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A Novel Radiation Protective Drape Reduces Radiation Exposure During Fluoroscopy-Guided Electrophysiologic Procedures

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Background: The rapid growth in electrophysiology (EP) has raised concerns of increasing doses of radiation to operators and staff. The purpose of this study was to evaluate a novel disposable lead-free radiation protection drape composed primarily of bismuth (RADPAD[®]) for decreasing radiation scatter during fluoroscopic EP procedures. Materials and Methods: The RADPAD[®] was positioned slightly lateral to the incision site for pectoral device implants and superior to femoral vein during EP studies. Each patient served as their own control (i.e., measurements with and without the RADPAD[®]). Dosimetric measurements were obtained 14 inches from the center of the X-Ray beam at the examiner's elbow and hand. Radiation badge readings for the operator were obtained 3 months prior to RADPAD[®] use and 3 months after introduction. Results: Radiation dosimetry was obtained in 20 patients: 7 EP studies, 6 pacemakers, 5 catheter ablations, and 2 implantable cardioverter-defibrillators. Eleven women and 9 men with a mean age of 63 ± 4 years had an average fluoroscopy time of 2.5 ± 0.42 minutes/case. Mean dosimetric measurements at the hand were reduced from 141.38 ± 24.67 to 48.63 ± 9.02 mR/hr using the protective drape (63% reduction, $p < 0.0001$). Measurements at the elbow were reduced from 78.78 ± 7.95 mR/hr to 34.50 ± 4.18 mR/hr using the drape (55% reduction, $p < 0.0001$). Badge readings for 3 months prior to drape introduction averaged 2.45 mR/procedure vs. 1.54 mR/procedure for 3 months post initiation (37% reduction). The table shows radiation exposure with and without the RADPAD[®] by procedure. Conclusion: The use of a novel radiation protection surgical drape can significantly reduce scatter radiation exposure to staff and operators during a variety of EP procedures.

Procedure (type)	Cases (number)	mean mR/hr at Elbow		mean mR/hr at Hand		% reduction	
		without RADPAD	with RADPAD	without RADPAD	with RADPAD	at Elbow	at Hand
EPS	7	68-81	26-36	61-76	21-30	56-62%	61-66%
ICD	2	85-100	23-33	225-280	68-90	67-73%	69-70%
PPM	6	70-84	27-34	192-223	53-71	60-61%	68-72%
RFA	5	76-87	43-51	113-126	47-59	41-43%	53-58%