

عنوان مقاله:

Evaluation of Effect of Different Computed Tomography Scanning Protocols on Hounsfield Unit and Its Impact on Dose Calculation by Treatment Planning System

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نویسندگان:

Mamta Mahur - *Department of Radiotherapy, Delhi State Cancer Institute(s), Dilshad Garden, Delhi – 110095, India*

Om Prakash Gurjar - *Roentgen-SAIMS Radiation Oncology Centre, Sri Aurobindo Institute of Medical Sciences*

RK GROVER - *Department of Radiotherapy, Delhi State Cancer Institute(s), Dilshad Garden, Delhi – 110095, India*

PS Negi - *Department of Radiotherapy, Delhi State Cancer Institute(s), Dilshad Garden, Delhi – 110095, India*

خلاصه مقاله:

Introduction: In radiotherapy treatment planning system (TPS), basic input is the data from computed tomography (CT) scan, which takes into account the effect of inhomogeneities in dose calculations. Measurement of CT numbers may be affected by scanner-specific parameters. Therefore, it is important to verify the effect of different CT scanning protocols on Hounsfield unit (HU) and its impact on dose calculation. This study was carried out to analyse the effect of different tube voltages on HU for various tissue substitutes in phantom and their dosimetric impact on dose calculation in TPS due to variation in HU–relative electron density (RED) calibration curves. Materials and Methods: HU for different density materials was obtained from CT images of the phantom acquired at various tube voltages. HU-RED calibration curves were drawn from CT images with various tissue substitutes acquired at different tube voltages used to quantify the error in dose calculation for different algorithms. Doses were calculated on CT images acquired at 120 kVp and by applying CT number to RED curve obtained from 80, 100, 120, and 140 kVp voltages. Results: No significant variation was observed in HU of different density materials for various kVp values. Doses calculated with applying different HU-RED calibration curves were well within 1%. Conclusion: Variation in doses calculated by algorithms with various HU-RED calibration curves was found to be well within 1%. Therefore, it can be concluded that clinical practice of using the standard HU-RED calibration curve by a 120 kVp CT acquisition technique is viable.

کلمات کلیدی:

Computed Tomography Hounsfield Units, Phantom, Treatment Planning System

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