PROTECTING HEALTHCARE PROFESSIONALS TODAY
FOR HEALTHIER LIVES TOMORROW

Society of Interventional Radiology 2024 Annual Meeting

Abstract

Title: Comparison of Scatter-Radiation Protection to an Operator Between Multi-Planar Structured and Unstructured Attenuation Pads During a Simulated Interventional Cardiopulmonary Procedure

Authors: Carmelo Panetta[1], Gregory Gordon[2], Joseph Stavas[3]

Affiliations:

1. University of Minnesota, Division of Cardiology, Maplewood, MN, USA
2. Radux Devices, Maple Grove, MN, USA
3. Creighton University School of Medicine, Department of Radiology, Omaha, NE, USA

Purpose: To determine the benefit of added vertical structural components in a multi-planar radiation attenuation pad (MPRAP) versus a standard horizontal radiation attenuation pad (HRAP) to reduce scatter-radiation exposure to the upper body and head during a mock simulation of a cardiopulmonary interventional procedure with right-sided femoral access.

Materials and Methods: Six dosimetric radiation measurements (Landauer RaySafe™) were obtained from 8 locations in a 140-200 cm vertical and 60 cm horizontal operator space during fluoroscopy of a supine anthropomorphic phantom centered over the central-left chest (Toshiba InfinX Angiography) at 110 cm perpendicular image intensifier (II) height. Scatter-radiation exposures were made for 5 seconds per point measurement toward the operator space (368 seconds) with no HRAP; with 0.15 mm Pb equivalent HRAP (Steradian Shield™, 12 x 22 in), 0.25 mm Pb equivalent HRAP (RadPad® 5300 AYM, 12 x 23 in), and structured 0.15 mm Pb equivalent MPRAP (Steradian Shield™, 12 x 22 in). A ceiling-mounted wall shield and personal radiation protection were positioned level with the distal outer edge and in contact with the II. Dosing was automated at 91mA, 7.9ms, and 70KeV.

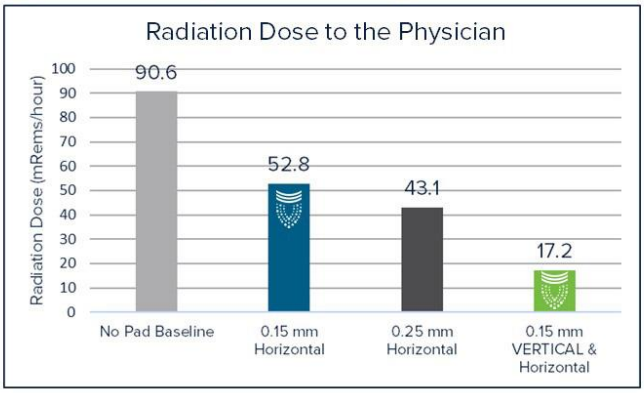
Results: Baseline measures were 90.6 mRems/hour across the scattergram. Radiation dose was reduced compared to baseline with the addition of HRAP 0.15mm, HRAP 0.25 mm, and MPRAP 0.15mm by 42%, 52% and 81%, respectively (52.8, 43.1 and 17.2mRems/hour respectively; $p < 0.05$). Radiation dose comparing MPRAP (0.15mm) to HRAP 0.15mm and 0.25mm was reduced 68% and 60% ($p<0.05$), respectively. The zone of most significant scatter reduction comparing exposure without HRAP versus flat (0.15 mm, 65.5% and 0.25 mm, 76.5%), and MPRAP, structured pad (0.15 mm, 90.4%) was on the right at 180 cm vertical.

Conclusion: The increasing volume of complex fluoroscopic procedures in populations with multiple comorbidities and higher BMIs raises the risks of untoward vertical scatter-radiation exposure to operators. In this simulation model, adding vertical multiplanar structure components to standard flat attenuation pads significantly improved operator protection from scatter radiation to the upper body and head by 2.5-3 times.

RADUX DEVICES

PROTECTING HEALTHCARE PROFESSIONALS TODAY
FOR HEALTHIER LIVES TOMORROW

The Steradian Effect: Steradian Shield™ Improves Protection to the Upper Body/Head by 2.5-3x



Steradian Shield's™ multi-planar protection results in a 60% reduction of radiation dose compared to a competitor pad that is 67% thicker but lacks structure and cannot block the Vertical Gap.