AbstractID: 13388 Title: Initial Performance Evaluation of GE CT 750HD Scanner

Purpose:
To present an initial performance evaluation of GE Discovery CT 750HD scanner in four imaging modes: Regular, Adaptive Statistical Iterative Reconstruction (ASIR), High Resolution (Hi-Res), and Gemstone Spectral Imaging (GSI) mode, in an effort to better understand the potential advantages of the scanner, including improved spatial resolution, reduced dose, and material separation capability.

Method and Materials:
The scanner was tested with the clinical protocol frequently used for adult abdomen scans (120 kVp, helical, 5 mm slice thickness, 1.375 pitch, Median Body SFOV, 40 mm beam collimation). Preset 11 was used for GSI mode, as it has settings similar to the above protocol. Regular, Hi-Res, and GSI were used under the same CTDIvol (19.1 mGy), while in ASIR mode 100% ~ 40% of this dose level were used. Catphan phantom was employed as the imaging target: low contrast detectability and CNR were compared for Regular, ASIR, and GSI mode; high contrast resolution patterns and MTF curves were compared for regular, Hi-Res, and GSI mode using all reconstruction kernels. Patterns that are made of iodine compounds were imaged to compare the measured and nominal iodine concentration levels.

Results:
Using ASIR, image quality of low contrast patterns was maintained with 40% less dose compared with regular mode. Regular and GSI mode have almost identical MTF curves. Hi-Res mode provides improvements in terms of the highest visible resolution pattern and MTF by 1~3 lp/cm for different reconstruction kernels, but high frequency artifacts were observed in point spread functions acquired with HD-Ultra and HD-Edge kernels. The measured and nominal iodine concentrations showed discrepancies.

Conclusion:
750HD scanner demonstrated potentials to improve spatial resolution and to reduce dose in clinical applications. We will perform further studies for more comprehensive evaluation of the GSI mode.