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RADIATION DOSE IN MICTURATING CYSTOURETHROGRAPHY EXAMINATIONS AT THE LADY RIDGEWAY HOSPITAL FOR CHILDREN

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Micturating cystourethrography (MCUG) is a specialized radiological procedure specially applied in children to detect anatomy, pathology and functional disorders of the urinary system. Although both fluoroscopy and screen film imaging modalities can be used for this procedure, fluoroscopy is reliable as it demonstrates real time images. It is crucial to define and optimize the radiation dose received by a child during MCUG examination, taking into account that children have a higher risk for stochastic effects than adults due to higher radiosensitivity of bone marrow. According to the International Commission on Radiological Protection effective dose is the most appropriate quantity correlating to the risk from exposures during radiological procedures.

The objective of this study was to calculate the effective dose and entrance surface dose (ESD) in paediatric patients subjected to MCUG using a conventional fluoroscopy imaging system at the Lady Ridgeway Hospital by using dose area product meter (DAP) value. Results are compared with available published data to identify factors associated with higher effective doses where necessary.

DAP values were recorded in 94 patients comprising 32 infants, in the 35 (1 - 5 yr.) and 27 in the (5 - 12 yr.) age groups. The mean DAP values for infants, 1-5 yr. and 5-12 yr. were 4.1, 7.9 and 9.3 $Gycm^2$ respectively. Calculated ESD for infants, 1-5 and 5-12 yr. were 7.5, 14.2 and 16.8 mGy respectively. Calculated effective doses for the same age groups were 0.74, 1.41 and 1.67 mSv. The effective doses calculated in this study are significantly higher than previously reported (by a factor of 3.5) for the age groups 1-5 and 5-12 yr. It is noted that this is due to use of higher mAs, longer screening times, improper technique and not using the additional Cu filter available in the machine. Radiation dose vary according to the skills of the operators. It is more beneficial to all patients, radiologists and technicians if a digital facility is available as it could reduce the dose to patients.

Identification of the major contributor to dose delivery is vital to reduce dose to patients. In this study, the radiation dose was found to contribute a substantial portion to the patients. Both image quality and patient dose depend on many interrelated parameters which include the equipment, cooperation of the patient and variables in the clinical situation. As imaging parameters should be optimized to minimize radiation exposure, the hospital should be encouraged to periodically audit radiation dose to patients during radiological examinations and provide continuing training to the operators.