vs. 1.2 SAVR

[1]Ando T, et al. Am J Cardiol 2019 123;827-32
[2]Kolte D, et al. Am J Cardiol 2018 122;2112-9
[3]Butt JH, et al. JACC 2019;73:1645-55

What do we know about TAVR IE

Incidence. Long term follow-up



Butt JH, et al. JACC; 2019;73:1645-55

What do we know about TAVR IE

Associated factors

IE after TAVR International Registry. Definite IE

Younger age

- 78.9 years vs 81.8 years; HR 0.97 per year; 95%CI, 0.94-0.99

Male sex

- 62.0%vs 49.7%; HR, 1.69; 95%CI, 1.13-2.52

Diabetes mellitus

- 41.7% vs 30.0%; HR, 1.52; 95%CI, 1.02-2.29

Residual AR (moderate to severe)

- 22.4% vs 14.7%; HR, 2.05; 95%CI, 1.28-3.28

Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE

Associated factors

NRD Registry. Definite and possible IE

Younger age

- HR 0.76 per 10 year; 95%CI, 0.66-0.87

PPM placement

- HR 1.56; 95%CI, 1.08-2.26

Cardiac Arrest

- HR 2.49; 95%CI, 1.44-4.30

Major Bleeding

- HR 1.56; 95%CI, 1.18-2.07

Sepsis

- HR, 2.73; 95%CI, 1.47-5.09

Kolte D, et al. Am J Cardiol. 2018; 122;2112-9

What do we know about TAVR IE

Associated factors

NIS Registry. Definite and possible IE. Same TAVR hospitalization

Younger age

- OR 0.92 per year; 95%CI, 0.89-95

Drug abuse

- OR 48.9%; 95%CI, 6.9-347.3

HIV infection

- HR 7.8; 95%CI, 1.4-44.4

Yeo I, et al. J Hosp Infet 2018;4:444-50

What do we know about TAVR IE

No association with:

Type of valve (self-expanding valve)

- IE 38.9% vs. No IE 43.5%; p=0.34

Cath lab vs. non cath lab (hybrid OR and standard OR)

- IE 80.6% vs. No IE 83.2%; p=0.47

Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE

Causative organisms

IE after TAVR International Registry

- *Enterococcus* species: 24.6%
- *Staphylococcus aureus:* 23.3%
- Coagulase-negative *Staphylococcus:* 16.8%
- *Viridans* streptococci: 6.9%
- Negative culture: 5.2%

Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE

Causative organisms

NRD Registry

- *Streptococcus: 29.9%*
- *Staphylococcus aureus:* 22.4%
- *Enterococcus* species: 20.5%

Kolte D, et al. Am J Cardiol 2018; 122;2112-9

What do we know about TAVR IE

Clinical characteristics and echocardiographic findings

68% of patients had vegetation

- 18% Stent frame
- 48% Valve leaflet

20% Mitral involvement

4% Tricuspid valve

6% Pacemaker lead

18% Periannular involvement

- 15.6% Abscess
- 1.6% Fistula

Regueiro A, et al. *JAMA*. 2016;316:1083-1092

What do we know about TAVR IE

Clinical characteristics and echocardiographic findings

37% Heart failure

44.5% Acute Kidney Injury

27.7% Septic Shock

10.5% Stroke

9.2% Other systemic embolization

21.4% Persistent bacteremia

Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE

Management

- 81.2% Had at least 1 indication for surgery
- Only 14.8% underwent surgery during infective endocarditis hospitalization
  - Surgical transcatheter valve explantation: 10.8%
  - Surgical treatment without valve explantation: 4.0%
- Isolated pacemaker extraction 2.8%

Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE

Management

- None of the patients with TAVR IE included in the NCR registry underwent surgery

Kolte D, et al. Am J Cardiol; 122;2112-9

What do we know about TAVR IE

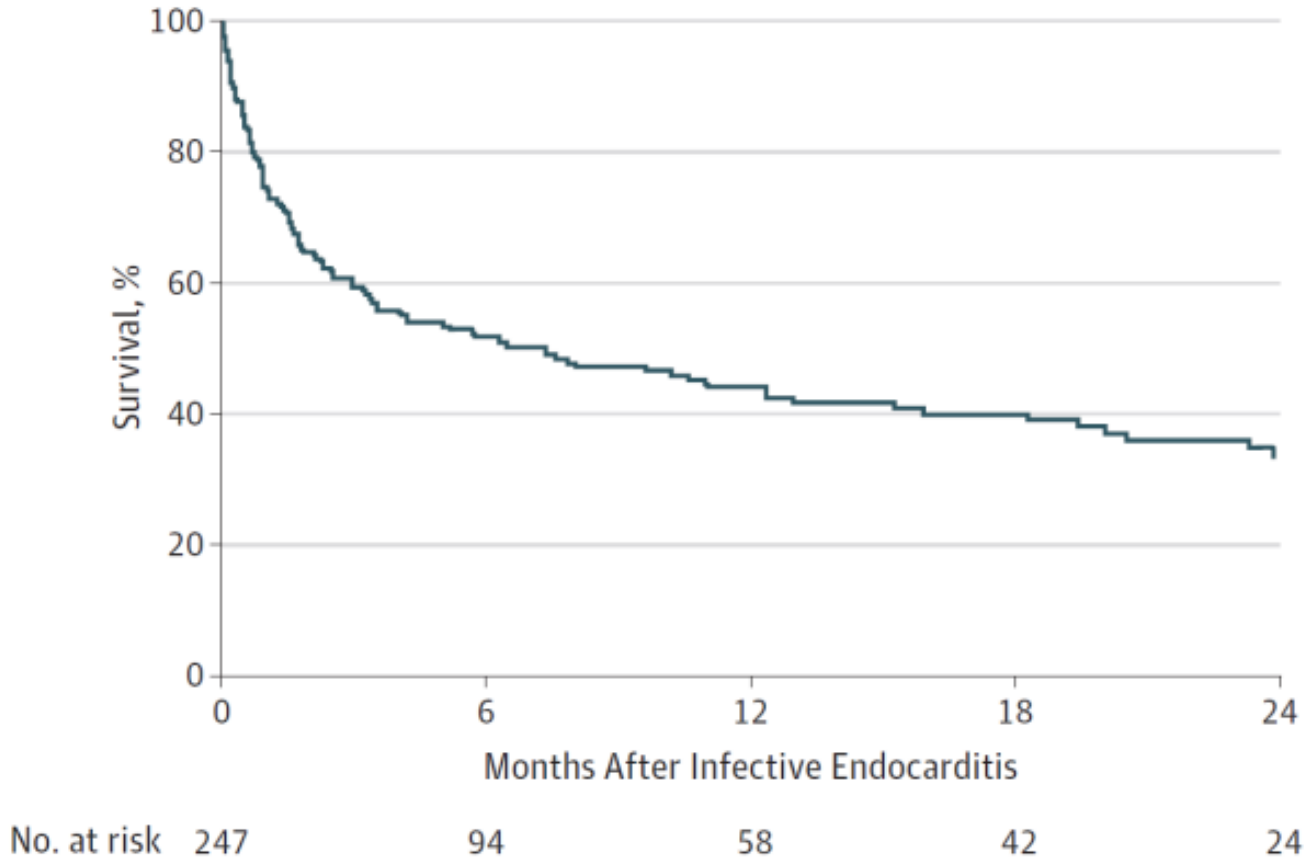
In-hospital outcomes

36% died during index hospitalization

- Higher logistic EuroSCORE
- Heart failure at admission
- Acute kidney injury

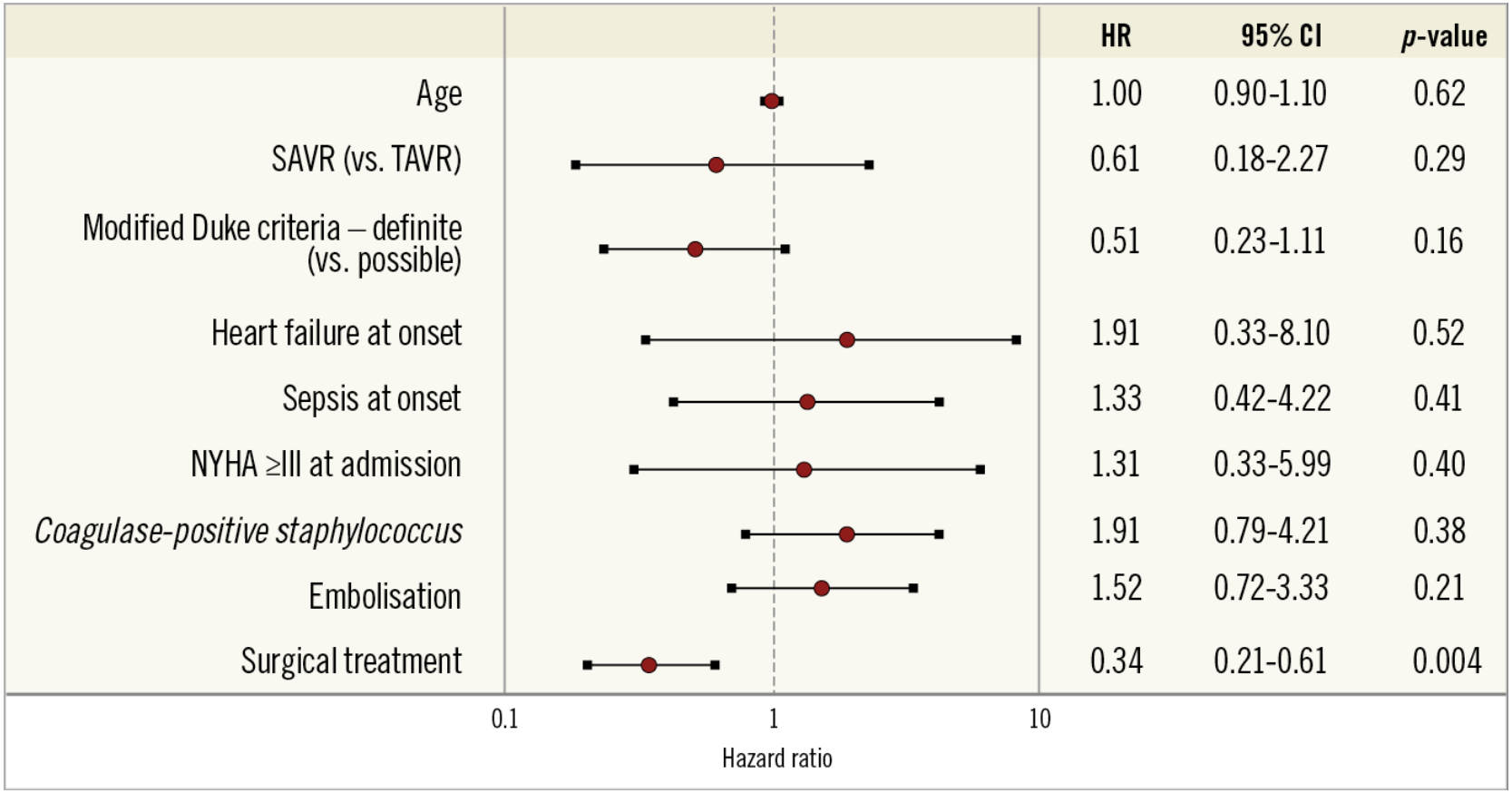
Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE



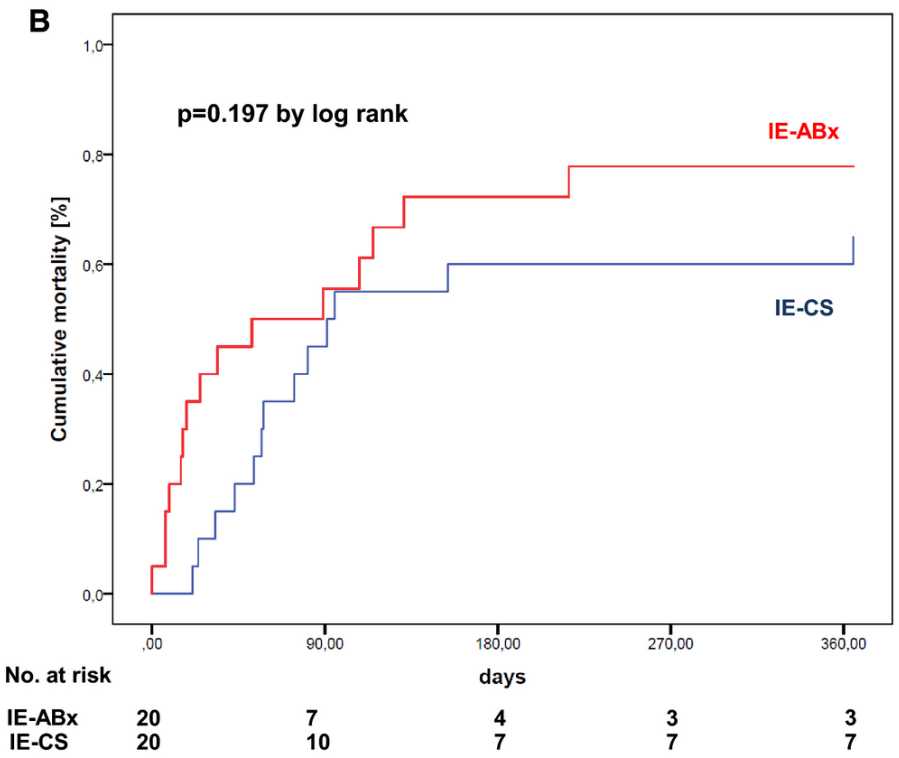
Regueiro A, et al. *JAMA*. 2016;316(10):1083-1092

What do we know about TAVR IE



Moriyama N, et al. EuroIntervention 2019; [Epub ahead of print]

What do we know about TAVR IE



Mangner N, et al. JAHA 2018;e010027

Specific recommendations on TAVR IE

- No data from randomized clinical trials
- Recommendations based on data from TAVR IE registries
- Data extrapolated from surgical prosthetic valve endocarditis

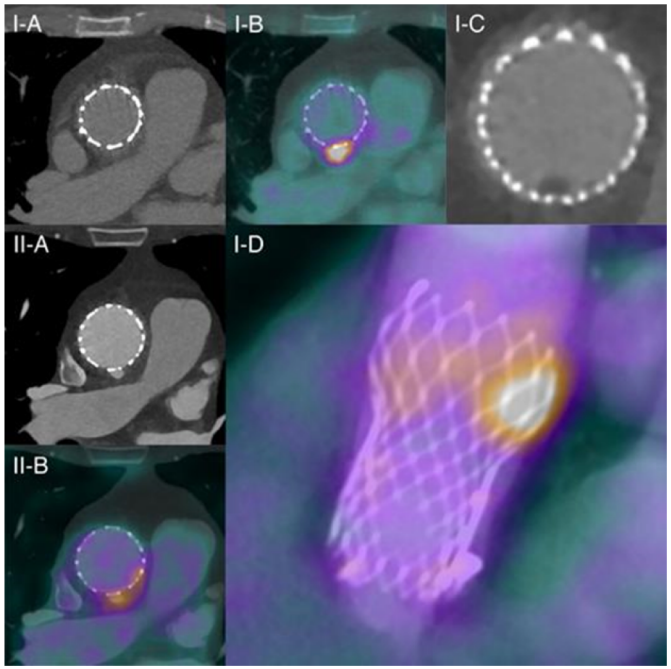
Specific recommendations on TAVR IE

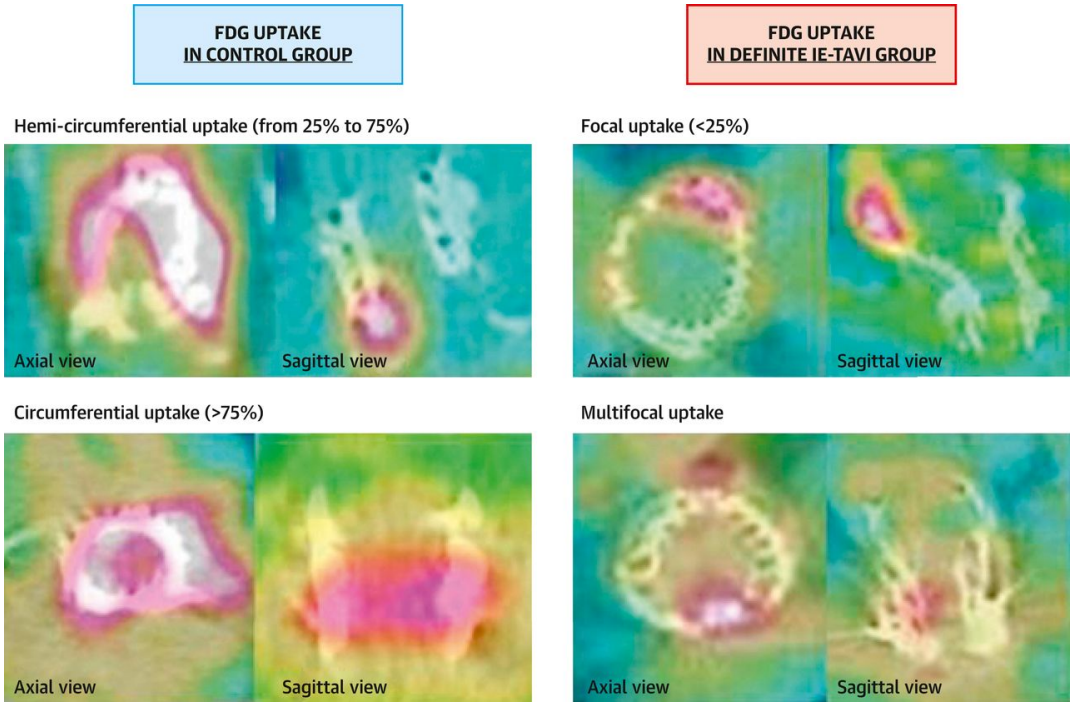
Prevention

- Antibiotic prophylaxis before TAVR should cover most frequent causative organisms
    - Combination of cephalosporin plus glycopeptide
    - Ceftazidime 2 gr plus Teicoplanin 400 g
- Minimize rates of residual aortic regurgitation, conduction disturbances, and vascular complications
- Avoid unnecessary invasive procedures after TAVR
- Antibiotic prophylaxis post TAVR should cover enterococcal infections

Specific recommendations on TAVR IE

Diagnosis





Swart LR, et al. EHJ. 2016;37(39):3059
San S, et al. JACC Cardiovasc Imaging 2019; 12:930

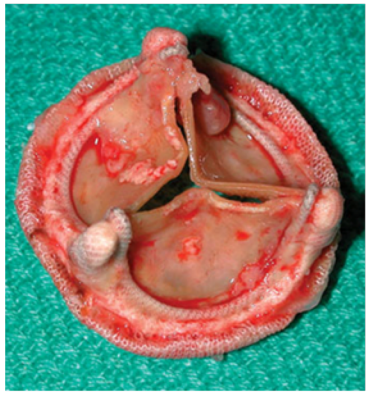
Specific recommendations on TAVR IE

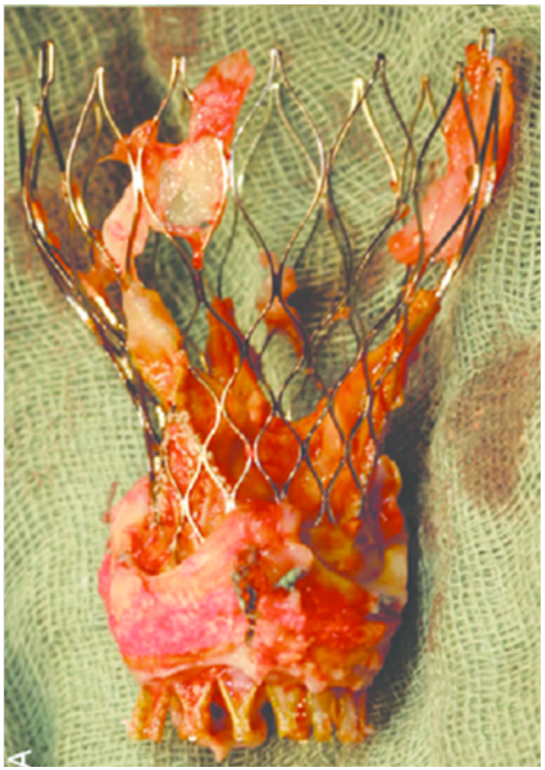
Treatment

- Small studies showed no benefit of surgery over medical treatment for TAVR IE
- Surgery might be reconsidered for high risk patients with indication for surgery
- Surgeons will have to get used to explant THV

Mangner N, et al. JAHA 2018;e010027

Specific recommendations on TAVR IE





TAVR IE Future perspectives

- Patient profile will be broader (high and low risk)
- Patients will live longer
- Minimalistic TAVR (sedation, radial secondary access, no TEE, discharge in 48 hours) will be the standard of care
- Percutaneous treatment of mitral and tricuspid valves will be more frequent

Conclusions

- Incidence of TAVR IE is similar than SAVR IE
- Incidence, clinical characteristics, and causative organisms are related in part to patient profile (and will change)

Conclusions

- Not enough evidence from randomized clinical trials to support specific recommendations
- TAVR IE prophylaxis should have adequate coverage (Enterococcus / S. Aureus)
- TAVR implantation should be optimized (reduce rate of PVL, pacemaker implantation, and vascular complications)
- PET/CT should be used to improve diagnostic accuracy
- Reconsider surgery when indicated (even for patients that were considered to be at high risk for surgery)

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