

An Assessment of Occupational Radiation Exposure in Cardiac Catheterization Laboratory at a Single Centre in Sri Lanka

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In a cardiac catheterization laboratory, the risk of continuous radiation exposure, which may affect both patients and staff personnel, is a significant concern. The main purpose of this study was to determine the level of radiation exposure to the first operator, a senior registrar who performs cardiac catheterization procedures, and the scrub nurse who assists during the cardiac catheterization procedures. The study conducted at the National Hospital of Sri Lanka included 202 procedures: 151 coronary angiograms (CAG) and 51 Percutaneous Coronary Intervention (PCI) procedures. Each person used two electronic pocket dosimeters (EPDs), with one placed under the apron at chest level and the other above the apron at neck or collar level. Annual procedure counts were obtained from hospital records in 2023. Effective doses were calculated based on EPD readings. Patient demographics (height, weight) and C-arm dose reports were recorded. The effective dose per year was calculated. Statistical correlations between effective dose, demographics, and procedural elements (fluoroscopy time, Air Kerma, Dose Area Product (DAP), cine acquisitions) were analyzed by considering operator experience levels. The average effective dose for the first operator was $0.08 \text{ mSv} \pm (0.02 \text{ mSv})$ while the average effective dose for the scrub nurse was $0.05 \text{ mSv} \pm (0.01 \text{ mSv})$. The individual estimated annual effective doses as well as the average annual effective doses for both first operator and the scrub nurse were well below the occupational average annual dose limit of 20 mSv as per the ICRP recommendations. Significant correlations were found between effective dose and the procedural factors like DAP, Air Kerma, cine acquisitions, fluoroscopy time, and operator experience.

Keywords: *occupational radiation exposure, cardiac catheterization laboratory, coronary angiograms, percutaneous coronary intervention procedures*