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Cardiac, coronary angiography, coronary arteries, Extended Brilliance Workspace 3.5, phantom, stent, Vascular

In-vitro assessment of coronary artery stents in 256-multislice computed tomography angiography

Publication
Philips CT Clinical Science • Philips Healthcare • USA

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** This article was originally published in Volume 7 of the BioMed Central.*

Background
The important detection of in-stent restenosis in cardiovascular computed tomography (CT) is still challenging. The first study assessing the in-vitro stent lumen visualization of the state of the art 256-multislice CT (256-MSCT), which was performed by our research group, yielded promising results. As the applied technical approach is not suitable for daily routine, we assessed the capability of the 256-MSCT and its different reconstruction kernels for the coronary stent lumen visualization employing a clinically applicable technique in a phantom study.

Results
The XCD kernel showed significantly lower artificial lumen narrowing (ALN) values (overall ALN < 40%) than the other reconstruction kernels (CC, CD, XCB) irrespective of the stent caliber. The ALN of coronary stents with a diameter > 3 mm was significantly lower than of stents with a smaller caliber. The ALN difference between stents with a diameter of 3 mm and smaller ones was not statistically significant. Yet, the lumen visualization of the smaller stents was impaired by a halo effect. The XCD kernel showed more constant attenuation values throughout the different stent diameters than the other reconstruction kernels.

Conclusions
The 256-MSCT provides a good lumen visualization of coronary stents with a diameter > 3 mm. The assessment of stents with a diameter of 3 mm seems feasible but has to be validated in further studies. The clinical evaluation of smaller stents cannot be recommended so far. The XCD kernel showed the best lumen

visualization and should therefore be applied in addition to the standard cardiac reconstruction kernels when assessing coronary artery stents using 256-MSCT.

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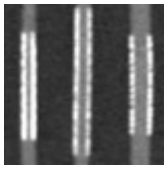

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This study by Andre, et al., assesses the capability of 256-MSCT and its reconstruction kernels for coronary stent lumen visualization by employing a clinically applicable technique in a phantom study.

CT • Publication
By: Philips CT Clinical Science
On: Feb 11, 2015

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