

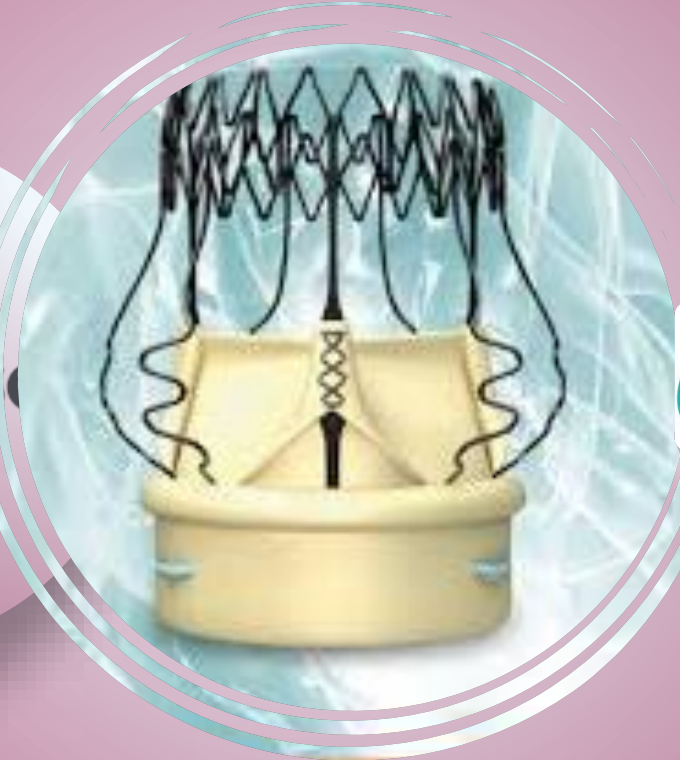
انجمن جراحان قلب ایران
Iranian Society of Cardiovascular Surgeons



Heart Valve Disease Research Center



LivaNova
Health innovation that matters



رایمن دراد
RAYMAND RAD

HIGHTECH AVR: PERCEVAL

A VIRTUAL CASE-BASED PANEL
DISCUSSION

Direct Link:Join Zoom Meeting

<https://us02web.zoom.us/j/8393332033?pwd=T1ZNO2pReThlSGNMTktZbCtNUzhSUTog>

Panelists

Moderator:

Alireza A. Ghavidel



Dr. Abdi

**Interventional
Cardiologist**

Tehran



Dr. Amirghofran

Cardiac Surgeon

Shiraz



Dr. Babazadeh

Cardiac Surgeon

Tehran



Dr. Hosseini

Cardiac Surgeon

Tehran



Dr. Mandegar

Cardiac Surgeon

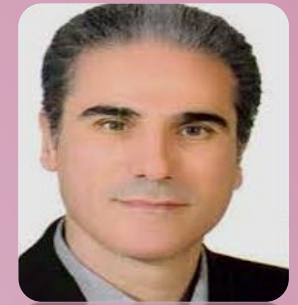
Tehran



Dr. Parvizi

Cardiac Surgeon

Tabriz



Dr. Shahzamani

Cardiac Surgeon

Isfahan

CASE

1

A 76 YEARS LADY CANDIDATE FOR CABG
HAVE MODERATE AS & MODERATE MR

STS mortality risk

9.23%

Euro score II

5.25%

3.4%

Exertional CP, DOE FC II
HTN, DM, No TIA
3VD, Good run offs
70% stenosis in left Carotid

BSA: 1.78

HgA1C : 7.2

Cr: 1.6

LVEF: 30%

Mild to Mod RV dysfunction

AVA : 1.3 cm²

TAMG: 40 mmHg

Vmax: 3.3 m/s

Mod MR, eccentric jet

LVEDD: 56 mm

C-Sept: 19 mm

Tethering angle 46

Annulus : 20 mm

Valsalva sinus: 34

STJ: 26 mm

Asc Aorta: 30

SAVR is recommended in patients at low surgical risk (STS or EuroSCORE II < 4% or logistic EuroSCORE I < 10% ^d and no other risk factors not included in these scores, such as frailty, porcelain aorta, sequelae of chest radiation) ⁹³	I	B
TAVI is recommended in patients who are not suitable for SAVR as assessed by the Heart Team. ^{91,94}	I	B
In patients who are at increased surgical risk (STS or EuroSCORE II ≥ 4% or logistic EuroSCORE I ≥ 10% ^d or other risk factors not included in these scores such as frailty, porcelain aorta, sequelae of chest radiation), the decision between SAVR and TAVI should be made by the Heart Team according to the individual patient characteristics (see Table 7), with TAVI being favoured in elderly patients suitable for transfemoral access. ^{91,94-102}	I	B
SAVR should be considered in patients with moderate aortic stenosis ^e undergoing CABG or surgery of the ascending aorta or of another valve after Heart Team decision.	IIa	C

	Favours TAVI	Favours SAVR
Clinical characteristics		
STS/EuroSCORE II < 4% (logistic EuroSCORE I < 10%) ^a		+
STS/EuroSCORE II ≥ 4% (logistic EuroSCORE I ≥ 10%) ^a	+	
Presence of severe comorbidity (not adequately reflected by scores)	+	
Age < 75 years		+
Age ≥ 75 years	+	
Previous cardiac surgery	+	
Frailty ^b	+	
Restricted mobility and conditions that may affect the rehabilitation process after the procedure	+	
Suspicion of endocarditis		+
Anatomical and technical aspects		
Favourable access for transfemoral TAVI	+	
Cardiac conditions in addition to aortic stenosis that require consideration for concomitant intervention		
Severe CAD requiring revascularization by CABG		+
Severe primary mitral valve disease, which could be treated surgically		+
Severe tricuspid valve disease		+
Aneurysm of the ascending aorta		+
Septal hypertrophy requiring myectomy		+

2

A 78 years lady with Severe AS, Mod AI and Mod MR

Patient History

- Hx Syncope 2 weeks ago
- No other symptom, FC I
- HTN.
- BSA: 1.8

- NSR
- Cr: 2

Euro Score : II
5.72%

STS mortality risk
6.5%

Imaging Study

- Functionally BAV
- Sever Calcified AS, Mod AI
- LVEF: 30-35% PAP:30
- TAVMG: 68 mmHg
- AVA: 0.8 cm²
- Annulus size 23 mm
- Sinus size: 35 mm
- STJ: 27 mm
- Asc Aorta 38 mm
- Sever MAC,
- Moderate central jet MR

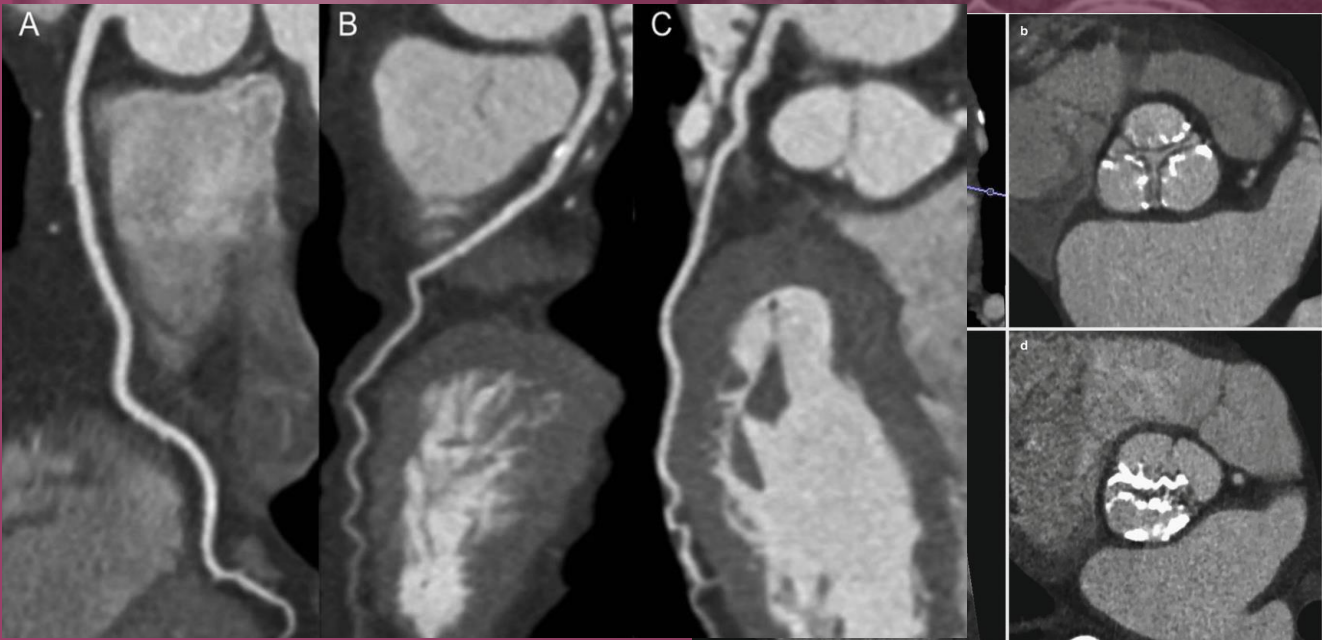
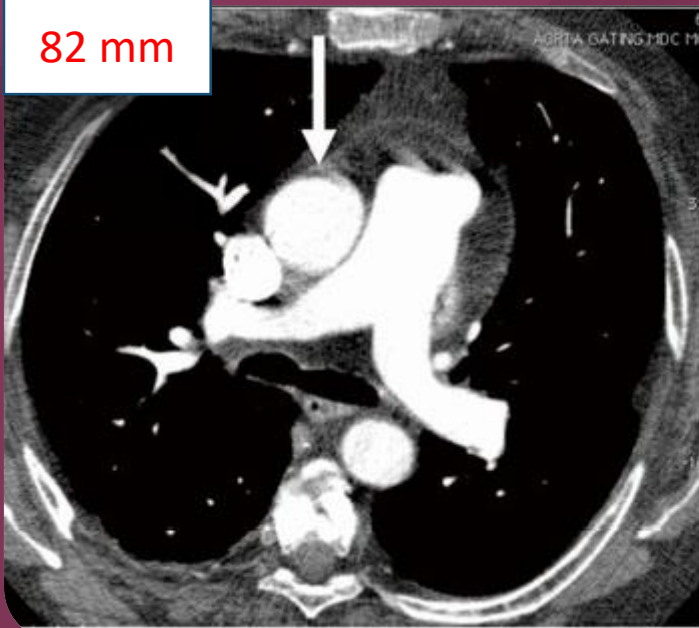
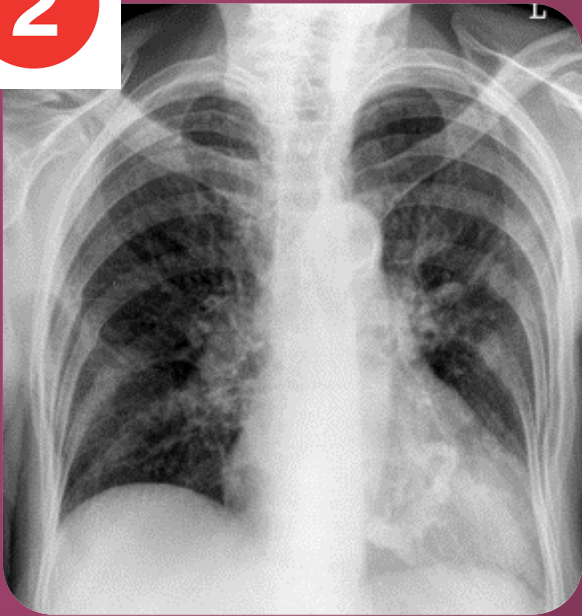
MSCT

- Minimal CAD
- Diffused atherosclerotic changes
- Circular three cusped AV
- Calcified Annulus: 25 mm
- Asc Aorta: 35 mm
- Annulus to coronary ostia: 7 and 9 mm
- CFA: 8 mm in both sides



2

Case II



Transcatheter, sutureless and conventional aortic-valve replacement: a network meta-analysis of 16,432 patients

Declan Lloyd¹, Jessica G. Y. Luc², Ben Elias Indja³, Vannessa Leung⁴, Nelson Wang^{3,4}, Kevin Phan^{3,5}

J Thorac Dis 2019;11(1):188-199

The inclusion of RCTs and propensity-matched studies are strengths in the present meta-analysis

Meta-analysis of 16,432 patients

This network meta-analysis demonstrates no differences in perioperative **mortality or stroke** between patients who received TAVI, SL-AVR or CAVR interventions for their AS.

2

In selected patients, minimally invasive surgical interventions including TAVI and SL-AVR for severe AS are viable alternatives to conventional surgery.

However, TAVI is associated with increased paravalvular regurgitation

TAVI and SL-AVR are associated with increased conduction disturbances compared to CAVR

Aortic valve replacement using stented or sutureless/rapid deployment prosthesis via either full-sternotomy or a minimally invasive approach: a network meta-analysis

Kei Woldendorp^{1,2,3}, Mathew P. Doyle^{2,3}, Paul G. Bannon^{1,2,3,4}, Martin Misfeld^{3,4,5}, Tristan D. Yan^{2,3,6}, Giuseppe Santarpino^{7,8,9}, Paolo Berretta¹⁰, Marco Di Eusanio¹⁰, Bart Meuris¹¹, Alfredo Giuseppe Cerillo¹², Pierluigi Stefano^{12,13}, Niccolò Marchionni^{13,14}, Jacqueline K. Olive¹⁵, Tom C. Nguyen^{16,17}, Marco Solinas¹⁸, Giacomo Bianchi¹⁸

Ann Cardiothorac Surg 2020;9(5):347-363 | <http://dx.doi.org/10.21037/acs-2020-surd-17>

Meta-analysis

Twenty-three studies with 8,718 patients were identified.

Had favourable survival and freedom from valve related reoperation, however follow-up times were short and demonstrated significant heterogeneity between intervention groups.

Minimally invasive and sutureless techniques demonstrate equivalent early postoperative outcomes to SAVR

May reduce ventilation time, hospital LOS and postoperative atrial fibrillation (POAF) burden.

Sutureless valve and rapid deployment valves: a systematic review and meta-analysis of comparative studies

Campbell D. Flynn^{1,2}, Michael L. Williams^{2,3,4,5}, Adam Chakos^{2,6}, Lucy Hirst², Benjamin Muston², David H. Tian^{2,7,8}

Ann Cardiothorac Surg 2020;9(5):364-374 | <http://dx.doi.org/10.21037/acs-2020-surd-27>

The outcomes of 4,076 patients (1,650 RDV, 2,426 SURD) were included.

Conclusions: Both valve types have an adequate safety profile and are comparable to conventional sutured prostheses. There was a significant reduction in cross-clamp and CPB times associated with SURD. This may be of benefit for patients requiring multiple concomitant procedures and increases the utility of minimally invasive valve replacement. However, SURD was associated with higher post-operative transvalvular gradients and a higher incidence of paravalvular regurgitation.

Comparable outcome
Lower CPB and AOX
Concomitant procedures and Minimally approaches

Long-term outcomes of sutureless and rapid-deployment aortic valve replacement: a systematic review and meta-analysis

Michael L. Williams^{1,2,3,4}, Campbell D. Flynn^{2,5}, Andrew A. Mamo⁶, David H. Tian^{2,7}, Utz Kappert⁸, Manuel Wilbring⁸, Thierry Folliguet⁹, Antonio Fiore⁹, Antonio Miceli¹⁰, Augusto D'Onofrio¹¹, Giorgia Cibin¹¹, Gino Gerosa¹¹, Mattia Glauber¹², Theodor Fischlein¹³, Francesco Pollari¹³

Ann Cardiothorac Surg 2020;9(4):265-279 | <http://dx.doi.org/10.21037/acs-2020-surd-25>

1,998 patients.

Long-term outcomes presented in this review show that not only does SURD-AVR have acceptable survival rates, but also good hemodynamic performance at 5-year follow-up.

2,505 patients were included.

Early results of the Sorin® Perceval S sutureless valve: systematic review and meta-analysis

Karan Sian¹, Sheila Li¹, Daneish Selvakumar², Ross Mejia¹

J Thorac Dis 2017;9(3):711-724

Conclusions: The Perceval valve is associated with excellent post-operative results in MAVR and in conventional AVR. Larger randomised controlled studies are required to evaluate the long-term efficacy of the prosthesis.

Sutureless aortic valve replacement with Perceval bioprosthesis: are there predicting factors for postoperative pacemaker implantation?

Ferdinand Vogt^a, Steffen Pfeiffer^a, Angelo Maria Dell'Aquila^b, Theodor Fischlein^a and Giuseppe Santarpino^{a*}

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Abstract

OBJECTIVES: Aortic valve replacement (AVR) with sutureless bioprostheses has become an alternative to conventional AVR for patients with intermediate to high operative risk. However, this technique is associated with an increased risk of postoperative conduction disorders.

METHODS: We analysed 258 patients who underwent AVR with the Perceval prosthesis from July 2010 to September 2014 at our centre. Electrocardiography were obtained at baseline to record preoperatively the presence of conduction disorders. Preoperative risk factors, intraoperative procedures and complications (61 variables) were compared between patients with permanent pacemaker (PPM group) and without (no-PPM group) need for postoperative PPM implantation.

RESULTS: One hundred and sixty-nine patients underwent isolated AVR with the Perceval bioprosthesis, 89 patients had associated surgery and 23 patients underwent redo operations. The mean age was 77.7 ± 5 years, 139 patients were female (46%) and the mean logistic EuroSCORE was $13.2 \pm 11\%$. At baseline, 8 patients had already an implanted pacemaker. Postoperatively, 27 patients (10.5%) required new PPM implantation due to complete atrioventricular block. On univariate analysis, age (PPM vs no-PPM group: 80 ± 5 vs 77 ± 5 years, $P = 0.009$) and preoperative presence of right bundle branch block (RBBB) [overall $n = 20$ (7.8%); PPM vs no-PPM group: 9 vs 11 (33 vs 4.8%); $P < 0.001$] were identified as independent predictors of postoperative conduction disorders, but only pre-existing RBBB persisted on multivariate analysis (odds ratio 11.3—C-statistic 0.74, error estimate 0.064, confidence interval 0.672–0.801; $P = 0.0002$). Among patients undergoing sutureless AVR, the rate of PPM implantation was high.

CONCLUSIONS: The analysis of the data collected made it possible to identify preoperatively a subset of patients undergoing sutureless AVR at higher risk of postoperative atrioventricular block. Additional surgical precautions should be implemented to prevent the occurrence of conduction disorders after sutureless AVR.

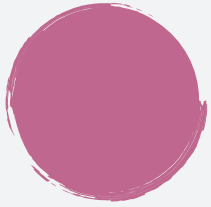
Keywords: Heart valve prosthesis • Pacemaker • Electrophysiology

WORK IN PROGRESS

RBBB and age >80

3

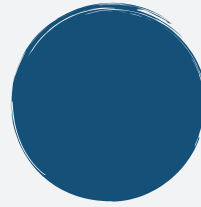
A 69 years gentleman with previous CABG + MVr referred for sever AS



History

- DOE FC III
- CABG 4 graft & Mitral ring annulopalsty 7 years ago
- HTN, Smoker, opium addict(oral)
- ECG: LBBB
- Lab data
- Hgb A1C: 7
- Cr: 1.4
- BSA: 1.83 BMI: 31

3.8%



TTE/TEE

- Sever AS, AI, Tri-leaflets
- Heavily Calcified Annulus
- TAMG: 61mmHg, AVA: 0.7 mm
- Up to Mod MR, No MS
- LVEF: 30-35% Mod RV dysfunction
- Mod TR, Annulus 39 mm
- PAP: 45
- LVEDD: 60 mm LVESD:46mm

Euro Score II:
7.12

STS mortality risk
8.8%

- Patent LIMA-LAD, SVG to OM & D
- Occluded PDA
- Tricuspid AV, Annulus 26 mm.
- Annular parameter:79
- Sinus: 40 mm, STJ 33, Asc. Aorta 36
- Annulus- Ostia distance: LM= 6mm RCA=7mm
- Aorto-mitral continuity distance 9 mm



- Normal Carotid and renal arteries
- Tortuous iliac arteries
- Left CFA=8 mm Right CFA= 7 mm
- Subclavian arteries 9 mm
- Free RV wall to sternum=9 mm

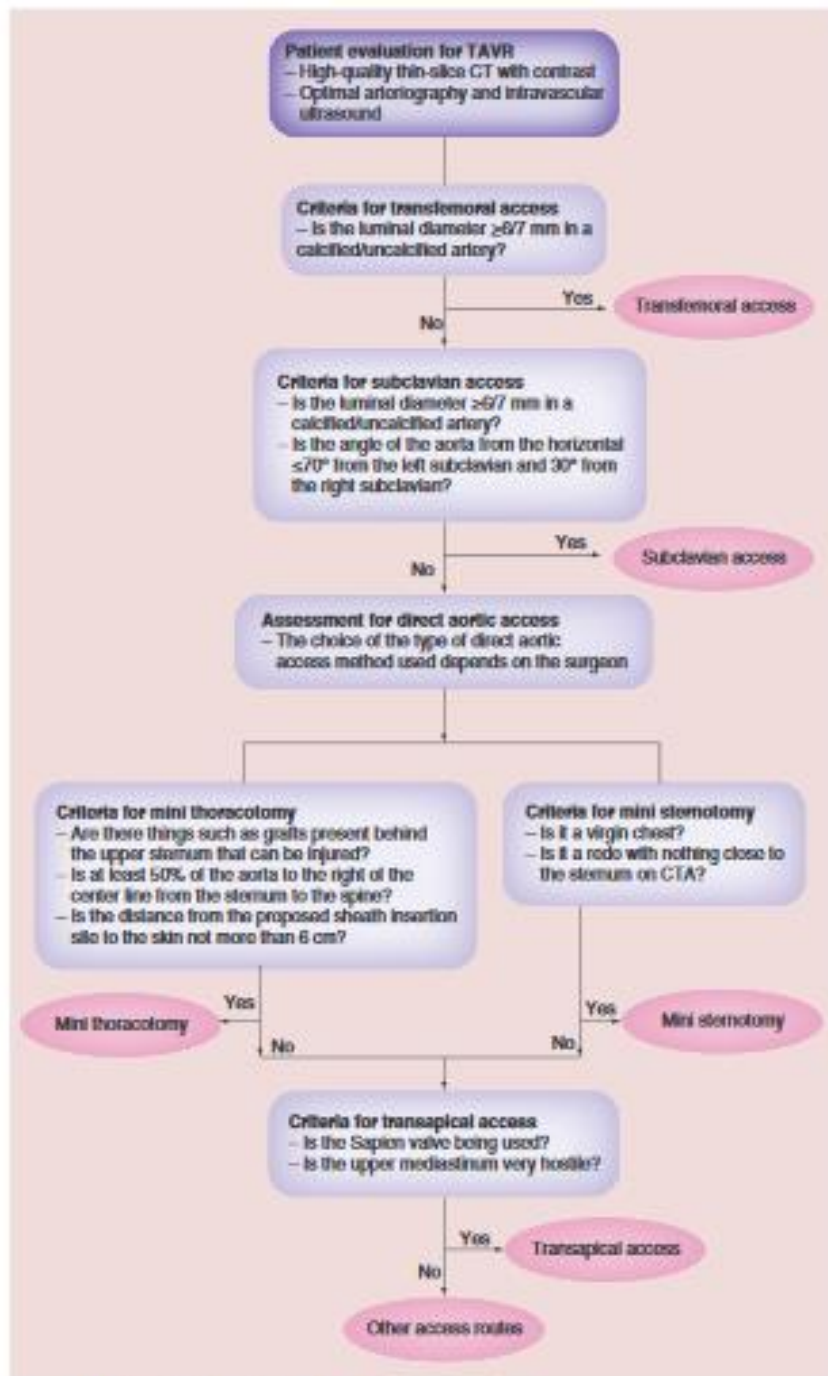


Figure 2. Algorithm for selection of access route.

Table 1. Advantages and disadvantages of different nontransfemoral transcatheter aortic valve replacement access routes.

Approach route	Advantages	Disadvantages
Subclavian	Proximity to the annulus Peripheral access Quick recovery Usually minimal calcification Usually minimal tortuosity	Usually limited by size (6–7 mm) Angle of the aorta from the horizontal should not exceed 70° from the left subclavian and 30° from the right subclavian
Direct aortic	Direct access route Straight path and proximity to deployment site No myocardial injury Not limited by peripheral vascular disease, sheath size and aortic angle Axial alignment easy to achieve Avoids passing device over arch	Requires surgical incision and partial sternotomy
Direct aortic: mini sternotomy	Quick and technically easy in virgin chest Easier to get out of challenging situations Does not enter the pleural space Availability of more aortic 'real estate'	Presence of grafts behind the upper sternum can pose a risk in redo chests
Direct aortic: mini thoracotomy	May be safer in the redo chest Away from left internal mammary artery and vein grafts in redo cases Generally more axial	Less room to work with Transgression of pleural space
Transapical	Direct access route Antegrade approach Not limited by sheath size, aortic angle or peripheral vascular disease Operator proximity Direct delivery path allows great control	Invasiveness of thoracotomy Penetration of myocardium Less stability of the left ventricular apex compared with the ascending aorta

Case IV

3.1%

STS Score
8.9%

Euro Score II
3.12

4

A 77 years gentleman presented by sever degenerative changes of his aortic tissue valve

History

- AVR with a 19 mm Hancock 12 years ago
- HTN, BPH surgery 4
- Carotid Stenting 4 years ago
- PCI on RCA 2 years ago
- BSA: 1.76

- Sever valve degeneration on F/U echo
- Asymptomatic
- FC I
- Good general condition
- Normal lab tests

TTE/TEE








- Mod AS, Sever Ai
- TAMG: 37
- LVEDD: 63mm LVESD: 47 mm
- LVEF: 40-45%
- Mild RV dysfunction
- PAP 27 mmHg
- Mild to mod MR

MSCT

- Patent Carotid and Coronary stents
- Non-significant stenosis in carotid and LAD
- Aortic Annulus: 20 mm
- Sinus diameter: 25
- STJ: 27 mm
- Asc Aorta: 29 mm
- Annulus to coronary ostia: 10 and 9 mm
- No vascular problem
- CFA: 9 mm in both sides

Article

Perceval or Trifecta to Prevent Patient-Prosthesis Mismatch

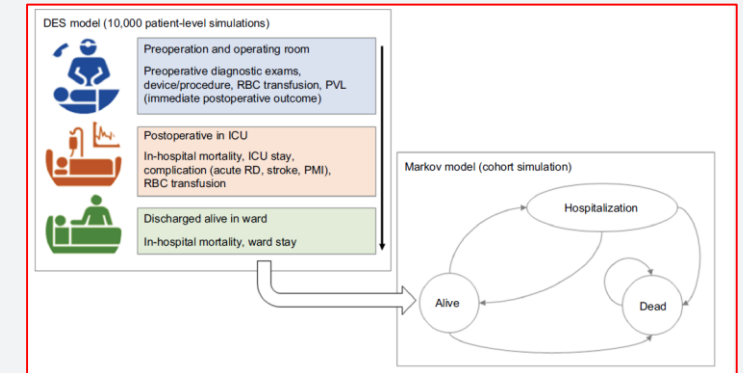
Daniel Hernandez-Vaquero ^{1,*}, Carlota Vigil-Escalera ¹, Yvan Persia ², Carlos Morales ¹, Isaac Pascual ², Alberto Domínguez-Rodríguez ³, Emiliano Rodríguez-Caulo ⁴, Manuel Carnero ⁵, Rocío Díaz ¹, Pablo Avanzas ², Cesar Moris ² and Jacobo Silva ¹

J. Clin. Med. 2020, 9, 2964; doi:10.3390/jcm9092964

549 pts

Sever PPM 3.8%

Cost-utility of surgical sutureless bioprostheses vs TAVI in aortic valve replacement for patients at intermediate and high surgical risk



Both in-hospital and long-term costs were lower for SU-AVR than for TAVIs with total savings ranging from \$4,158 (France) to \$20,930 (US).

Conclusion: SU-AVR results dominant when compared to TAVIs in intermediate- to high-risk patients. Both in-hospital and long-term costs are lower for SU-AVR than for TAVI patients, with concomitant significant gains in life expectancy, both raw and adjusted for the quality of life.



TABLE 10-1: Risk Assessment Combining STS Risk Estimate, Frailty, Major Organ System Dysfunction, and Procedure-Specific Impediments

	Low Risk (Must Meet ALL Criteria in This Column)	Intermediate Risk (Any 1 Criterion in This Column)	High Risk (Any 1 Criterion in This Column)	Prohibitive Risk (Any 1 Criterion in This Column)
STS PROM*	<4%	4–8%	>8%	Predicted risk with surgery of death or major morbidity
Frailty†	AND None	OR 1 Index (mild)	OR ≥2 Indices (moderate to severe)	(all-cause) >50% at 1 year
Major organ system compromise not to be improved postoperatively‡	AND None	OR 1 Organ system	OR No more than 2 organ system	OR ≥3 Organ systems
Procedure-specific impediment§	AND None	OR Possible procedure-specific impediment	OR Possible procedure-specific impediment	OR Severe procedure-specific impediment

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