EUROVALVE

VAN DER VALK SELYS HOTEL LIÈGE

SAVE THE DATE

SEPTEMBER 25&26 2025

COURSE DIRECTORS

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Detection, assessment, treatment of valve thrombosis

Marco Moscarelli MD, PhD
GVM Care&Research

Detection, assessment, treatment of valve thrombosis

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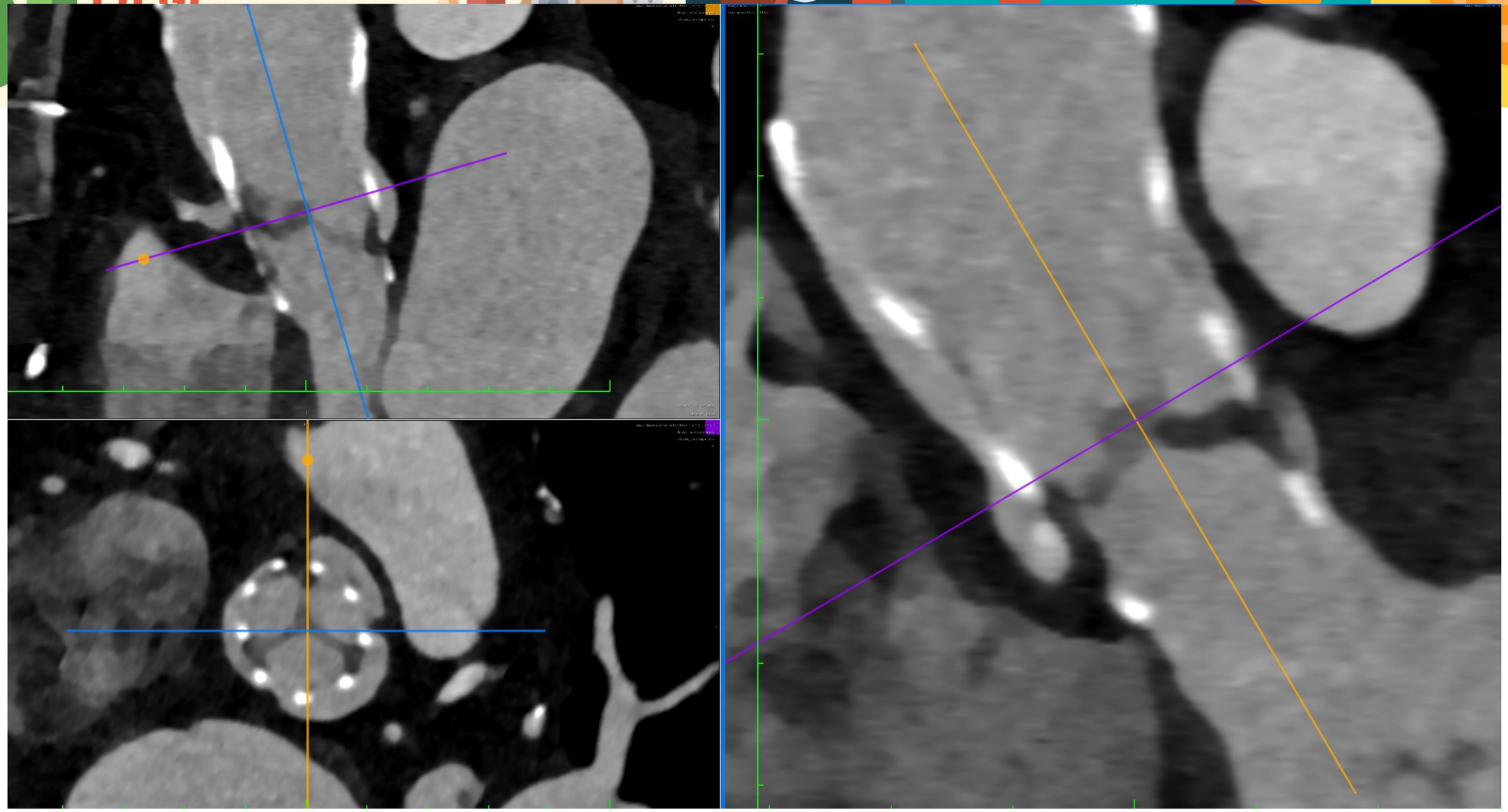
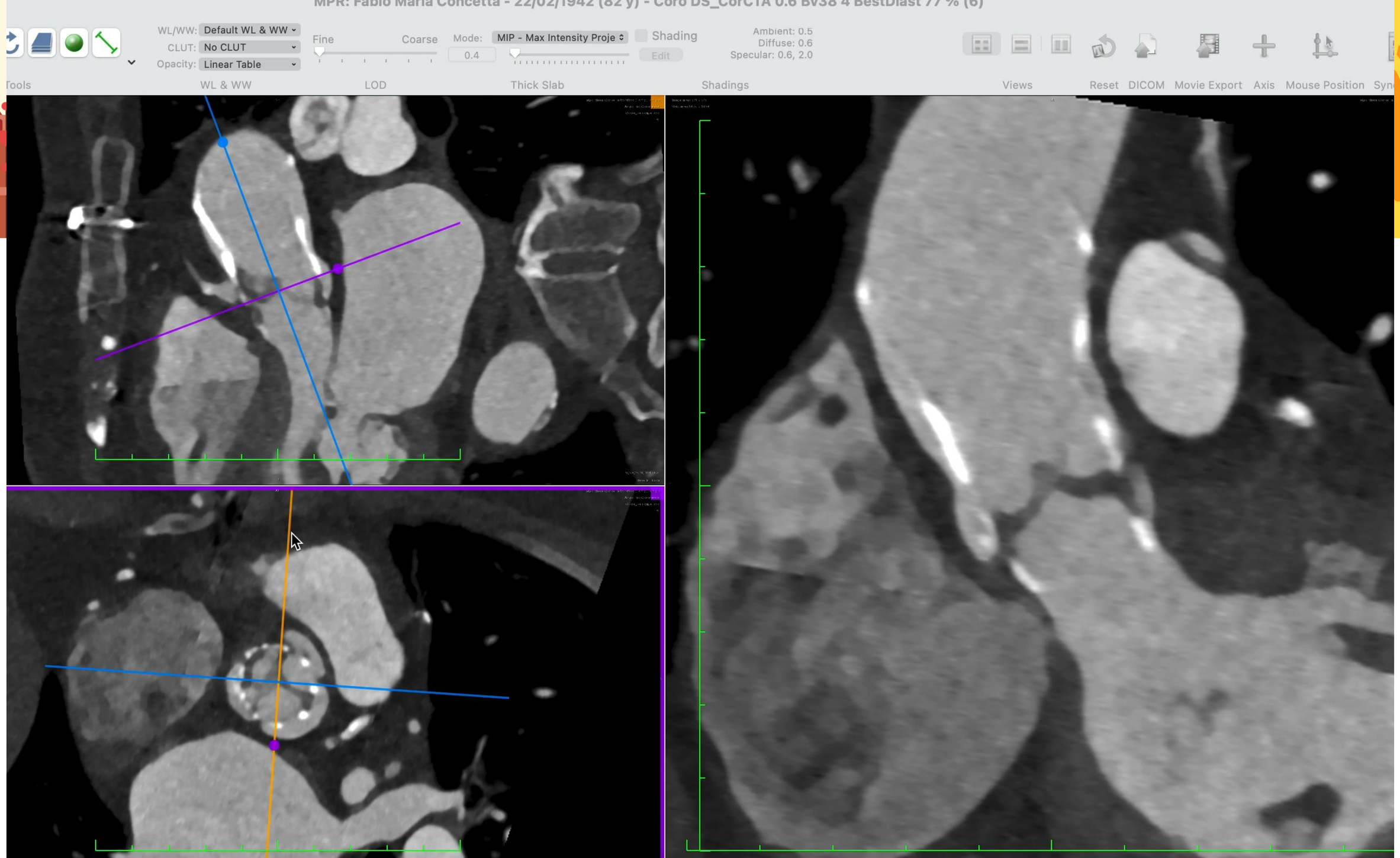
GVM Care&Research

NO DISCLOSURE

HALT definition

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WL/WW: Default WL & WW
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Edit
Ambient: 0.5
Diffuse: 0.6
Specular: 0.6, 2.0
Tools
WL & WW
LOD
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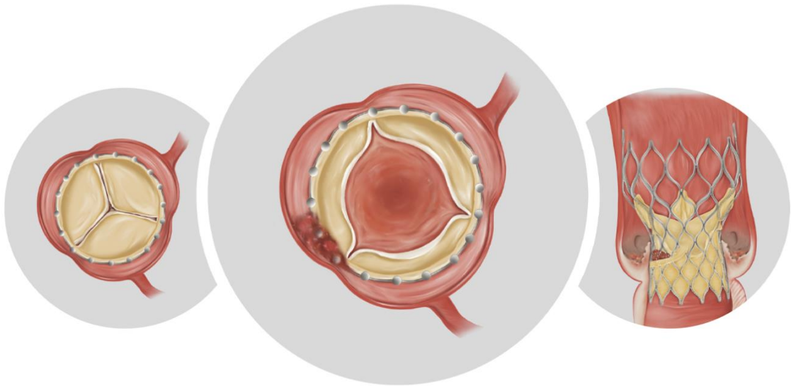
info@endotavi.it

EndoTAVI

An integrated and computational environment for the analysis of markers of endothelial dysfunction, multi-detector computed tomography transthoracic echocardiography and advanced functional imaging following aortic valve replacement with transcatheter technology (TAVR) and conventional surgery (SAVR)

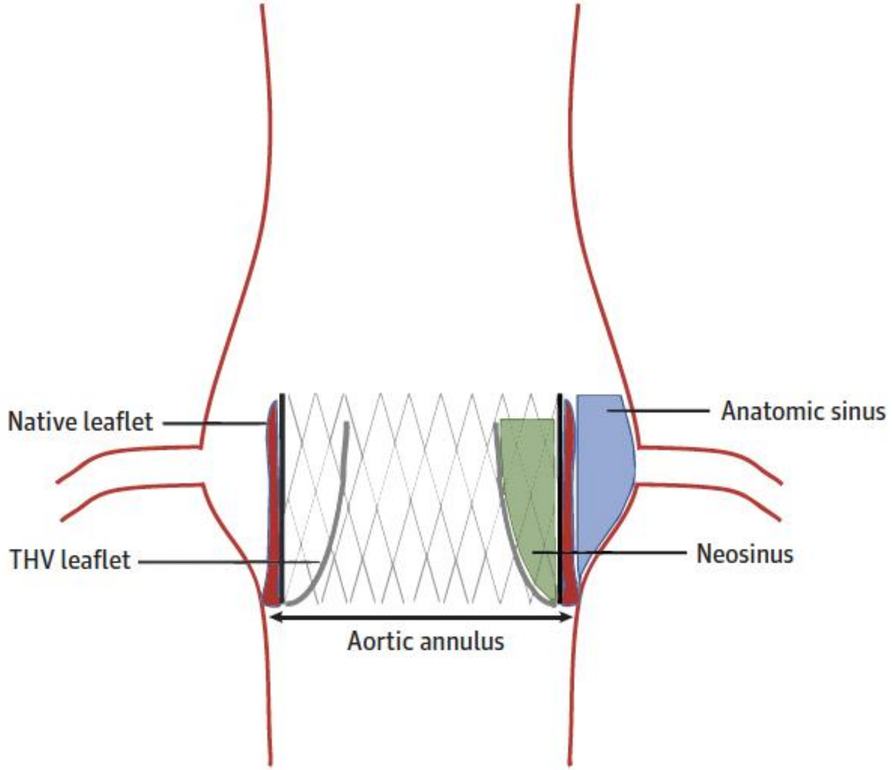
Progetto finanziato a valere sul P.O.C. FESR SICILIA 2014/2020, Azione 1.1.1

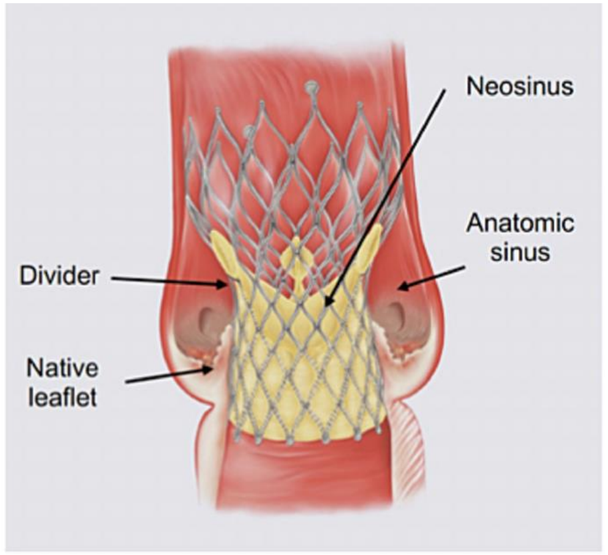


THE PROJECT

HALT is synonymous of structural valve diseases and represents its early stage.

HALT: mechanism - predictors





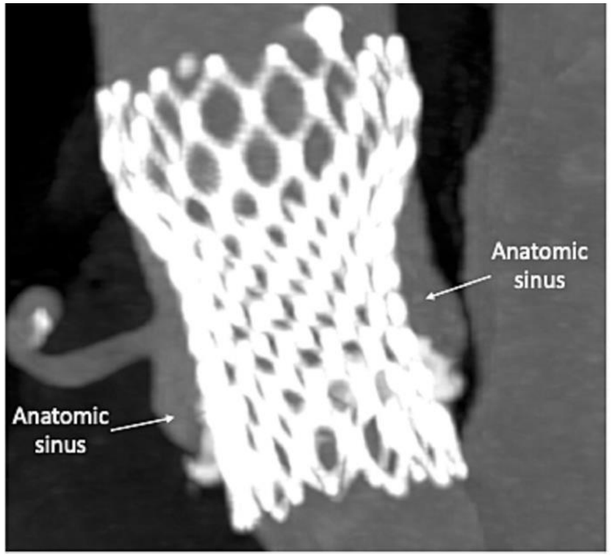


Fig. 1. A / B: The divider of the Evolut R (Medtronic, Minneapolis, MN) prosthesis creates a partitioning between the 'inner neosinus' and the 'anatomic or anatomical sinus'.

2.HALT relevance

STS 2024

The 60th Annual Meeting of
The Society of Thoracic Surgeons

January 27-29, 2024 | San Antonio, Texas

Guidelines versus Practice: A Statewide Survival Analysis of SAVR versus TAVR in Patients Aged ≤ 60 Years

Jad Malas MD[1]; **Sundos Alabbadi PharmD[2]**; Qiudong Chen MD[1]; Wen Cheng MD[1];Derrick Y. Tam MD PhD[1]; Michael E. Bowdish MD MS[1]; Natalia Egorova PhD[2]; Joanna Chikwe MD[1]

[1] Department of Cardiac Surgery, Cedars-Sinai Medical Center, Smidt Heart Institute, Los Angeles, CA
[2] Department of Population Health Science and Policy at Icahn School of Medicine at Mount Sinai, New York, NY

STS 2024

Conclusions

- In 2021, 47% of patients with aortic stenosis under the age of 60 underwent TAVR in California statewide registry

- Transcatheter aortic valve replacement was associated with 2.5-fold increased hazard of 5-year mortality in propensity-matched patients (96.7% vs 88.7%)

Transcatheter aortic valve must perform forever..!!!!

- Expansion of THV toward moderate aortic stenosis

EXPAND TAVR II
Pivotal Trial

Moderate aortic stenosis
is not benign.

Recruiting

Evolut™ EXPAND TAVR II Pivotal Trial

ClinicalTrials.gov ID NCT05149755

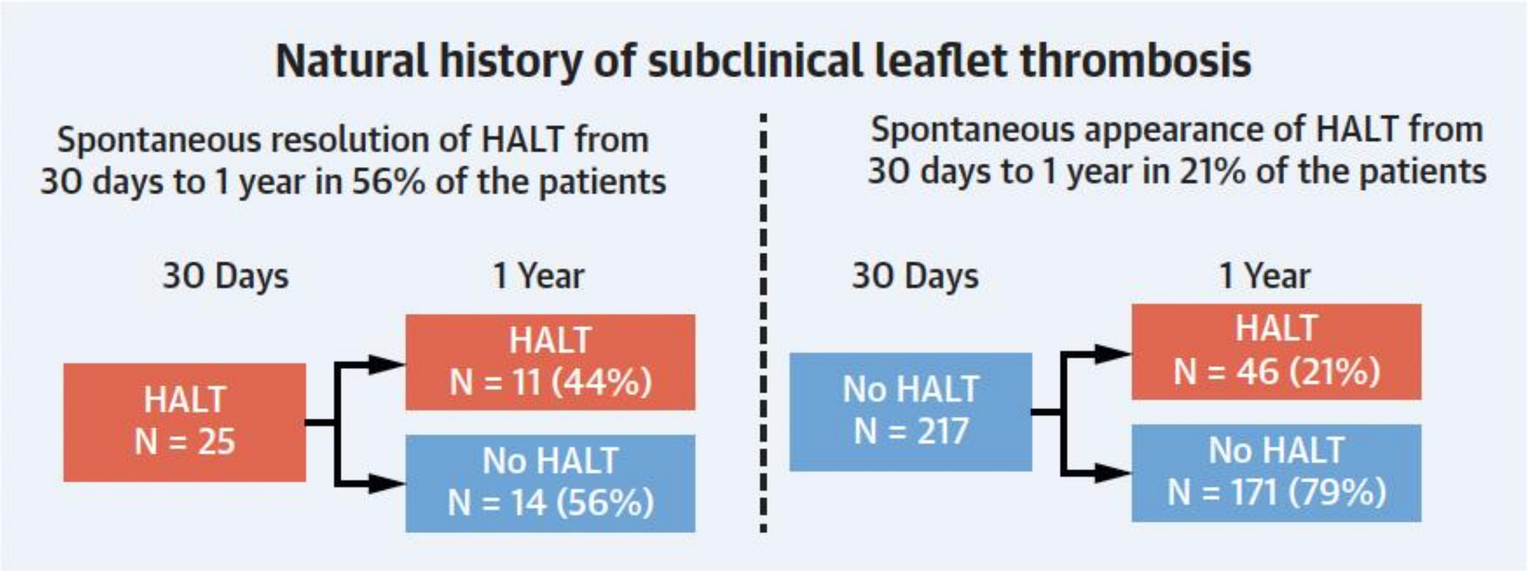
Sponsor Medtronic Cardiovascular

Information provided by Medtronic Cardiovascular (Responsible Party)

Last Update Posted 2024-09-19

- HALT/SLT if diagnosed in time (early) is a reversable – dynamic condition

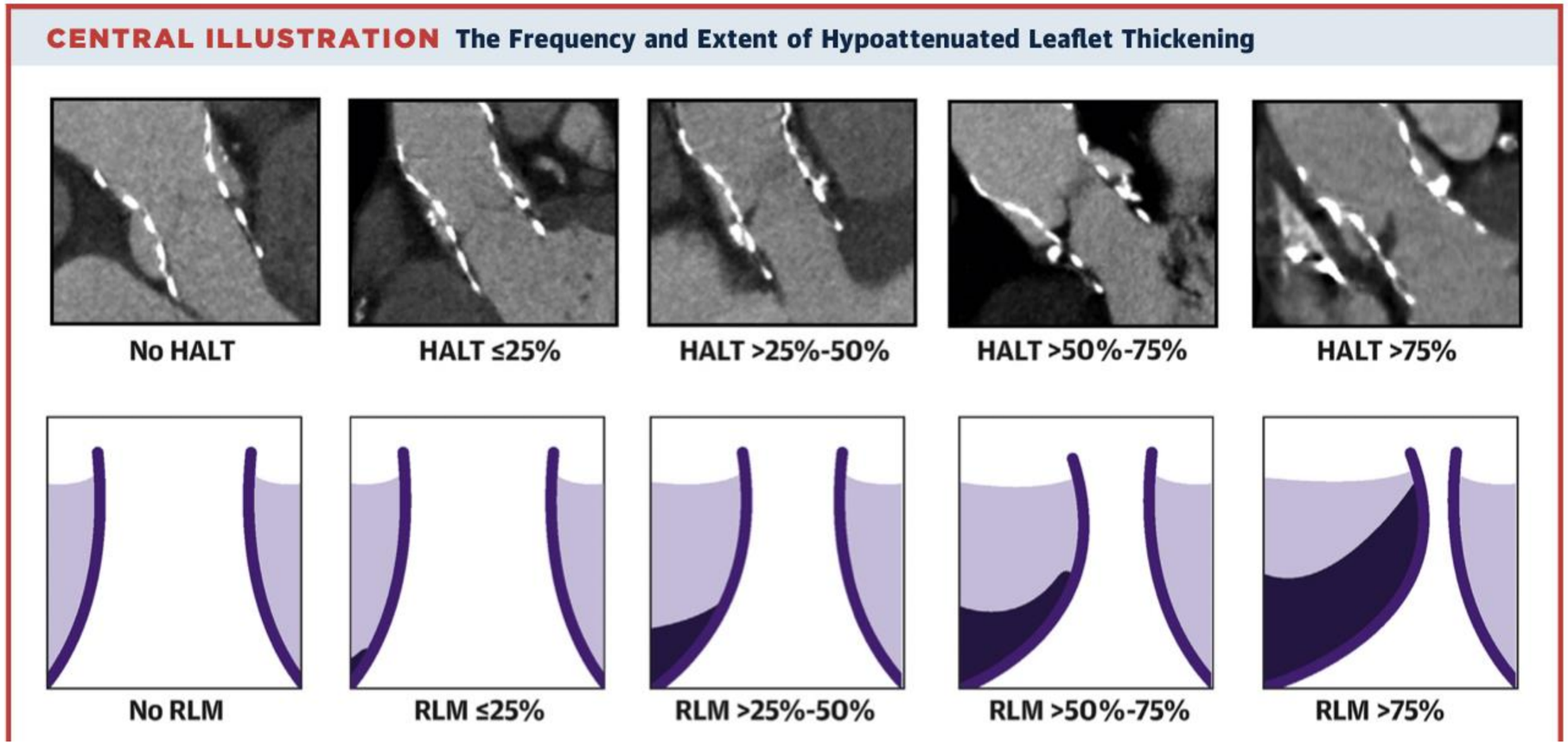
CENTRAL ILLUSTRATION Subclinical Leaflet Thrombosis of Transcatheter and Surgical Bioprosthetic Aortic Valves



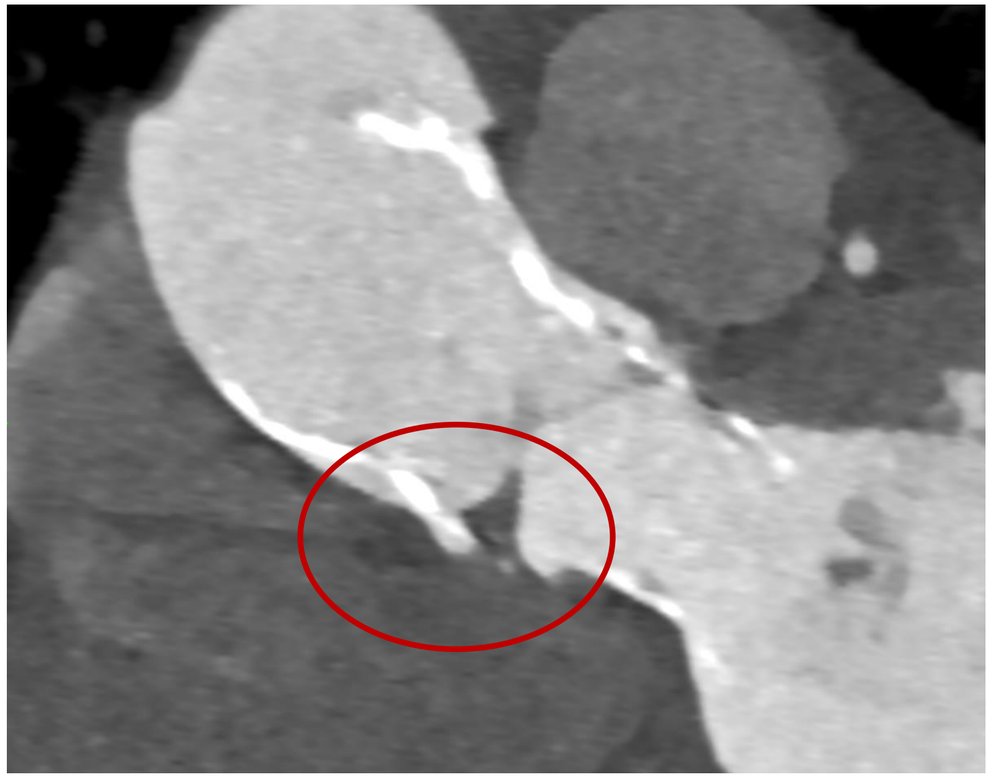
Low-risk Partner 3 MDCT subgroup analysis

Makkar, R.R. et al. J Am Coll Cardiol. 2020;75(24):3003–15.

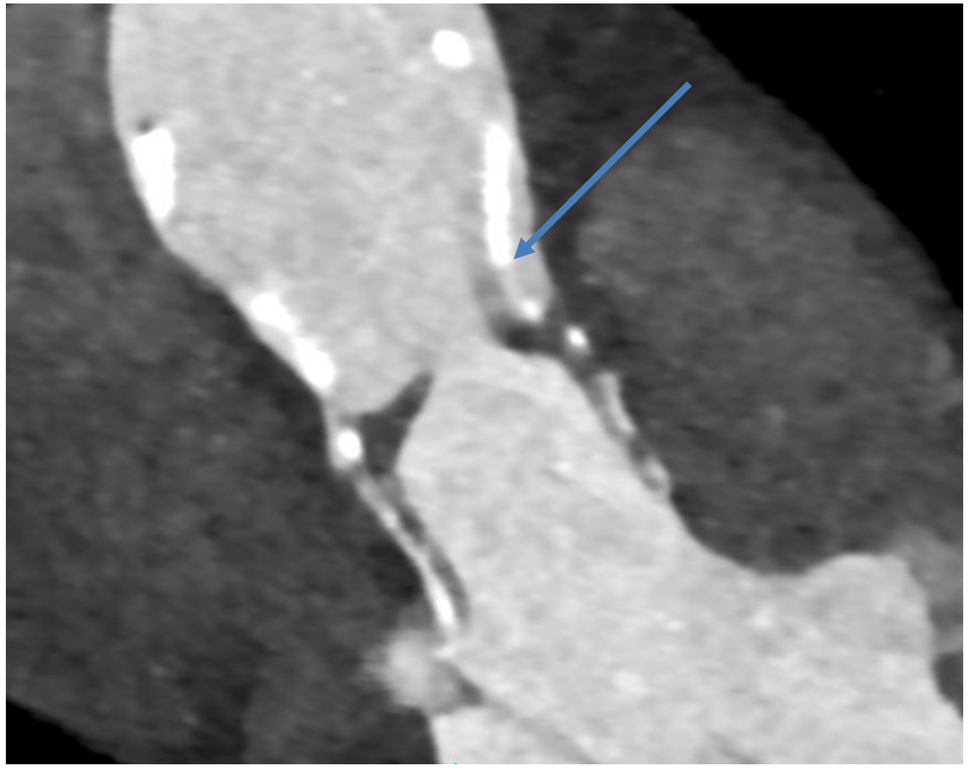
3.HALT grading



Diastolic phase



Systolic phase



4.HALT advanced assessment

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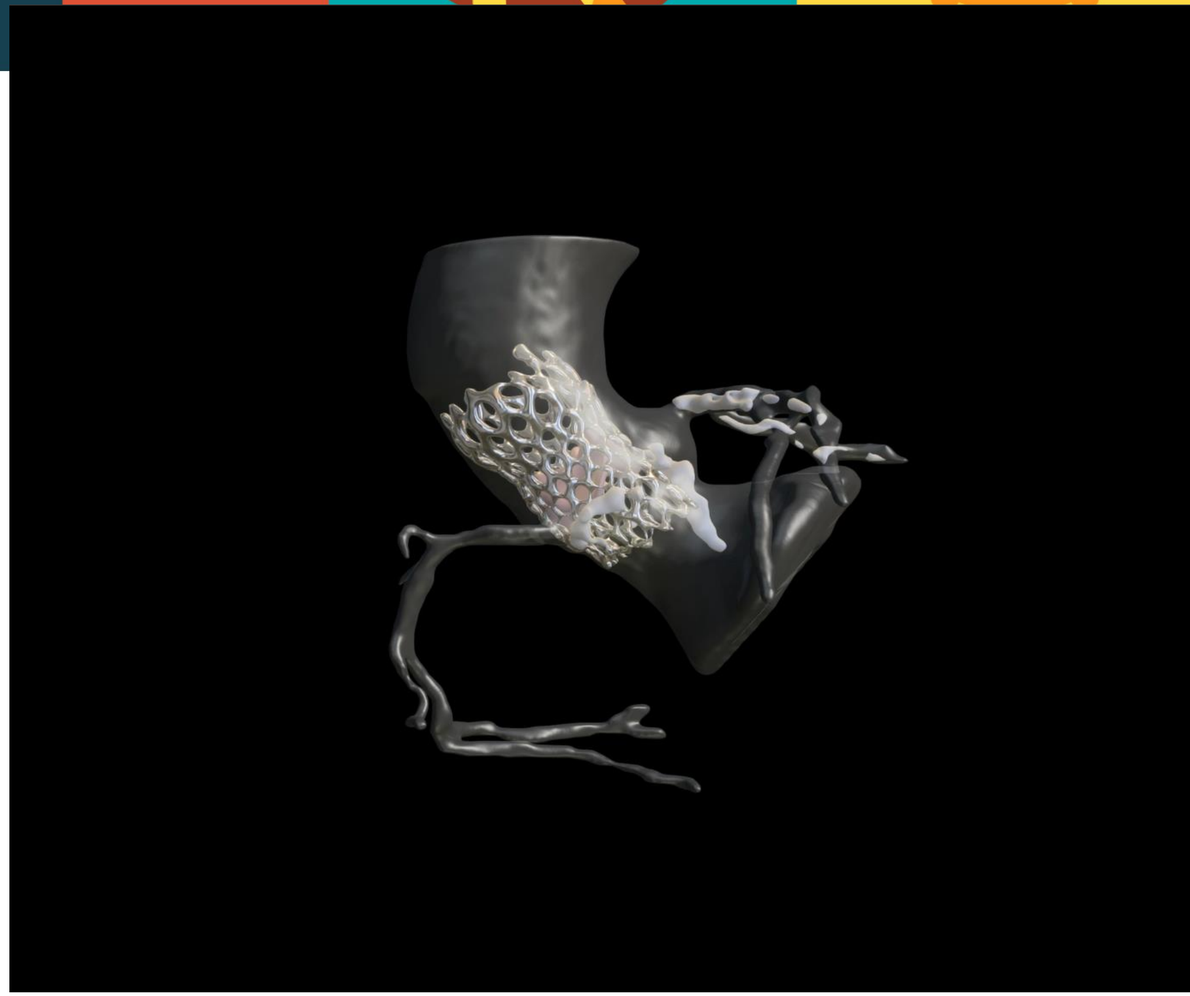

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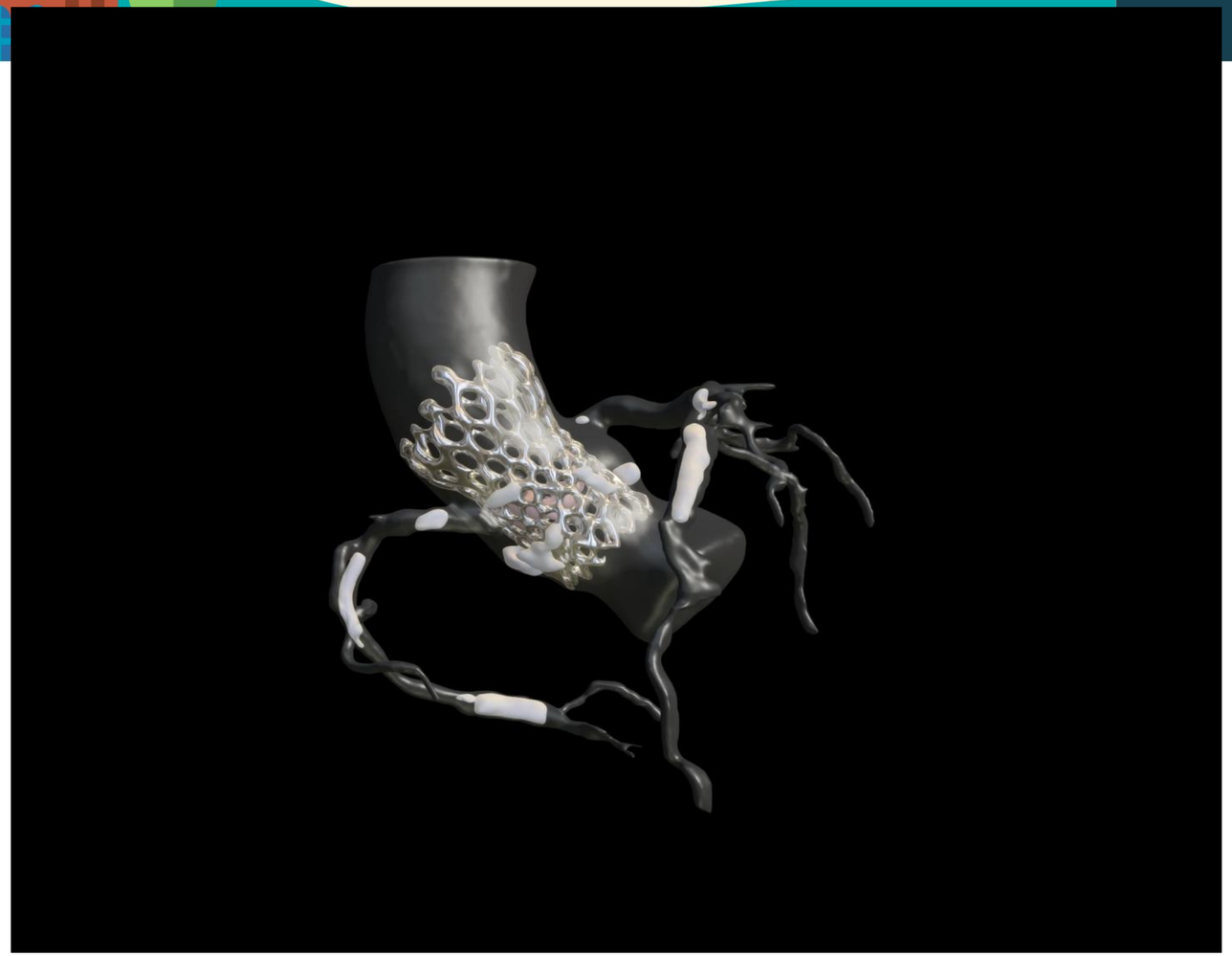

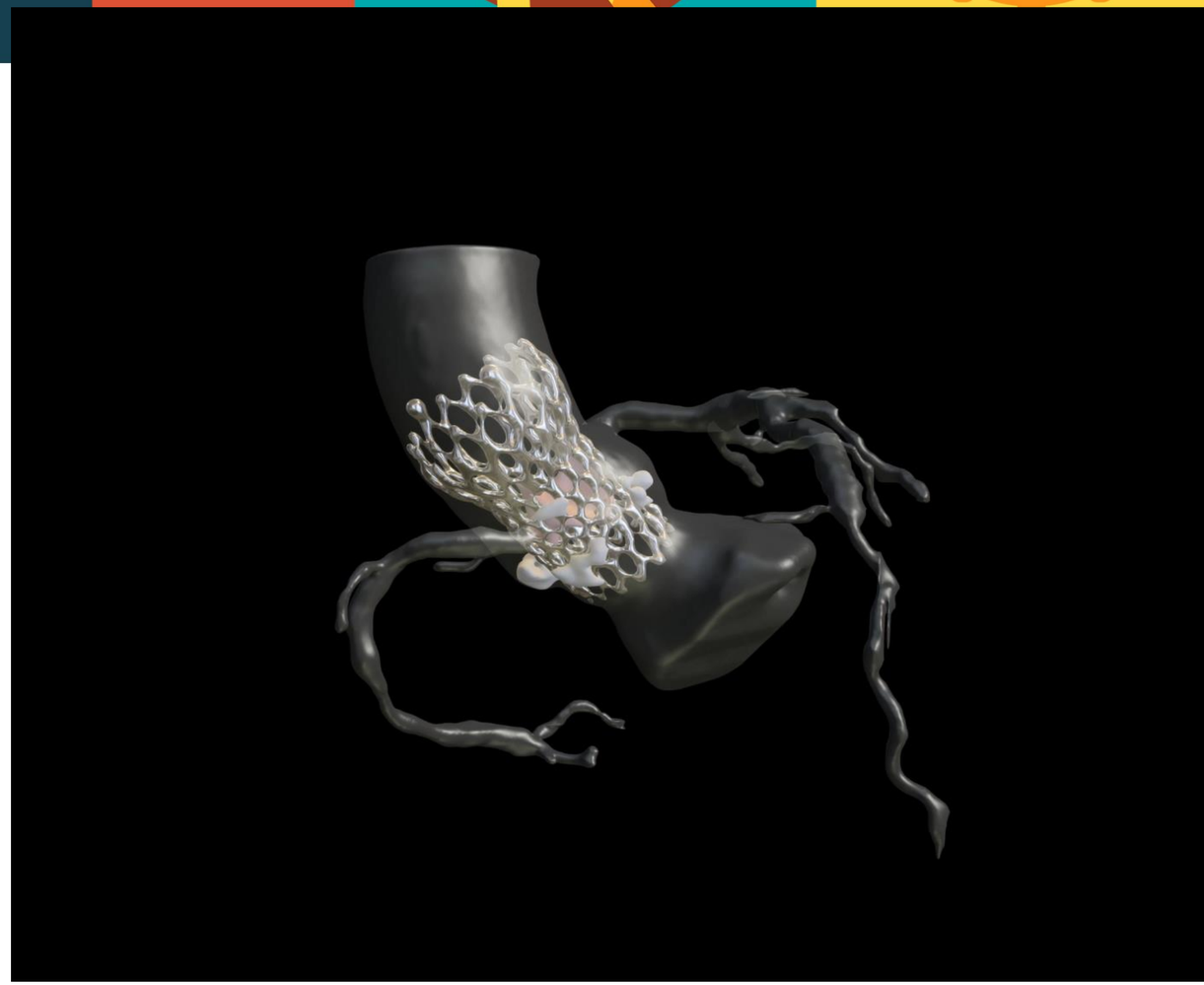

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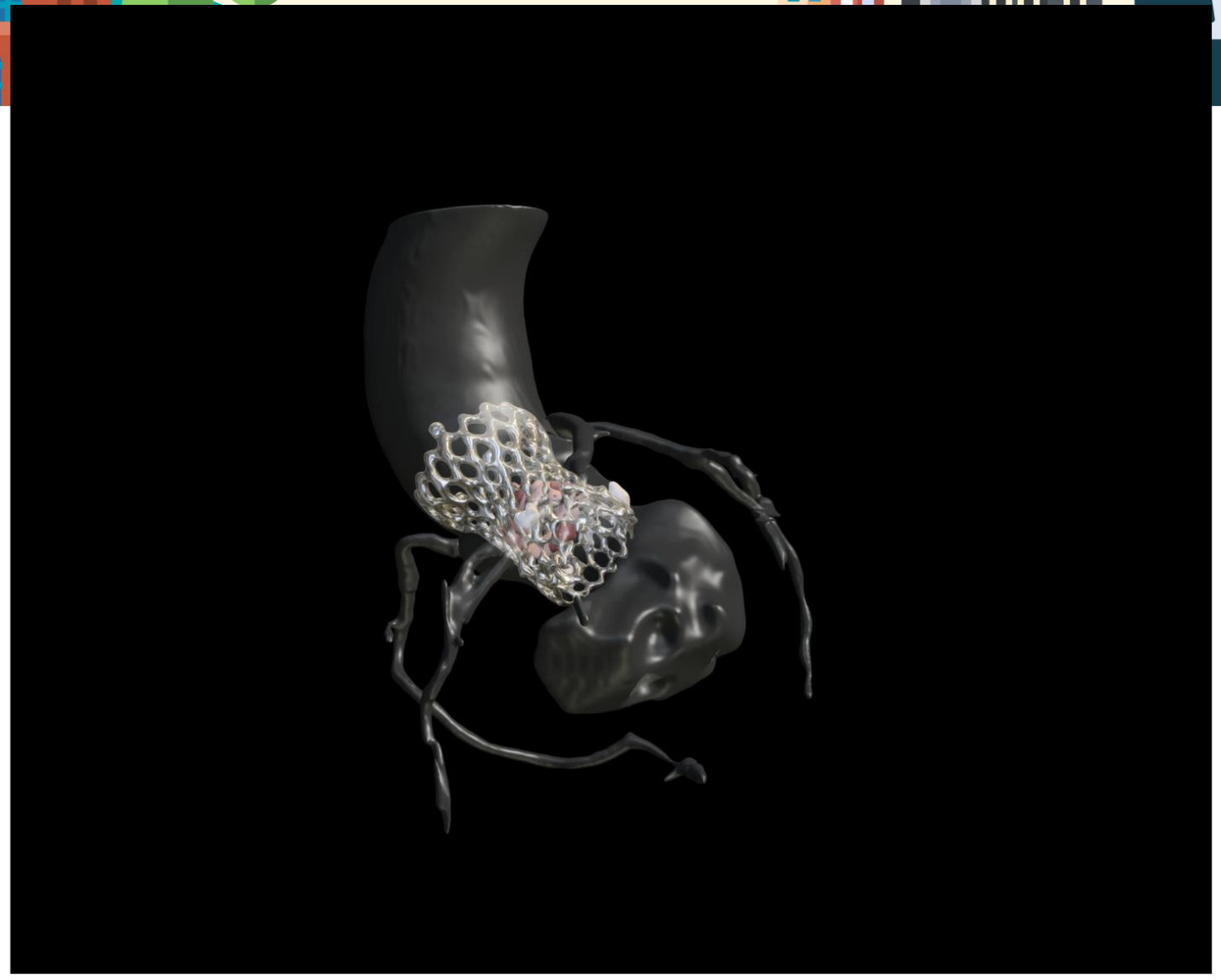

IMAGE FOCUS

https://doi.org/10.1093/ehjci/jeae051
Online publish-ahead-of-print 16 February 2024

Three-dimensional analysis of subclinical leaflet thrombosis following transcatheter aortic valve replacement

Marco Moscarelli [1,2]*, **Adriana Zlahoda-Huzior** [3,4], **Vincenzo Pernice** [1], **Giuseppe Speziale** [5], **and Khalil Fattouch** [1,6]

[1]Department of Cardiovascular Surgery, Maria Eleonora Hospital, GVM Care&Research, Viale della Regione Siciliana Nord Ovest, 1571, 90135 Palermo PA, Italy; [2]Imperial College, National Heart Lung Institute, 72 Du Cane Rd, London W12 0HS, UK; [3]Department of AGH Department of Measurement & Electronics, AGH University of Science and Technology, Krakow, Poland; [4]Digital Innovations & Robotics Hub, Krakow, Poland; [5]Department of Cardiovascular Surgery, Anthea Hospital, GVM Care&Research, Bari, Italy; and [6]University of Palermo, DICHIRONS, Palermo, Italy

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An 81-year-old female patient with normal renal function was evaluated at 12 months follow-up after transfemoral transcatheter aortic valve replacement with Evolut R 34 mm (Medtronic, Minneapolis, USA) at Maria Eleonora Hospital, GVM Care&Research, Palermo, Italy. The patient was asymptomatic and had a normal sinus rhythm. 2D-transthoracic echocardiography revealed a mean transprosthetic gradient of 25 mmHg, with no paravalvular or intraprosthetic leak.

Contrast-enhanced multidetector computed tomography (MDCT) was performed using a Siemens Healthcare GmbH SOMATOM Drive (VB 20, 2019), and revealed severe subclinical leaflet thrombosis of one leaflet since the hypoattenuated lesion reached the tip of the leaflet, and mild and moderate thrombus stratification at the level of the other two leaflets (*Panels A* and *B*).

The left ventricle, aortic root, coronary arteries, and transcatheter valve were segmented from the post-procedural MDCT using semiautomatic algorithms with additional manual corrections in Slicer 3D (version 5.2.2), which is a free, open-source platform for visualization, processing, and analysis of medical images. Segmentations were converted into 3D mesh structures and exported as stereolithography files to create a 3D digital model (*Panels C* and *D*). Advanced 3D multiparametric digital approach analysis was performed at the AGH University of Science and Technology, Department of Measurement & Electronics, Krakow, Poland. The systolic phase (*Panel E*) revealed moderately restricted motion in one of the leaflets.

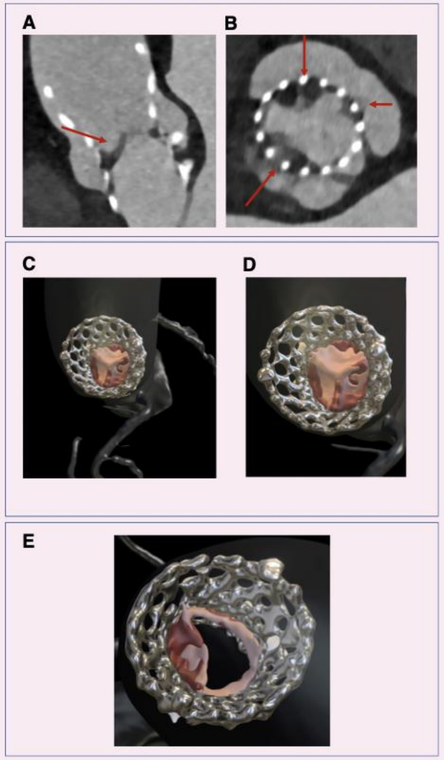
Advantages of this novel multiparametric digital approach include the possibility of performing 3D interactive visualization of the prosthesis (see Supplementary data online, *Video S1*) and thrombus volumetric–spatial quantifications (mm^3/voxel) (see Supplementary data online, *Figure S1*).

Supplementary data are available at *European Heart Journal - Cardiovascular Imaging* online.

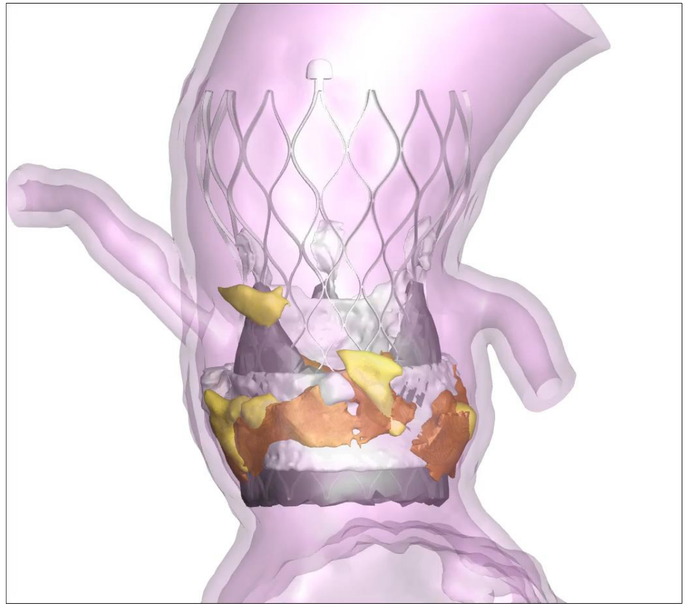
Funding: This study was partially funded by European grant (PO-FESR 2014-2020 www.endotavi.it).

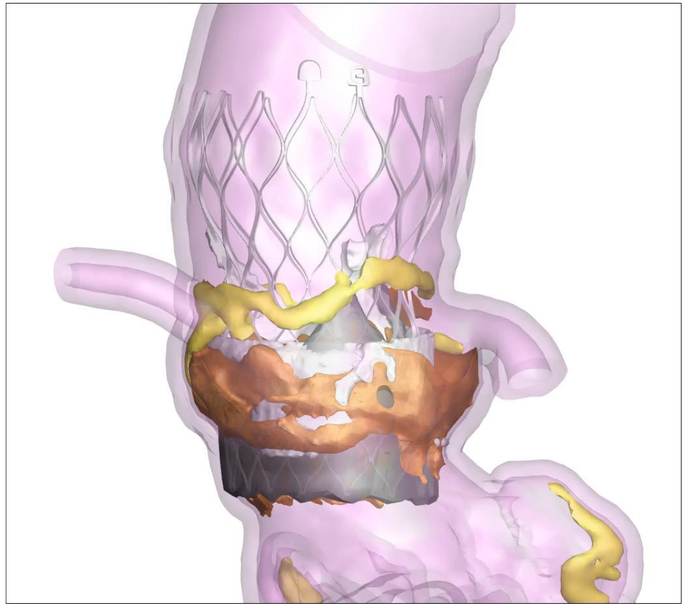
Conflict of interest: None declared.

Data availability: The data underlying this article are available in the article and in its online supplementary material.



	NC Sinus Thrombus Volume (mm^3)	LC Sinus Thrombus Volume (mm^3)	RC Sinus Thrombus Volume (mm^3)
Mild HALT	177	92	71
Moderate HALT	411	126	95
Severe HALT	468	446	356





4.HALT: valvular and perivalvular

ESC European Society of Cardiology

European Heart Journal Open (2024) **4**, oeae085
https://doi.org/10.1093/ehjopen/oeae085

ORIGINAL ARTICLE
Vascular and cardiac imaging

Valvular and perivalvular thrombosis following self-expandable aortic valve replacement: analysis of 100 multi-detector computed tomography scans

Marco Moscarelli [1,2,*], Gregorio Zaccone[1], Adriana Zlahoda-Huzior[3,4], Vincenzo Pernice[1], Sabrina Milo[5], Francesco Violante[5], Francesca Trizzino[1], Dariusz Dudek[6], Giuseppe Speziale[7], Patrizio Lancellotti [8], and Khalil Fattouch [9]

[1]Department of Cardiovascular Surgery, Maria Eleonora Hospital, Viale della Regione Siciliana Nord Ovest, 1571, 90135 Palermo PA, Italy; [2]Department of Surgery & Cancer, Faculty of Medicine, Hammersmith Hospital, 72 Du Cane Rd, London W12 0HS, UK; [3]Department of Measurement and Electronics AGH University of Krakow, Poland, al. A. Mickiewicza 30 / B1 30-059 Kraków; [4]SimHub, VIRMED Sp. z o. o.Ul. Miechowska 5B / 1, 30-055 Kraków, Polska NIP 6772492319; [5]Department of Radiology, Maria Eleonora Hospital, Viale della Regione Siciliana Nord Ovest, 1571, 90135 Palermo PA, Italy; [6]Jagiellonian University Medical College, Świętej Anny 12, 31-008 Kraków, Poland; [7]Department of Cardiovascular Surgery, Anthea Hospital, GVM Care & Research, Via Camillo Rosalba, 35/37, 70124 Bari BA, Italy; [8]Département des sciences cliniques, Cardiologie-Pathologies spéciales et réhabilitation, GIGA Institute, B36 Quartier Hôpital 4000 Liège, Belgique; and [9]Kore University, Faculty of Medicine, Piazza dell'Università, 94100 Enna EN, Italy

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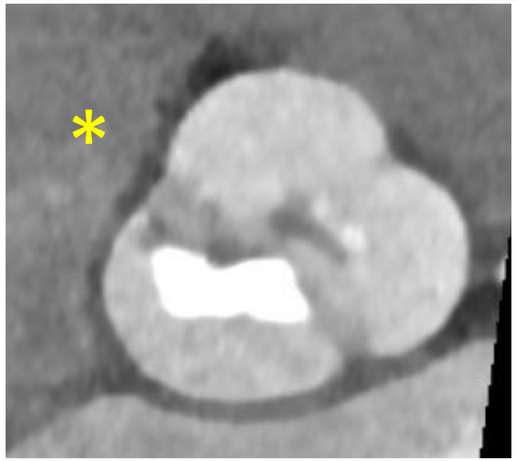
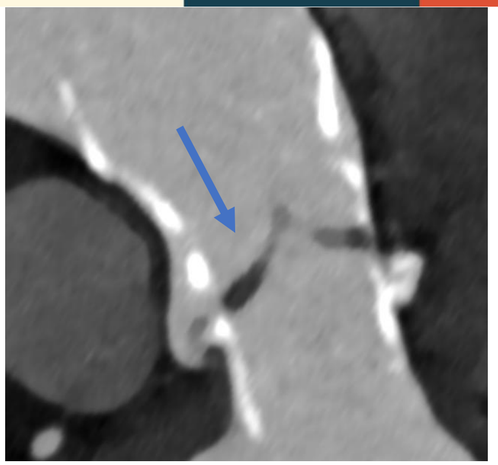
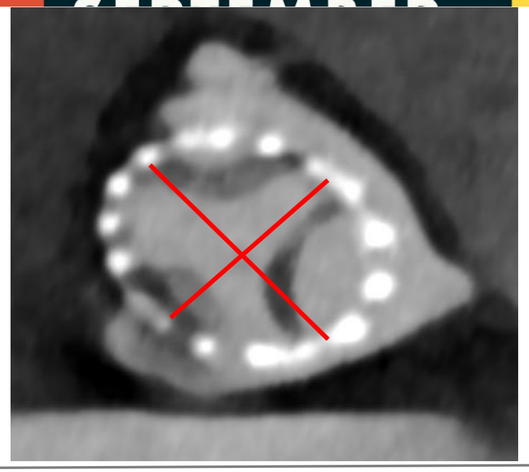
Handling Editor: Frank A. Flachskampf

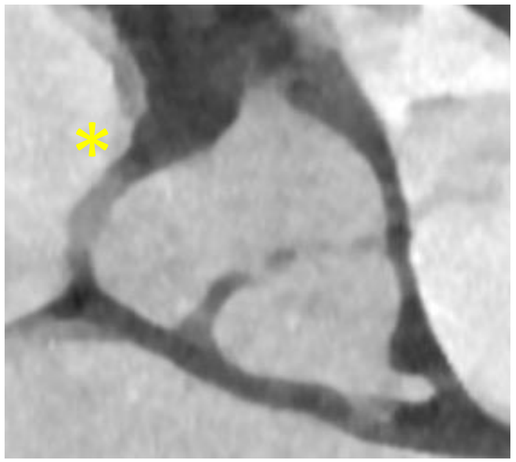
A

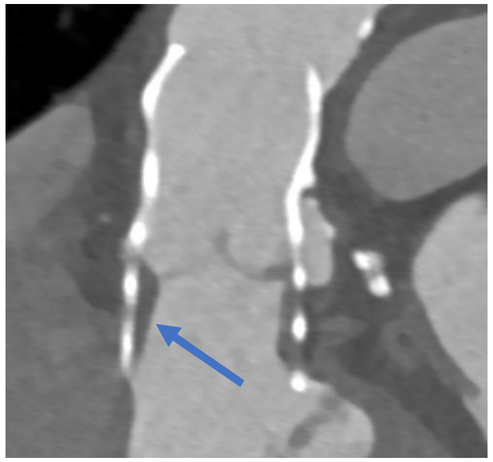


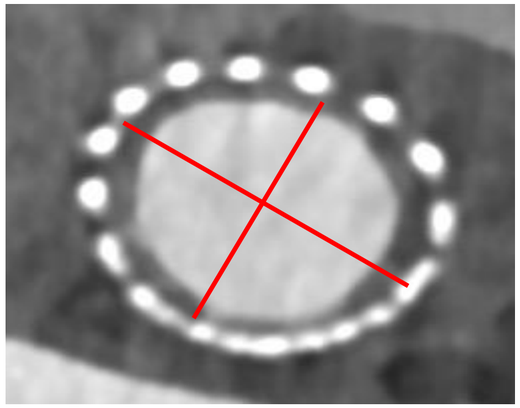




B







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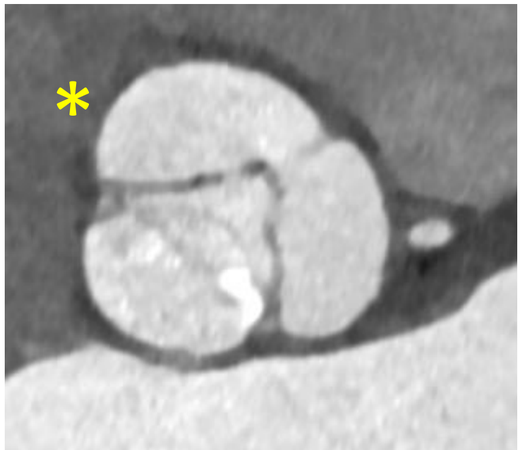
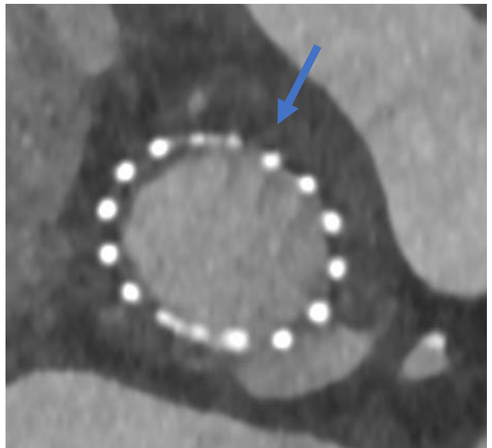
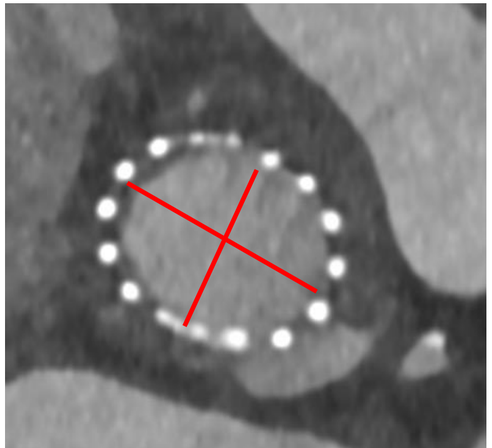
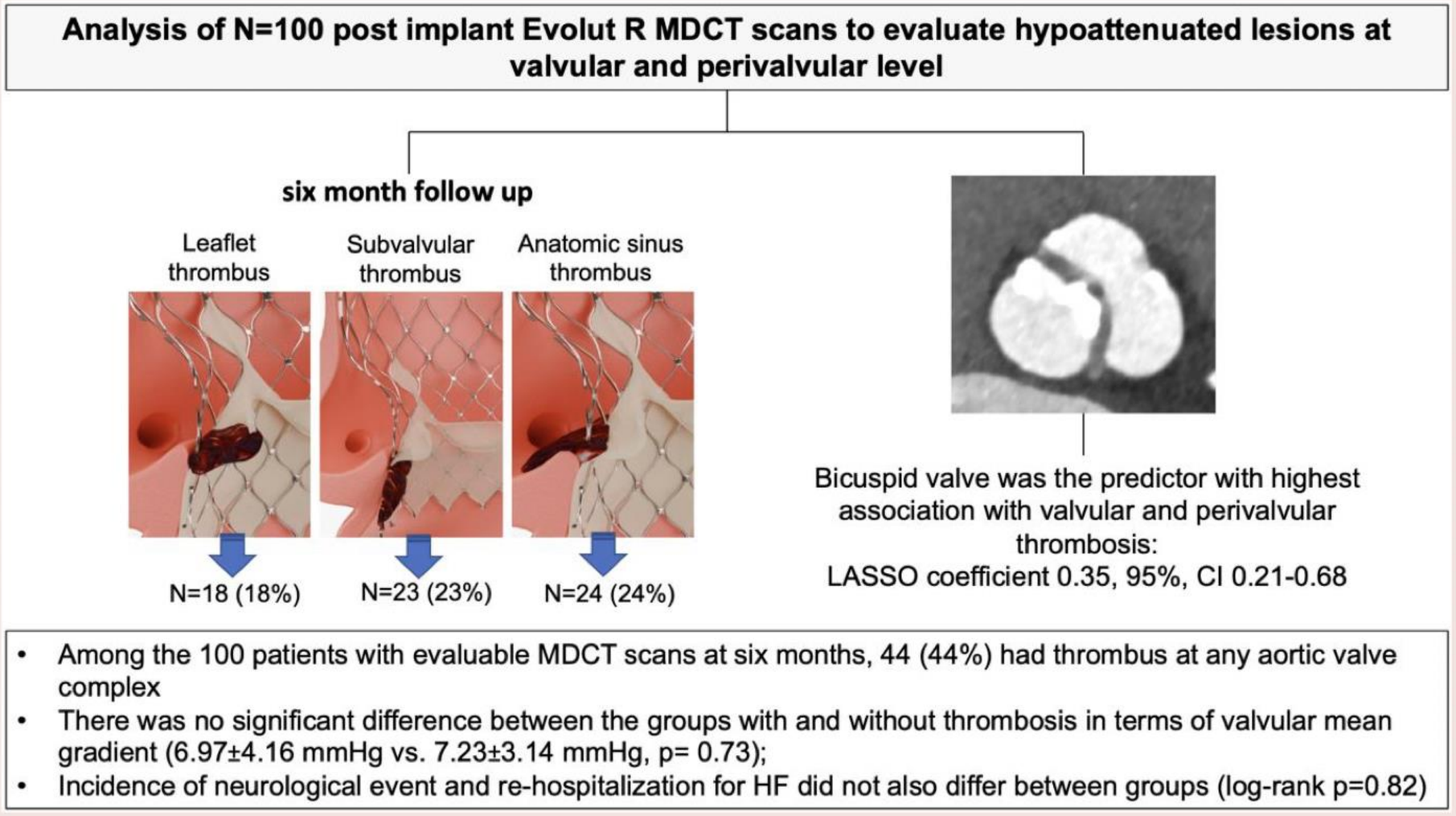






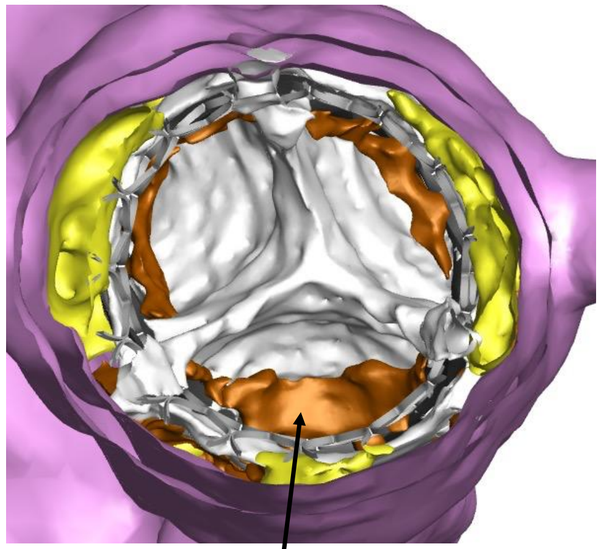
Graphical abstract



Keywords Transcatheter aortic valve replacement • Subclinical leaflet thrombosis • Multi-detector computed tomography • Hypoattenuated lesion

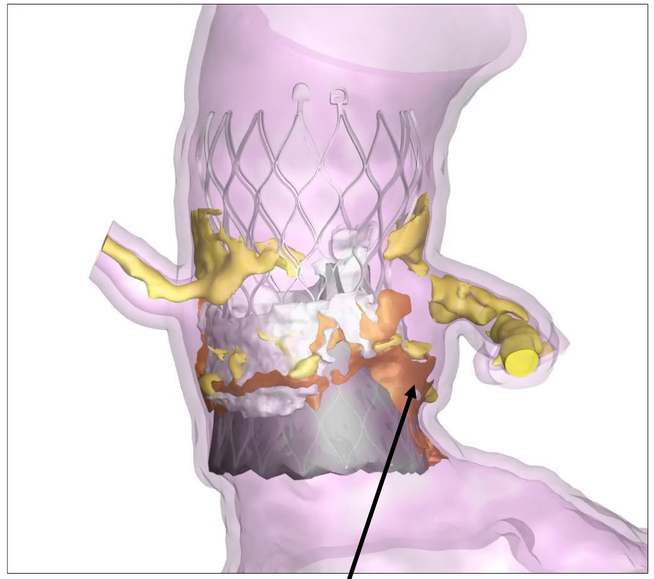
Calcium Evolut-R leaflets Thrombus

A



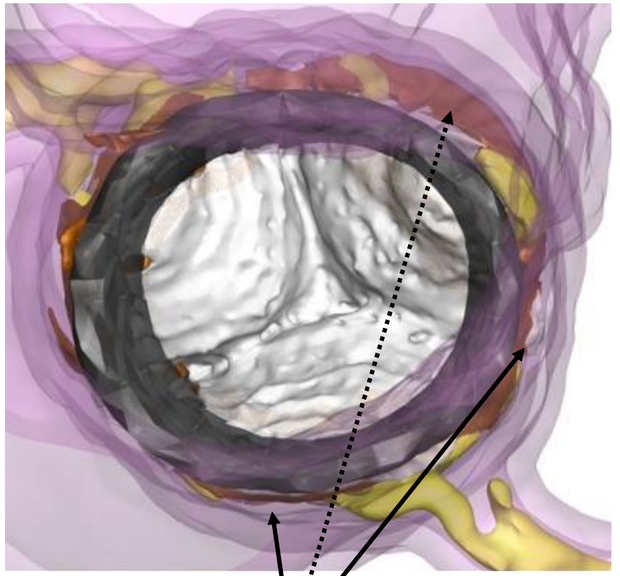
Thrombus at the level of the *neo-sinus*

B



Thrombus at the level of the *anatomic sinus* with partial involvement of the sub valvular component

C



Thrombus at the level of the *sub valvular component*

HALT: Management

JAMA Cardiology | Review

Subclinical Leaflet Thrombosis and Anticoagulation After Transcatheter Aortic Valve Replacement
A Review

Thomas J. Cahill, MB, BS, DPhil; Ajay J. Kirtane, MD, SM; Martin Leon, MD; Susheel K. Kodali, MD

Box. Unanswered Questions

- Should patients be screened for leaflet thrombosis after transcatheter aortic valve replacement?
- Do specific patient groups at increased risk of leaflet thrombosis (eg, valve-in-valve transcatheter aortic valve replacement) benefit from up-front preventive anticoagulation to prevent leaflet thrombosis?
- What is the relationship between leaflet thrombosis and future structural valve degeneration?
- Does treatment of leaflet thrombosis with oral anticoagulation reduce the risk of structural valve degeneration, thromboembolism, or stroke?
- Is low-dose oral anticoagulation sufficient to prevent/treat leaflet thrombosis?
- How long should patients with leaflet thrombosis receive anticoagulation treatment?
- How does valve choice and implant technique influence the risk of leaflet thrombosis?

6.HALT: flash messages - conclusion

I. MDCT is not indicated at follow-up, however CT scan is the only way to intercept at early stage HALT/SLT

II. HALT/SLT at early stage perhaps can be reversed

III. 2DTTE has no potential to identify HALT/SLT (if you see HALT/SLT with echo is too late then…)

IV. The role of anticoagulants must be clarified (particularly low risk patient for bleeding)

Detection, assessment, treatment of valve thrombosis

Marco Moscarelli MD, PhD
GVM Care&Research

Thank you