

Radiation Dose To Pediatric Patients in Computed Tomography in Sudan

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Introduction

The use of pediatric CT has been increasing rapidly with annual growth estimated at about 10% per year. Because of current and growing use of CT and the potential for increased radiation exposure to children undergoing these scans. In Sudan, there has been a remarkable increase in the number of CT examinations being performed.

Objectives

The purposes of this study are to: (i) to measure the radiation dose and estimate the related risks to both pediatrics and adults patients during CT for chest, abdomen and brain and (ii) propose a local diagnostic reference level for abdominal CT.

Methods

A total of 80 patients were investigated. CT scanners that participated in this study are helical CT scanners (16 slices and dual slices). Organ and surface dose to specific radiosensitive organs was estimated by using software from National Radiological Protection Board (NRPB).

Results

For the pediatric group, the age was ranged between 0-10 years while the mean of weight was 13.53 Kg. The DLPs were 320.58 mGy.cm , 79.93 mGy.cm, 66.63mGy.cm for brain, abdomen and chest respectively. The CTDI_{vol} were 25.06, 3.48, 2.46,mGy for brain, abdomen and chest respectively and the effective doses were 2.05, 1.8, 1.08,mSv for brain, abdomen and chest respectively.

Table 1:

Statistical summary of assistant radiation doses for all patients

Value	DLP(mGy.cm)	CTDI (mGy)	Effective Dose (mSv)
Brain	320.6±200	25.1±14.9	2.1±1.6
Abdomen	79.9±67.8	3.55.3	1.8±1.5
Chest	66.6±69.4	2.5±1.8	1.1±0.9

Table 2: Patients risk estimation during pediatric CT

Value	Effective dose (mSv)	Cancer probability (10 ⁻⁵)
Brain	2.1	27.3
Abdomen	1.8	23.4
Chest	1.1	14.3

Conclusions:

The study has shown a great need referring criteria, continuous training of staff in radiation protection concepts especially for pediatric. Further studies are required in order to establish a reference level in Sudan