SUMMARY

The growing burden of coronary artery disease is out of question. Every effort is done in modern medicine to prevent, diagnose, evaluate and adequately treat this serious life threatening condition. In the effort to address proper evaluation for coronary artery disease patients several non invasive tests are being evaluated for their diagnostic accuracy. The current study was concerned with evaluating the accuracy of dual source 64-slice computed tomography in evaluating the coronary anatomy non invasively.

The study included 30 patients who underwent MSCT coronary angiography and invasive coronary angiography within 30 days of each other. Patients with arrhythmia, renal impairment, known contrast allergy and patients who could not hold their breath were excluded from the study.

All patients had the MSCT conducted using a dual source 64- slice scanner. The study included a prescan calcium scoring, followed by a contrast enhanced scan. We excluded patients with dense localized calcification involving certain coronary segments (especially the proximal segments) regardless of the total coronary calcium score. The contrast was injected intravenously using a dual head power injector. All patients received non ionic, low osmolar contrast. The bolus tracking

technique was used, the scan was automatically started when the contrast reached a peak concentration in the left side of the heart. All the scans were ECG gated. The ECG gating was used to retrospectively reconstruct the mid to late diastolic phase of each cardiac cycle. Few scans needed an additional systolic reconstruction to better visualize some non evaluated segments on diastolic reconstruction. Heart rate control was attempted in every patient using a beta blocker (atenolol) orally. Patients with uncontrolled heart rates and contraindication for beta blockade were excluded from the study.

Both the MSCT and invasive coronary angiography data were evaluated by operators blinded to the results of the other test.

MSCT data were evaluated using the transaxial images, as well as other reconstrution modalities; multiplanar reconstructions, MIP and curved MPR. A 15-segment coronary tree model was used. Each segment was evaluated both with MSCT and coronary angiography. By MSCT segments were labeled either with significant stenosis (≥ 50% luminal narrowing) or with non significant stenosis (< 50% luminal narrowing) and non evaluable. Each coronary segment was labeled either normal or atherosclerotic with the degree of luminal stenosis recorded. Visual analysis was used with both tests.

The current study revealed a very good diagnostic accuracy of the MSCT coronary angiography. Sensitivity, specificity, PPV and NPV were 95.5%, 92.7%, 76.7% and 98.8% respectively (per segment analysis). This analysis included the non evaluable coronary segments (4.2% of all segments subjected for evaluation) which were considered as false positive segments. This accounts for the relatively low PPV in this study. However, the test preserved its very high NPV. This should be very valuable if the test is viewed as a rule out procedure, ruling out the presence of significant coronary artery stenosis. This result is consistent with several other studies which noted the high NPV of the MSCT coronary angiography. From all the scanning parameters, the heart rate was the most important predictor of the diagnostic quality of the study.

We can reach to a conclusion from this study that the dual source 64-slice CT coronary angiography is a test that can be used confidently to diagnose patients with coronary artery disease and more importantly to rule out significant coronary artery disease.