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An Approach to Establish Local Diagnostic Reference Level (DRL) for Coronary Angiography Procedures in Sri Lanka

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Among many interventional procedures performed in a cardiac catheterization laboratory, Coronary Angiogram (CAG) is the most frequently performed cardiac interventional procedure. A Diagnostic Reference Level (DRL) is an effective tool to optimize the radiation exposure to patients and staff while maintaining adequate diagnostic image quality. In Sri Lankan context, there is no single study about DRL for interventional procedures. The aim of this study was to establish an institutional DRL for CAG performed in a selected private hospital in Colombo, Sri Lanka. This study was conducted in cardiac catheterization laboratory in the selected hospital, Colombo. A total of 325 CAG procedures which were performed using two C-arm machines were selected for the study. Dose Area product (DAP), cumulative air-KERMA and fluoroscopy time were gathered from each procedure. The median (50th percentile) values of the cumulative DAP for the two catheterization laboratories were recorded as 8307 mGycm2 for machine 1 and 12899 mGycm2 for machine 2 respectively and they were considered to be their respective DRLs for the CAG procedures performed in each machine. To establish DRLs for each machine, the median DAP value was considered as adopted by the ICRP recommendations. The amount of radiation produced in CAG procedures can be varied on several parameters such as physician's experience, patient's condition and fluoroscopy equipment facility. In addition, there was a significant correlation between the cumulative air KERMA (Kinetic Energy Released per Medium) and the patients' effective dose. The calculated patients' mean effective dose was 3.561 mSv. In interventional cardiology procedures, patient effective dose may frequently exceed the thresholds of 2 Gy which could induce the transient erythema and skin burns. But in this study 13.34 mSv was the maximum effective dose that occurred. The developed institutional DRL for CAG procedure complies with available other countries national DRL and regional DRL.

Keywords: *catheterization laboratory, coronary angiogram, cumulative dose area product, dose reference level*