Purpose:

Sterile radiation reduction gloves have been widely used in the past decade to provide modest decreases in operator hand dose when the hands are placed in the field of view (FOV). While multiple publications have quantified the potential dose reduction from the use of such gloves, possible effects on the patient have not yet been assessed. The aim of this study was to determine if radiation reduction gloves can result in a significant increase in patient dose and increased risk of radiation induced skin injury when used in interventional radiology.

Methods:

The effect of radiation reduction gloves when used in the FOV was determined by measurement of patient entrance exposure rate (EER) for a variety of patient sizes and varying operating and magnification modes. EERs were measured with no glove in the FOV, with one glove and, to replicate the actions of many dose-conscious radiologists, with double gloves in the FOV.

Results:

Compared to an ungloved hand, the use of a single radiation reduction glove near the center of the FOV results in a 2-fold average increase in patient EER. The use of double radiation reduction gloves results in a 3-fold average increase in EER. In both cases, this increase was only weakly dependent on the size of the patient and on the operating and magnification modes used. In fact, patient thicknesses ranging from 6-14 inches and operating modes ranging from low-dose fluoroscopy to DSA produced less than a 20% deviation from the increases in EER quoted above.

Conclusions:

When used in the FOV, radiation reduction gloves can substantially increase patient EER. This increase in patient dose, when compared with the relatively small published reduction in extremity dose provided to the operator, may make their use contraindicated in cases where radiation induced skin injury is a possible risk.