

Development of Institutional Reference Level of Radiation Dose for Cardiac Catheterization Procedures

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Abstract

Fluoroscopy-guided interventional procedures have gained prominence in diagnostic and therapeutic settings due to their minimally invasive nature. Among these procedures, Coronary Angiogram (CAG) stands out as one of the most commonly performed cardiac interventions. To minimize patient radiation exposure, the International Commission of Radiation Protection (ICRP) recommends to establish Diagnostic Reference Levels (DRLs) nationally or regionally. This study aims to establish an institutional DRL for CAG procedures at a selected private hospital in Colombo, Sri Lanka. The research was conducted in the cardiac catheterization laboratory, focusing on 201 CAG procedures performed using two separate C-arm machines. For machine No: 01- PHILIPS ALLURA clarity FD-10, the median cumulative DAP was 9060.50 mGy.cm² while it was 7498.00 mGy.cm² for machine No: 02- PHILIPS AZURION 7 B20/15. These median values were considered as their respective DRLs for CAG procedures in each machine according to the ICRP recommendation. In addition to establishing the DRLs, the study identified significant correlations between patient effective dose and several factors, including patient weight, fluoroscopy time, and the number of images taken. In conclusion, this study established institutional DRLs for CAG procedures and highlights the importance of optimizing radiation dose to achieve better patient outcomes. Established DRL values for DAP were quite low compared with previous studies. Therefore, this study recommends to develop national DRLs for interventional procedures to optimize the radiation exposure level.

Keywords: *Catheterization laboratory, CAG, Cumulative dose area product, Dose reference level, Radiation dose optimization*