



Automatic Computerized Evaluation of 64 Multislice Coronary CTA: A Comparison Between COR Analyzer Software® and Visual Evaluation

Lopez CF, Weissman G, Joshi SB, Weigold WG., Department of Cardiology, Washington Hospital Center, Washington, DC.

Introduction: Coronary computed tomography angiography (CTA) is a widely accepted tool for coronary artery disease (CAD) evaluation. Proper assessment of coronary CTA requires an expert reader and can be time consuming. An automated protocol that can accurately rule out significant stenosis would be useful in screening, prioritizing, and possibly improving the clinical evaluation. We evaluated the accuracy of an automated software protocol for the assessment of coronary CTA versus the clinical evaluation.

Methods: We screened 114 consecutive CTAs performed via a 64 detector row CT (Philips, Best, The Netherlands) for the evaluation of CAD. After exclusion of studies with prior coronary bypass surgery or stenting (26), 88 studies were evaluated by the COR Analyzer II Software (RCadia, Haifa, Israel) in a fully automated fashion. The left main (LM), left anterior descending artery (LAD), left circumflex (LCX), and right coronary artery (RCA) were evaluated in the 70, 75, and 80% phase. The software excludes branch vessels. An expert reader reviewed all studies and comparison to the reader's interpretation was performed on a per patient and per vessel basis. A significant stenosis was defined as >50% lumen diameter stenosis by visual assessment.

Results: From a total of 88 patients, mean age 56 ± 11.9 , 34 (39%) female, the software failed in 5 (6%) cases to process the data set due to artifact or poor opacification in 4 cases, and a coronary anomaly in one. Typical analysis time required was 5 minutes, with no user input. Prevalence of significant abnormality was 24%, and 8% had at least one uninterpretable segment.

Analysis per patient and per vessel (351 vessels) revealed a sensitivity of 89.7 and 80.7% and a specificity of 66 and 85% respectively when compared to expert reading. Within specific vessels, the LM, LAD, LCX, and RCA had a sensitivity of 80, 73, 87, and 82% and specificity of 95, 86, 74, and 82% respectively. Negative predictive value was 93% on a per patient basis and 96% on a per vessel basis.

Conclusions: This novel automated coronary analysis software appears to be a promising tool for the rapid assessment of coronary CTA. Analysis proceeds in the background without requiring any user input. The analysis has sufficient specificity and negative predictive value to make future utilization of such protocols viable. Current limitations include an inability to evaluate branch vessels and a relatively low specificity and positive predictive value.

Table 1. Per Patient and Per Vessel Accuracy of Automated Coronary Analysis

	Sensitivity	Specificity	PPV	NPV
Per patient	89.7	66	56.5	92.9
Per vessel (Average)	80.7	85	69.7	95.8
LM	80	95	50	98.7
LAD	73	86	52.4	94
LCX	86.7	73.9	40.6	96.4
RCA	81.8	81.8	60	93