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Diagnostic reference levels for paediatric computed tomography

Author:
Zakariya Vawda[1]

Affiliation:
[1]Department of Medical Imaging and Clinical Oncology, Stellenbosch University, South Africa

Corresponding author:
Zakariya Vawda,
zvawda@vodamail.co.za

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Objectives: To establish local diagnostic reference levels (LDRLs) for emergency paediatric head computed tomography (CT) scans performed at a South African tertiary-level hospital and to compare these with published data.

Materials and methods: A retrospective analysis was conducted of volume-based CT dose index (CTDIvol) and dose length product (DLP) data from uncontrasted paediatric head CT scans performed in the Trauma and Emergency Unit of a tertiary-level South African hospital from January 2013 to June 2013. A random sample of 30 patients in each of three age groups (0 years – 2 years, > 2 years – 5 years and > 5 years – 10 years) was used. LDRL values were compared with several national DRLs from Europe and Australia.

Results: Mean $CTDI_{vol}$ and DLP values were 30 mGy and 488 mGy.cm for the 0 years – 2 years age group, 31 mGy and 508 mGy.cm for the > 2 years – 5 years group and 32 mGy and 563 mGy.cm for the > 5 years – 10 years group, respectively. The mean DLP for 0-year olds – 2-year olds was the only parameter outside the range of corresponding published reference data. Stratification into narrower age groupings showed an increase in DLP values with age.

Conclusion: An institutional review of the head CT scanning technique for emergency studies performed on children less than 2 years of age is recommended. This study highlights the role of LDRLs in establishing institutional dosimetry baselines, in refining local imaging practice and in enhancing patient safety. Standard age stratification for DRL and LDRL reporting is recommended.

Note: A selection of conference abstracts: RSSA/SASPI Paediatric Imaging Congress, 03–06 November 2016, Spier Estate, Stellenbosch, South Africa. Faculty collaborators: Professor Kassa Darge (Body Imaging, University of Pennsylvania, Philadelphia, USA), Professor Edward Lee (Thoracic Imaging, Harvard University, USA), Professor Beverley Newman (Cardiac Imaging, Stanford University, California, USA), Professor Kimberly Applegate (Image Gently and Body Imaging, Emory University, Atlanta, USA) and Professor Savvas Andronikou (Thoracic Imaging, University of Bristol, UK) supported by South African Paediatric Radiologists, co-ordinated by Dr Jaishree Naidoo, President of the African Society of Paediatric Imaging and Head of Division of Paediatric Radiology, Charlotte Maxeke Johannesburg Academic Hospital.

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