Coronary CT Radiation Reduction - The Lehigh Valley Health Network Experience

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Background

Efforts to reduce radiation exposure in medical imaging are underway nationwide and has become a large focus for our institution.

Cardiac computed tomography (CCT) is an important method employed for noninvasive coronary artery assessment.

Several dose reduction strategies have been recently developed to reduce radiation exposure with variable success.

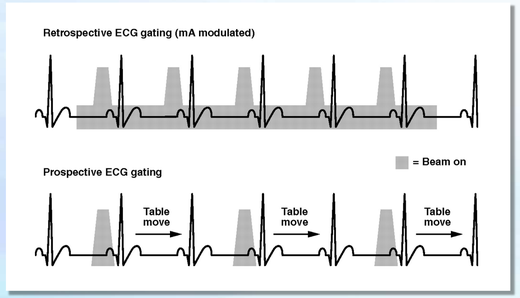
We sought to evaluate the effect of iterative reconstruction (IR) and prospective gating (PG) compared with traditional filtered back projection (FBP) to reduce radiation exposure.

Methods

Consecutive patients referred for CCT between Jan 2010 to July 2011 ar our facility were included.

Radiation reduction methods for each patient were recorded.

Dose-length product was recorded for each patient and the effecive radiation dose in milllisiverts (mSv) was calculated.



Ischematics display difference in acquisition between retrospectively gated dose modulation and prospective axial scanning.

Results

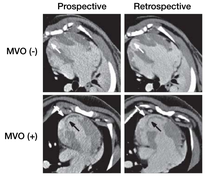
85 patients were identified, 65% male, 35% female) Mean and median radiation dose were 13.36±7.21 mSy and 13.24(8.5-15.7) mSv.

Mean radiation exposure by FBP=17.85 ±6.87, IR without PG=10.77±3.54 mSy, IR with PG=4.33±1.51 mSy.

A significant radiation reduction was observed when comparing FBP with IR without PG (p=<0.0001) and IR with PG (p=<0.0001).

The median radiation doses per month at our center decreased from 15.52(13.38-20.04) to 3.93(3.41-5.16) mSv over the duration of the study enrollment with increased use of prospective gating and iterative reconstruction techniques.

Comparison of prospective and retrospective ECG-gated MDCT images obtained 10 min after injection of constrast agent



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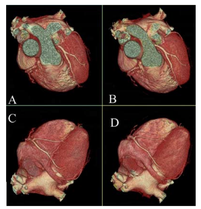
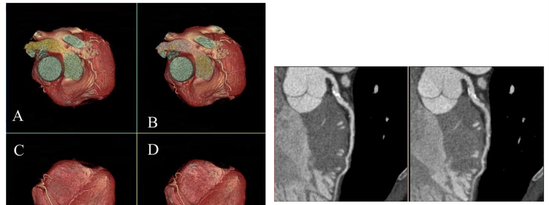


A & C - Prospective gating
B & D - Retrospective gating

Results



A & C - Prospective gating
B & D - Retrospective gating

Conclusions

Radiation reduction techniques have resulted in significantly reduced radiation exposure during CCT at our facility.

IR in combination with PG results in substantial reduction in radiation, improved patient care and enhanced clinical utility of CCT.