

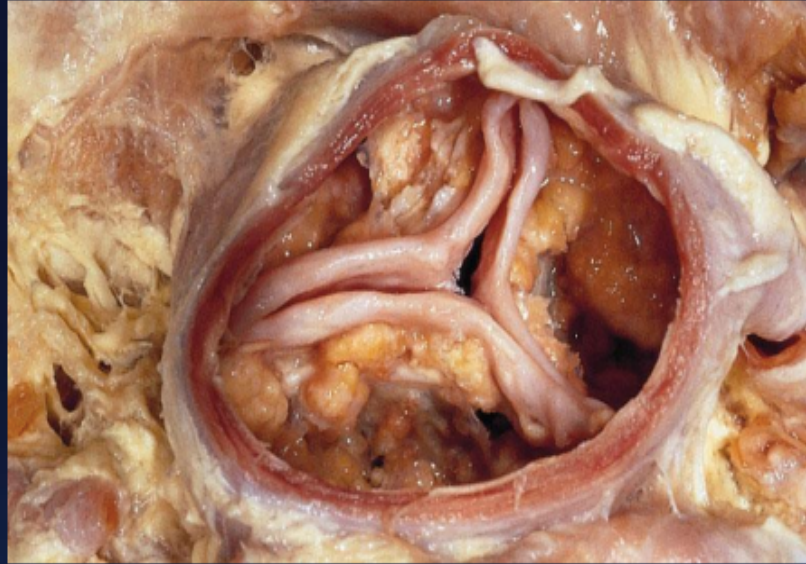
AGGIORNAMENTI IN CARDIOLOGIA
A CURA DI ANCE CARDIOLOGIA ITALIANA DEL TERRITORIO
REGIONE EMILIA ROMAGNA

Il trattamento della stenosi aortica nel 2025

Dr. Cinzia Marrozzini



Valvulopatia degenerativa



un **processo** attivo

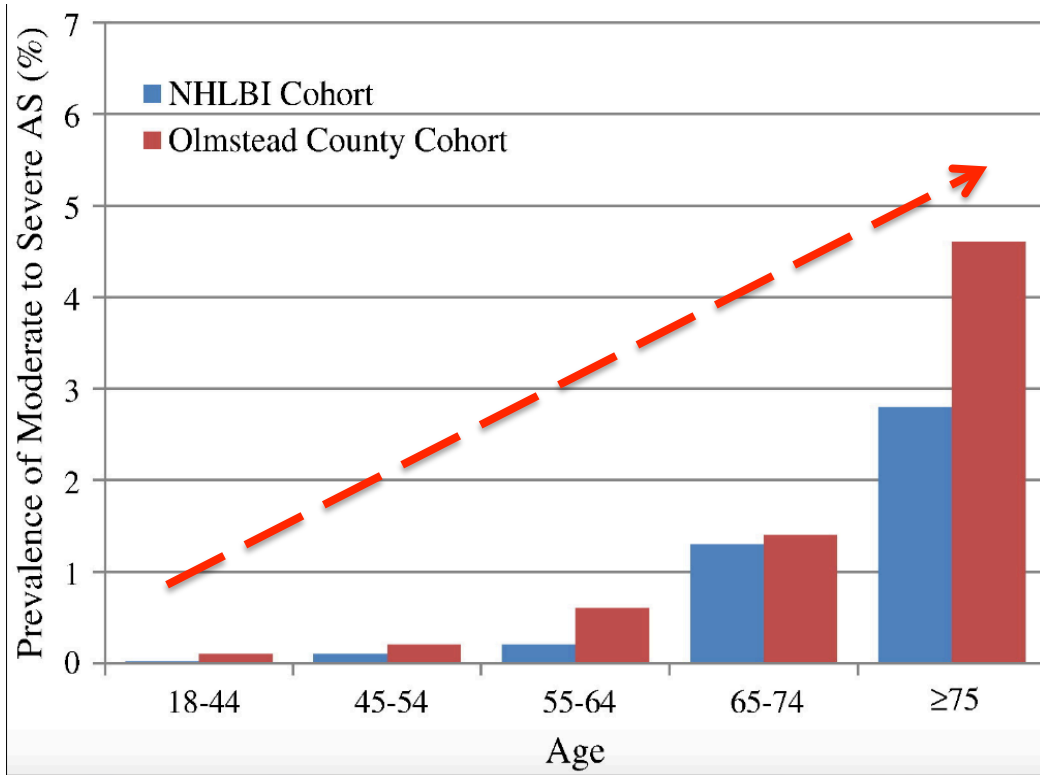
progressiva deposizione del calcio sulle cuspidi aortiche

impedisce l'apertura piena della valvola in sistole, può associarsi a insufficienza

... per anni un processo clinicamente silente

... possono concomitare altre valvulopatie/cardiopatie

Quanto è frequente la stenosi aortica?



*La stenosi aortica
aumenta con l'età
ed è presente in
circa il 10% degli
ottantenni*

Diagnosi - eco

Eco adulti

X5-1
15Hz
18cm



2D

71%
C 50
P Basso
APen

CF

50%
3770Hz
WF 376Hz
2.5MHz

G
P R
1.3 2.6

TIS0.8

Eco adulti

X5-1
15Hz
18cm



2D

73%
C 50
P Basso
APen

CF

50%
3770Hz
WF 376Hz
2.5MHz

CW

50%
WF 225Hz
1.8MHz

TIS0.6 MI 0.1

M3 M4
+58.1

÷ AV VTI

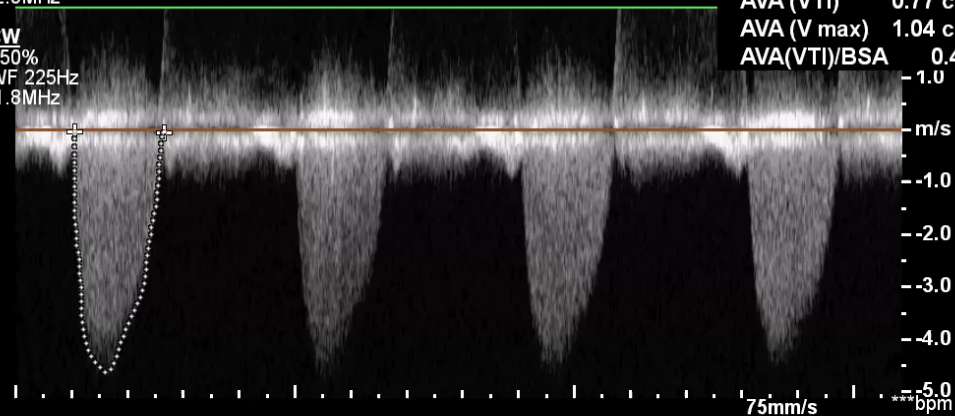
V max 463 cm/s
V media 335 cm/s
PG max 86 mmHg
PG medio 51 mmHg
VTI 108 cm

AV VR 0.37

AVA (VTI) 0.77 cm²

AVA (V max) 1.04 cm²

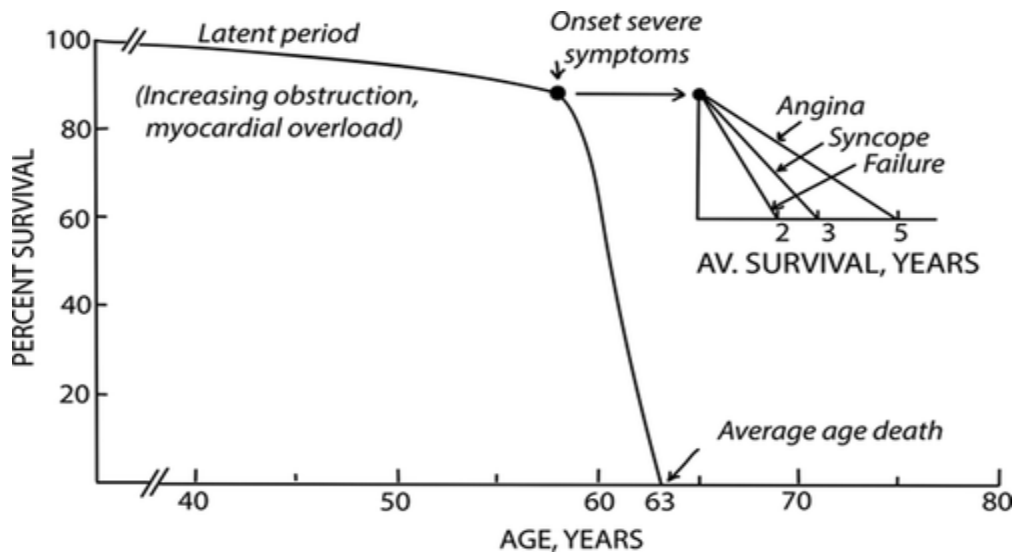
AVA(VTI)/BSA 0.45



TIPO DI STENOSI AORTICA	V MAX	AVA	LVEF	DVI	STROKE VOLUME INDEX
normal flow-normal gradient	>4 m/s	<1 cm2	>50%	<0.25	>35 ml/min
low flow-low gradient-low LVEF	< 4 m/s	<1 cm2	<50%	<0.25	<35 ml/min
low flow-low gradient-normal LVEF (paradoxical aortic stenosis)	<4 m/s	< 1 cm2	>50% con v sx ipertrofico piccolo	<0.25	>35 ml/mn

Indicazione a trattamento

→ severa e SINTOMATICA



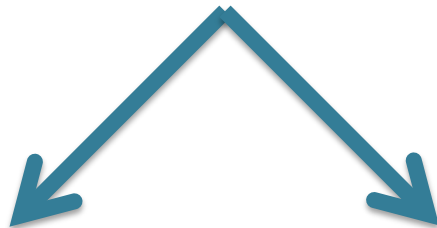
*Dopo la comparsa dei sintomi,
senza trattamento,
sopravvivenza media:*

- 50% dopo i primi due anni
- 20% a 5 anni



Trattamento

Obiettivi del trattamento



Migliorare la prognosi
→ Allungare la vita

Migliorare i sintomi
→ Vivere meglio

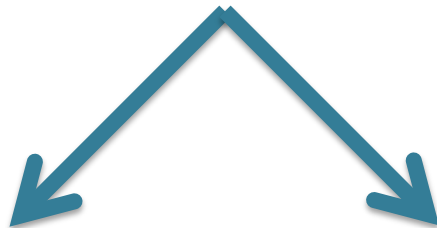
Considerare entrambi gli aspetti nei pazienti più anziani

Trattamento della stenosi aortica nel 2025

- Estensione delle indicazioni
- Nuove protesi
- Tecniche meno invasive
- Riduzione delle complicanze

Trattamento

PROCEDURE



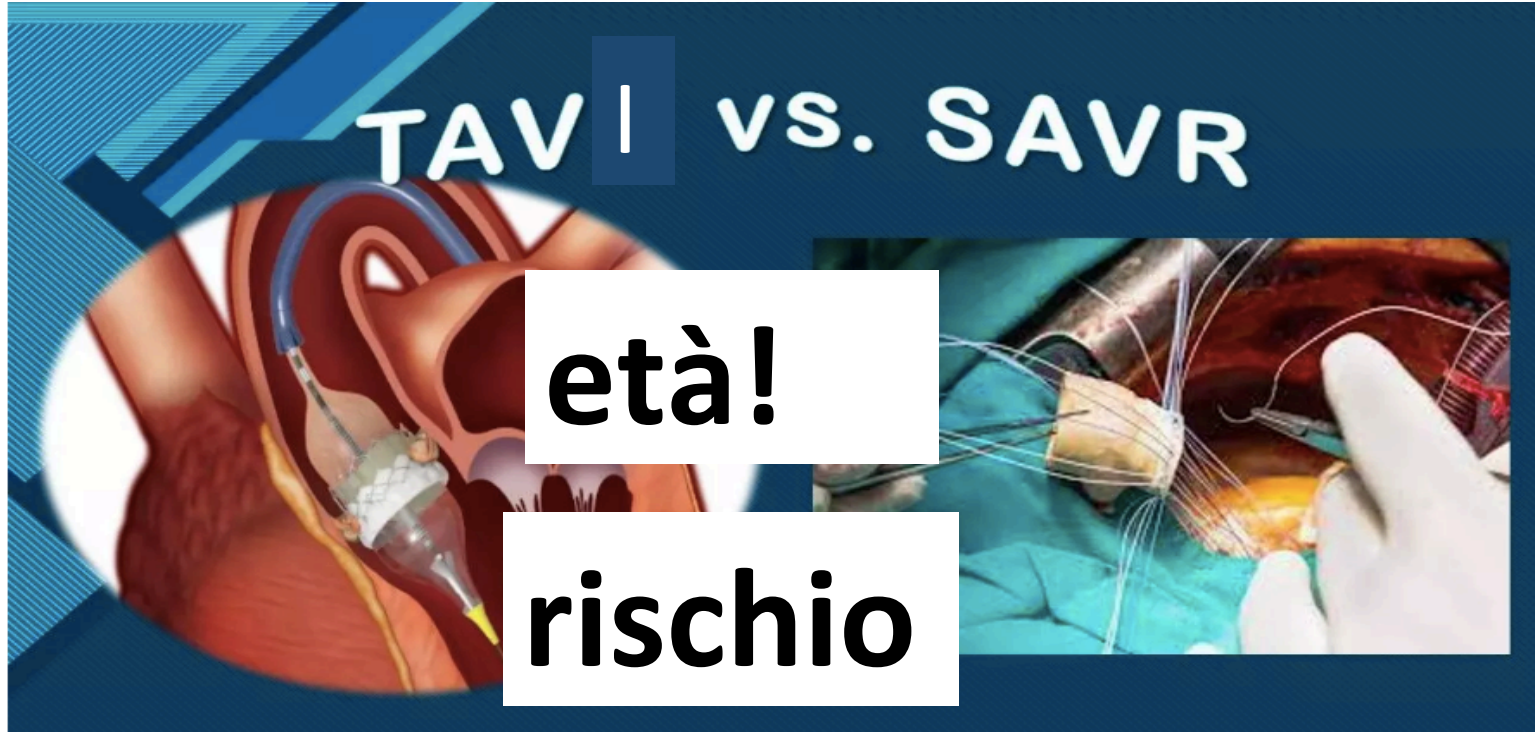
SOSTITUZIONE VALVOLARE
CHIRURGICA

SAVR

IMPIANTO DI PROTESI
PERCUTANEA

TAVI

Discussione Heart Team



HEART TEAM

- Chi conosce il Paziente
- Cardiologo clinico
- Cardiologo Emodinamista
- Cardiochirurgo
- Ecocardiografista
- Radiologo
- Anestesista

Stenosi aortica severa

→ **Non sempre gradiente alto!**

Classica: FE normale, gradiente transaortico medio >40 mmHg

Low-flow low gradient : FE ridotta, grad medio **<40 mmHg**, ma $AVA \leq 1$ cm²

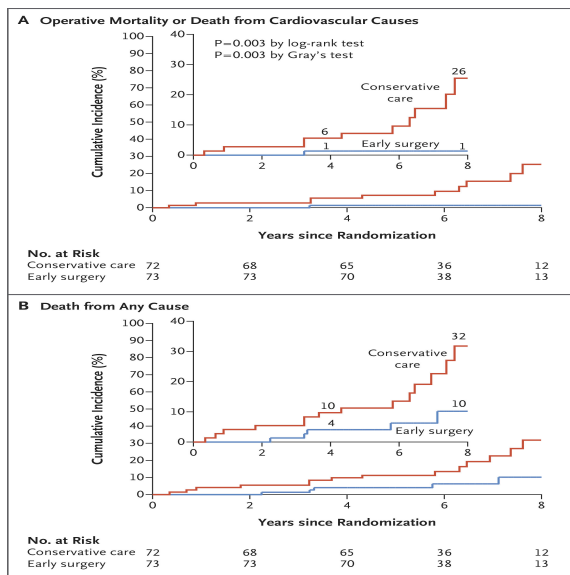
Paradoxical low-flow low gradient: FE normale, gradient **<40 mmHg**, $AVA \leq 1$ cm² **

** altre condizioni associate (amiloidosi, CPipertrofica...

Indicazioni a trattamento

→ severa e ASINTOMATICA ?

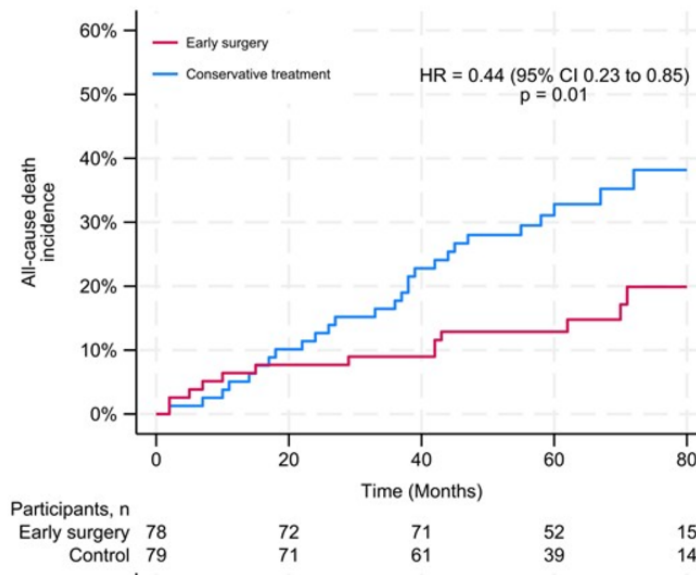
RECOVERY TRIAL



SAVR ✓

*Agire prima
riduce la mortalità,
ma pochi pazienti*

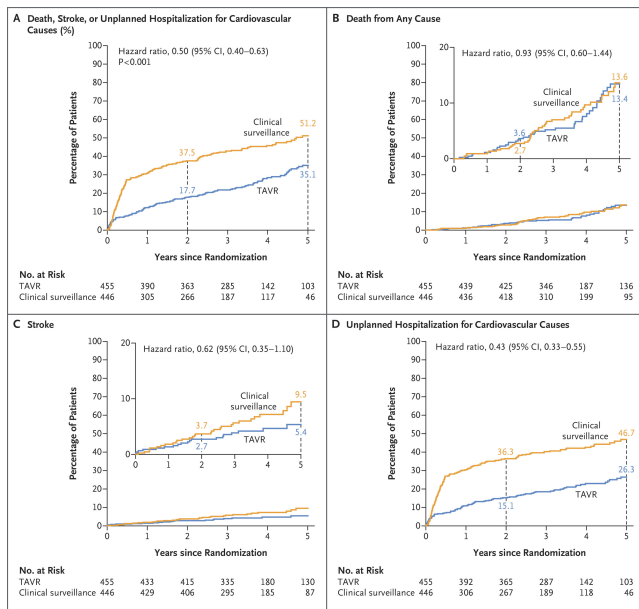
AVATAR TRIAL



Indicazioni a trattamento

➔ severa e ASINTOMATICA ?

EARLY TAVI TRIAL



TAVI ?

*Agire prima
riduce le
ospedalizzazioni, ma
non la mortalità*

FATTORI DI RISCHIO A FAVORE DI UN INTERVENTO PRECOCE NELL'ASINTOMATICO

FE ridotta (<50%)

I	B
---	---

SAo MOLTO severa

(G med > 60 mmHg, $V_{\max} > 5.5$ m/s)

IIa	B
-----	---

Rapido peggioramento della SAo

(Aumento della $V_{\max} > 0.3$ m/s/anno)

IIa	B
-----	---

~~Iperensione polmonare
(PAPs>60 mmHg)~~

Eliminata nelle LG 2021



A) Symptomatic aortic stenosis	Class ^b	Level ^c
Intervention is recommended in symptomatic patients with severe, high-gradient aortic stenosis [mean gradient ≥ 40 mmHg, peak velocity ≥ 4.0 m/s, and valve area ≤ 1.0 cm ² (or ≤ 0.6 cm ² /m ²)]. ^{235,236}	I	B
Intervention is recommended in symptomatic patients with severe low-flow (SVI ≤ 35 mL/m ²), low-gradient (< 40 mmHg) aortic stenosis with reduced ejection fraction ($< 50\%$), and evidence of flow (contractile) reserve. ^{32,237}	I	B
Intervention should be considered in symptomatic patients with low-flow, low-gradient (< 40 mmHg) aortic stenosis with normal ejection fraction after careful confirmation that the aortic stenosis is severe ^d (Figure 3).	IIa	C
Intervention should be considered in symptomatic patients with low-flow, low-gradient severe aortic stenosis and reduced ejection fraction without flow (contractile) reserve, particularly when CCT calcium scoring confirms severe aortic stenosis.	IIa	C
Intervention is not recommended in patients with severe comorbidities when the intervention is unlikely to improve quality of life or prolong survival > 1 year.	III	C

**B) Asymptomatic patients with severe aortic stenosis**

Intervention is recommended in asymptomatic patients with severe aortic stenosis and systolic LV dysfunction (LVEF <50%) without another cause.^{9,238,239}

I**B**

Intervention is recommended in asymptomatic patients with severe aortic stenosis and demonstrable symptoms on exercise testing.

I**C**

Intervention should be considered in asymptomatic patients with severe aortic stenosis and systolic LV dysfunction (LVEF <55%) without another cause.^{9,240,241}

IIa**B**

Intervention should be considered in asymptomatic patients with severe aortic stenosis and a sustained fall in BP (>20 mmHg) during exercise testing.

IIa**C**

Intervention should be considered in asymptomatic patients with LVEF >55% and a normal exercise test if the procedural risk is low and one of the following parameters is present:

- Very severe aortic stenosis (mean gradient ≥ 60 mmHg or $V_{\max} > 5$ m/s).^{9,242}
- Severe valve calcification (ideally assessed by CCT) and $V_{\max}$ progression ≥ 0.3 m/s/year.^{164,189,243}
- Markedly elevated BNP levels ($> 3 \times$ age- and sex-corrected normal range) confirmed by repeated measurements and without other explanation.^{163,171}

IIa**B**



C) Mode of intervention

Aortic valve interventions must be performed in Heart Valve Centres that declare their local expertise and outcomes data, have active interventional cardiology and cardiac surgical programmes on site, and a structured collaborative Heart Team approach.	I	C
The choice between surgical and transcatheter intervention must be based upon careful evaluation of clinical, anatomical, and procedural factors by the Heart Team, weighing the risks and benefits of each approach for an individual patient. The Heart Team recommendation should be discussed with the patient who can then make an informed treatment choice.	I	C
SAVR is recommended in younger patients who are low risk for surgery (<75 years ^e and STS-PROM/EuroSCORE II <4%) ^{e,f} , or in patients who are operable and unsuitable for transfemoral TAVI. ²⁴⁴	I	B
TAVI is recommended in older patients (≥75 years), or in those who are high risk (STS-PROM/EuroSCORE II ^f >8%) or unsuitable for surgery. ^{197–206,245}	I	A
SAVR or TAVI are recommended for remaining patients according to individual clinical, anatomical, and procedural characteristics. ^{202–205,207,209,210,212 f,g}	I	B
Non-transfemoral TAVI may be considered in patients who are inoperable and unsuitable for transfemoral TAVI.	IIb	C

- **La stenosi aortica**
- **Diagnosi**
- **Indicazioni al trattamento**
- **TAVI vs SAVR**
- **TAVI nel 2025**

- CLINICA
- ECOCARDIOGRAMMA
- DECISIONE ALL'INTERVENTO
- SCELTA DELL'INTERVENTO
- VALIDITA' DELLE LINEE GUIDA
 - ELEMENTI DA CONSIDERARE

Che cosa si intende per “rischio”

La probabilità di morte perioperatoria nei pazienti sottoposti a cardiochirurgia (SAVR)

- quindi attualmente si tratta di un dato incompleto

Important: The previous additive¹ and logistic² EuroSCORE models are out of date. A new model has been prepared from fresh data and is launched at the 2011 EACTS meeting in Lisbon. The model is called EuroSCORE II³ - this online calculator has been updated to use this new model. If you need to calculate the older "additive" or "logistic" EuroSCORE please visit the old calculator by [clicking here](#).

Patient related factors			Cardiac related factors		
Age ¹ (years)	0	0	NYHA	select	0
Gender	select	0	CCS class 4 angina ⁸	no	0
Renal impairment ² See calculator below for creatinine clearance	normal (CC >85ml/min)	0	LV function	select	0
Extracardiac arteriopathy ³	no	0	Recent MI ⁹	no	0
Poor mobility ⁴	no	0	Pulmonary hypertension ¹⁰	no	0
Previous cardiac surgery	no	0	Operation related factors		
Chronic lung disease ⁵	no	0	Urgency ¹¹	elective	0
Active endocarditis ⁶	no	0	Weight of the intervention ¹²	isolated CABG	0
Critical preoperative state ⁷	no	0	Surgery on thoracic aorta	no	0
Diabetes on insulin	no	0			
EuroSCORE II EuroSCORE II 0					
 Note: This is the 2011 EuroSCORE II			Calculate Clear		

Important: The previous additive ¹ and logistic ² EuroSCORE models are out of date. A new model has been prepared from fresh data and is launched at the 2011 EACTS meeting in Lisbon. The model is called EuroSCORE II ³ - this online calculator has been updated to use this new model. If you need to calculate the older "additive" or "logistic" EuroSCORE please visit the old calculator by [clicking here](#).

Patient related factors			Cardiac related factors		
Age ¹ (years)	83 ✓	0.68	NYHA	II ✓	.1070545
Gender	female ✓	.2196434	CCS class 4 angina ⁸	no	0
Renal impairment ² See calculator below for creatinine clearance	moderate (CC >50 & <85) ✓	.303553	LV function	good (LVEF > 50%) ✓	0
Extracardiac arteriopathy ³	no	0	Recent MI ⁹	no	0
Poor mobility ⁴	no	0	Pulmonary hypertension ¹⁰	moderate (PA systolic 31-55 mmHg) ✓	.1788899 ✓
Previous cardiac surgery	no	0	Operation related factors		
Chronic lung disease ⁵	no	0	Urgency ¹¹	elective	0
Active endocarditis ⁶	no	0	Weight of the intervention ¹²	single non CABG ✓	.0062118 ✓
Critical preoperative state ⁷	no	0	Surgery on thoracic aorta	no	0
Diabetes on insulin	yes ✓	.3542749			
EuroSCORE II ✓ EuroSCORE II 3.02 %					
Note: This is the 2011 EuroSCORE II Calculate Clear					

→ Basso rischio



Important: The previous additive ¹ and logistic ² EuroSCORE models are out of date. A new model has been prepared from fresh data and is launched at the 2011 EACTS meeting in Lisbon. The model is called EuroSCORE II ³ - this online calculator has been updated to use this new model. If you need to calculate the older "additive" or "logistic" EuroSCORE please visit the old calculator by [clicking here](#).

Patient related factors			Cardiac related factors		
Age ¹ (years)	69	0.29	NYHA	II	.1070545
Gender	female	.2196434	CCS class 4 angina ⁸	no	0
Renal impairment ² See calculator below for creatinine clearance	severe (CC <50)	.8592256	LV function	moderate (LVEF 31%-50%)	.3150652
Extracardiac arteriopathy ³	yes	.5360268	Recent MI ⁹	no	0
Poor mobility ⁴	no	0	Pulmonary hypertension ¹⁰	moderate (PA systolic 31-55 mmHg)	.1788899
Previous cardiac surgery	no	0	Operation related factors		
Chronic lung disease ⁵	yes	.1886564	Urgency ¹¹	elective	0
Active endocarditis ⁶	no	0	Weight of the intervention ¹²	single non CABG	.0062118
Critical preoperative state ⁷	no	0	Surgery on thoracic aorta	no	0
Diabetes on insulin	yes	.3542749			
EuroSCORE II EuroSCORE II 9.33 %					
Note: This is the EuroSCORE II Calculate Clear					

→ Alto rischio

Rischio chirurgico

- $< 4\%$ → rischio basso
- $4\%-8\%$ → rischio intermedio
- $> 8\%$ → rischio alto
- $> 20-30\%$ → rischio proibitivo

ETA'

- ≤ 75
- $>75 <85$
- > 85

Molte cose non entrano nel calcolo del rischio

- Fragilità
- Capacità funzionale
- Aorta a porcellana
- Pregressa radioterapia toracica
- ...

Gli score di rischio

*Sono elementi incompleti che non sostituiscono il giudizio clinico
ma sono complementari ad esso*

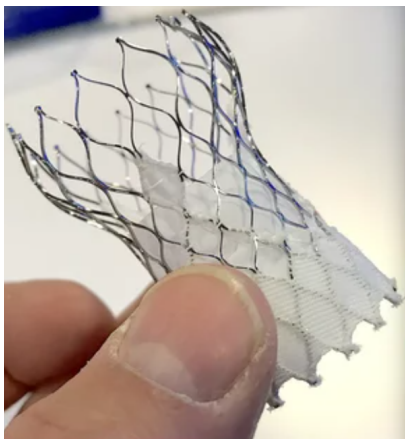
TAVI vs. SAVR decision-making is now mainly based on predicted life expectancy in relation to prosthetic durability and patient preferences.

Sostituzione chirurgica o percutanea transcatetere (TAVI)?

...cosa ci dicono le linee-guida:

SAVR is recommended in younger patients who are low risk for surgery (<75 years ^a and STS-PROM/EuroSCORE II <4%) ^{a,c} , or in patients who are operable and unsuitable for transfemoral TAVI. ²⁴⁴	I	B
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**2021 ESC/EACTS Guidelines for the
management of valvular heart disease**



«era TAVI»

STERNOTOMIA
COMPLETA



SAVR dal 1962 → >60 anni!



a



Carpentier-Edwards
PERIMOUNT™



Carpentier-Edwards
Magna Ease™



St. Jude Medical
Trifecta™

b



Medtronic
Mosaic®



Medtronic
Hancock® II



St. Jude Medical
Biocor™

c



Medtronic
Freestyle®



St. Jude Medical
Toronto SPV®

SAVR – novità e punti di forza

- ✓ bicuspidia aortica
- ✓ aneurisma dell'aorta ascendente
- ✓ nuove bioprotesi con elevata longevità
- ✓ protesi meccaniche con INR ridotto (1.5-2)
- ✓ tecniche meno invasive –
ministernotomia e minitoracotomia

SAVR: Misurazione diretta dell'anello valvolare



Vantaggi della chirurgia aortica mini-invasiva

Riduzione della degenza post-operatoria

Riduzione dell'utilizzo di emoderivati

Riduzione del dolore post-operatorio

Recupero funzionale più rapido

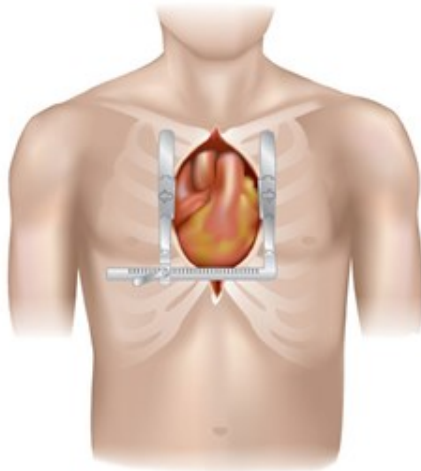
Riduzione delle infezioni del sito chirurgico

Miglior risultato estetico

Maggior accettazione dell'intervento

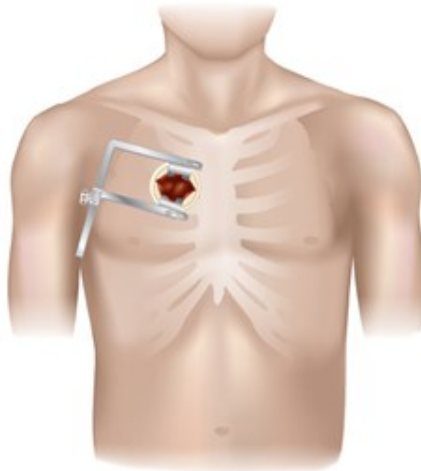
Vantaggi in caso di futuro reintervento (ridotte aderenze)

Conventional

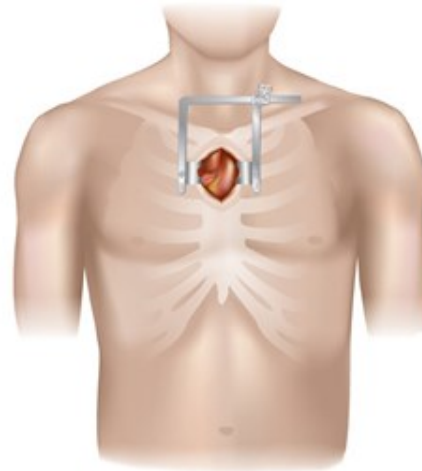


Sternotomy

Minimally-invasive



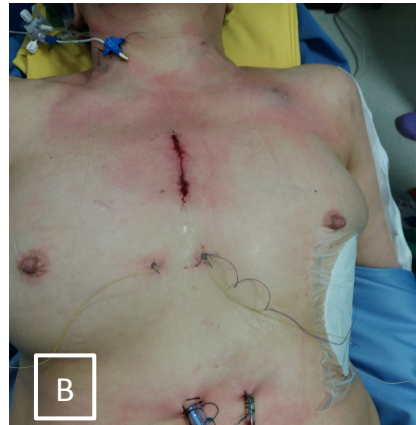
Mini-thoracotomy



Hemi-sternotomy

CHIRURGIA MINI-INVASIVA DELLA VALVOLA AORTICA:

- ✓ MINI-STERNOTOMIA
SUPERIORE (A, B)
- ✓ MINI-TORACOTOMIA
ANTERIORE DESTRA (C)



(dall'archivio fotografico Dr. Ramoni –Villa Torri Hospital)

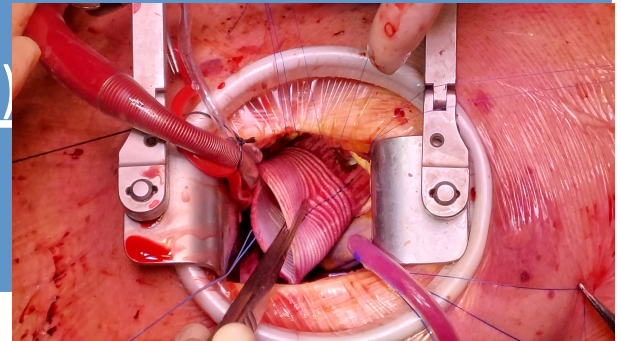
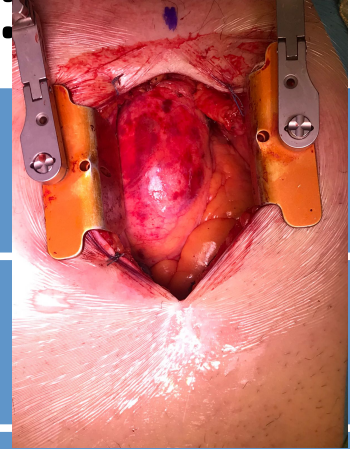
Attraverso l'approccio mini-invasivo è possibile eseguire:

Sostituzione della valvola aortica

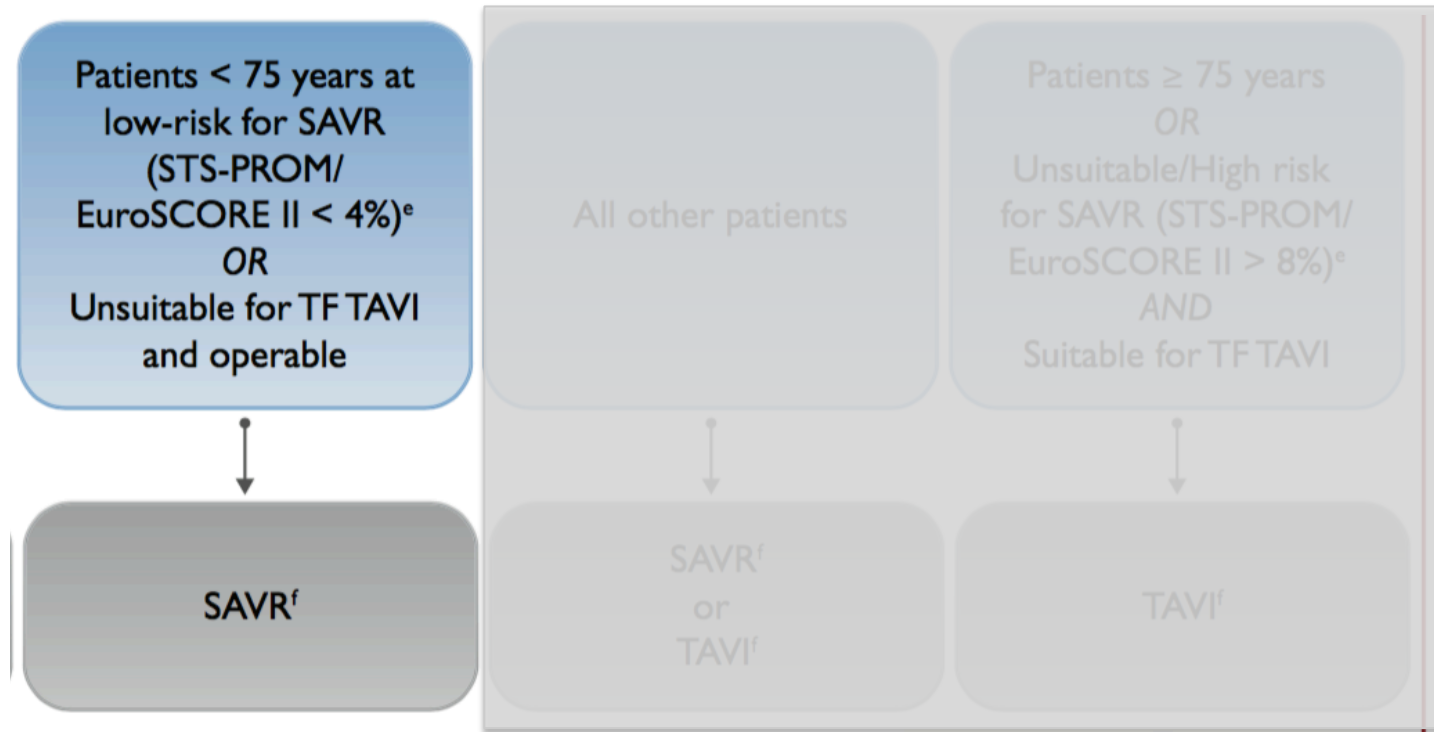
Plastica della valvola aortica

Sostituzione del bulbo aortico
(intervento di David, intervento di Bentall)

Sostituzione dell'aorta ascendente



SAVR - a chi ?



ESC



EACTS

NO mininvasivo

- Valvulopatie associate
- Necessità di CABG
- Aneurisma Aorta Ascendente
- (NO AG e CEC in «grandi anziani»)

Tipo di intervento – SAVR o TAVI ?

- **TAVI – Transcatheter Aortic Valve Implantation**

impianto di protesi aortica transcaterere

- con accesso femorale (percutaneo in prima scelta)
- con accesso centrale (trans-aortico, trans-anonimo o trans-succlavio)

- **SAVR – Surgical Aortic Valve Replacement**

sostituzione valvolare aortica chirurgica

- sternotomia mediana
- mini-invasivo
- ...

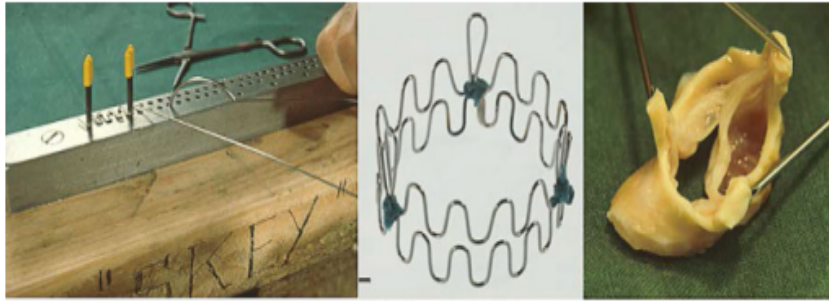
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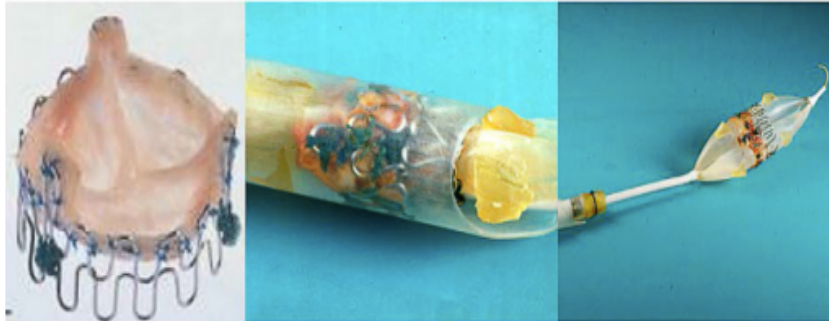
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management of valvular heart disease**

TAVI – gli inizi nel 1989



"316 SL" 8-14 mm

Porcine



41 Fr = 13.6 mm (OD)



Prof. Henning Rud Andersen

TAVI – primo impianto nell'uomo



First-in-Man implantation (Rouen, April 16, 2002).
B-View of the transcatheter valve in place within the native calcified valve and hemodynamic result (no gradient).
C-The patient immediately after valve implantation and D, 8 days later.

April 16, 2002

Sant'Orsola Bologna 2008



Sant'Orsola Bologna 2008



Dr. F. Saia

Dr. A. Marzocchi

Prof. A. Cribier

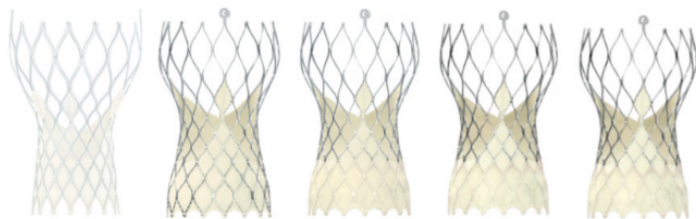
Dr.ssa C. Marrozzini

TAVI nel 2025

>20 anni di evoluzione

Due tipi di valvole TAVI – vari modelli

Autoespandibile



Corevalve

Evolut R

Evolut PRO

Evolut PRO+

Evolut FX



Portico



Navitor



Allegra

Espandibile a pallone



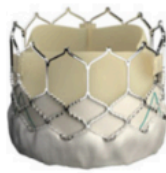
Cribier-Edwards



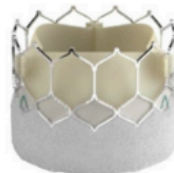
Sapien



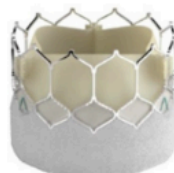
Sapien XT



Sapien 3



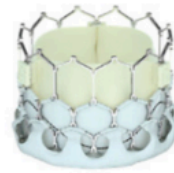
Sapien 3 Ultra



Sapien 3 Ultra
Resilia



Sapien X4



MyVal



MyVal Octacor

TAVI – evoluzione

TAVI prototipo

1989



**13.5–14.5 mm
AA Battery**

Le prime TAVI

2002



**10.5 mm
AAA Battery**

TAVI ora

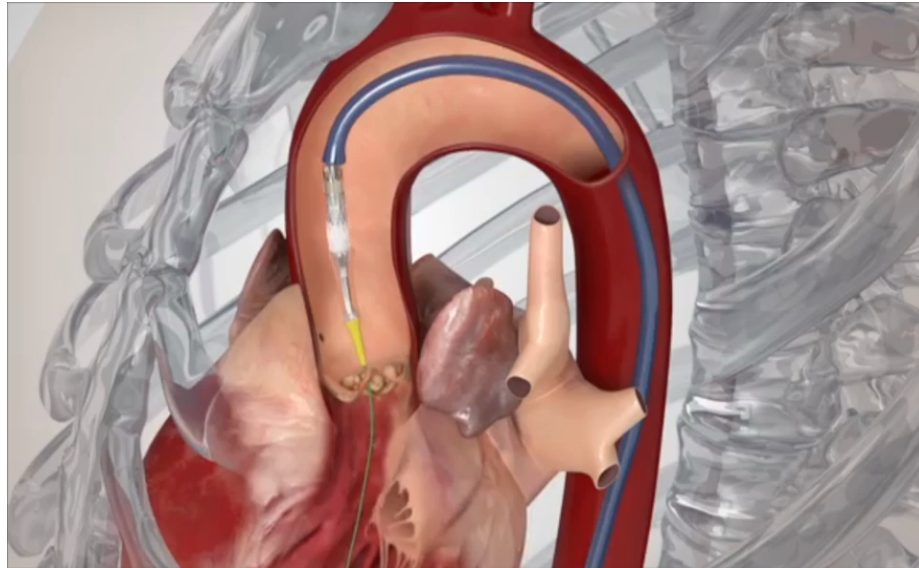
2025



**4.5 mm
#2 Pencil**

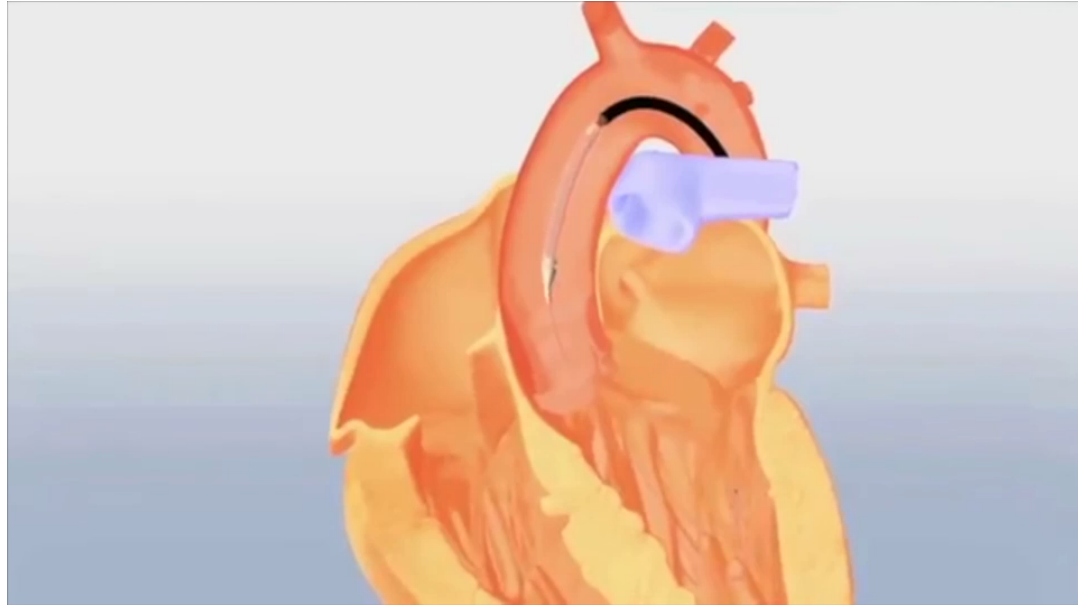
TAVI adesso

14-16 Fr → 4.6 – 5.2 mm



TAVI adesso

14-16 Fr → 4.6 – 5.2 mm



TAVI nel 2025 - sempre meno invasiva

- solo anestesia locale, paziente sveglio
- 1 accesso arterioso femorale 14Fr
- 1 accesso arterioso radiale 6Fr
- sistemi di chiusura dell'accesso femorale affidabili
- durata della procedura circa 1 ora
- non terapia intensiva
- Mobilizzazione lo stesso giorno, al massimo il mattino dopo
- dimissione possibile a 24-48 ore (48-72)

TAVI – molti studi nelle diverse categorie di rischio

Table 1. Comparison between the pivotal studies on transcatheter heart valve intervention with regard to patients included, patient age, the type of transcatheter valve, follow-up duration and the primary outcome.

	High-Risk Patients		High-Intermediate-Risk Patients	Intermediate-Risk Patients		Low-Risk Patients	
	PARTNER 1A	US CoreValve High Risk	UK TAVI	PARTNER 2A	SURTAVI	PARTNER 3	EVOLUT
Number of patients	699	795	913	2032	1660	950	1468
Study population	symptomatic severe AS	severe AS with heart failure symptoms	symptomatic severe AS	symptomatic severe AS	symptomatic severe AS	severe AS with an indication for intervention	severe AS with an indication for intervention
Type of valve	Balloon-expandable	Self-expandable	balloon-expandable and self-expandable	Balloon-expandable	Self-expandable	balloon-expandable	Self-expandable
Patient median age, for the TAVI group (years)	83.6	83.1	81.1	81.5	79.9	73.3	74
Follow-up (years)	5	1	1	2	2	1	2
Primary endpoint	All-cause death	All-cause death	All-cause death	death from any cause or disabling stroke	death from any cause or disabling stroke	death, stroke, rehospitalization	death or disabling stroke
Result (with regard to the primary outcome)	TAVI non-inferior to SAVR	TAVI superior to SAVR	TAVI non-inferior to SAVR	TAVI non-inferior to SAVR	TAVI non-inferior to SAVR	TAVI superior to SAVR	TAVI non-inferior to SAVR

AS, aortic stenosis; TAVI, transcatheter aortic valve intervention; SAVR, surgical aortic valve replacement.

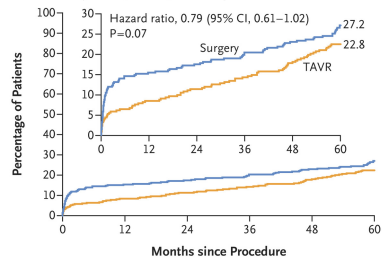
Transcatheter Aortic-Valve Replacement in Low-Risk Patients at Five Years

Authors: Michael J. Mack, M.D., Martin B. Leon, M.D., Vinod H. Thourani, M.D., Philippe Pibarot, D.V.M., Ph.D., Rebecca T. Hahn, M.D., Philippe Genereux, M.D., Susheel K. Kodali, M.D., ^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100} for the PARTNER 3 Investigators* [Author Info](#) & [Affiliations](#)

Published October 24, 2023 | N Engl J Med 2023;389:1949-1960 | DOI: 10.1056/NEJMoa2307447

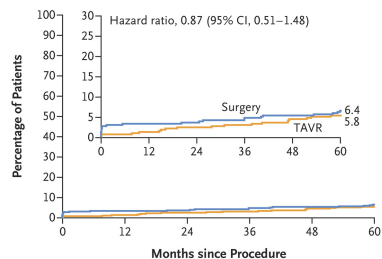
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A Death from Any Cause, Stroke, or Rehospitalization



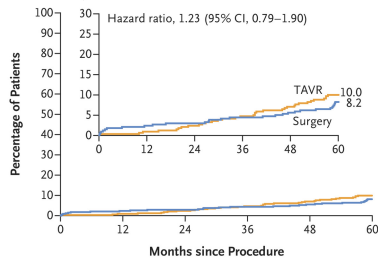
No. at Risk	0	12	24	36	48	60
Surgery	454	372	349	328	309	276
TAVR	496	453	434	415	391	353

C Stroke



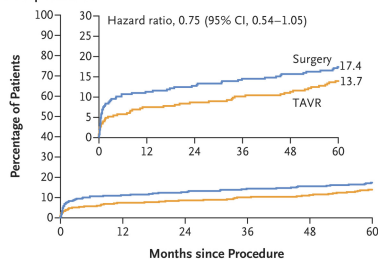
No. at Risk	0	12	24	36	48	60
Surgery	454	416	397	378	361	329
TAVR	496	486	468	450	428	391

B Death from Any Cause



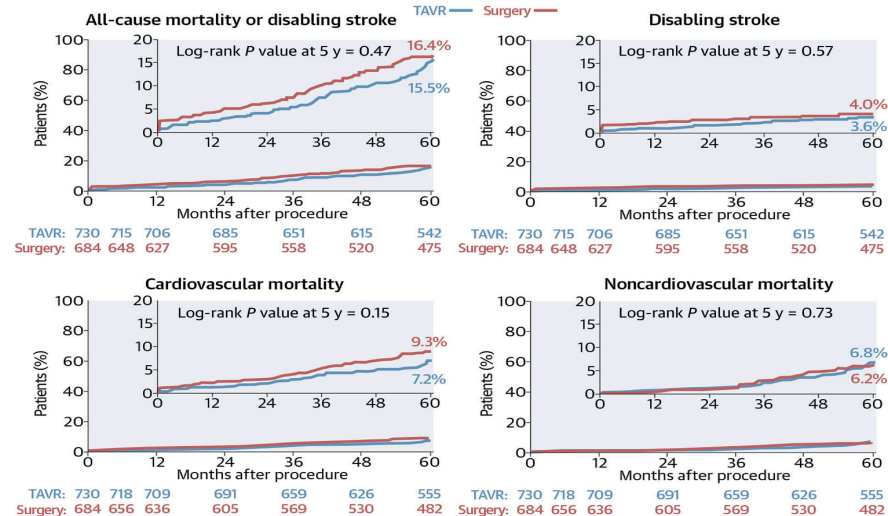
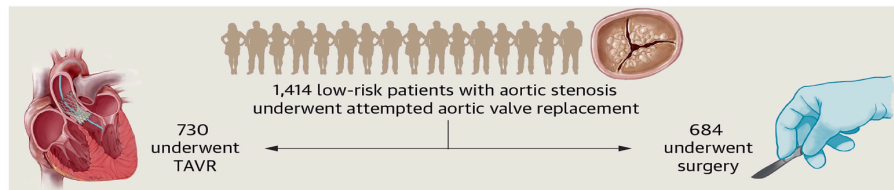
No. at Risk	0	12	24	36	48	60
Surgery	454	427	409	394	379	346
TAVR	496	490	478	460	438	405

D Rehospitalization



No. at Risk	0	12	24	36	48	60
Surgery	454	381	359	339	321	289
TAVR	496	455	439	419	396	361

CENTRAL ILLUSTRATION: 5-Year Outcomes After Transcatheter or Surgical Aortic Valve Replacement



Transcatheter and surgical aortic valve replacement had comparable rates of all-cause mortality or disabling stroke with sustained outcomes over 5 years

Forrest JK, et al. JACC. 2025;85(15):1523-1532.

TAVI = SAVR a 5 anni

ALLORA....

TAVI A TUTTI

?

I NOVANTENNI

- **Mortalità a 1 anno di un 90enne dopo TAVI → 20%**
- **Mortalità a 1 anno di un 90enne nella popolazione generale → 16 %**



Stenosi aortica severa ≠ indicazione certa all'intervento sicuro se ci sono comorbidità importanti

Intervention is not recommended in patients with severe comorbidities when the intervention is unlikely to improve quality of life or prolong survival >1 year.



J.Q. 86-years old



"VERY FIT"

F.C. 83-years old



"VERY SEVERELY FRAIL"

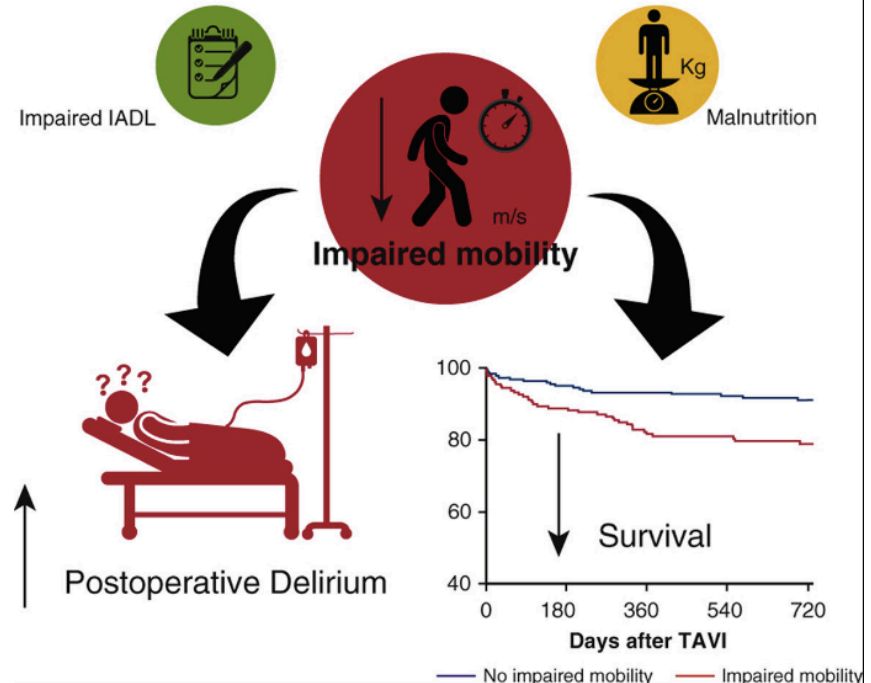
Scala di fragilità di Rockwood

(da Rockwood K, Song X, MacKnight C, et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-95, mod.)

- 1 - Molto in forma**
Persona forte, attiva, energica, motivata e sana. Pratica regolare esercizio fisico e appartiene alla categoria di persone più in forma fra la propria fascia d'età.
- 2 - In forma**
Persone che non hanno sintomi della malattia attivi, ma che sono meno in forma rispetto alle persone della categoria 1. Praticano sport o sono attive a seconda della stagione.
- 3 - Se la cava bene**
Persone i cui problemi medici sono ben monitorati, ma non sono regolarmente attive al di fuori della normale deambulazione quotidiana esterna.
- 4 - Potenzialmente fragile**
Anche se non differenti dall'aiuto degli altri nella vita quotidiana, queste persone sono spesso limitate nelle loro attività. Spesso lamentano di sentirsi "rallentati" e/o stanche durante il giorno. Alla condizione possono contribuire sintomi di malattia non ben controllati.
- 5 - Fragilità lieve**
Persone rallentate nei movimenti e nelle attività più impegnative della vita quotidiana (ad es. gestione delle finanze, locomozione, lavori domestici pesanti, gestione dei farmaci). Appaiono sempre più limitate nello shopping, nella deambulazione autonoma, nella preparazione dei pasti e nei lavori domestici. Molto spesso hanno bisogno di aiuto esterno.
- 6 - Fragilità moderata**
Come sopra ma hanno costantemente bisogno di aiuto esterno.
- 7 - Fragilità grave**
Completamente dipendenti dagli altri per la cura personale. Appartengono a questa fascia sia i pazienti non terminali (= apparentemente stabili e non ad alto rischio di morte entro ~6 mesi), sia pazienti terminali (= con un'aspettativa di vita < 6 mesi).

Fragilità

GERIATRIC ASSESSMENT IN TAVI PATIENTS



Età e comorbidità influenzano il risultato della procedura

Gli aspetti tecnici sono prevedibili e la percentuale di complicanze rimane bassa ma...

TABLE 2 Patient selection

	Key question	Red flags
Short-term risks	Is the patient at risk for a major procedural complication?	• High TAVR risk score • Comorbidity-complication dyads • Technically complex procedure



chronic kidney disease and risk of acute kidney injury

protruding aortic atheroma and risk of stroke

bulky aortic valve calcification and risk of coronary occlusion

peripheral arterial disease and risk of vascular complications

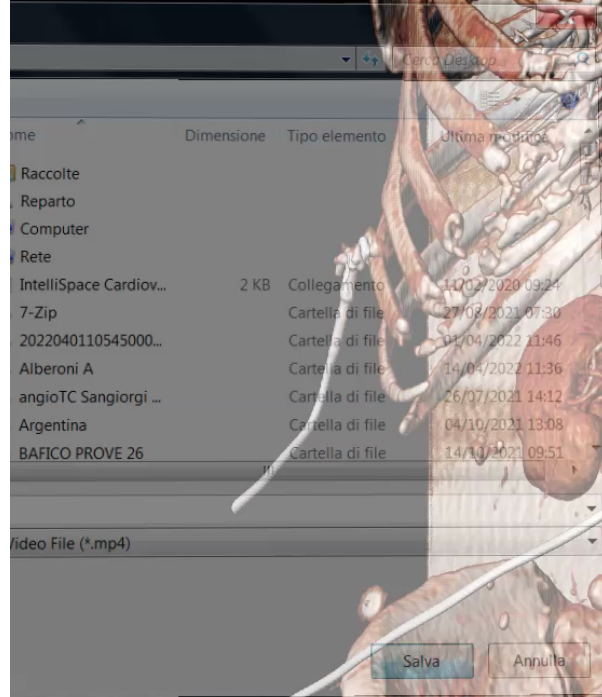
escalation of procedural complexity (e.g nonfemoral access) is not trivial and can shift the delicate balance of risks

TAVI – il ruolo chiave dell'angio TAC

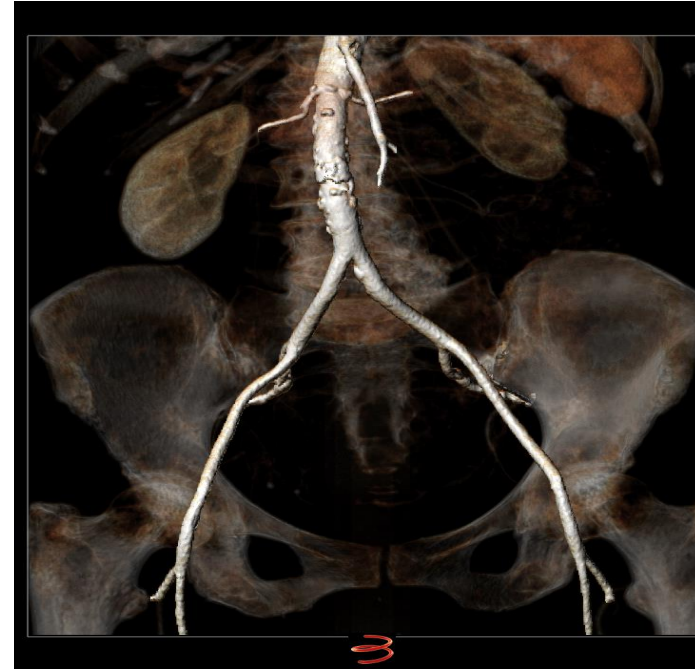
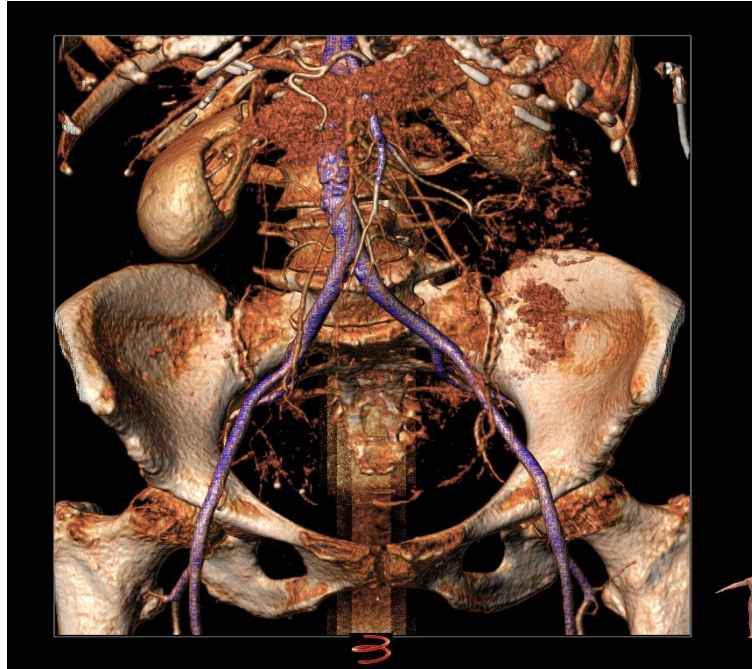
- L'ecocardiogramma riveste un ruolo centrale nel definire la severità della SAo
- La TAC ha il ruolo chiave per identificare la strategia corretta per la TAVI (o per controindicarla)

Che cosa cercare con la TAC

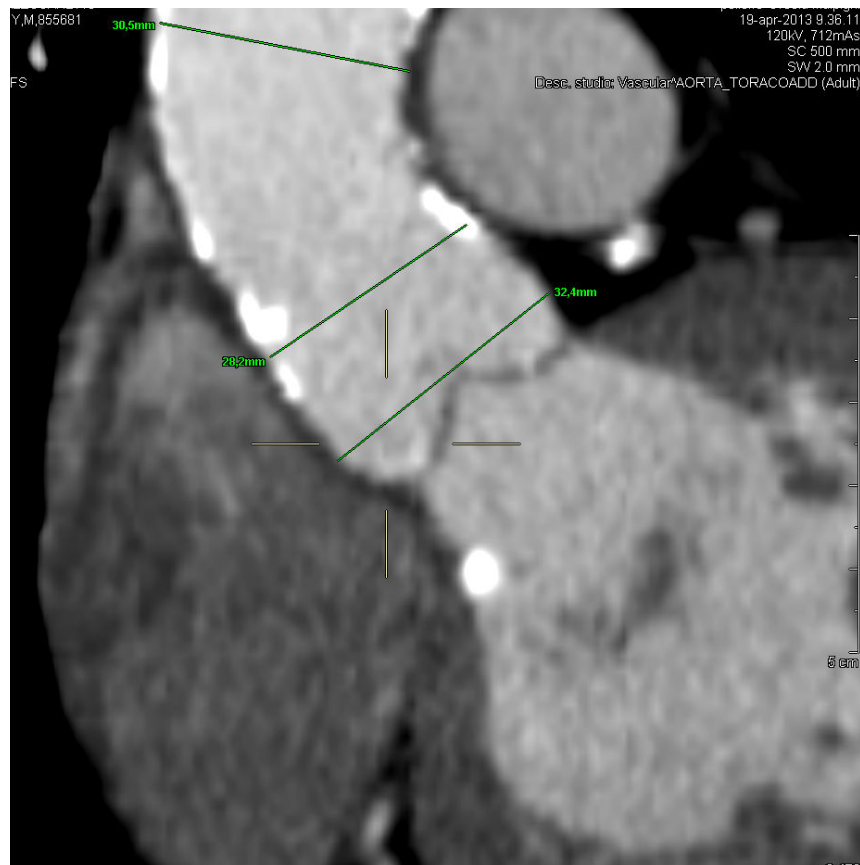
- Calcificazioni, posizione del calcio, diametro
- Altezza delle coronarie
- Rapporti con il setto (vedi rischio di BAV)
- Accessi femorali ed ev necessità di trattamento



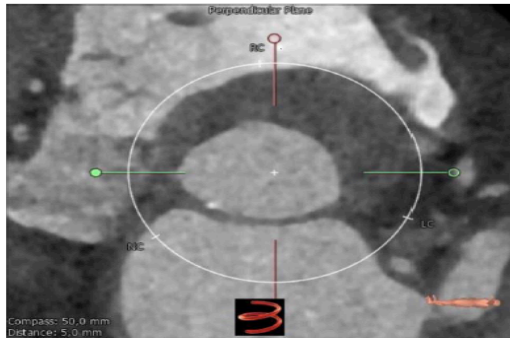
Accessi → l'asse iliaco-femorale



Misurazione dei seni di valsalva e aorta ascendente



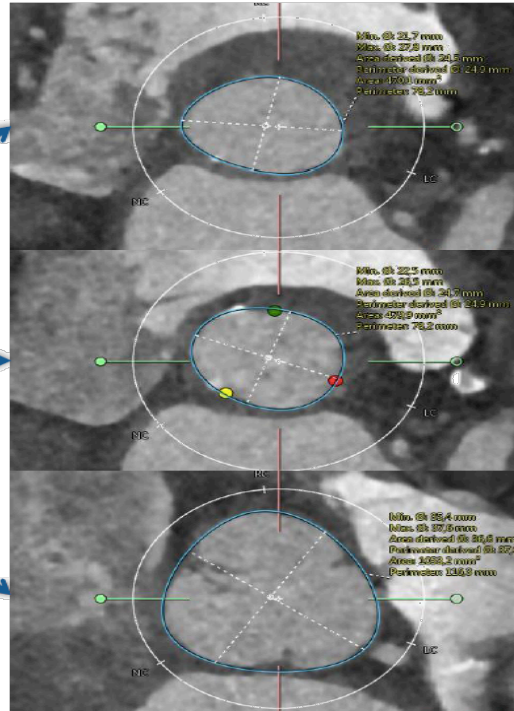
Misurazione dell'anello alla TAC



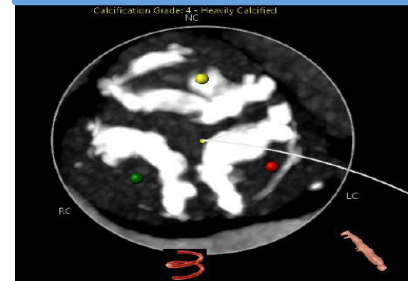
LVOT

Annulus

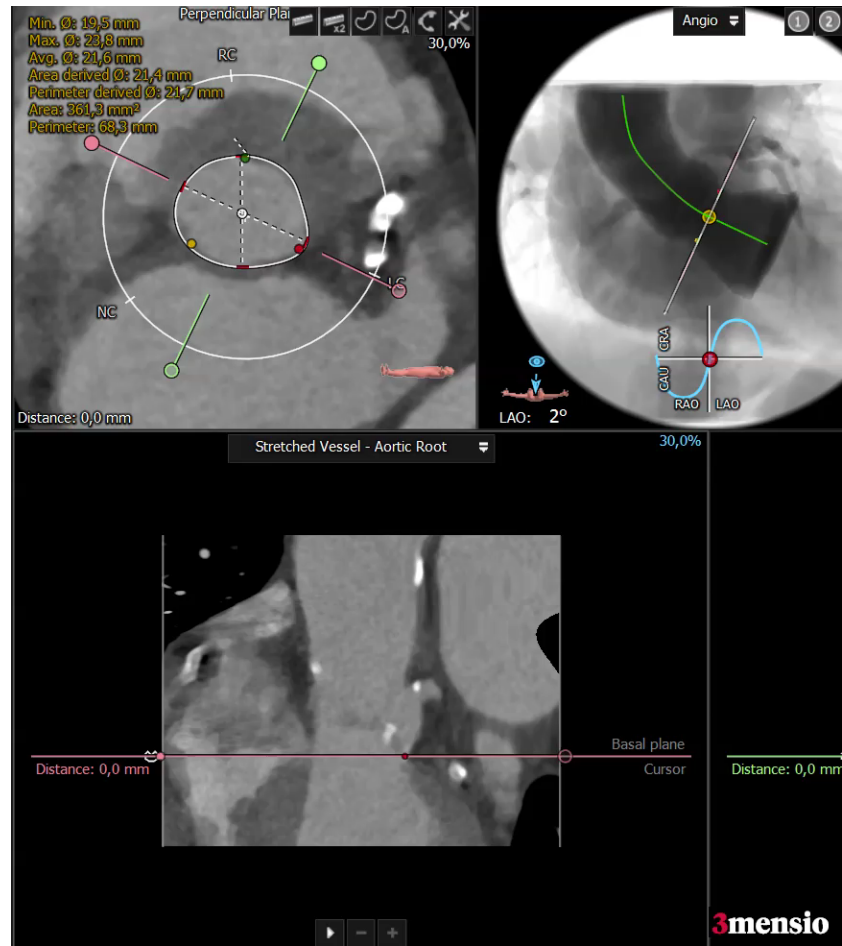
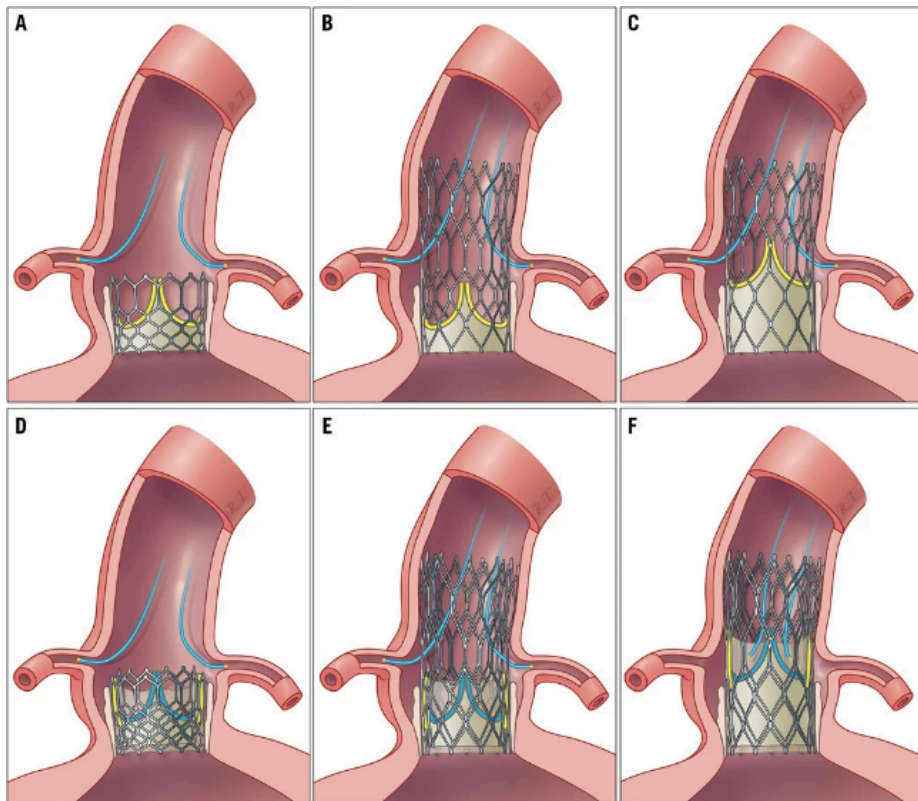
SOV



Calcifications



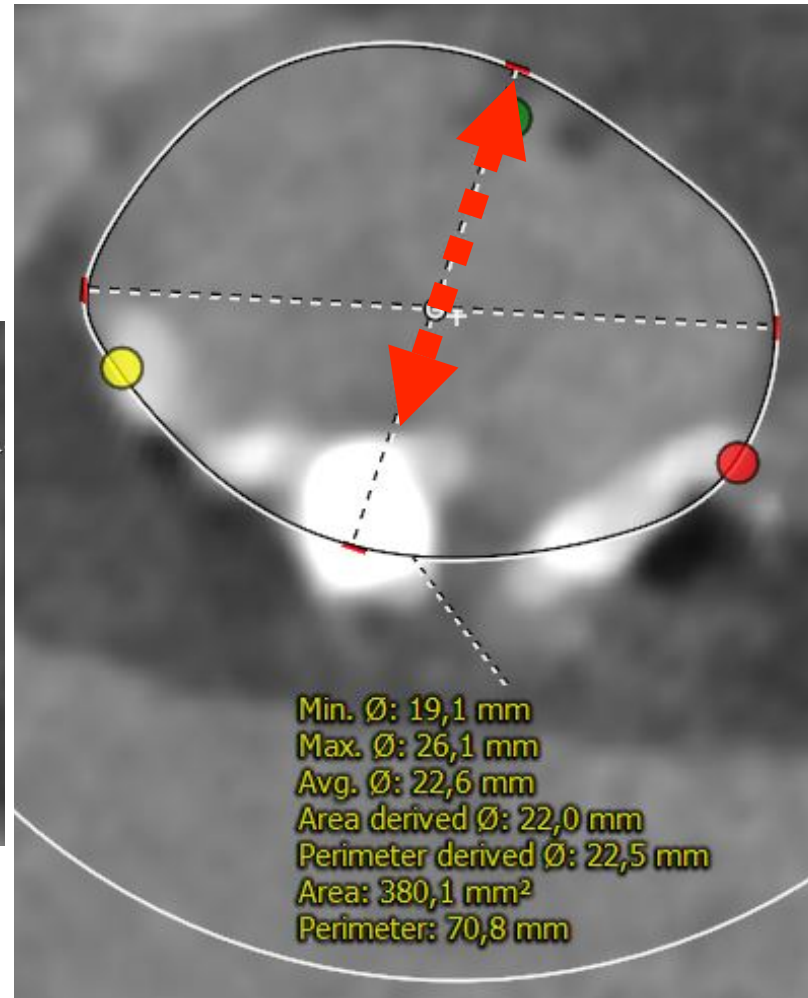
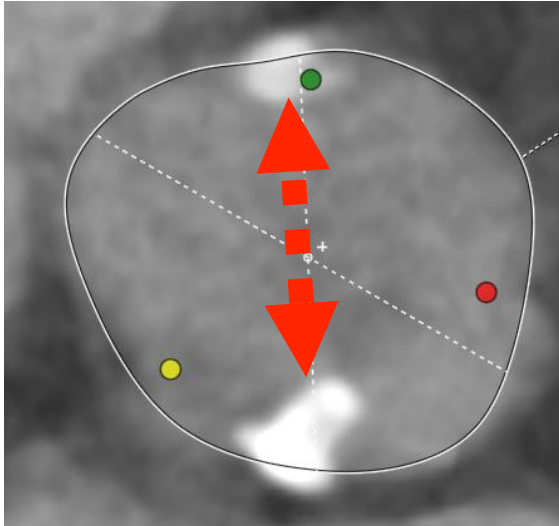
Importanza delle coronarie



TAVI: possibili problemi

- Calcificazioni eccentriche
 - Rischio di rottura dell'anello o di leak paravalvolare
- Coronarie basse
- Anello troppo piccolo o troppo grande

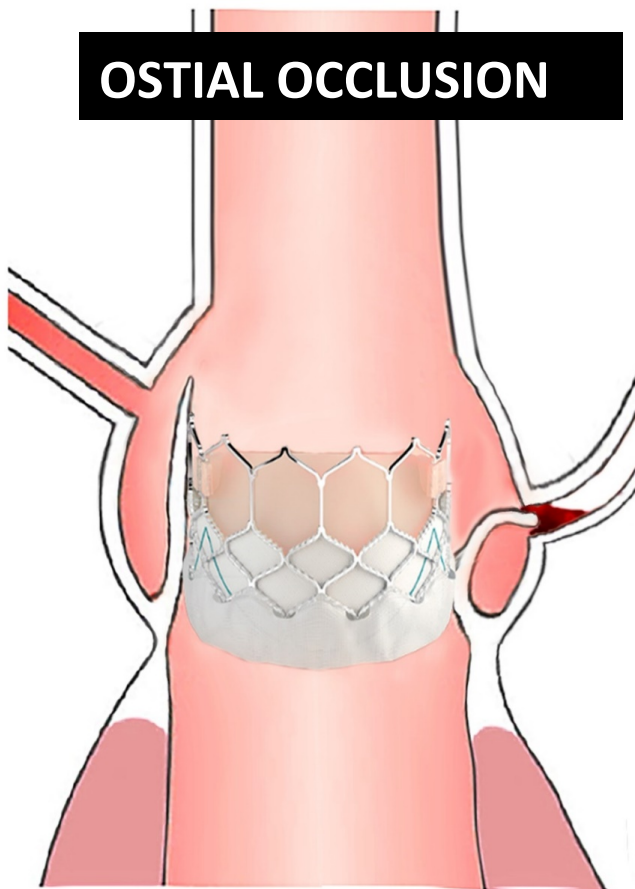
**Noduli prominenti
(peggio se sul diametro corto...)**



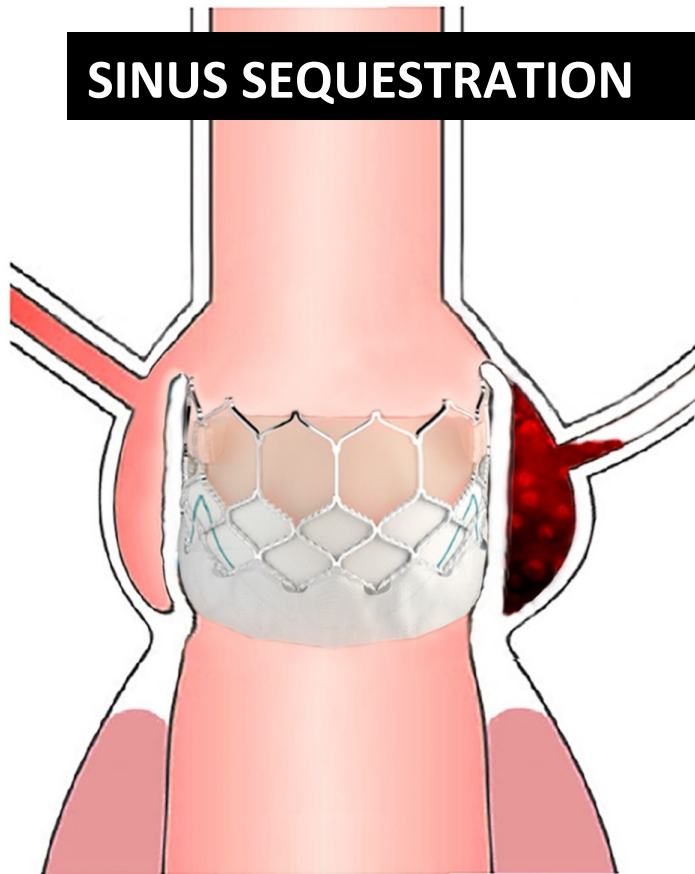
TAVI: Possibili problemi

- Può essere necessario trattare o proteggere le coronarie (con stent) se sono basse
- Gli stent ostiali possono rendere difficile una eventuale futura PTCA

OSTIAL OCCLUSION



SINUS SEQUESTRATION

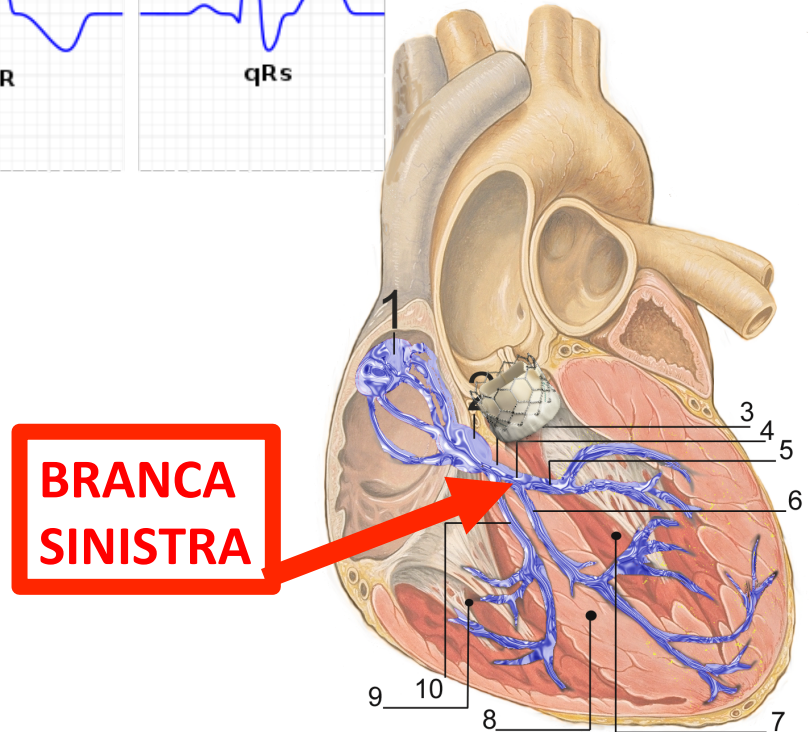


Principale fattore predisponente allo sviluppo di blocchi AV: blocco di branca destra all'ECG pre TAVI

Perché?

- Perché la **branca sinistra** è quella **più vicina alla sede di impianto della TAVI**.
- Se la branca destra ha già un deficit prima della procedura, al cuore del paziente resta solo la branca sn, che è quella più esposta

Quindi fare più attenzione ai pz con BBDx noto



Troppo vecchio per la TAVI? I novantenni

- Negli Stati Uniti l'attesa di vita media è di 76,5 anni per i maschi e di 80 anni per le femmine
- I novantenni hanno superato l'attesa di vita media di oltre dieci anni possono paradossalmente aver sviluppato una migliore resistenza agli stress avendo probabilmente superato diversi rischi nella loro vita e avendo meno comorbidità rispetto alla controparte ottantenne
- In base a questa "autoselezione" l'attesa di vita media residua di un novantenne può raggiungere i 4,5 anni

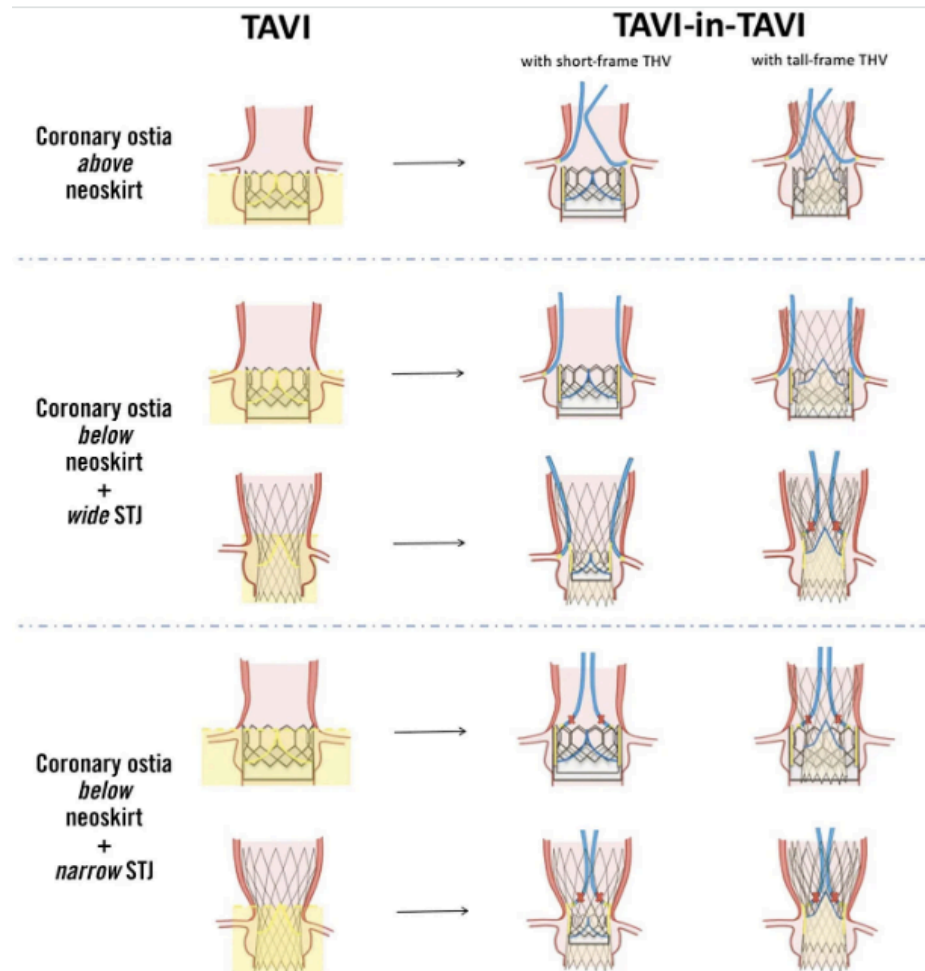
Degenerazione

- E' prevedibile la degenerazione della TAVI*?
 - Eccentricità delle calcificazioni
 - Insufficienza renale
 -

**Degenerazione di valvola biologica come quella chirurgica*

Quando la protesi degenera ? TAVI-in-TAVI ?

**Simulazione per valutare
la perfusione coronarica dopo TAVI e la futura
possibilità di cannularle in caso di necessità**



	Five chair rises <15 seconds	0 Points
	Five chair rises ≥15 seconds	1 Point
	Unable to complete	2 Points
	No cognitive impairment	0 Points
	Cognitive impairment	1 Point
	Hemoglobin ≥13.0 g/dL ♂ ≥12.0 g/dL ♀	0 Points
	Hemoglobin <13.0 g/dL ♂ <12.0 g/dL ♀	1 Point
	Serum albumin ≥3.5 g/dL	0 Points
	Serum albumin <3.5 g/dL	1 Point

EFT Score	1-Year Mortality TAVR	SAVR
0-1	6%	3%
2	15%	7%
3	28%	16%
4	30%	38%
5	65%	50%

EFT Points: _____

Afilalo, J. et al. J Am Coll Cardiol. 2017;70(6):689-700.

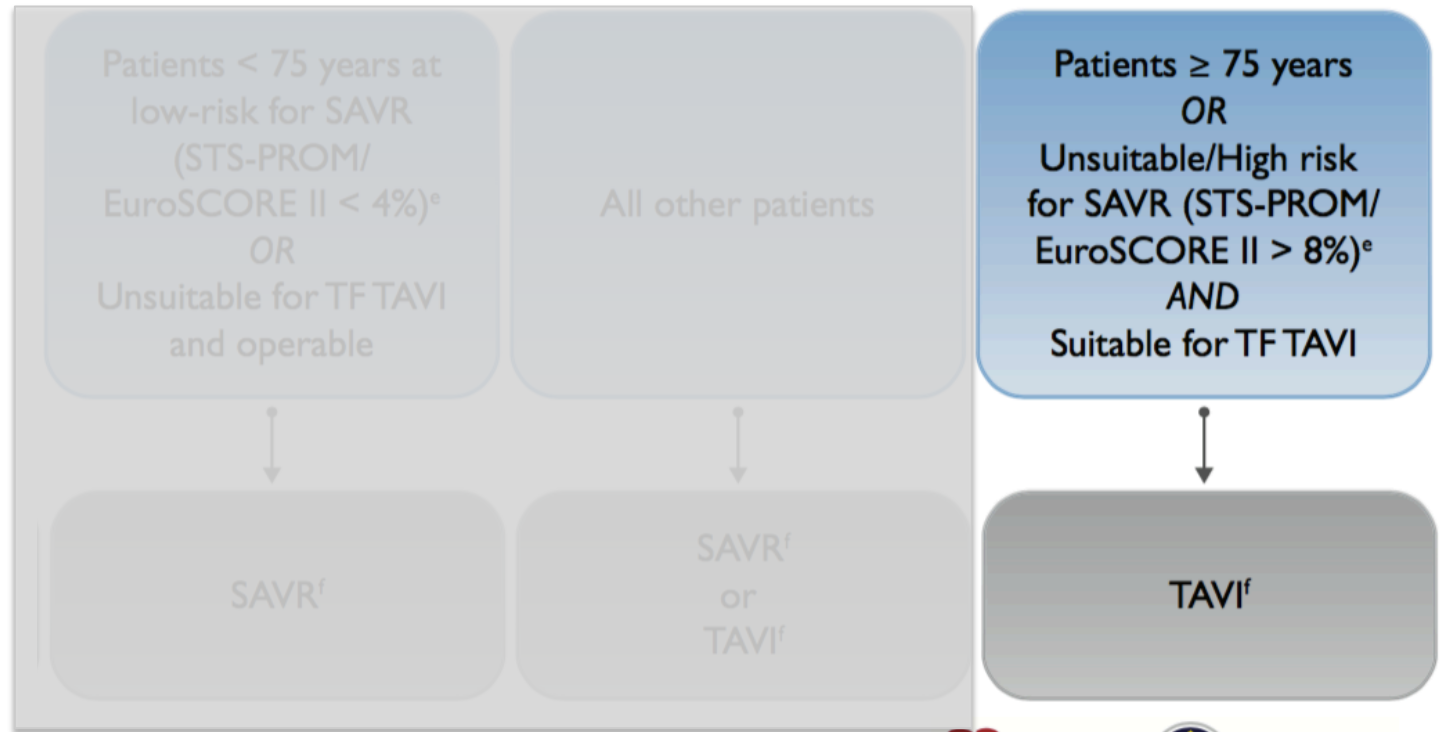
The EFT is scored 0 (least frail) to 5 (most frail) based on the following 4 items: pre-procedural anemia, hypoalbuminemia, lower-extremity muscle weakness defined as a time of ≥15 s or inability to complete five sit-to-stand repetitions without using arms, and cognitive impairment defined as a score of <24 on the Mini-Mental State Examination (which is highly unlikely if the patient is able to correctly recall 3 out of 3 words after a distractive task and may obviate the need for further cognitive testing). EFT = Essential Frailty Toolset; SAVR = surgical aortic valve replacement; TAVR = transcatheter aortic valve replacement.

Troppo fragile per la TAVI?

La fragilità condiziona:

- *Aumento della mortalità a 1 anno*
- *Maggiore disabilità*
- *Più sanguinamenti*
- *Dimissione con necessità di assistenza specifica*
- *Peggior qualità della vita dopo TAVI*

TAVI a chi?



ESC



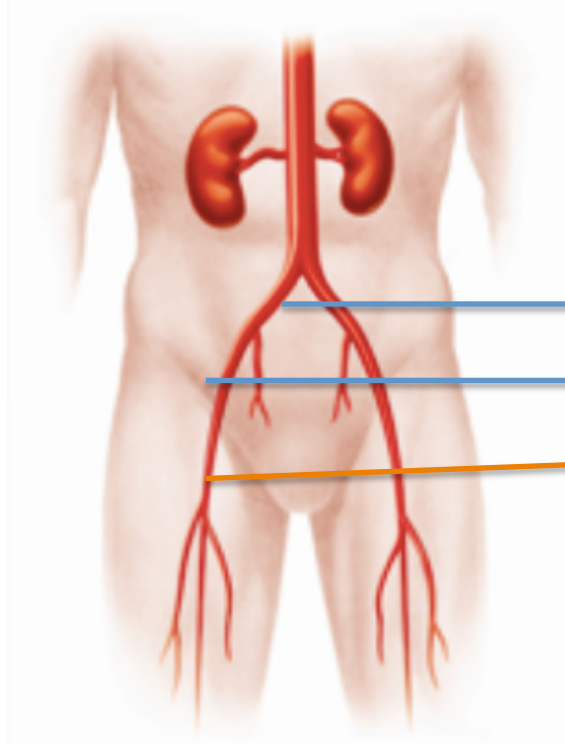
EACTS

TAVI – primo impianto nell'uomo



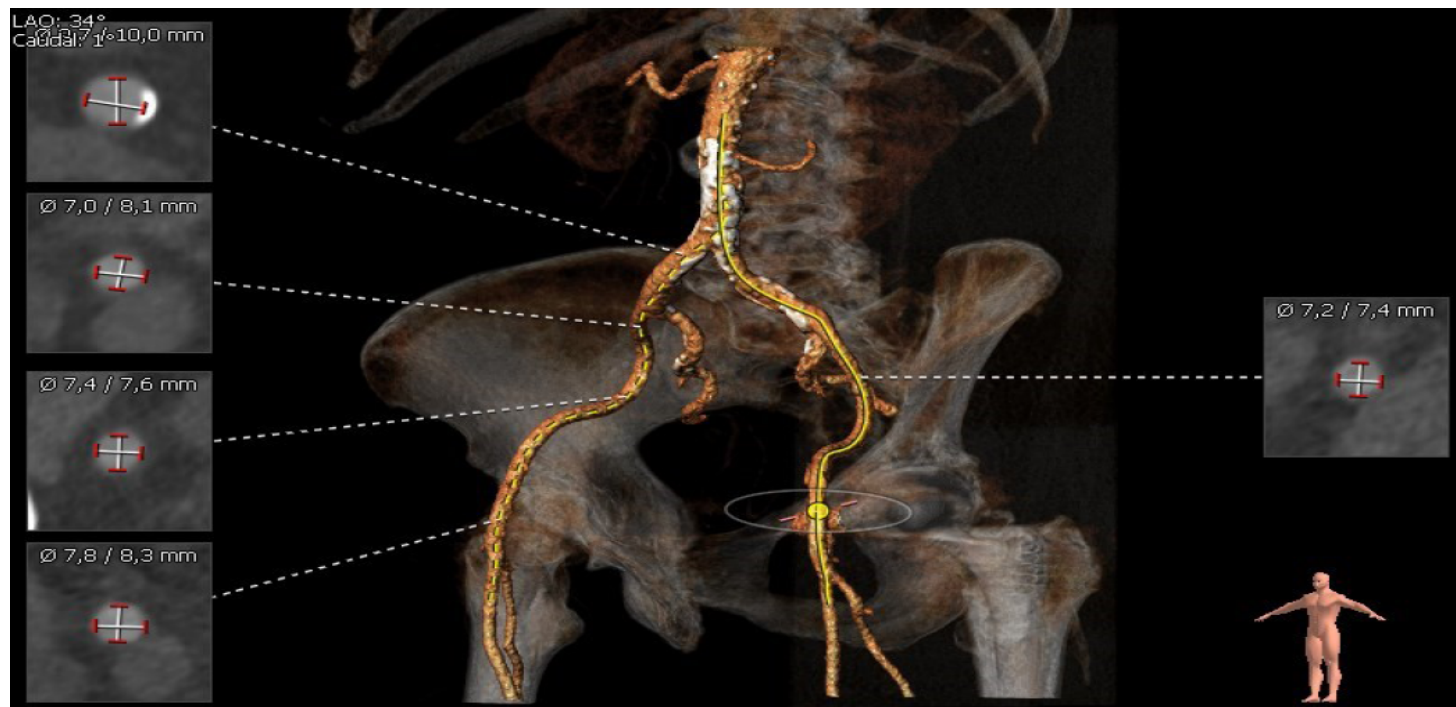
First-in-Man implantation (Rouen, April 16th, 2002). A-The complex antegrade transseptal route used for TAVR. B-View of the transcatheter valve in place within the native calcified valve and hemodynamic result (no gradient). C-The patient immediately after valve implantation and D, 8 days later.

Perché il diametro e' importante ?

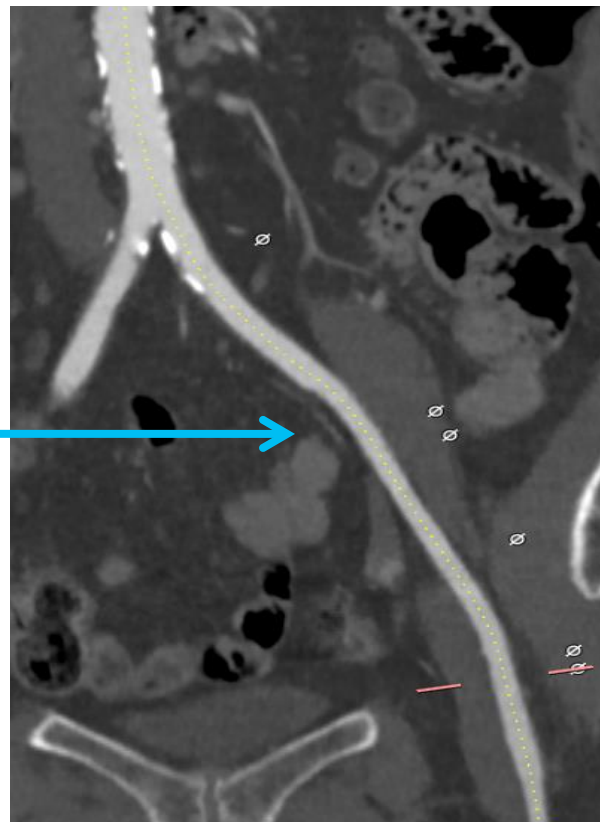
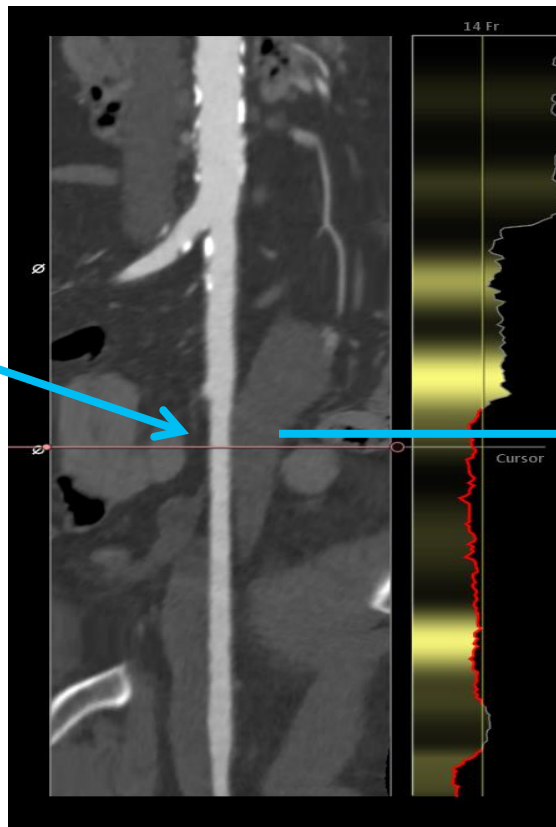


Normal diameter of lower limb artery

- | | |
|------------------------------|------------|
| • Sub-diaphragmatic aorta | 21 – 24 mm |
| • Infra-diaphragmatic aorta | 17 – 20 mm |
| • Common iliac artery | 10 – 12 mm |
| • External iliac artery | 8 – 10 mm |
| • Common femoral artery | 7 – 9 mm |
| • Superficial femoral artery | 6 – 8 mm |
| • Popliteal artery | 4 – 6 mm |



Scelta dell'accesso



VANTAGGI DELL' APPROCCIO PERCUTANEO

- Possibilità di trattamento combinato
- TAVI e EVAR (endoprotesi aorta addominale)
- TAVI e Stent carotideo
- TAVI e PTA iliaco-femorale

caso clinico

Maschio, 84 anni

FRCV: DM II, iperteso

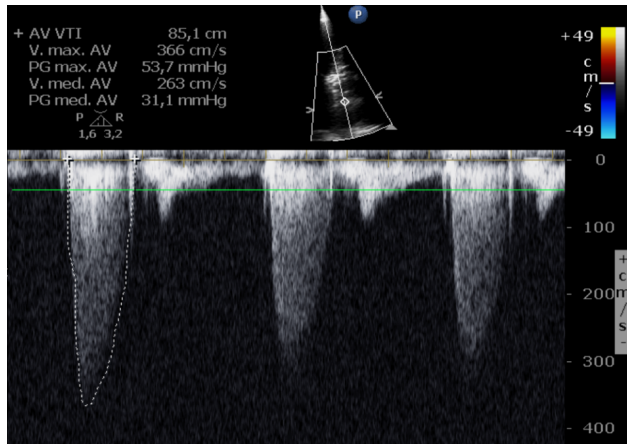
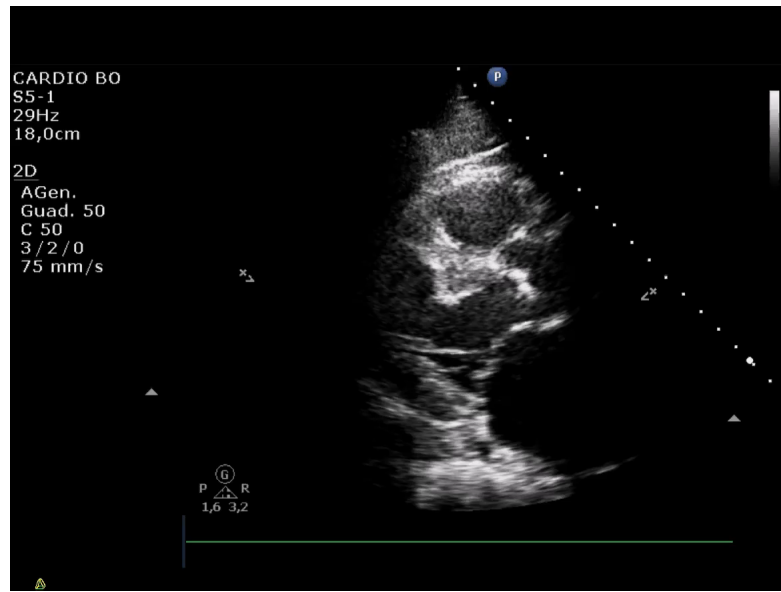
Comorbidità: BPCO, pregresso TIA, fibrillaz atriale in DOAC

2001, diagnosi di infarto silente

FE 45%. SAo lieve → tp medica

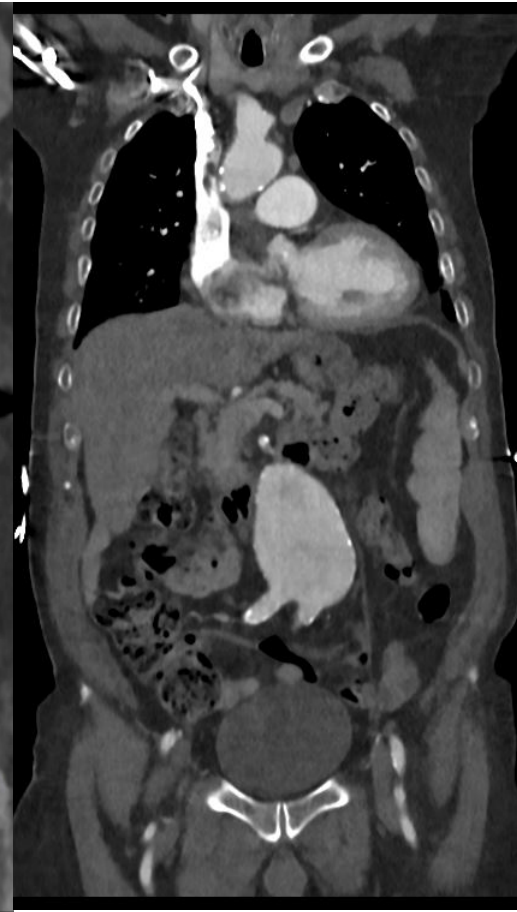
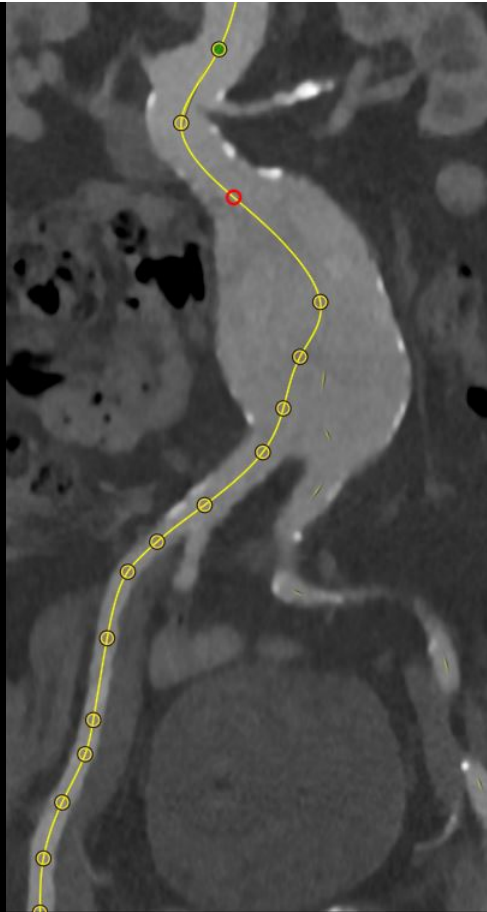
Inizio 2019, riscontro occasionale di aneurisma aortico ad una TAC

→ **Angio-TC scan**

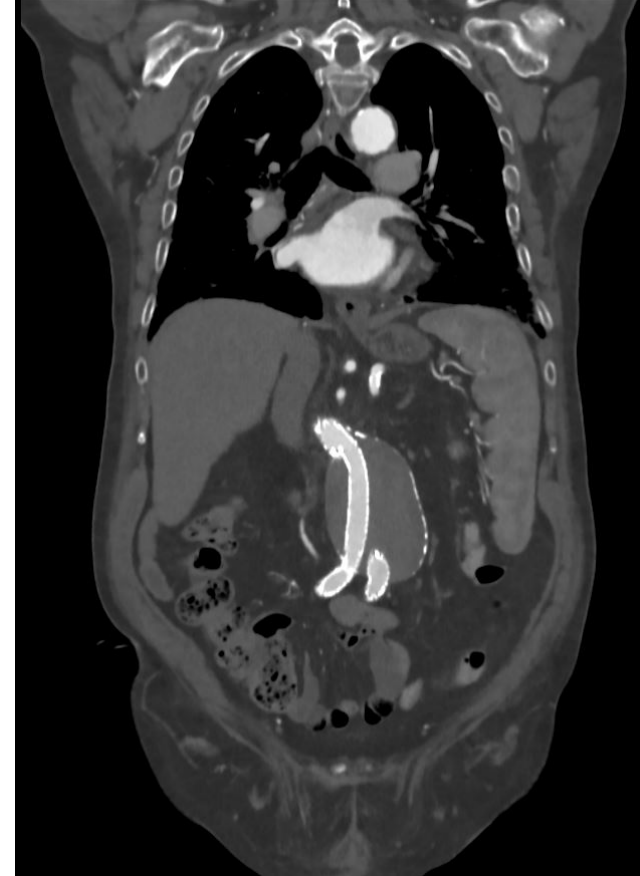


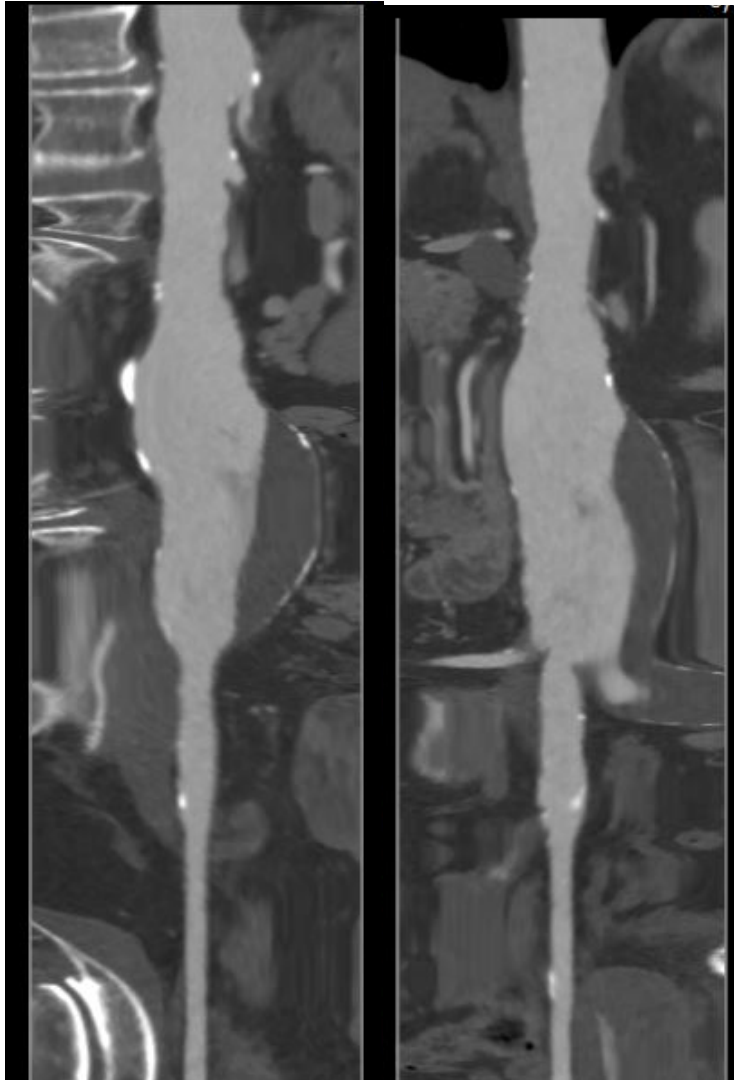
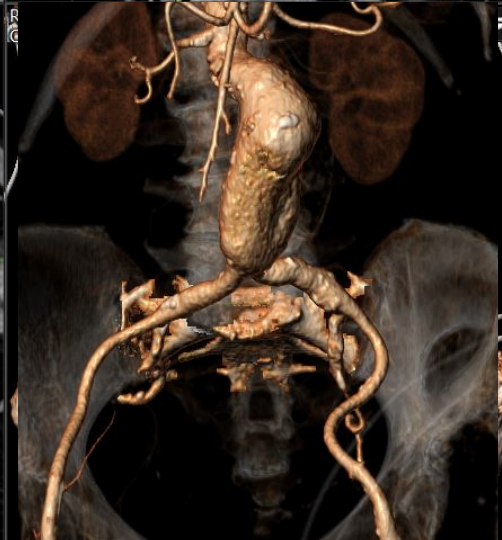
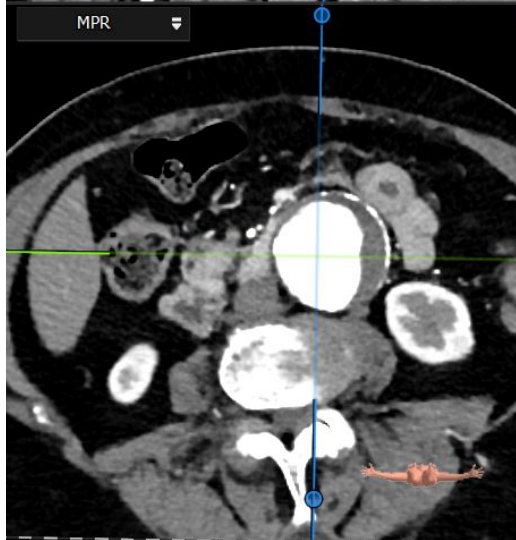
FE 54%, acinesia apicale (pregresso IM)
SAO severa:
AVA 0.65 cm² – 0.3 cm²/m²
G max/med 83/47 mmHg
Ipertensione polmonare: PAPs 50 mmHg

Aneurisma addominale 66 x 62 mm



Angio-TC post procedurale





CONCLUSIONI

- DIAGNOSTICARE LA STENOSI AORTICA E' IMPORTANTE
- E' ALTRETTANTO IMPORTANTE IL TIMING DELLA SUA CORREZIONE
- SAVR E TAVI SONO DUE OTTIME SOLUZIONI, DA SCEGLIERE CON ATTENZIONE....
- LA DECISIONE IN HEART TEAM E' ESSENZIALE

CONCLUSIONI 2

- NEI PAZIENTI GIOVANI SENZA COMORBIDITA' MEGLIO SAVR MININVASIVA
- NEI PAZIENTI ANZIANI (>80) MEGLIO TAVI
- IN CASO DI PREVEDIBILE DEGENERAZIONE PRECOCE (IRC SEVERA) PROTESI MECCANICA
- NO TAVI NEI PAZIENTI MOLTO GIOVANI ANCHE IN CASO DI PREFERENZA INDIVIDUALE

Abbiamo dubbi sull'opportunità di trattare la Sao?

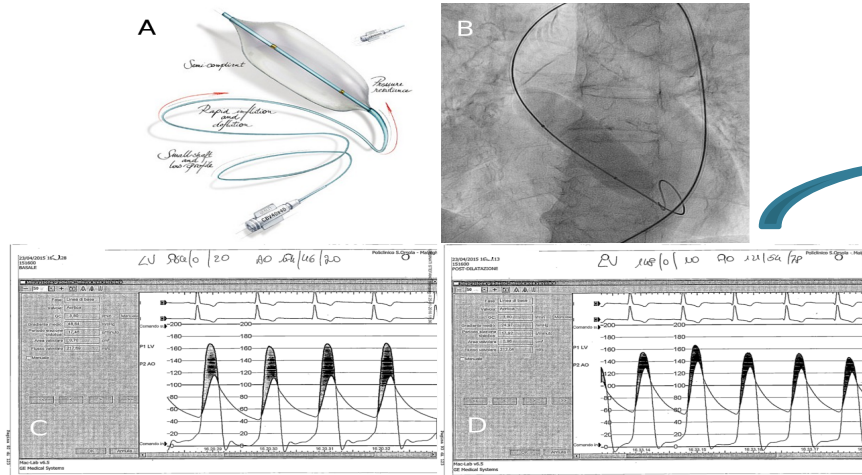
Valvuloplastica aortica percutanea

1. Destination Therapy

→ Paziente troppo fragile, comorbidità multiple, attesa di vita <1 anno, si può ripetere

2. Bridge/Test

→ in sintomi atipici o in presenza di altri problemi clinici, per stabilire l'effettiva importanza clinica della Stenosi aortica che può essere risolta con la TAVI



Non è definitiva
Riduce la SAo severa a SAo moderata o lieve

Non dimenticare la preferenza del paziente

TABLE 2 Patient selection

	Key question	Red flags
Patient preference	Does the patient understand the expected benefits/risks and want to proceed?	• Limited comprehension • Unrealistic expectations • External pressure to proceed 

Che cosa pensiamo di migliorare in questo particolare paziente?

Qual è la situazione generale del Paziente: Oligosintomatico a casa o spesso ricoverato per scompenso cardiaco?

Qual è la sua normale attività quotidiana?

Presenta sintomi nella sua vita normale? Sincopi?

L'astenia è un sintomo aspecifico spesso correlata all'età e non alla stenosi aortica e non migliorerà con la TAVI