

Radiation doses to paediatric patients with pneumonia and co-patients undergoing Chest X rays

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Introduction

- Infants and children constitute 10% of the total number of radiological examinations.
- Neonates and children are more sensitive to exposure to ionizing radiation than adults, having a risk of developing a radiation-induced cancer 2 to 3 times that of adults.
- Pneumonia is an important cause of hospital admission in children in the developed world and it is estimated to be responsible for 3–18% of all paediatric admissions.

Introduction

- Chest X ray is an important examination for pneumonia diagnosis and to evaluate for complications.
- Therefore, increased attention has been directed towards the dose to the patient.



Chest X rays

Preface

This protocol designed to define a local Diagnostic Reference level (DRL), as apart of the department efforts to establish a local DRL.

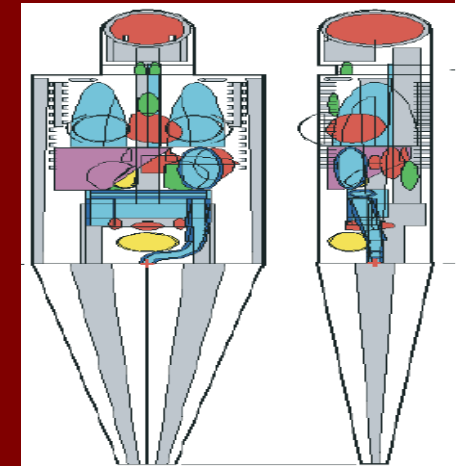
The Ethics and research committee approved the study and a written consent was obtained from all patients prior to the procedure.

Purpose

- This study aims to determine the entrance surface dose (ESD), gonad dose, effective dose and relevant radiogenic risks associated with pediatric patients and their co-patient.

Materials and Methods

- The study was carried out at University hospital of Larissa, Greece.
- Patients were divided into four groups; organ and effective dose were estimated using National Radiological Protection Board (NRPB) software.
- The entrance surface dose (ESD) was determined by thermoluminescent dosimeters (TLDs) for 132 children.



Materials and Methods

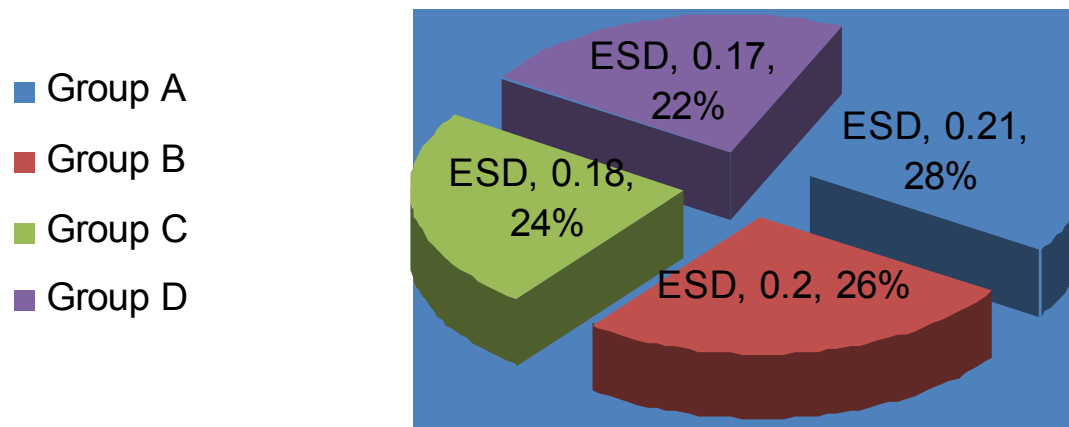
- A typical readout cycle begins with preheat phase at 100°C. Heating rate is 11°C/s up to 280°C (300 °C for TLD-200).
- Radiation dose measurements were made using two groups of TL dosimeters from Harshaw (Bicron-NE, Solon, Ohio, USA).
- TLD-100 was selected to measure patient dosimetry



Results

- The average ESD value was 0.1 mGy. The effective dose for patients was 0.02 mSv.

relation between ESD(mGy) and Thyroid dose for the four groups



Conclusions

- The radiation dose to the patients is well within established safety limits, in the light of the current practice.
- Co-patient radiation doses are negligible.
- Dose values are still higher than UK Diagnostic reference levels.
- This study provide data that can helps the regulatory authority to establish reference dose level for pediatric diagnostic radiology in Khartoum state and Sudan.