Reduction of scatter radiation during transradial percutaneous coronary angiography: A randomized trial using a lead-free radiation shield

Abstract

Background: Occupational radiation exposure is a growing problem due to the increasing number and complexity of interventional procedures performed. Radial artery access has reduced the number of complications at the price of longer procedure duration. Radpad® scatter protection is a sterile, disposable bismuth-barium radiation shield drape that should be able to decrease the dose of operator radiation during diagnostic and interventional procedures. Such radiation shield has never been tested in a randomized study in humans.

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Methods: Sixty consecutive patients undergoing coronary angiography by radial approach were randomized 1:1 to Radpad use versus no radiation shield protection. The sterile shield was placed around the area of right radial artery sheath insertion and extended medially to the patient trunk. All diagnostic procedures were performed by the same operator to reduce variability in radiation absorption. Radiation exposure was measured blindly using thermoluminescence dosimeters positioned at the operator's chest, left eye, left wrist, and thyroid.

Results: Despite similar fluoroscopy time (3.52 ± 2.71 min vs. 3.46 ± 2.77 min, $P = 0.898$) and total examination dose (50.5 ± 30.7 vs. 45.8 ± 18.0 Gycm^2, $P = 0.231$), the mean total radiation exposure to the operator was significantly lower when Radpad was utilized (282.8 ± 32.55 μSv vs. 367.8 ± 105.4 μSv, $P < 0.0001$) corresponding to a 23% total reduction. Moreover, mean radiation exposure was lower with Radpad utilization at all body locations ranging from 13 to 34% reduction.

Conclusions: This first-in-men randomized trial demonstrates that Radpad significantly reduces occupational radiation exposure during coronary angiography performed through right radial artery access.

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