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**Winner of the 2022 Cover Contest**

**Milan Vecsey-Nagy**

**From the Desk of the President**

- 1 **The secret sauce is the scholarship**

**Reviews**

- 2 **Computed tomography imaging for subclinical leaflet thrombosis following surgical and transcatheter aortic valve replacement**

Hashrul N. Rashid, Ronak Rajani, Jonathon Leipsic, Pál Maurovitch-Horvat, Tiffany Patterson, Simon Redwood, Jack Lee, Harriet Hurrell, Stephen J. Nicholls, Arthur Nasis, Sujith Seneviratne, James D. Cameron, Bernard Prendergast, Robert P. Gooley

Subclinical leaflet thrombosis (LT) may occur following surgical and transcatheter aortic valve replacement. Computed tomography (CT) has become an established imaging modality to diagnose subclinical LT following bioprosthetic aortic valve replacement. Even so, there is a limited (but growing) experience in utilising CT imaging for this indication. This review emphasises a systematic approach to acquiring and analysing CT imaging for subclinical LT, highlighting evidence surrounding clinical sequelae of subclinical LT and anti-thrombotic implications following diagnosis.

- 11 **Great debates in cardiac computed tomography: OPINION: “Artificial intelligence and the future of cardiovascular CT – Managing expectation and challenging hype”**

Edward D. Nicol, Jonathan R. Weir-McCall, Leslee J. Shaw, Eric Williamson

- 18 **Great debates in cardiac computed tomography: OPINION: “Artificial intelligence is key to the future of CCTA – The great hope”**

Manish Motwani, Michelle C. Williams, Koen Nieman, Andrew D. Choi

**Original Research**

- 22 **Higher coronary artery calcium score is associated with increased risk of atrial fibrillation recurrence after catheter ablation**

Sara Lopes Fernandes, Ricardo Ladeiras-Lopes, Mariana Silva, Gualter Silva, Inês Cruz, Sílvia O. Diaz, António S. Barros, Francisca Saraiva, Rita Faria, João Almeida, Paulo Fonseca, Helena Gonçalves, Marco Oliveira, Nuno Ferreira, João Primo, Ricardo Fontes-Carvalho

In this study was evaluated the impact of coronary artery calcium score (CACS) on atrial fibrillation (AF) recurrence following first catheter ablation. A total of 311 patients were included, with a median age of 57 (48, 64) years and 65% men. More than half of the patients had a CACS > 0 (52%) and 18% a CACS ≥ 100. This study showed that a CACS ≥ 100 was associated with a 69% increase in the risk of atrial fibrillation recurrence after first catheter ablation. Therefore, CACS opportunistic screening may benefit these patients’ management by leveraging a personalized therapeutic strategy.

**28 Mortality impact of low CAC density predominantly occurs in early atherosclerosis: explainable ML in the CAC consortium**

Fay Y. Lin, Benjamin P. Goebel, Benjamin C. Lee, Yao Lu, Lohendran Baskaran, Yeonyee E. Yoon, Gabriel Thomas Maliakal, Umberto Gianni, A. Maxim Bax, Partho P. Sengupta, Piotr J. Slomka, Damini S. Dey, Alan Rozanski, Donghee Han, Daniel S. Berman, Matthew J. Budoff, Michael D. Miedema, Khurram Nasir, John Rumberger, Seamus P. Whelton, Michael J. Blaha, Leslee J. Shaw

We used SHAP, an explainable machine learning (ML) technique, to determine the risk predictive value and age interaction of coronary artery calcium (CAC) characteristics among 63,215 asymptomatic patients in the CAC consortium. The addition of CAC density and number of calcified vessels to an ML model with clinical characteristics + CAC did not improve prediction for all-cause mortality ( $p=0.23$ ), but did improve for cardiovascular mortality ( $p=0.03$ ). Lower CAC density increased mortality, particularly very low CAC density  $\leq 0.75$ , which occurred predominantly in CAC1-100. Explainable ML should be applied in clinical research for transparent predictive modeling.

**34 The effect of patient and imaging characteristics on coronary CT angiography assessed pericoronary adipose tissue attenuation and gradient**

Melinda Boussoussou, Borbála Vattay, Bálint Szilveszter, Judit Simon, Andrew Lin, Milán Vecsey-Nagy, Gábor Konkoly, Béla Merkely, Pál Maurovich-Horvat, Damini Dey, Márton Kolossváry

Pericoronary adipose tissue (PCAT) assessed by coronary CT angiography (CCTA) has become an important inflammatory imaging biomarker. However, they are potentially confounded by patient and imaging characteristics as being interpreted using HU values. We aimed to determine the effect of these parameters based on the association between non-calcified plaque characteristics and PCAT attenuation and gradient in a zero-calcium score patient population undergoing CCTA. Based on our results, associations between PCAT markers and NCP did not persist following correction for patient and imaging characteristics. This highlights the importance of correcting for all possible confounders before evaluating PCAT markers.

**43 Implications of computed tomography reconstruction algorithms on coronary atheroma quantification: Comparison with intravascular ultrasound**

Anantharaman Ramasamy, Ameer Hamid A Khan, Jackie Cooper, Judit Simon, Pal Maurovich-Horvat, Retesh Bajaj, Pieter Kitslaar, Rajiv Amersey, Ajay Jain, Andrew Deaner, Johan HC. Reiber, James C. Moon, Jouke Dijkstra, Patrick W. Serruys, Anthony Mathur, Andreas Baumbach, Ryo Torii, Francesca Pugliese, Christos V. Bourantas

Coronary CT angiography reconstruction with thinner slice thickness, smoother kernel, and highest strength advanced model-based iterative reconstruction enabled more accurate quantification of coronary atheroma at segment-, lesion- and cross-section-level compared to high resolution intravascular ultrasound.

**52 Randomized comparison of chest pain evaluation with FFR<sub>CT</sub> or standard care: Factors determining US costs**

Mark A. Hlatky, Sam Wilding, Beth Stuart, Zoe Nicholas, James Shambrook, Zina Eminton, Kim Fox, Derek Connolly, Peter O'Kane, Alex Hobson, Anoop Chauhan, Neal Uren, Gerry P. Mccann, Colin Berry, Justin Carter, Carl Roobottom, Mamas Mamas, Ronak Rajani, Ian Ford, Pamela S. Douglas, Nick Curzen

We tested whether fractional flow reserve derived from computed tomography coronary angiography (FFRCT) would lead to lower costs compared with standard evaluation pathways among patients with stable chest pain. A total of 1399 patients were randomized and followed for nine months. US costs did not differ significantly between the FFRCT and standard care groups: (+7%, confidence interval -12% to +26%,  $p = 0.49$ ). Overall costs were significantly increased by older age, male sex, diabetes, hypertension, hyperlipidemia, prior angina, and planned invasive coronary angiography at baseline, and by the post-randomization use of coronary revascularization, invasive angiography, and number of tests done.

### Editorial Comment/Viewpoint

**60 Diagnosing coronary artery disease and cost of care**

William S. Weintraub

### Correspondence

**62 International practice patterns of coronary artery calcium scanning prior to coronary CT angiography**

J. Ford Franklin, Andrew S. Brown, Andrew D. Choi, David J. Hur, Todd C. Villines

**64 Prognostic value of coronary calcium score post coronary artery bypass graft surgery**

Rami M. Abazid, Monerah A. Almohideb, Osama Smettei, Ahmed A. Alruwaili, Jonathan G. Romsa, James Warrington, Cigdem Akincioglu, William C. Vezina

### Societal Guidelines and Statements

**66 Cardiac computed tomographic imaging in cardio-oncology: An expert consensus document of the Society of Cardiovascular Computed Tomography (SCCT). Endorsed by the International Cardio-Oncology Society (ICOS)**

Juan Lopez-Mattei, Eric H. Yang, Lauren A. Baldassarre, Ali Agha, Ron Blankstein, Andrew D. Choi, Marcus Y. Chen, Nandini Meyersohn, Ryan Daly, Ahmad Slim, Carlos Rochitte, Michael Blaha, Seamus Whelton, Omar Dzaye, Susan Dent, Sarah Milgrom, Bonnie Ky, Cezar Iliescu, Mamas A. Mamas, Maros Ferencik

### The Editor's Page

**84 Building on success**

Armin Arbab Zadeh

### Case Report - Online Only

**e1 Follow-up assessment of myocardial calcification secondary to fulminant myocarditis with computed tomography**

Congjun Zeng, Ying Song, Weibing Tang, Ze Chen, Hailin Shen