

Measurement and Analysis of Radiation Doses to Radiosensitive Organs from CT Examination of the Cervical Spine Using Radiochromic Films and Monte Carlo Simulation Based Software

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Abstract : Radiation dose received by patients undergoing Computed Tomography (CT) examination of the cervical spine was evaluated using Gafchromic XR-QA2 films and CT-EXPO software (ver. 2.3), in order to document our clinical dose values and to compare our results with other benchmarks reported in the current literature. Radiochromic films were recently used as practical dosimetry tool that provides dose profile information not available using the standard ionisation chamber routinely used in CT dosimetry. We have developed an in-house program to use the films in order to calculate the Entrance Dose Length Product (EDLP) in (mGy.cm) and to relate the EDLP to various organ doses calculated using the CT-EXPO software. We also calculated conversion factor in (mSv/mGy.cm) relating the EDLP to the effective dose (ED) from the examination using CT-EXPO software. Variability among different types of CT scanners and dose modulation methods are reported from at least three major CT brands available at our medical institution. Our work describes the dosimetry method and results are reported. The method can be used as in-vivo dosimetry method. But this work only reports results obtained from adult female anthropomorphic Phantom studies.

Keywords : CT dosimetry, gafchromic films, XR-QA2, CT-Expo software

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