INTRODUCTION
Atherosclerotic coronary artery disease is a major burden on the health care system world over.

Non-invasive coronary artery imaging is now a reality with CT. At least 2.5 lakh people a year die of a heart attack within one hour of the onset of symptoms and before they reach a hospital. 12 million people alive today have a history of heart attack, chest pain or both.

A meta-analysis of coronary heart disease prevalence in India done in 1996 revealed that there has been a 9-fold increase of coronary heart disease in urban population from 1960’s to 1990’s and a 2-fold increase in the rural population from 1970’s to 1990’s. (Gupta, et al. Indian Heart Journal May-June 1996 vol.48 no. 3, 241-245)

The overall prevalence of coronary artery disease in urban India is 11%, 6.2% for males and 14.8% for females. (Vishwanathan Mohan et al. Journal of American College of Cardiology, Sept. 2001 vol. 38 no. 3)

NON-INVASIVE MODALITIES TO DIAGNOSE CARDIAC DISEASE
ECG: baseline test with sensitivity of 42% and specificity of 80%.
Exercise Stress Test: Sensitivity of only 68%.
Thallium Stress Test: studies the perfusion of the heart muscle and not the coronary status per se with sensitivity of 88%, but specificity of 54%
Catheter Angiography: gold standard but invasive.
CT Coronary Angiography: capable of showing and evaluating coronary arteries as good as catheter angiography and in a non-invasive way.

WHO SHOULD UNDERGO CT CORONARY ANGIOGRAPHY?
All persons with high risk factors are potential candidates.

High Risk Factors
Strong Family History.
Diabetes.
High Blood Pressure.
Obesity.

Table 1:

<table>
<thead>
<tr>
<th>Author</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>-ve Predictive Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOPP, et al</td>
<td>86%</td>
<td>93%</td>
<td>99%</td>
</tr>
<tr>
<td>ACHENBACH, et al</td>
<td>91%</td>
<td>84%</td>
<td>97%</td>
</tr>
<tr>
<td>BECKER, et al</td>
<td>82%</td>
<td>97%</td>
<td>98%</td>
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High Cholesterol.
Stressful and High Tension Jobs.
Alcoholics and Smokers.

WHO SHOULD WORRY?
Changing lifestyle.
Dietary habits.
Less physical activity.
Irregular or no exercise.
Any person above the age of 40.

Traditional CAD Risk Factors
Traditional CAD risk factors are incomplete in predicting CAD events.
50% of patients with an acute MI have normal cholesterol profiles.
Sudden death is the FIRST (and last) sign of CAD in 150,000 people/year.

Primary prevention - strategies to prevent development of CAD (asymptomatic). Identify risk factors, measure subclinical atherosclerosis, diet restrictions and cholesterol lowering drugs.

This is the Future
Secondary prevention - aggressive medical and surgical therapy in those that have had a MI or have angina.

This is the Present.

CT Coronary Angiogram Vs Cath Coronary Angiogram (See Table 1).

CARDIAC CT APPLICATIONS
Coronary calcium scoring.
CT coronary angiography.
Miscellaneous e.g., evaluation of a mass lesion, evaluation of the heart chambers, pericardium etc.
CORONARY CALCIUM SCORE
Detection and quantification of calcium present within the coronary arteries using multi-slice CT with ECG-gated imaging.

Ca++ is absent in normal vessel walls. Ca++ is more common in the elderly and advanced lesions.
Coronary calcium is not an inevitable part of growing older.
A negative CCS does not rule out atherosclerotic disease but does imply a low likelihood of significant luminal obstruction.
A high CCS is consistent with a moderate to high risk of a cardiovascular event within the next 2-5 years. The more extensive the coronary calcification, the more likely that a coronary event may occur.

(Coronary artery calcification: Pathophysiologic, Epidemiology, Imaging methods and Clinical implications AHA writing group Circulation vol. 94, no. 5 Sept. 1, 1996)

PATIENT PREPARATION
No caffeine for 12 hours prior to the exam.
Fasting for 4 hrs prior to the study
Everyone gets beta-blockers.
Metoprolol 100 mg. One hour before the study.
Second dose of Metoprolol 50 mg. if HR>62
Antecubital vein only.
Office procedure and no admission is required.
15 mins to complete the procedure.

MEDICATIONS AT SCAN TIME
If stenosis correlation is critical give nitroglycerin.
All caths are done with nitro and correlation will theoretically be better.
Nitro spray 1/150gr. sl.
Nitroglycerin contraindications-Allergy, Viagra.

INJECTION PARAMETERS
Non-ionic contrast.
RATE OF 4 cc/sec.
At 300 psi pressure.
20 g cannula in ante-cubital vein.
Manual timing bolus = 20cc contrast.
Coronary CTA = 80-100 cc contrast.

IMAGE RECONSTRUCTION
Maximum intensity projection.
Volume rendering.
Curved multiplanar reformation.

LAD FUSIFORM ANEURYSM