Diagnostic reference levels for paediatric computed tomography

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 (CTDvol) 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 CTDIvol 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.