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RADIATION DOSE TO THE EYE LENS OF A CATH LAB RADIOGRAPHER

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Occupational radiation dose in fluoroscopy guided interventional procedures are the highest registered among medical staff. The cath lab radiographer receives the highest occupational dose compared to other radiographers. Several studies done amongst exposed human populations in the last decade suggest that lens opacities (cataracts) occur at doses far lower than those previously assumed to cause cataracts. Therefore, the International Commission on Radiological Protection (ICRP) directed its attention on recent epidemiological evidence and issued a statement after its meeting on 21st April 2011 giving an equivalent dose limit for the lens of the eye as 20 mSv in a year replacing the previous annual dose limit of 150 mSv. It is realised that the eye lens dose will mainly depend on the type of procedure, performance of the operator and the radiographer and the radiation protection practices. During the recent past there is a concern that radiation induced cataract could be stochastic in nature.

The aim of this study was to measure the average annual equivalent dose to the eye lens of a cath lab radiographer and to determine whether it complies with the 2011 ICRP recommendations, and to make recommendations on radiation protection measures where necessary.

Eye lens dose to a single cath lab radiographer was measured by an electronic personnel dosimeter (EPD) - [PDM-117(MYDOSE mini) manufactured by Hitachi Aloka Medical, Ltd., Tokyo, Japan] which can measure above 20 keV of X (gamma) rays. The range of the EPD was 10-9999 μ Sv with an accuracy of $\pm 20\%$. Data of 300 fluoroscopic procedures are reported where 70% accounted for CAG (Coronary Angiogram) and 12% for PCI (Percutaneous Coronary Intervention). The measured dose for a total 300 procedures was 449 μ Sv. Based on this value the annual equivalent eye dose (H) estimated was 1.2 mSv $\pm 20\%$. Of the procedures studied, much longer fluoroscopic time was taken by PCI with a mean time of 19.2 min. According to the hospital statistics during the period 2005 to 2011, an increase of 11% of PCI procedures was observed.

The studied hospital adhered to good radiation protection practices by using equipment related protective lead screens which would have contributed to the estimated low annual equivalent eye dose. A study of this nature has not been previously reported in Sri Lanka.

The measured value of 1.2 mSv to the eye of the radiographer is below the ICRP (2011) recommendation of 20 mSv to the eye. This could be attributed to the good radiation protection practices adhered in the cath lab and the skill of the team performing the procedure of the studied hospital. With a growing concern and school of thought that radiation induced cataract could be stochastic, it is recommended that the cath lab radiographer wear lead lined eye goggles. This would further reduce the dose to the lens of the eye.