

AbstractID: 13492 Title: Reducing eye lens dose during brain perfusion CT examinations by moving the scan location or tilting the gantry angle

Purpose: Brain perfusion CT studies may result in radiation doses to the eye lens because of repeated scans that may in some cases be high enough to cause deterministic effects, such as cataracts. The purpose of this study is to investigate the eye lens dose from brain perfusion CT studies, and the dose reduction achieved by clinically practical approaches, such as moving the x-ray beam away from the eye lens or tilting the gantry angle. **Method and Materials:** Eye lens doses were estimated using the Monte Carlo method with: (a) a detailed voxelized patient model including a model of the lens of the eye; and (b) detailed CT source models of a Siemens Sensation 64 scanner using the widest collimation (28.8mm) and 120 kVp tube voltage. Simulated brain perfusion axial scans were performed at various scan locations from 5.5cm above the eye lens to 5.5cm below the eye lens with 0.5cm intervals to investigate the scatter contribution to the eye lens dose. For the scan location where the eye lens is completely in the beam, the gantry was tilted at 5, 10, 15, 20, 25 and 30 degrees to study the dose reduction. **Results:** Eye lens dose drops dramatically as the scan location moves away. When the lenses are just outside the primary x-ray beam, the dose is 17% of the maximum dose when they are completely in the beam. Tilting the gantry angle by 15 degree reduces the eye lens dose by 87%. **Conclusion:** The eye lens dose from CT perfusion examinations can be reduced by moving the beam away from the eyes since the scatter component is fairly small. When the examination has to be performed right over the location of the eyes, tilting the gantry angle is another effective method to reduce the eye lens dose.