AbstractID: 8594 Title: How well does the CT mAs predict patient dose?

Abstract

Background and Purpose. CT clinical protocols often specify technique factors in terms of x-ray tube voltage and tube current-rotation time product (mAs). In this study, we investigated variations in $CTDI_{100}$ per unit mAs value at a fixed x-ray tube voltage (120 kV).

Method. Data were obtained for $CTDI_{100}$ in head and body phantoms for 47 scanners from the four major imaging equipment vendors from the ImPACT web site. Data were analyzed as follows: (a) all $CTDI_{100}$ (mGy/mAs) data were plotted as a single histogram, and the 10^{th}, 50^{th}, and 90^{th} percentile values determined; (b) $CTDI_{100}$ for each vendor were averaged and compared with each other; and (c) $CTDI_{100}$ for each vendor were plotted as a function of the introduction of the CT scanner model under consideration.

Results. The median $CTDI_{100}$ values were 0.18 mGy/mAs and 0.076 mGy/mAs for head and body phantoms respectively. The ratio of the 90^{th} percentile value to the 10% value was 2.0 for body phantoms, and 1.8 for head phantoms. Average vendor $CTDI_{100}$ ranged between 0.17 and 0.20 mGy/mAs for head phantoms, and 0.07 and 0.10 mGy/mAs for body phantoms. There were no evident trends in CTDI100 as a function of time for any one of the four vendors investigated.

Conclusions. At the same kV/mAs, patient doses can differ by up to a factor of approximately two, and clinical protocols should therefore be based on patient dose (CTDI100) rather than the selected mAs value.