

**Purpose:** To directly measure skin dose using point-dosimeters from clinical CT brain perfusion scans and compare these measurements to estimates using the standard CTDI100 method.

**Methods:** Our clinical brain perfusion scan protocol included 11 axial 80kVp scan groups plus 2 helical 120kVp scan groups. The Landauer OSL nanoDOT dosimeters were calibrated using the same kVp's as the clinical protocol. Using nanoDOT dosimeters, skin doses at several positions on the surface of an anthropomorphic adult head phantom were measured during a perfusion protocol. The head CTDI100 was also measured using a 100mm-pencil CT ion chamber. The standard CTDI100 method estimates peak skin dose from the brain perfusion scans based on the head CTDI100(top) for axial scans plus the head CTDI100(top)/pitch for helical scans. The peak skin dose estimated from the CTDI100 method was compared with the measured values at different locations on the anthropomorphic phantom.

**Results:** The measured skin doses ranged from 0.11 to 0.95Gy depending on dosimeter positions. The highest dose location was located at the left-front surface laterally ~3cm above the ear, and the lowest dose was at the back-center surface ~4cm from the top. The surface doses to the locations of the eyes were ~0.23Gy. Dose origin was ~89% from the axial scans, ~11% from the helical scans, and <1% from the scouts. The CTDI100 method overestimated the peak skin dose to a typical adult head size, by ~20%. No image artifact was caused by presence of nanoDOT dosimeters in scan FOV.

**Conclusions:** Direct measurements of skin dose using nanoDOT dosimeters provided accurate and precise skin dose values without any image artifacts. CTDI100 method overestimated the skin doses for our clinical CT brain perfusion scans. Direct measurements rather than estimates will be useful in terms of: a) documenting real patient dose, and b) guiding future dose optimization efforts.