Comparison of Operator Eye Exposures When Working From Femoral Region, Side, or Head of Patient.

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Learning Objective
To determine the impact of operator stance on operator eye exposures while performing interventional radiology procedures.

Materials and Methods
Primary operators performed procedures (N=49, fluoroscopic minutes=493) from the femoral region (FEM), the side (SIDE), or the head (HEAD) of patients. Method of protection SHIELDS utilized conventional lead aprons and aggressive utilization of under-table, side-table and mobile suspended lead shields (Figure 1 A, B; Mavig, Munich, Germany). Method of protection SPRPS used Zerogravity (Figure 1 C; CFI Medical Solutions, Fenton, MI) with a curved lead acrylic head shield (0.5 mm Pb) and expansive lead apron. For sensitive, per case exposure determination, an electronic direct dosimeter (Figure 1 D; EDD-30, Unfors, Bilddal, Sweden) was worn adjacent to the left eye. Study was institutional review board approved and HIPPA compliant.

Results

| Method      | Cases | Fluoroscopy Minutes | Operator Exposures (microR/Min) | Relative % *
|-------------|-------|---------------------|---------------------------------|----------------
| SHIELDS FEM | 7     | 97                  | 1.817                           | 100%
| SHIELDS SIDE| 7     | 32                  | 4.762                           | 262%
| SHIELDS HEAD| 6     | 35                  | 3.466                           | 191%
| SPRPS FEM  | 14    | 215                 | 0.022                           | 1.2%
| SPRPS SIDE | 8     | 67                  | 0.035                           | 1.9%
| SPRPS HEAD | 7     | 47                  | 0.013                           | 0.7%

Conclusion
Using SHIELDS personal protection to full potential, eye exposures were 91% higher when operators stood at the patient’s head compared to the femoral region and were 162% higher when standing at the patient’s side compared to the femoral region. This is relevant to interventional radiologists who are commonly performing procedures such as transjugular intrahepatic portosystemic shunt and body procedures in these positions, often with prolonged radiation exposure times. Exposures during a femoral approach nevertheless remain highly important due to large volumes of such procedures. Operator exposures for all positions were negligible using SPRPS – Zerogravity.

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