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Markers of Neural Degeneration and Regeneration in Blood of Cardiac Catheterization Personals

The catheterization laboratory is considered an area where exposure to ionizing radiation (IR) is particularly high during fluoroscopic procedures. Neuro-vascular and cerebro-vascular damage are considered to be induced by IR. Such damage is postulated to be repaired by circulating endothelial and neural circulating progenitor cells originating from the Bone Marrow. The aim of the present study was to evaluate neural damage and rejuvenation capacity among cardiac catheterization (CC) staff. Subjects and Methods: Venous blood samples were obtained from 70 cardiac catheterization staff exposed to x-ray during fluoroscopy procedures at three busy hospitals in Cairo –Egypt vs. 40 controls. Blood was assayed for the amyloid beta peptide, the frequency of micronuclei (FMN), plasma nerve growth factor (NGF) and cell phenotype of circulating neural progenitor cells (NPCs), whose surface markers were identified as the nestin, CD45 and CD34. Amyloid beta peptide was non significantly increased among CC staff compared to controls. The individual three month collective dose information, as measured by thermoluminscent personal dosimeters (TLD), ranged between 2.16 and 14.9 mSv/y. Results: NFG and FMN were significantly higher among CC staff compared to controls. Nestin„ CD45 and CD34 were also significantly higher among CC staff compared to the controls. Smoking seemed to have a positive effect on the FMN and SDF-1, while negative on circulating prpgenitor cells. Conclusion: It is found that among CC staff, the numbers of EPCs had increased indicating an increased capacity for tissue repair. This regenerative process is hindered by smoking, evidenced by increased levels of NFG and decreased numbers of PCs. Further studies are required to prove whether changes in of EPCs'levels can offer a reliable detection marker for radiation exposure.

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