CT / Case Study

Spectral Late Enhancement Myocardial CT Clinical Benefits

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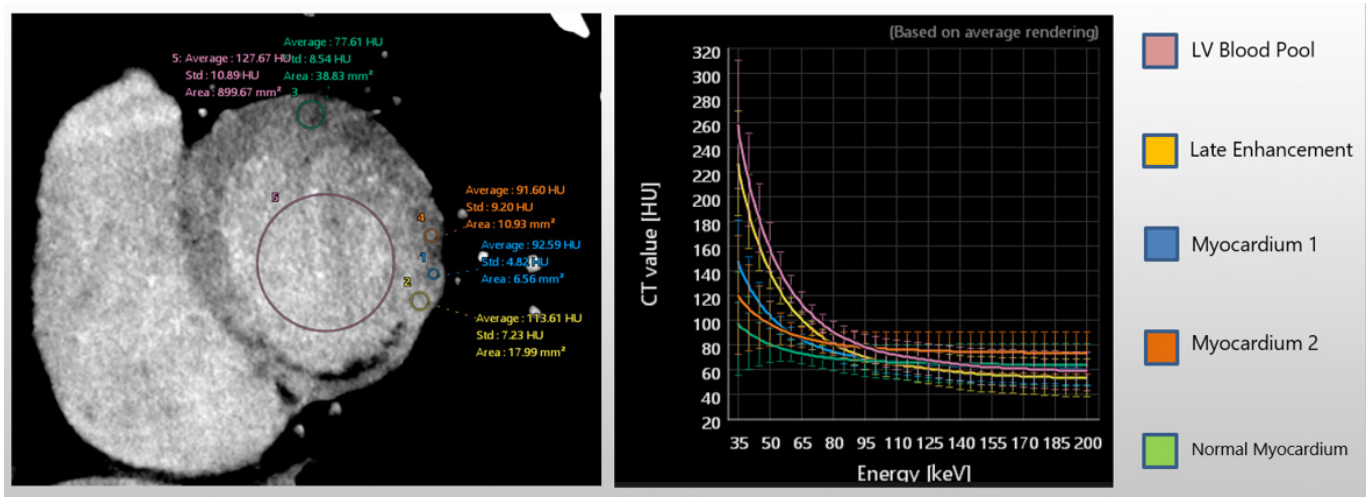
"Spectral imaging more effectively highlights delayed myocardial contrast agent uptake in the presence of fibrotic tissue compared to standard single energy scans." Dr. Gemma Burcet

Patient history

A 79-year-old female patient with a history of angina who had previously undergone stenting of the mid-segment of the right coronary artery (RCA) presented with palpitations. The electrocardiogram (ECG) revealed ventricular extrasystoles.

A cardiac CT late enhancement study was requested to assess myocardial fibrotic scarring prior to arrhythmia ablation.

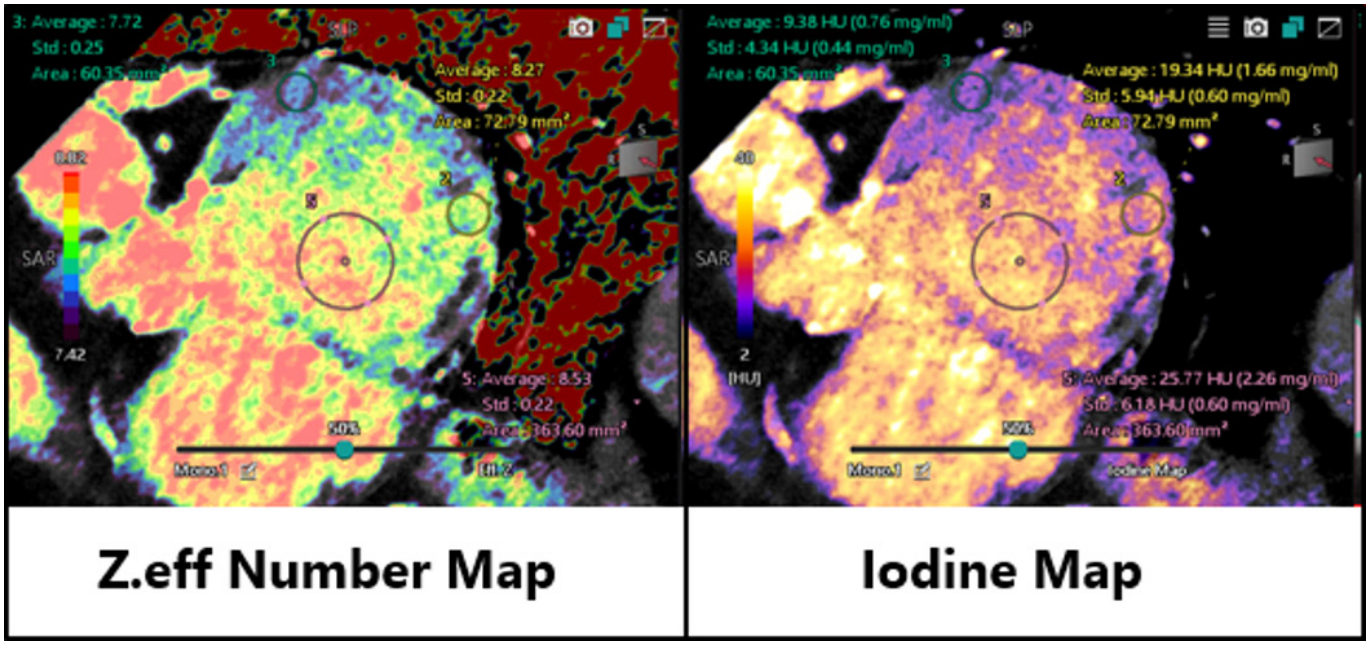
The ECG tracing during the CT scan demonstrated a heart rate of 67–69 bpm.



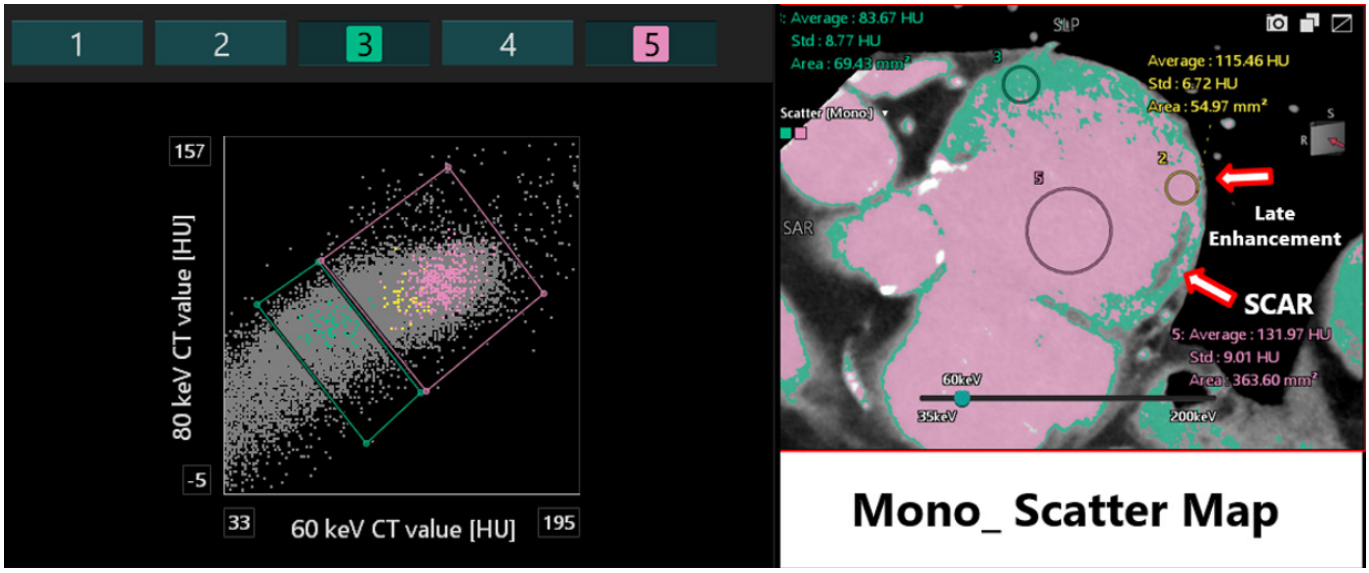
In the 50 keV monochromatic short-axis view, a myocardial scar is visible in the mid-myocardium of the RCA territory, with an adjacent area of late enhancement along the rim of the scar.

By plotting a series of ROIs extending from the area of late enhancement into the adjacent normal myocardium, a clear gradient of enhancement is observed.

LV Blood Pool and Late Enhanced tissue ROI's present similar curves.

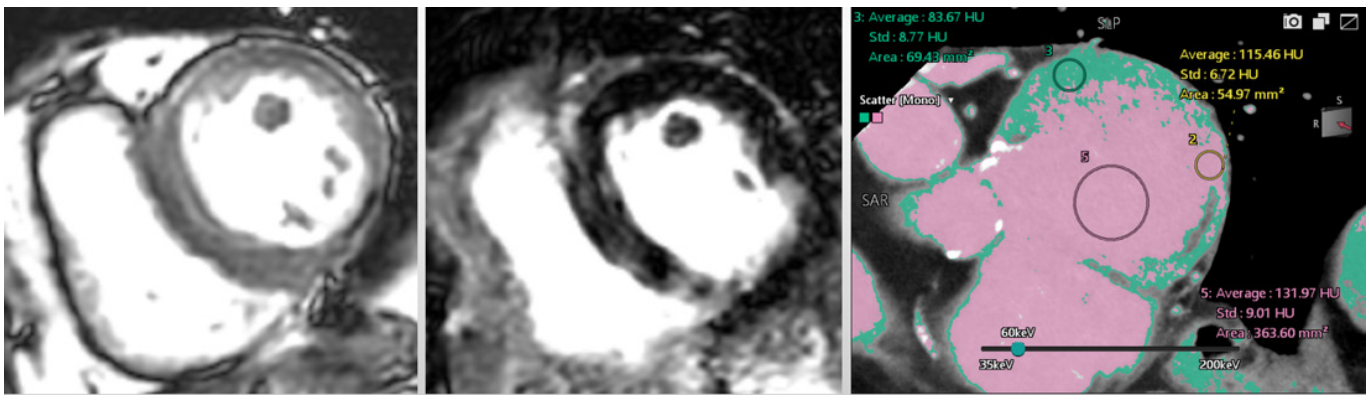


Z.eff number map and Iodine map confirm a late enhancement pattern in continuity with the scar, which is indicative of myocardium infarction.



The Mono_scatter Map can easily separate enhanced areas from the normal myocardium with a clearer depiction of the late enhancing myocardium.

The MR examination confirms the myocardium infarction.



Conclusions

Spectral imaging obtained with wide-area detector CT enables isophase myocardium acquisition, and combines superior motion-free advantages of a 16-cm one-beat scan with the advantages of the low keV monochromatic image, Iodine Map, Z.eff map, and Mono-scatter map to better evaluate myocardium contrast uptake.

This comprehensive approach significantly improves myocardial contrast visualization, especially in areas where conventional single-energy helical acquisition could demonstrate notable limitations.

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