

ESTIMATION OF DIAGNOSTIC REFERENCE LEVELS AND ACHIEVABLE DOSES FOR PEDIATRIC PATIENTS IN COMMON COMPUTED TOMOGRAPHY EXAMINATIONS: A MULTI-CENTER STUDY

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Abstract

This study was conducted to determine first local diagnostic reference levels (DRLs) and achievable doses (ADs) for pediatric patients during the most common computed tomography (CT) procedures in Yazd province. The DRL was obtained based on volume CT dose index ($CTDI_{vol}$) and dose length product (DLP) for four various age groups of children. Data were collected from the most commonly performed pediatric CT scans, including abdomen–pelvis, chest, brain and sinus examinations, at six high-loaded institutes. The patients' data (766 no.) in terms of $CTDI_{vol}$ and DLP were obtained from four age groups: ≤ 1 -, 1–5-, 5–10- and 10–15-y-old. The 75th percentiles of $CTDI_{vol}$ and DLP were considered as DRL values and the 50th percentiles were described as ADs for those parameters. Consequently, the acquired DRLs were compared with other national and international published values. The DRLs in terms of $CTDI_{vol}$ for abdomen–pelvis, chest, brain and sinus examinations were 3, 8, 9 and 10 mGy; 4, 5, 5 and 5 mGy; 25, 28, 29 and 38 mGy; and 23, 24, 26 and 27 mGy for four different age groups of ≤ 1 -, 1–5-, 5–10- and 10–15-y-old, respectively. The DRL values in terms of DLP were 75, 302, 321 and 342 mGy.cm; 109, 112, 135 and 170 mGy.cm, 352, 355, 360 and 481 mGy.cm; and 206, 211, 228 and 245 mGy.cm, respectively, for the mentioned age groups. In this study, the DRL and AD values in the brain examination were greater among the other studied regions. The DRL plays a critical role in the optimization of radiation doses delivered to patients and in improving their protection. This study provides the local DRLs and ADs for the most common pediatric CT scanning in Yazd province to create optimum situation for the clinical practice.