AbstractID: 1562 Title: Beyond CTDI Dose Measurements for Modern CT Scanners

With the advent of helical scanning and multi-slice CT scanners with wider beam widths, the existing dose index methodologies ($CTDI_{FDA}$ and $CTDI_{VOL}$) have become confusing, inconsistent and inaccurate. Dixon has recently proposed a new method of characterizing CT dose that involves using a small ion chamber to make dose measurements from helical scans of longer phantoms[1]. My study compares the results from the existing methodologies with a modified Dixon approach for some different collimated beam widths associated with modern multi-slice scanners. Three different CTDI phantoms that roughly simulate the attenuation and scan lengths of clinical studies were used in these measurements. Baby CTDI phantom: a right circular cylinder with 10cm diameter and 15 cm length. Head CTDI phantom: a right circular cylinder of 15 cm diameter and 15 cm length. Body CTDI phantom: a right circular cylinder of 32 cm diameter and 15 or 30 cm length. $CTDI_{VOL}$ was measured using the conventional single scan axial method(s) and then using the small probe – helical method. The phantom lengths were slightly over-scanned with the helical method. The results indicate that the current methodologies are inconsistent with each other and underestimate the true integrated dose in phantoms from helical scans by more than 20% in some cases. The new small probe – helical method of measuring CT dose described here is more accurate at determining the average absorbed dose in phantoms from typical clinical type scans with modern CT scanners.

[1] Dixon, Med. Phys. 30 (6), 2003.

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