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Society of Computed Body Tomography & Magnetic Resonance

Poster #: 12

Title of Abstract: COMPARISON OF THREE COMMERCIALLY AVAILABLE ITERATIVE RECONSTRUCTION ALGORITHMS (ASiR, IDOSE SAFIRE) ON IMAGE QUALITY AND RADIATION DOSE IN KIDNEY STONE CT EXAMS.

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Modality: CT

Organ System: GU

Intro: Iterative reconstruction (IR) enables us to significantly reduce the radiation dose while preserving the image quality. Various IR algorithms have been introduced by different vendors. We evaluated the impact of various IR algorithms on image quality and radiation doses in kidney stone exams.

Purpose: To evaluate the impact of three commercially available iterative reconstruction (IR) algorithms ASIR, iDOSE and SAFIRE on the image quality and radiation dose in kidney stone abdominal CT exams in a busy academic practice.

Methods Used: We reviewed 380 consecutive adults kidney stone CT exams performed on 16 scanners (GE=12, Siemens=2, Philps=2) between Dec12 to June 13. A total of 351/763 exams were reconstructed using FBP while 412/763 exams were processed using IR (ASIR=292, iDOSE=75 and SAFIRE =45). The standard dose (SD) scanning parameters including weight based kV (100,120), mA(150-450), slice thickness 5mm were used for various FBP scanners while for IR scanners, the dose was modified (DM). Two radiologists blinded to image reconstruction and scanning technique independently reviewed the CT exams for image quality (IQ) and diagnostic acceptability. Size specific dose estimate (SSDE) within patient cohorts was compared using ANOVA.

Results of Abstract: All 763 CT exams were rated of diagnostic quality with higher IQ for the DM-IR group compared with SD-FBP group ($p<0.05$). Overall the SSDE was substantially lower in DM-IR group over SD-FBP exams (SSDE, IR: 8.7±3.8, FBP:11.5±3.6) ($p<.0001$). However, the SSDE was comparable for each IR subgroup (SSDE mean, ASIR: 8.9±3.1, iDOSE: 7.7±1.9, SAFIRE: 9.6±3.2)($P=.07$). SSDE was 26% lower in IR group in patients weighing ≥200 lbs compared to FBP (SSDE mean (≥200lbs): IR: 9.8±3.4, FBP:13.4±3.3) ($p<.0001$).

Discussion: CT exams for kidney stones performed with IR preserves the diagnostic acceptability of images with significant reduction (25%) in radiation dose irrespective to the type of commercial IR algorithm.

Scientific and/or Clinical Significance? Introduction of commercially available IR techniques are beneficial to CT practice for lowering substantial radiation dose in a busy practice while yielding diagnostic quality images irrespective of the manufacturer's algorithm.

Relationship to existing work To the best of our knowledge this is the first study comparing various IR algorithms in kidney stone exams.

N/A