



Diagnostic Utility of Automated Stenosis Detection in Dual Source CT Coronary Angiography as a Stand Alone or Add-on Tool

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Introduction: Automated detection of coronary artery stenoses would be of potential value to aid with reaching a diagnosis when expert evaluation is not readily available. A potential additional value would be to provide an “overread” of physician interpretation to help avoid misdiagnosis due to oversight or misinterpretation. We evaluated the automated “rcadia COR Analyzer” system alone and to enhance interpretation of expert readers.

Methods: 50 coronary CT angiography data sets acquired by dual source CT were evaluated. Data sets were evaluated with the COR Analyzer system, a PC-based automated coronary analysis software package, by expert interpretation alone using a commercially available 3D workstation with options for axial image review, multiplanar reconstruction and maximum intensity projection in free double oblique planes, and by expert re-interpretation after making the automated findings available. Presence of $\geq 50\%$ stenoses was noted on a per-vessel and per-patient basis and compared to invasive angiography.

Results: Automated interpretation was successfully completed in 76% of patients and 83% of vessels. After excluding uninterpretable patients and vessels, per-patient sensitivity was 100% (16/16), specificity was 59% and accuracy was 76%. Per-vessel sensitivity was 87% (20/23), specificity was 71% and accuracy was 73%. All data sets were fully evaluable by expert interpretation. Per-patient sensitivity was 95% (20/21), specificity was 76% and accuracy was 84% ($p = 0.4$ as compared to automated interpretation). Per-vessel sensitivity and specificity were 93% (25/27) and 91% and accuracy was 92% ($p < 0.001$ as compared to automated interpretation). Making the results of automated interpretation available did not significantly improve diagnostic performance of expert readers, with a per-vessel sensitivity of 89%, specificity of 91% and accuracy of 91%.

Conclusion: Automated interpretation of coronary CT angiography data sets has a high per-patient sensitivity, but relatively low specificity in evaluable data sets. Addition of automated interpretation to expert evaluation did not increase accuracy of the expert read.