A Novel **Radiation Protection Drape Reduces Radiation Exposure during Fluoroscopy-Guided Electrophysiology Procedures**

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ABSTRACT: Objective. The purpose of this study was to evaluate a novel disposable lead-free radiation protection drape for decreasing radiation scatter during electrophysiology procedures. **Background**. In recent years, there has been an exponential increase in the number of electrophysiology (EP) procedures exposing patients, operators and laboratory staff to higher radiation doses**. Methods**. The RADPAD® was positioned slightly lateral to the incision site for pectoral device implants and superior to the femoral vein during electrophysiology studies. Each patient served as their own control and dosimetric measurements were obtained at the examiner's elbow and hand. Radiation badge readings for the operator were obtained three months prior to RADPAD use and three months after introduction. **Results**. Radiation dosimetry was obtained in twenty patients: 7 electrophysiology studies, 6 pacemakers, 5 catheter ablations, and 2 implantable cardioverter--defibrillators. Eleven women and nine 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 milliroentgen (mR)/hour using the protective drape (63% reduction; $p < 0.0001$). Measurements at the elbow were reduced from 78.78 ± 7.95 mR/hour to 34.50 ± 4.18 mR/hour using the drape (55% reduction; $p < 0.0001$). Badge readings for three months prior to drape introduction averaged 2.45 mR/procedure versus 1.54 mR/procedure for 3 months postinitiation (37% reduction). **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.

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Over the past 15 years, there has been an exponential increase in the number of procedures performed in the electrophysiology (EP) laboratory. These procedures can be technically difficult with relatively long fluoroscopy times and high radiation dose exposure to patients, operators and laboratory staff. [1,2]

During fluoroscopic imaging, diagnostic information is carried in the primary beam. These high intensity X-rays are the chief hazard to the patient. Lower energy scattered radiation deviates in all directions from the patient. Despite typical precautions *(i.e.*, hanging a lead shield between the patient and the operator), long-term radiation exposure may result in stochastic and deterministic effects. Stochastic effects (malignancy in those exposed and inherited defects in later generations) have no particular threshold dose. Deterministic effects (skin erythema, sterility and cataracts) occur at a particular threshold, above which, the probability of observing these effects increases rapidly.[1-3]

The purpose of this study was to test the hypothesis that a disposable radiation protection drape could help minimize radiation

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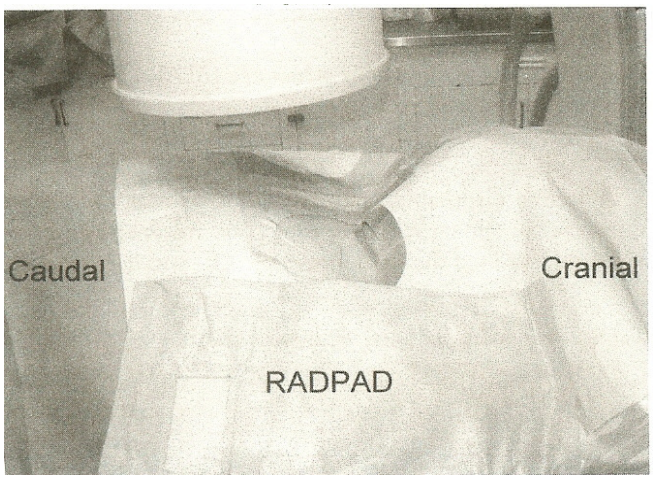
Panel A



Panel B

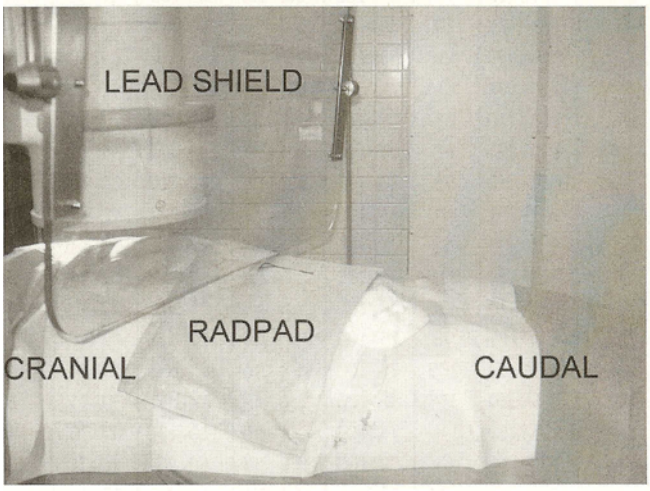


Figure 1. *Utilization of the RADPAD during electrophysiology procedures* **(A)** *Positioning of the RADPAD for pectoral device implants. The drape is placed slightly lateral to the incision site.* **(B)** *Positioning of the RADPAD for procedures utilizing a femoral approach. The RADPAD is placed superior to the femoral line insertion site making contact with a ceiling-suspended lead shield. The RADPAD and lead shield, as well as cranial and caudal positions, are labeled where appropriate.*