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AI-enabled Cardiac Chambers Volumetry In Non-contrast Coronary Artery Calcium CT Scans Vs. Contrast-enhanced Coronary CT Angiography Scans In The Same Patients

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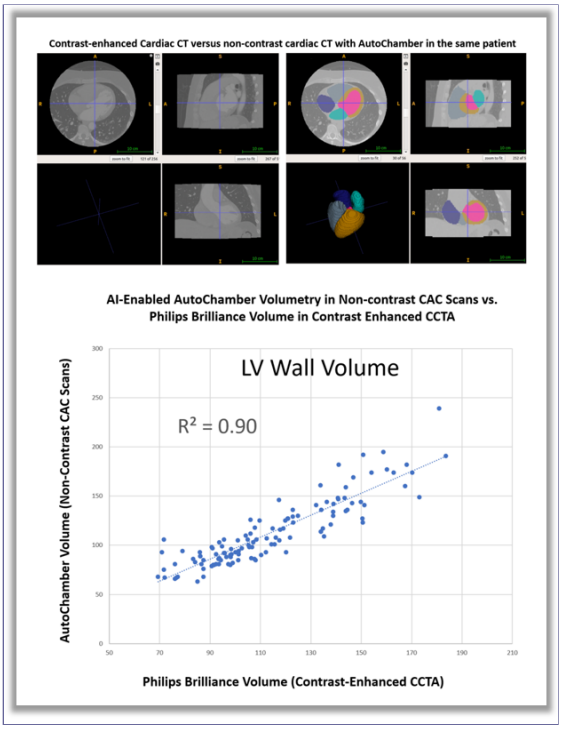
Abstract:
Introduction: We have developed an AI-enabled automated volumetry of cardiac chambers (AutoChamber) that works both on non-contrast ECG-gated cardiac CT scans used for coronary artery calcium (CAC) score, and non-contrast non-gated lung cancer screening CT scans. We have recently reported the agreement between AutoChamber measurements vs cardiac MRI measurements. Here we report AutoChamber results on non-contrast CAC scans and contrast enhanced coronary CT angiography (CTA).
Methods: We have obtained CT images from a previously published study in which 131 cases underwent non-contrast CAC and contrast enhanced CCTA at the Harbor UCLA Lundquist Research Institute. The cases consisted of 74 [52.4%] women with a mean age of 55 years ± 10.1. The cardiac chambers volume in 131 cases of contrast enhanced CCTA were measured using automated chamber volumetry by Philips Brilliance Volume v 4.5; Philips Healthcare.
Results: The correlations between Philips' automated chamber volumetry in contrast enhanced CCTA scans versus AutoChamber automated volumetry in non-contrast CAC scans for left atrium (LA), left ventricle (LV), right atrium (RA), right ventricle (RV), and left ventricular wall (LVW) volume were 0.73, 0.65, 0.85, 0.93, 0.90, respectively. P for all <0.01.
Conclusions: AI-enabled AutoChamber volumetry based on non-contrast cardiac scans is feasible, and correlates reasonably well with contrast-enhanced cardiac CT scans. Further studies are warranted to reproduce these results and explore the add-on value of AutoChamber to CAC scans.



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