# Role of 64 MDCT Angiography in Quantification of Coronary Artery Luminal Stenosis in Patients with Ischemic Heart Disease Comparative Study with Coronary Angiography

*Thesis*

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*By*

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# List of Abbreviations

| | |
|---|---|
| **3D** | 3 dimensional |
| **AHA** | American heart association |
| **AMI** | Acute myocardial infarction |
| **Ao** | Aorta |
| **BMI** | Body mass index |
| **CAD** | Coronary artery disease |
| **CTA** | Computed tomographic angiography |
| **ECG** | Electro cardiogram |
| **IHD** | Ischemic heart disease |
| **IVUS** | Intravascular ultrasonography |
| **LA** | Left atrium |
| **LAA** | Left atrial appendage |
| **LAD** | Left anterior descending |
| **LCX** | Left circumflex artery |
| **LM** | Left main coronary artery |
| **LV** | Left ventricle |
| **MDCT** | Multidetector CT |
| **MIP** | Maximum intensity projection |
| **MO** | Marginal obtuse |
| **MPR** | Multiplanar reformat |
| **MSCT** | Multislice CT |
| **NPP** | Negative predictive value |
| **P value** | Probability value |

# List of Abbreviations *(Cont...)*

| | |
|---|---|
| **PA** | Pulmonary artery |
| **PDA** | Posterior descending artery |
| **PPV** | Positive predictive value |
| **QCA** | Quantitative coronary angiography |
| **QCT** | Quantitative computed tomography |
| **RA** | Right atrium |
| **RCA** | Right coronary artery |
| **ROI** | Region of interest |
| **RV** | Right ventricle |
| **SD** | Standard deviation |
| **SSD** | Surface shaded display |
| **VRT** | Volume rendering technique |

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# Introduction

Coronary artery disease is one of the leading causes of death worldwide. In symptomatic patients, diagnosis of the presence and severity of coronary artery disease is critical for determining appropriate clinical management ***(Miller et al., 2008).***

Conventional invasive coronary angiography is currently the diagnostic criterion standard for clinical evaluation of known or suspected coronary artery disease (CAD) ***(Kuettner et al., 2004).***

Conventional coronary angiography reveals the extent, location, and severity of coronary obstructive lesions, which are potent predictors of disease outcome and identify high-risk patients who may benefit from revascularization ***(Miller et al., 2008).***

The risk of adverse events is small, but serious and potentially life-threatening sequelae may occur, including arrhythmia, stroke, coronary artery dissection, and access site bleeding (total complication rate, 1.8%; mortality rate, 0.1%). Furthermore, catheterization induces some discomfort and mandates routine follow-up care ***(Hoffman at al., 2005).***

The 64-MDCT scanners have a faster gantry rotation time and faster volume coverage compared with previous-generation scanners, thus enabling a more robust examination of the coronary arteries that is less susceptible to respiratory artifact and patient movement compared to previous generations. The small diameter of the coronary segments, complex 3D geometry, and rapid movement through the cardiac cycle represent major challenges for artifact-free CT angiography; all of which challenges could actually be overcome in this ECG-gated multidetector technology with the high spatial and temporal resolution it offers ***(Dewy et al., 2010).***

Still MDCT has still some limitations including radiation exposure, blooming artifacts due to a highly calcified plaque, respiratory motion artifacts, and low heart rate as a perquisite for the study ***(Shuman et al., 2008),*** which mandates further progression of this technology before it could credibly replace the gold standard technique in quantification of coronary artery luminal stenosis ***(Otsuka et al., 2008).***