

Supra-aortic trunk TAVI



**CHIRURGIE
THORACIQUE CARDIAQUE ET VASCULAIRE**

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Introduction

Alternate Access for TAVI: Stay Clear of the Chest

Pavel Overtchouk¹ and Thomas Modine¹

TF-TAVI is favoured

15-20 % non TF TAVI needed

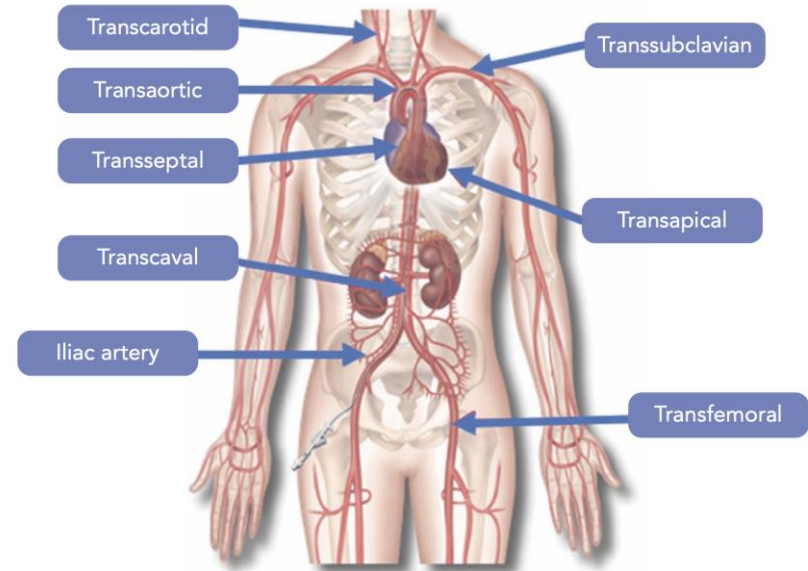
Vascular complications as high as 6% in
Partner 2

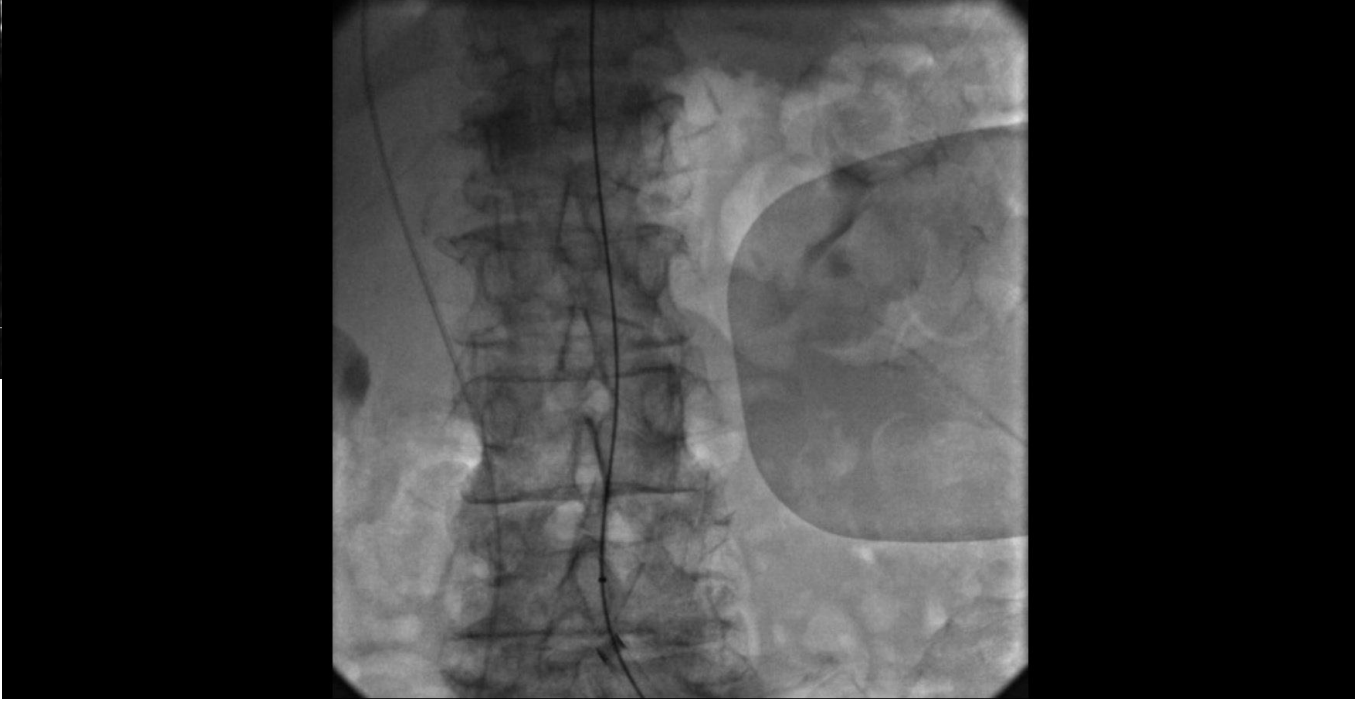
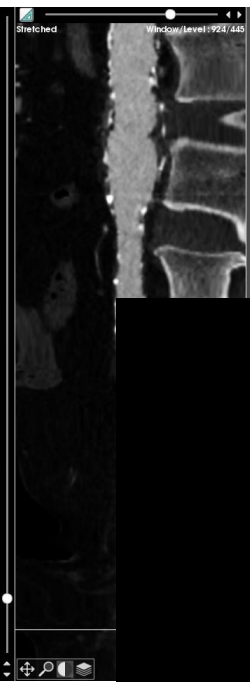
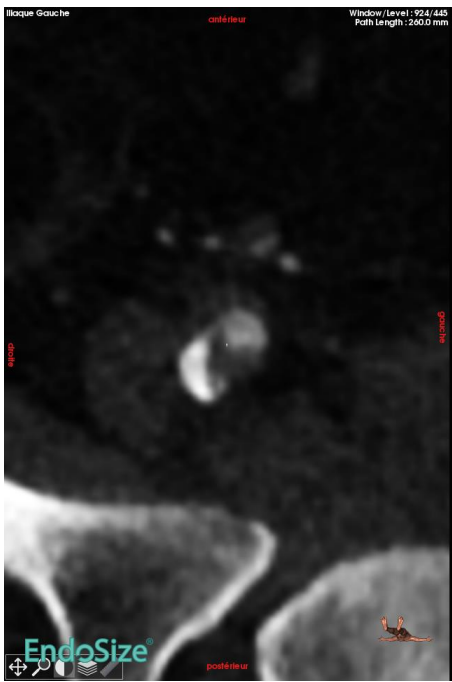
Transthoracic approaches developed first

Time of Transvascular non TF TAVI

First description of Trans carotid by Modine
et al. 2010

Figure 2: Overview of the alternative approaches





Sizing and Planning

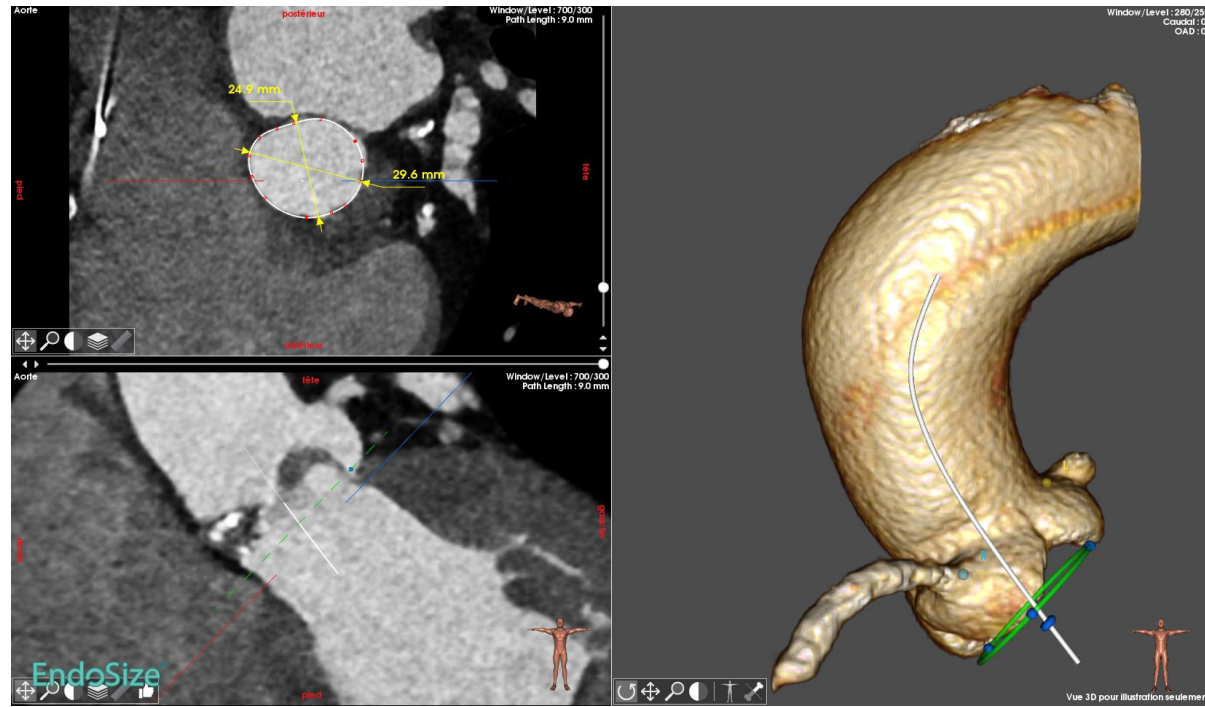
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[Minim Invasive Ther Allied Technol](#). 2019 Jun;28(3):157-164. doi: 10.1080/13645706.2018.1488734. Epub 2018 Jul 24.

Automatic aortic root segmentation and anatomical landmarks detection for TAVI procedure planning.

[Lalys F¹](#), [Esneault S¹](#), [Castro M^{2,3}](#), [Royer L¹](#), [Haigron P^{2,3,4}](#), [Auffret V^{2,3,4}](#), [Tomasi J⁴](#).



Comparison of the Transarterial and Transthoracic Approaches in Nontransfemoral Transcatheter Aortic Valve Implantation.

Beve M¹, Auffret V², Belhaj Souлами R³, Tomasi J³, Anselmi A³, Roisne A⁴, Boulmier D¹, Bedossa M¹, Leurent G¹, Donal E¹, Le Breton H¹, Verhoye JP³.

May 2009 – September 2017

104 transthoracic

87 transarterial (83.9 % trans-subclavian and 16.1% transcarotid)

Mortality lowered in transarterial at 30 days but no difference at 1 year

Composite end-point 30-day (death, need for open, tamponade, stroke, major bleeding, AKI stage 2 or 3, coronary obstruction)

25% vs 11.5 %

Shorter lenght of stay 6 vs 7 days

Femoral vs non Femoral peripheral TAVI

France TAVI

- 21611 patients
 - 92.5 % femoral (19,995 pts)
 - 7.5 % non femoral (1,616 pts)
 - 914 carotids
 - 702 sub clavian

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

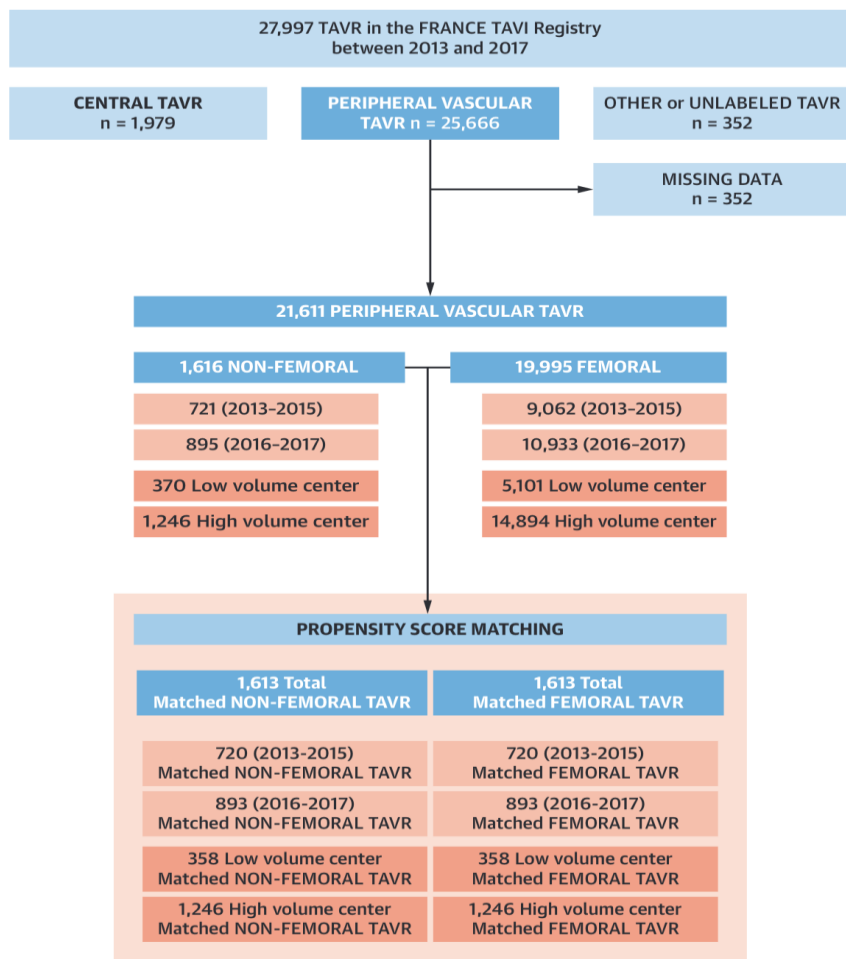
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Femoral Versus Nonfemoral Peripheral Access for Transcatheter Aortic Valve Replacement

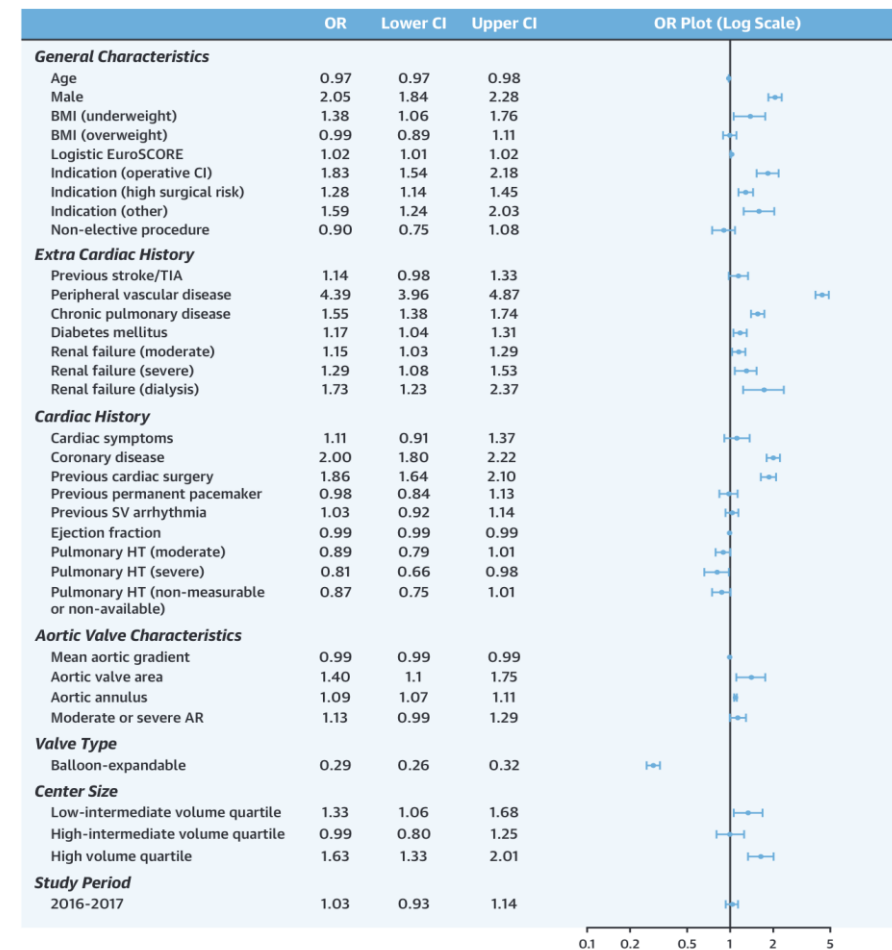
Sylvain Beurtheret, MD,^a Nicole Karam, MD, PhD,^{b,c,d} Noemie Resseguier, MD,^e Remi Houel, MD,^a Thomas Modine, MD, PhD,^f Thierry Folliguet, MD, PhD,^g Chekrallah Chamandi, MD,^{b,c,d} Olivier Com, MD, PhD,^h Jacques Bille, MD,^h Patrick Joly, MD,^h Nicolas Barra, MD,^h Alain Tavildari, MD,^h Philippe Commeau, MD,ⁱ Sebastien Armero, MD,^j Mathieu Pankert, MD,^k Michel Pansieri, MD,^k Sabrina : René Koning, MD,^l Marc Laskar, MD, PhD,^m Yvan Le Dolley, MD,^a Arnaud Maudiere, MD,^a Bertrand Vill Patrick Khanoyan, MD,^h Julien Seitz, MD,^h Didier Blanchard, MD,^{b,c,d} Christian Spaulding, MD, PhD,^{b,c,d} Thierry Lefevre, MD,^h Eric Van Belle, MD, PhD,^o Martine Gilard, MD, PhD,^p Helene Eltchaninoff, MD, PhD, Bernard Lung, MD, PhD,^q Jean Philippe Verhoye, MD, PhD,^r Ramzi Abi-Akar, MD,^t Paul Achouh, MD, PhD, Thomas Cuisset, MD, PhD,^u Pascal Leprince, MD, PhD,^v Eloi Marijon, MD, PhD,^{b,c,d} Hervé Le Breton, MD Antoine Lafont, MD, PhD,^{b,c,d}

FIGURE 1 Study Flowchart



Among 27,997 patients included in the FRANCE TAVI (French Transcatheter Aortic Valve Implantation) registry, 21,611 patients were included in the study. Patients who underwent nonfemoral peripheral (n-FP) transcatheter aortic valve replacement (TAVR) (n = 1,613) with complete data were matched with 1,613 patients who underwent FP TAVR for comparison purposes.

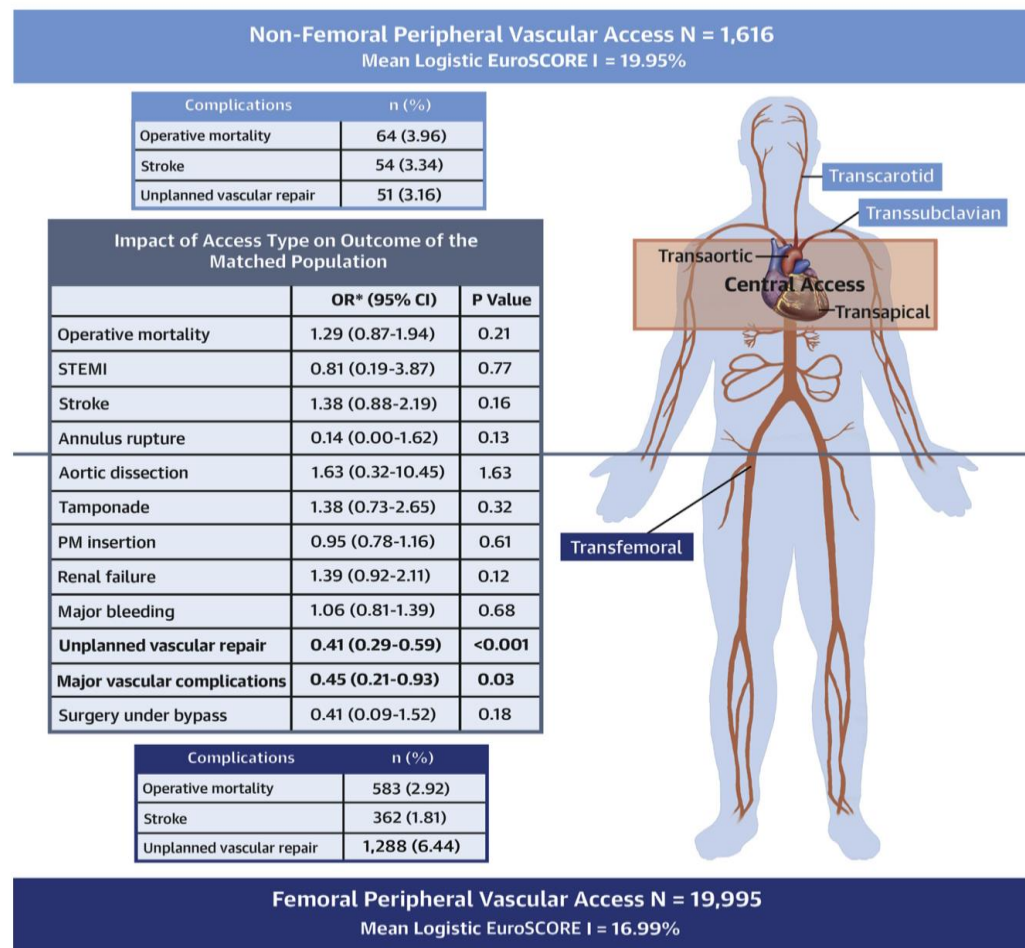
FIGURE 2 Patients' Factors Associated With n-FP TAVR Versus FP TAVR



Odds ratios (ORs) expressing the probability of having n-FP TAVR. AR = aortic regurgitation; BMI = body mass index; CI = confidence interval; HT = hypertension; SV = supraventricular; TIA = transient ischemic attack; other abbreviations as in Figure 1.

- Among peripheral vascular TAVR

- Similar results
- 2-fold lower rate of major vascular complications
- N-FP is safe reproducible, at least as good



Beurtheret, S. et al. J Am Coll Cardiol. 2019;74(22):2728-39.

Comparison of patients from the FRANCE TAVI (French Transcatheter Aortic Valve Implantation) registry (2013 to 2017) who underwent transcatheter aortic valve replacement (TAVR), either through a femoral peripheral or a nonfemoral peripheral (n-FP) access. After propensity score-based matching, both groups had similar

Transcarotid transcatheter aortic valve implantation: A systematic review.

Wee IJY¹, Stonier T², Harrison M³, Choong AMTL⁴.

- 8 trials 650 patients 2012-2017
- 364 trans carotid mortality 6.5 %, Strokes 3.8 %
- Vascular complications 7.7 %
- Alternative to other routes

Transcarotid Route: the Ideal Alternative Access for TAVI?

Verhoye JP¹, Belhaj Souлами R, Tomasi J, Di Perna D, Leurent G, Rosier S, Biedermann S, Anselmi A.

- 50 first cases in Rennes
- No mortality
- 5 PPM (10%)
- 2% of AR ≥ 2

Characteristic	
Mortality	None
Acute Myocardial Infarction	None
<u>Composite Endpoints</u>	
- Device Success	46 (92%)
- Early Safety	48 (96%)
- Clinical Efficacy	46 (92%)
Stroke	1 (2%)
TIA	1 (2%)
<u>Bleeding complications</u>	
- Life-threatening	1 (2%)
- Major	2 (4%)
- Minor	5 (10%)
<u>AKI Stage 3</u>	2 (4%)
<u>Vascular access complications</u>	
- Major	None
- Minor	5 (10%)
<u>Details of minor vascular access complications</u>	
- Access-related	2 (4%)
- Non access-related	3 (6%)
New PPM implantation	5 (10%)
New onset AF/Flutter	2 (4%)
Mean transvalvular gradient (mmHg)	11.9 \pm 4.8
Aortic regurgitation ≥ 2	1 (2%)
Aortic valve area (cm ²)	1.84 \pm 0.45
LVEF (%)	56.1 \pm 12.7

AKI: Acute Kidney Injury. PPM: Permanent Pacemaker. AF: Atrial Fibrillation.



- Safe and reproducible approach
- Beware of bovine arch

Carotid versus femoral access for transcatheter aortic valve implantation: a propensity score inverse probability weighting study.

Folliguet TA¹, Teiger E¹, Beurtheret S², Modine T³, Lefevre T⁴, Van Belle E⁵, Gilard M⁶, Eltchaninoff H⁷, Koning R⁸, Lung B⁹, Verhoye JP¹⁰, Leprince P¹¹, Le Breton H¹², Lafont A^{13,14,15}, Parolari A¹⁶, Barili F¹⁷.

Author information

Table 2: Non-parametric comparison of outcomes between access routes: transcarotid versus transfemoral transcatheter aortic valve implantation

Variables	All patients (11 033), n (%)	Transcarotid access (435), n (%)	Transfemoral access (10 598), n (%)	P-value
Procedural and 30-day deaths	419 (3.8)	18 (4.1)	401 (3.8)	0.73
Procedural deaths	103 (0.9)	3 (0.7)	102 (1)	0.80
30-Day deaths	315 (2.9)	15 (3.4)	300 (2.8)	0.46
Annulus rupture	50 (0.4)	0 (0)	50 (0.5)	0.27
Aortic dissection	37 (0.3)	0 (0)	37 (0.3)	0.40
Valve migration	121 (1.1)	6 (1.4)	115 (1.1)	0.48
Cardiac tamponade	234 (2.1)	7 (1.6)	227 (2.1)	0.61
Coronary obstruction	33 (0.3)	0 (0)	33 (0.3)	0.64
Urgent surgery	50 (0.4)	2 (0.5)	48 (0.5)	0.99
Stroke	219 (2.0)	19 (4.4)	200 (1.9)	0.001
STEMI	22 (0.2)	3 (0.7)	19 (0.2)	0.05
Permanent pacemaker implantation	1689 (15.3)	82 (18.9)	1607 (15.2)	0.04
Vascular complications	827 (7.5)	14 (3.2)	813 (7.7)	<0.001
Infections	449 (4.1)	29 (6.7)	420 (4.0)	0.01
Bleeding	535 (4.8)	40 (9.2)	495 (4.7)	<0.001
Pulmonary embolism	15 (0.1)	1 (0.2)	14 (0.1)	0.45
Renal failure	376 (3.4)	22 (5.1)	354 (3.3)	0.06
Renal dialysis	349 (3.2)	22 (5.1)	327 (3.1)	0.03

Table 3: ORs derived by logistic regression model in unadjusted cohort and after adjustment with propensity score weighting

Variables	Unadjusted OR	<i>P</i> -value	Adjusted OR	<i>P</i> -value
Death	0.95 (0.59–1.54)	0.84	1.02 (0.62–1.68)	0.99
Stroke	2.37 (1.47–3.84)	<0.001	2.42 (2.01–2.92)	<0.001
STEMI	3.87 (1.14–13.1)	0.03	7.32 (3.87–13.87)	<0.001
Permanent pacemaker implantation	1.30 (1.01–1.66)	0.04	1.05 (0.96–1.15)	0.28
Vascular complications	0.40 (0.23–0.69)	0.001	0.37 (0.32–0.43)	<0.001
Infections	1.73 (1.17–2.56)	0.006	2.36 (2.04–2.71)	<0.001
Bleeding	2.07 (1.48–2.90)	<0.001	2.01 (1.76–2.29)	<0.001
Renal failure	1.54 (0.99–2.40)	0.06	2.23 (1.90–2.60)	<0.001
Renal dialysis	1.74 (1.09–2.78)	0.02	2.36 (2.01–2.76)	<0.001

OR: odds ratio; STEMI: ST-segment elevation myocardial infarction.

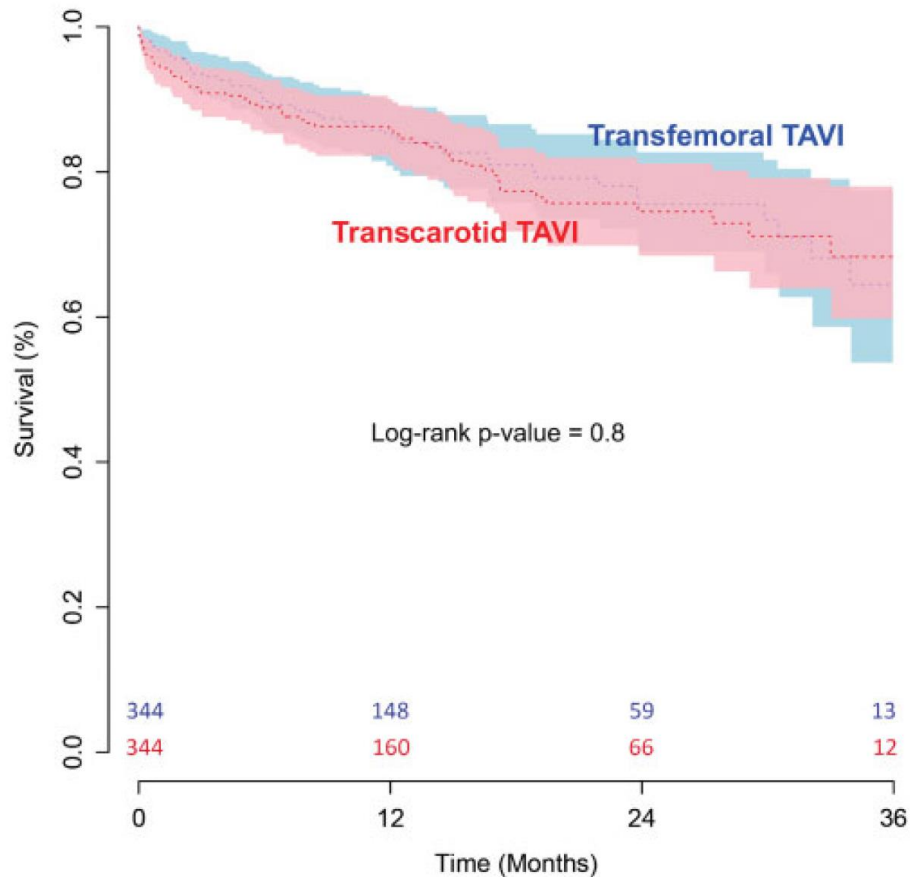
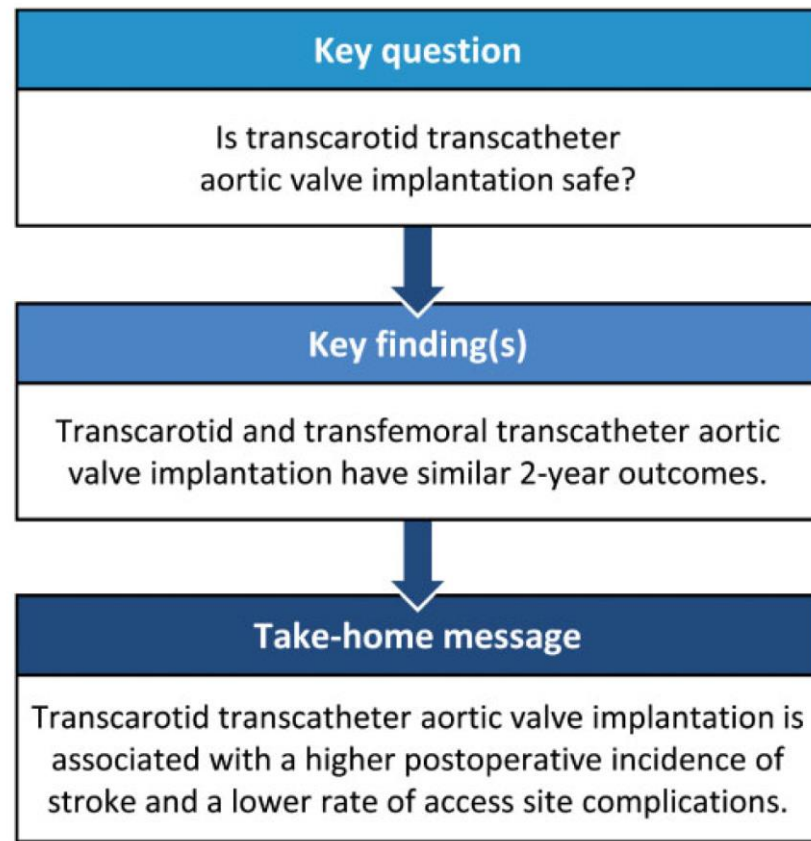


Figure 1: Kaplan-Meier estimates of survival at 1 and 2 years. TAVI: transcatheter aortic valve implantation.



Conclusion

- TA non TF-TAVI are as safe as TF
- TA should be preferred to trans thoracic approaches
- Results are excellent
- Trans carotid is supplanting trans subclavian

