Contrast enhancement with dual energy CT for the assessment of atherosclerosis

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Author(s) Stefan C. Saur,; Hatem Alkadhi,; Luca Regazzoni,; Simon Eugster,; Gabor Szekely,; Philippe Cattin,
Author(s) at UniBasel Cattin, Philippe Claude ;
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A drawback of the commonly used single source computed tomography systems (CT) is that different materials might show very similar attenuation at any selected radiation energy. However, the assessment of atherosclerosis requires good differentiation between vessel lumen, calcium, adipose, and surrounding tissue. Dual energy CT (DECT) simultaneously measures attenuations at two energies and therefore can improve the differentiation to some extent. A tissue cancelation and enhancement algorithm for dual energy data was already proposed in 1981 and evaluated on experimental settings with a stationary X-ray source. For this study, we adapted this algorithm for DECT and propose its usage as a pre-processing step for the assessment of atherosclerosis. On clinical DECT patient data and with fixed parameters we could show a simultaneous contrast enhancement between 8% and 67% among all targeted tissues.

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