

عنوان مقاله:

Assessing the image quality and eye lens dose reduction using bismuth shielding in computed tomography of brain

محل انتشار:

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خلاصه مقاله:

Background: Epidemiological studies show that computed tomography (CT) is one of the main sources of ionizing radiations. Shielding of radiosensitive organs is one of the dose reduction methods. This study aimed to assess the eye lens dose reduction and image quality resulting from the use of radio-protective bismuth shield in brain CT imaging. Methods: Bismuth shields were constructed with two different thicknesses (0.02 and 0.06 cm) and two different geometries including: direct contact with eye (contact setup) and 4 cm above the eye (distant setup). The lens dose was determined using thermo luminescent dosimeter (TLD)-207A chips inside an anthropomorphic head phantom during the CT examinations. Noise, SNR (signal to noise ratio), and CNR (contrast to noise ratio) were calculated to evaluate the image quality. Results: The lens dose reduction was higher using the shield with 0.06 cm thickness and in 'contact setup'. On the other hand, the bismuth shield with the thickness of 0.02 cm and in 'distant setup' had lower dose reduction and better image quality. Conclusion: Bismuth shield with the thickness of 0.02 cm and in 'distant setup' could decrease the lens dose to the acceptable levels, while providing a better image quality in comparison with the contact shield setup and with 0.06 cm thickness. Using the bismuth shield is a simple and low cost method for protecting the eye lens in brain CT scans with conventional scanners especially in low income or developing countries.

کلمات کلیدی:

Computed Tomography, Lens dose reduction, Bismuth Shielding, Image quality

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