

AbstractID: 6932 Title: Dose and image quality of flat-panel detector volume computed tomography for sinus imaging

Purpose:

CT of the sinuses is commonly used for diagnosis and assessment of chronic sinusitis and preoperative planning for otolaryngological and dental procedures. Sinus imaging is a high-contrast procedure requiring high spatial resolution. The purpose of this study is to compare the dose and image quality for typical sinus CT clinical protocols using conventional 16- and 64-slice CT scanners with a flat-panel volume CT scanner.

Method and Materials:

Three systems were chosen: a MiniCAT (Xoran Technologies, Inc.) flat-panel detector unit, a Lightspeed 16 Pro, and a Lightspeed VCT (GE Medical Systems). A typical sinus technique of 120 kVp, 150 mAs, and 2.5 mm slice thickness was selected for the GE scanners. The MiniCAT used a preset sinus technique of 120 kVp, 45 mAs, and 0.4 mm voxel size. The doses from 20 TLDs (Landauer, Inc.) inserted in a Rando head phantom were used to estimate the effective dose for each technique. The spatial resolution and slice sensitivity profiles (SSP) were measured for these same techniques.

Results:

The flat-panel detector volume CT scanner gave an effective dose of 0.17 mSv while the 16- and 64-slice scanners gave 0.96 and 0.87 mSv, respectively. The Lightspeed scanners had a trans-axial spatial resolution of 7 lp/mm (standard filter) and 11 lp/cm (bone filter). The flat-panel CT scanner had isotropic spatial resolution of 12 lp/cm. The FWHM of the SSP along the z-axis was 0.49 mm for the MiniCAT, and 2.32 and 2.34 mm for the 16- and 64-slice scanners, respectively.

Conclusion:

Flat-panel volume CT with sub-millimeter isotropic spatial resolution is a low dose alternative for high-contrast sinus imaging. While the conventional CT scanners have advantages for low-contrast resolution, this can be sacrificed for a five-fold dose reduction and increased spatial resolution in a volume image.

Conflict of Interest: Research sponsored by Xoran Technologies, Inc.