Prospectively Gated Coronary CT – "Step and shoot" in The Chest Pain Unit: Uncompromised Quality with Markedly Reduced Radiation Exposure

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Coronary CT angiography (CCTA) is used daily for patient triage in the chest pain unit (CPU), however the radiation entailed in CCTA is not negligible and has been addressed as a hazard to patients. CCTA using prospective axial ECG gating ("Step and shoot") is a novel technique allowing significant radiation exposure reduction.

Purpose:
The purpose of this study was to compare CCTA "step and shoot" (S&S) with "conventional" CCTA in a CPU setup.
Subjects and methods:
S&S inclusion criteria: stable heart rate (HR) < 60/min and weight < 90 Kg. S&S was performed in 40 patients (mean age 51; 24 males; mean HR 53; mean weight 71 Kg). Conventional CCTA was performed in 27 patients (mean age 43; 19 males; mean HR 60; mean weight 68 Kg). All coronary segments were evaluated for image quality (scale 1-5; An average quality score assigned per patient) and estimated radiation dose.

Results:
Average image quality score were 4.91±0.163 and 4.90±0.383 for the S&S and Conventional CCTA, respectively. Coronary artery assessability (15 segments) was similar between the two groups as well. The mean radiation dose exposure using S&S was 5.8 mSv (range 2.7-12.4 mSv) compared with 17 mSv using conventional CCTA (range 13-26mSv); P value >0/001.

Conclusion:
CCTA using S&S reduces radiation exposure by 65% when compared to conventional CCTA. S&S study diagnostic quality was not inferior to conventional CCTA. Due to the relatively young population in the CPU, considering the life time radiation hazards, significant dose reduction renders CCTA S&S an attractive modality.