

Coronary Evaluation Using Multidetector Spiral Computed Tomography Angiography using 64 Detectors:

A Multicenter International Trial

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Background

- **Non-invasive evaluation of symptomatic patients with suspected CAD is performed primarily to determine the presence and significance of coronary artery obstruction as well as the need for invasive procedures.**
- **Invasive coronary angiography is the standard for defining significant coronary stenosis and the need for and the approach to revascularization .**
- **Recent advances in MDCT technology have enabled the non-invasive imaging of coronary anatomy.**
 - **Prior studies limited, most single center, variable results.**

Study Design

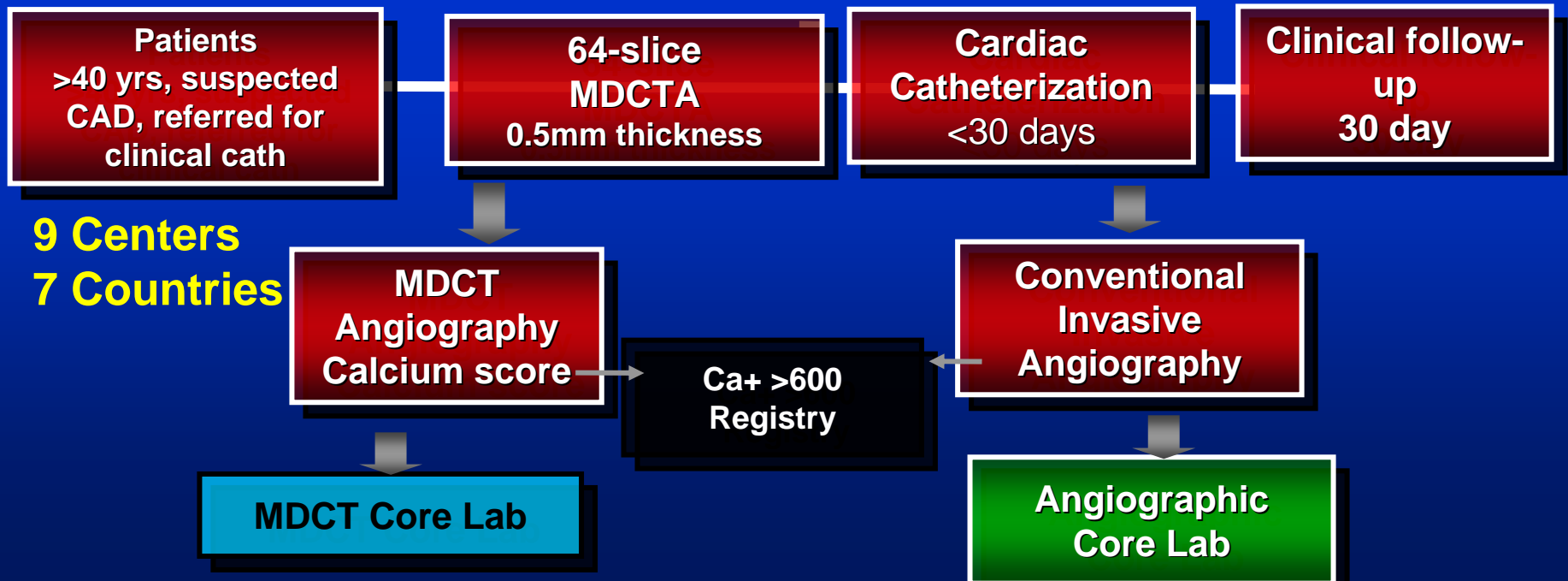
Multicenter International

Primary

- To evaluate the diagnostic performance (profile) of 64 detector MDCT in **patients** with suspected or known coronary artery disease (CAD)
 - Sensitivity and specificity in detecting $\geq 50\%$ (significant) stenosis by quantitative conventional coronary angiography (QCA)

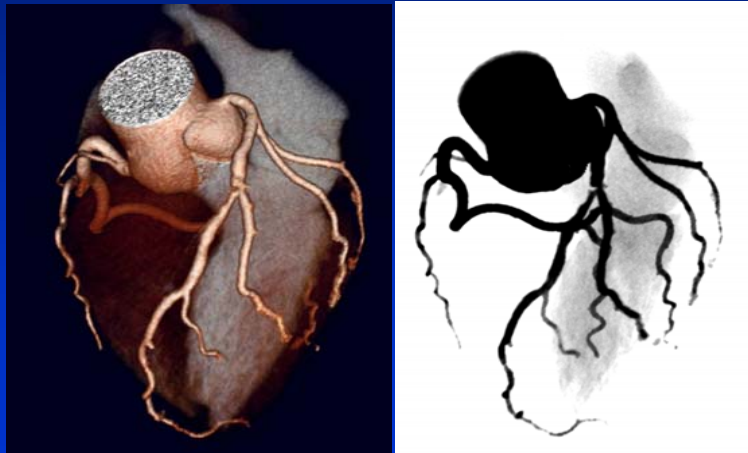
Secondary

- Per **vessel** diagnostic accuracy
- To evaluate the diagnostic ability of MDCTA in comparison with coronary angiography for predicting coronary revascularization.

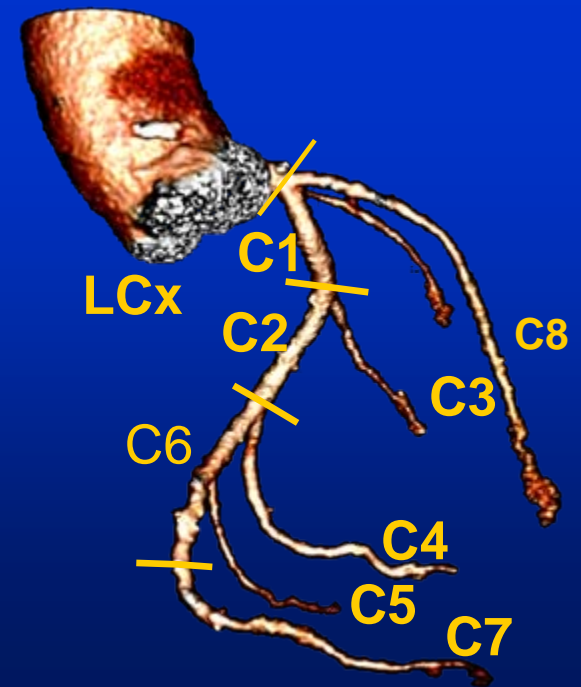
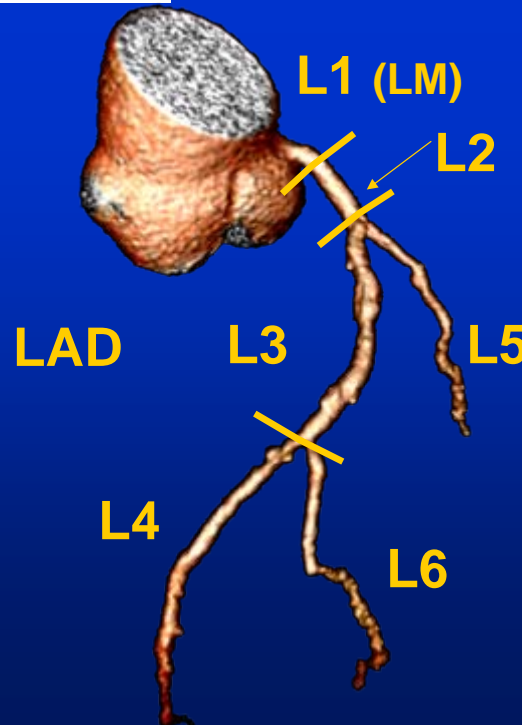
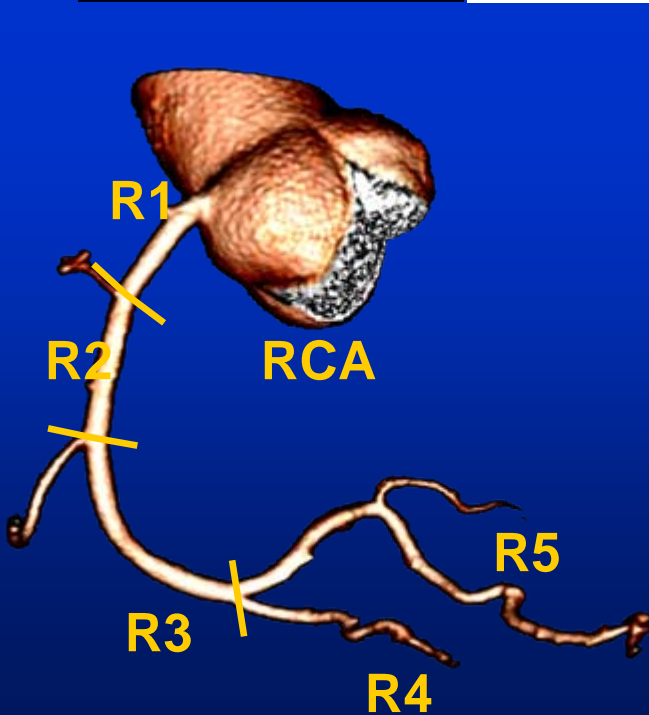


9 Centers
7 Countries

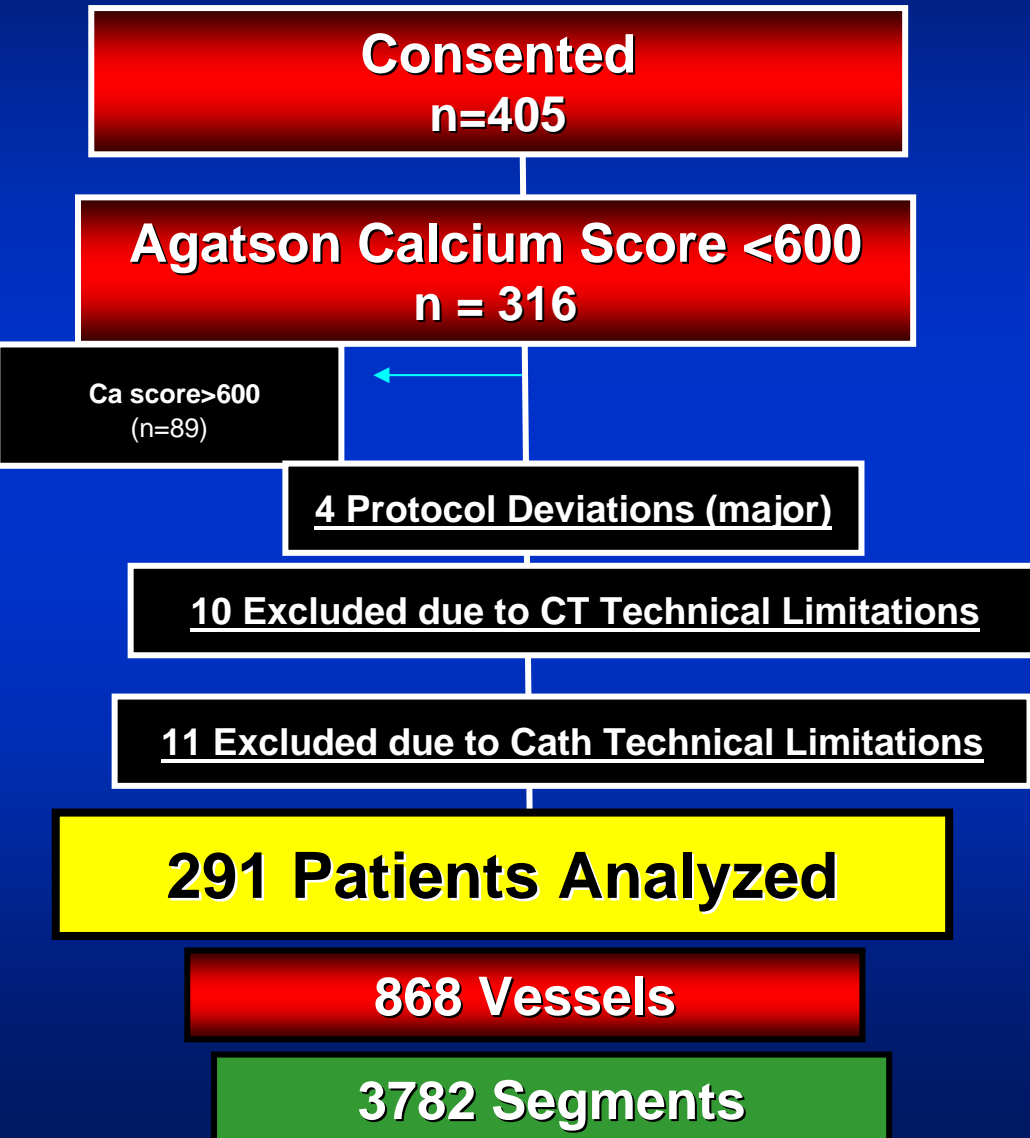
Coronary Segment Analysis



Entire coronary Tree analyzed
 All segments $\geq 1.5\text{mm}$
 Stents excluded
 Worst lesion per segment
 Visual and Quantitative
 Maximum % stenosis per segment
** modified from the BARI and CASS investigators*



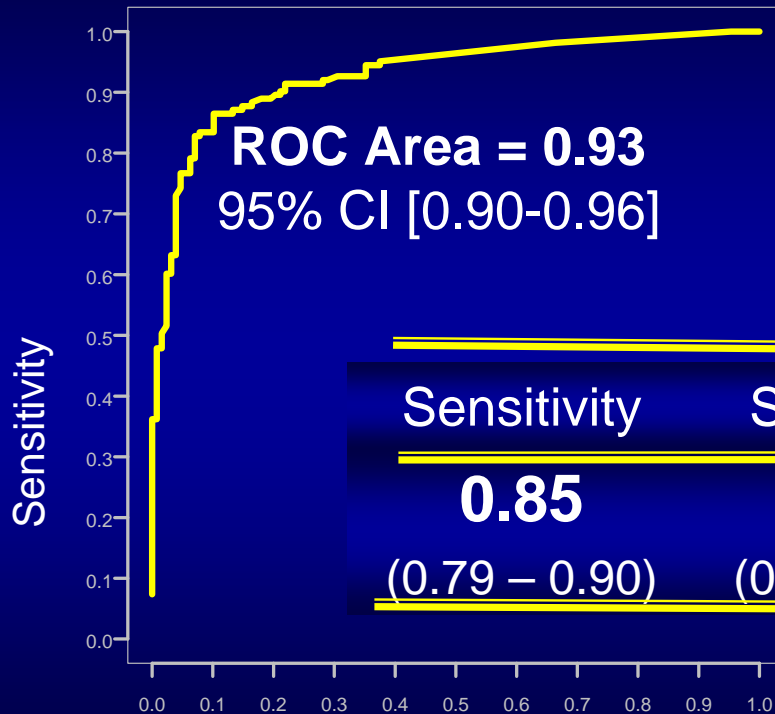
Results: Patient Flow



Age, median (IQR)	59 (52,66)
Men	216 (74%)
BMI, median (IQR)	27 (25,30)
Hypertension	192 (66%)
Diabetes	68 (23.4%)
Dyslipidemia	175 (60%)
Previous MI	58 (19.9)
Smoking - Current	56 (19.2%)
Family History CAD	74 (25.4%)
Prior PCI	28 (9.6)
History of Unstable Angina	62 (21.3)
Ejection Fraction median (IQR)	63 (57, 70)
Calcium Score	
Median (IQR)	80 (1-244)
Mean (SD)	140.3 (158.7)
Evaluable segments - CT	
patients all seg evaluable	97% (282/291)
vessels	98% (854/868)
Segments	95% (3763/3782)

Primary Results: Patient Analysis

MDCT vs. QCA



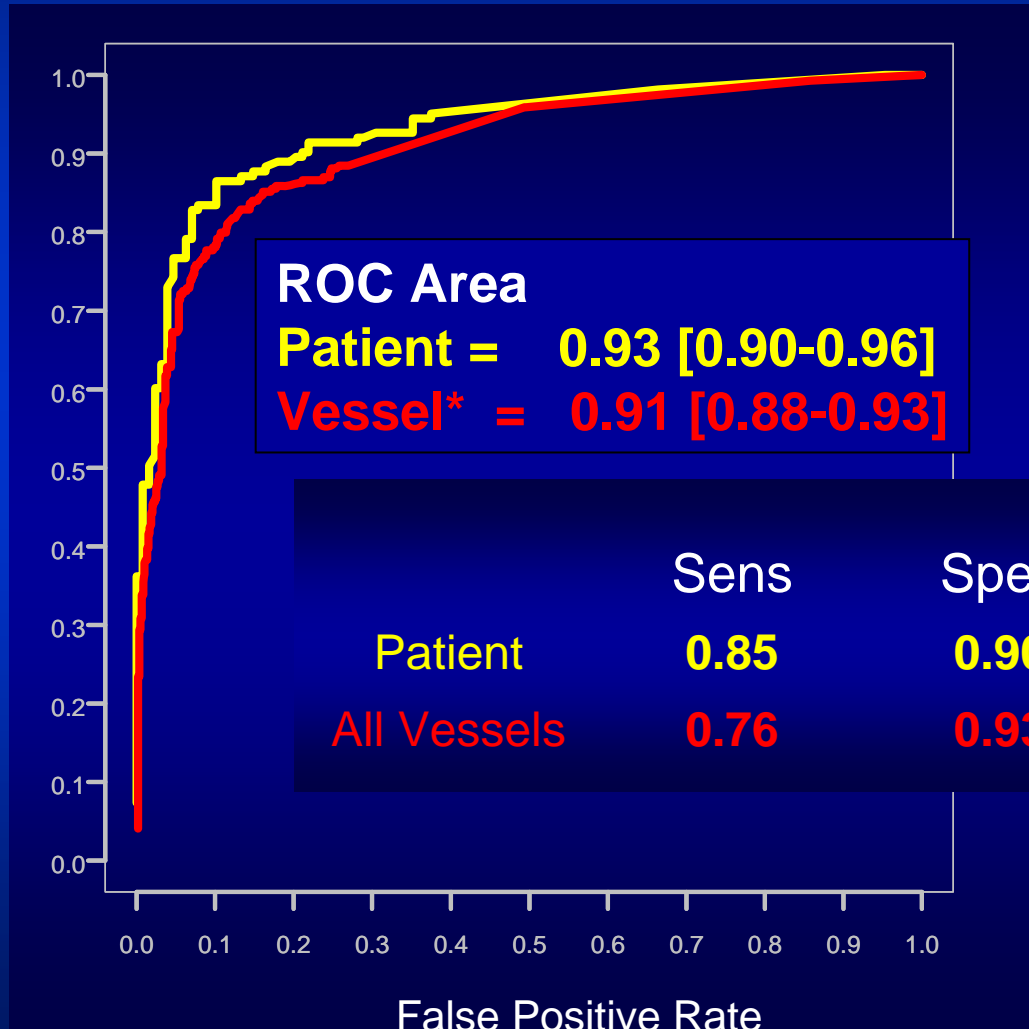
Quantitative MDCT
vs.
Reference standard
(QCA defined $\geq 50\%$
Stenosis)

Sensitivity	Specificity	PPV	NPV
0.85	0.90	0.91	0.83
(0.79 – 0.90)	(0.83 – 0.94)	(0.86 – 0.95)	(0.75 – 0.89)

1 - Specificity

n = 291
Prevalence = 56%

Comparison: Patient vs Vessel MDCT ROC's



**Patient vs Vessel
 AUC comparison**
[0.00014, 0.044] 95% CI

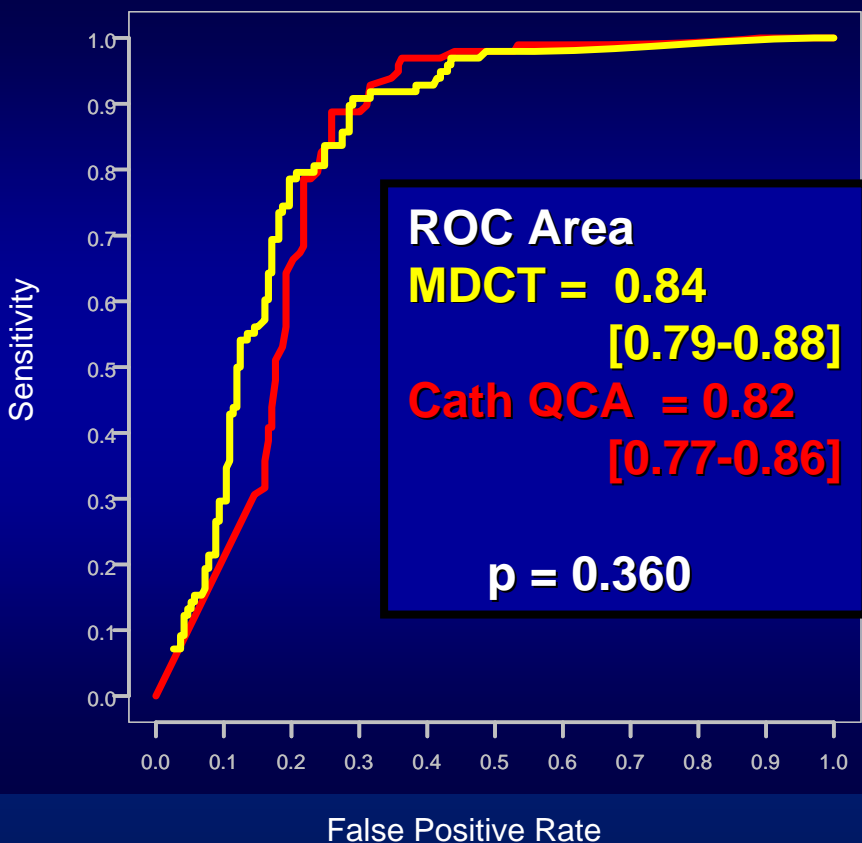
	Sens	Spec	PPV	NPV
Patient	0.85	0.90	0.91	0.83
All Vessels	0.76	0.93	0.82	0.89

Patient and Vessel Analysis

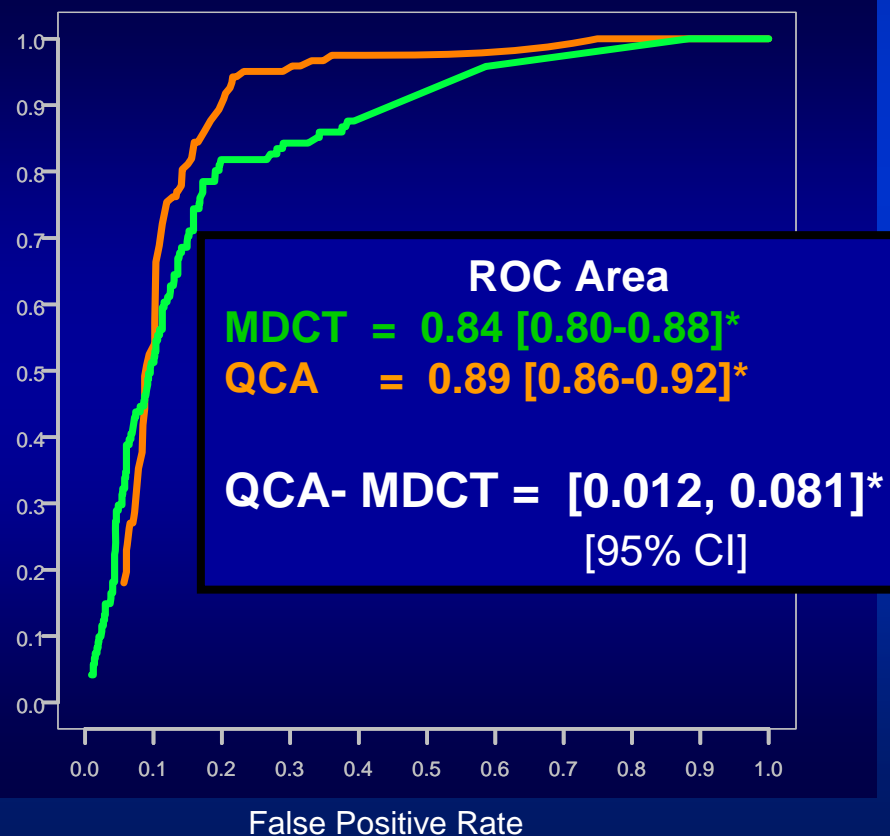
QCA vs MDCT with Revascularization

Cath QCA vs. MDCT Reference standard = Revascularization

Per Patient



Per Vessel



* Clustered

Summary

The diagnostic ability of 64 detector MDCTA when compared to quantitative coronary angiography (QCA) is good, reflected by an AUC = 0.93 [0.90-0.96] in patients with suspected CAD and calcium scores <600.

At the patient level, MDCTA had a similar ability as QCA to identify patients who underwent clinically-driven coronary revascularization

The diagnostic performance of MDCTA on a per patient base appears to be superior than on a per vessel basis when compared with QCA.

In patients with suspected CAD and calcium score <600, 64 detector MDCTA can be used to assess the presence of significant CAD and the potential need for coronary revascularization.

website: www.hopkinsmedicine.org