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Winner of the 2022 Cover Contest

Milan Vecsey-Nagy

From the Desk of the President

Reviews

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.

Original Research

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.

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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 ≤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 cofounded 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.

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