

AbstractID: 8843 Title: Dose Reduction in Detection of Pulmonary Thrombotic Embolism with Computed Tomography

Purpose: Due to recent concerns raised regarding excessive doses acquired by CT, it is prudent to review and audit the amount of radiation acquired by a patient who undergoes a procedure. Included is an assessment of a proposed dose-reduced CT scan protocol for detecting a pulmonary thrombotic embolism (PTE). An alternative protocol for the PTE scan involves a reduction in the peak voltage of the x-ray tube from 120 kV to 80 kV for young female patients.

Method and Materials: An assessment of the dose was done using Monte Carlo simulation data provided by the U.K. Health Protection Agency publication NRPB-SR250 (D G Jones and P C Shrimpton 1993). Using a FORTRAN program, the data can be used to determine organ dose along with a concise calculation of the effective dose upon a statistically average human. This dose model was compared to a measurement of the dose under equivalent scanning conditions for verification of the accuracy and reliability of the computer model.

Results: Calculations from the computer model show a difference in breast dose is nearly a factor of six reduction. Comparisons to weighted CTDI suggest at least a factor of four dose reduction under equivalent conditions. Contrast-to-Noise (CNR) actually improves under sample cases due to increased response of the contrast media at lower tube voltages and smaller patient size.

Conclusion: The results of the computer modeling clearly demonstrate a considerable dose savings, as young female patients can be expected to have a breast dose reduction of nearly 83%, while maintaining an acceptable level of efficacy in the scan protocol by reassigning the image's window level and window width to help compensate for the shift in contrast media signal in an 80 kV scan.

Conflict of Interest (only if applicable): None.