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Establishment of Institutional Diagnostic Reference Levels (DRLs) for Computed Tomography in National Hospital of Sri Lanka

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The institutional DRLs for the National Hospital of Sri Lanka were established by considering the most frequent computed tomography (CT) examination performed by three CT units in the Department of Radiology. CT dose volume index (CTDIvol) and dose–length product (DLP) were collected from 1200 patients who have faced 30 different types of frequent CT examinations related to nine anatomical regions. The facility reference levels (FRLs) were separately initiated per each CT unit, and the institutional DRLs were established. The established DRLs based on CTDI (mGy) and DLP (mGy.cm) are 10.80 mGy/486.86 mGy.cm for the Non-contrast (NC) abdomen, 7.25 mGy/1061.25 mGy.cm for NC/duel phase abdomen, 8.53 mGy/1358 mGy.cm for NC/triple phase abdomen, 11.73 mGy/1566.3 mGy.cm for abdomen prone, 10.58 mGy/1712.05 mGy.cm for Chest to pelvis NC/CE dual phase, 9.08 mGy/1721 mGy.cm for NC/CE(Contrast Enhancement) triple phase, 6.66 mGy/398.8 mGy.cm NC HRCT chest Inspiration/Expiration, 6.68 mGy/354 mGy.cm for Thoracic HRCT, 2.5 mGy/103.60 mGy.cm for NC chest, 8.20 mGy/347.40 mGy.cm CE chest, 11.30 mGy/283.80 mGy.cm for Pulmonary CTA, 70.90 mGy/1229.60 mGy.cm for Brain HCT, 56.12 mGy/794.00 mGy.cm for Brain(Head), 7.38 mGy/193.00 mGy.cm for Pelvis, 15.52 mGy/402.00 mGy.cm for Lumbar spine, 15.75 mGy/397.50 mGy.cm for Cervical spine, 8.44 mGy/219.50 mGy.cm for Spine routine, 8.72 mGy/165.50 mGy.cm for Extremities and 6.53 mGy/2084.80 mGy.cm for Peripheral angiography. The established institutional DRLs were compared with the NDRL of Sri Lanka as well as the NDRLs of the countries such as Australia, Japan, Turkey, USA, UK, Greece, Canada, Ireland, Indonesia, Italy and European commission reference levels. It was concluded that the CTDI and DLP parameters obtained for Brain HCT, NC/CE chest and NC abdomen studies were less than that for the National DRLs of Sri Lanka. The effective comparison of DRLs with the international benchmark confirmed that the initiated DRLs are under the recommended dose limits. Finally, the patient's data in one week are cross-checked with the established DRLs to ensure that the institution uses the optimal CT procedures by avoiding unnecessary high doses being delivered to patients, resulting in diagnosable image quality.

Keywords: Computed Tomography, Diagnostic Reference Level, Dose Length Product