

How to prevent detrimental effects of ionizing radiation in patients undergoing cardiac electrophysiologic study and ablation procedures

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Background: Cardiac radiofrequency (RF) ablation is used for treating some type of heart rhythm problems. The numbers of RF ablation procedures are increasing rapidly because of lower complication risks than surgery and high success rate. Due to higher patient exposure to X ray radiation in different cardiac ablation procedures, public concerns regarding the detrimental effects of ionizing radiation including skin injury, genetic effects and malignancy are increasing. This study aimed to determine the patient absorption doses during electrophysiologic study (EPS) and RF ablation of different cardiac arrhythmias in an electrophysiology laboratory unit with a flat panel detector.

Material and methods: Two hundred and four patients who underwent cardiac RF ablation enrolled in our study. All procedures were executed on a single plan angiography unit with floor mounted C-arm. Total dose area product (DAP), total entrance skin dose (ESD), total fluoroscopy time, KV and mA in each different procedures were recorded.

Results: Median and range of fluoroscopy time, ESD and DAP were 7.3 min (range: 0.35-85.10), 164.9 miligray (mGy; range: 6-5863) and 19.62 Gycm² (range: 0.68-35.36), respectively.

Discussion and Conclusion: for prevention of deterministic and stochastic effects of radiation exposure such as skin damage and cancer, operators should attempt to reduce patient radiation exposure as low as reasonably achievable. Although modern angiography unit with 3D mapping systems are very effective factors in reduction of patient absorbed dose, experience of the electrophysiologist and type of arrhythmia could influence these factors and causes reduction or enhancement in patient absorbed doses.

Keywords: RF ablation; ESD; DAP; fluoroscopy time; absorb dose