

Assessment of Entrance Skin Dose of Neonate for Common Radiography Examination

Abstract

explore and analyze the radiation dose of the pediatric patient undergoing chest and abdomen X-rays. Radiographs of the chest and the abdomen are the most commonly requested diagnostic X-ray examinations undertaken in neonates. A neonatal phantom was designed and constructed, and each radiographic technique was simulated. The Entrance Surface Dose (ESD) was measured.

INTRODUCTION

Entrance skin dose is the value of the radiation absorbed dose by the skin where the X-ray beam enters the patient. Assessment of entrance skin doses, specifically for neonate radiology, is very crucial as the infants' cells are dividing rapidly and are more sensitive to radiation than adults. Their cells can be easily damaged by excessive radiation dose. This research considered as an attempt to evaluate the effects of diagnostic X-ray on neonate patients throughout measuring the entrance skin doses. (Saeed & Ali, 2017)

Research objectives

The research objectives of this projects are:

- Measure the Entrance Skin Dose for neonate patients in different projections: for chest and abdomen supine & upright.
- Calculate the mean and standard deviation of the obtained dose.
- Measure the ESD while adjusting the voltage and current to observe any occurrence of fluctuation.

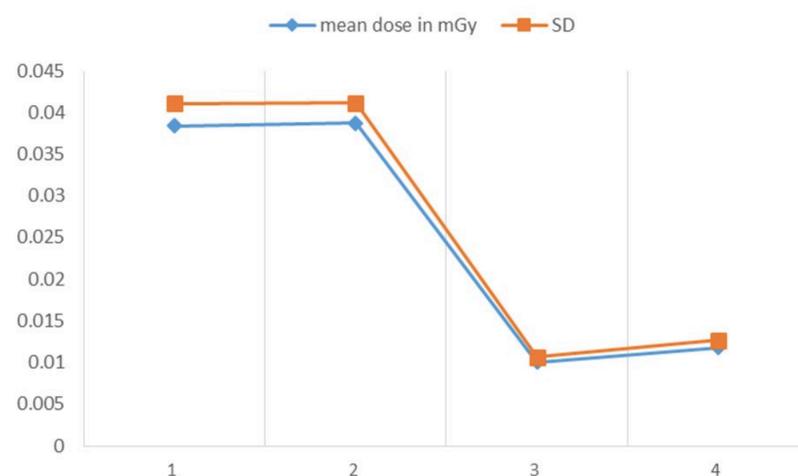
Methodology

- Research design :The image receptor 14 x 17 inch (35 x 43 cm) was placed on the tabletop where the phantom was in a supine and upright position for abdomen and chest .
- Instruments: Philips x-ray machine ,digital image receptor , phantom and piranha
- Procedure :During the execution of the experiment, it was done multiple times to double check individual contribution behaviour of each parameters. The parameter that was changes was the current and then the voltage and eventually the SID each time parameters was change new reading were displayed on the piranha.



RESULTS

Average exposure mGy for chest and abdomen						
	Kvp	mAs	Chest AP supine	Abdomen AP supine	Chest upright	Abdomen upright
1 st reading	40	4	0.036413333 ± 1.52753E-05	0.037493333 ± 4.16333E-05	0.00974933 ± 2.07445E-05	0.011217 ± 1.1547E-05
2 nd reading	44	3.2	0.040316667 ± 3.05505E-05	0.041516667 ± 3.51188E-05	0.01084333 ± 2.51661E-05	0.012447 ± 1.1547E-05
3 rd reading	46	2.5	0.03603 ± 6E-05	0.037146667 ± 2.3094E-05	0.009685 ± 1.30767E-05	0.011137 ± 3.05505E-05



DISCUSSIONS

X-ray dose can cause negative effect on neonates. However, in order to get close look at the patient, the penetration of the skin has to increase with the aid of increasing the volt not the current increment. The results showed that increasing the voltage and decreasing the current wont sufficiently affect the exposure for the supine and upright positions. This is due to the pressure exerted on the chest and abdomen during different positions.

REFERENCES

Dabin, J., Struelens, L., & Vanhavere, F. (2013). Radiation dose to premature new-borns in the Belgian neonatal intensive care units. *Radiation Protection Dosimetry*, 158(1), 28–35. doi:10.1093/rpd/nct184