Radiological Science & Safety Service

Brighton and Sussex University Hospitals NHS Trust

Dose Reduction to the Eye for a CT Head Examination using Kemmetech Barium Impregnated Vinyl Eye Shields

This is a short report on some work carried out by two trainees at Brighton and Sussex University Hospitals NHS Trust (Nick Harding and Ruth Hanly) on the effectiveness of barium impregnated vinyl eye shields (GrayShield).

A Rando head phantom was used to measure eye doses using TLD-100H lithium fluoride chips (with a Harshaw 4500 TLD reader). Measurements were carried out during the commissioning measurements of a new Siemens Flash CT scanner recently installed at the Royal Sussex County Hospital.

This scanner is equipped with X-Care, a facility that reduces the power of the x-ray beam when it passes over the anterior surface of a supine patient – in particular this is designed to reduce the breast dose and eye dose. In order to maintain image quality the power of the beam is increased slightly through the remainder of the rotation.

The eye shields were tested on their own and in combination with X-Care.

The eye shields were 0.07 mm lead equivalent and were mounted on approximately 7 mm of foam.

TLD were mounted on both the left and right eyes and measurements made without the shield (with and without X-Care) and with the shield (with and without X-Care). All measurements were repeated three times, and the doses quoted are the means of the doses for each eye.

The scan parameters used were as follows:

kV	mAs per rotation	Beam Collimation (mm)	Pitch
120	390	38.4	0.55

At the time the work was carried out, this was the scan protocol for a standard head.

Results

	Standard Unshielded	X-Care, Unshielded	Standard Shielded	X-Care, Shielded
Dose (mGy)	58.6	40.9	43.4	33.7
% Dose Reduction	-	30	26	42

The effect of the GrayShield alone is to reduce the dose by approximately 26%, which is in good agreement with other work carried out by Swansea which gave a 29.6% reduction.

The X-Care unshielded dose reduction was comparable at 30%. Both techniques combined gave a dose reduction of 42%.

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