

Purpose: Tissue injury depends on the extent as well as the intensity of the assault. It would be helpful to develop skin dose indices that are more descriptive of the skin area receiving radiation above a threshold value of potential injury.

Method and Materials: For quality control, a GafChromic XR Type R film was placed close to the skin of 36 patients undergoing cardiac catheterization procedures. A hand-held densitometer was used to measure the peak radiation dose. With the approval of the Institutional Review Board, these films were scanned. Contours were drawn at the increment of 100 cGy. Using each contour value as a threshold, the area exceeding this threshold, and the average dose within this area were computed.

Results: For 3 patients who had skin dose exceeding the 200 cGy threshold, but less than 300 cGy, the total area of the skin with this amount of irradiation ranged from 1 cm² to 27 cm². The averages doses within these areas were not greater than 221 cGy. One patient had incurred a peak entrance dose of 409 cGy. For this patient, the area exceeding 300 cGy was 82 cm² and the area exceeding 400 cGy was 4 cm². The limited skin areas associated with the high skin entrance radiation exposures might explain the lack of significant skin injury in this sample of patients.

Conclusion: If we define "skin dose load_{threshold}" to be the area exceeding a chosen threshold value, the skin dose load₂₀₀ would be the area exceeding 200 cGy and having the potential of skin injury. Summary statistics describing the dose distribution within this area might also be helpful. An example parameter would be the average dose within the area described by the "skin dose load_{threshold}". This investigation has demonstrated the technical feasibility of providing such dose indices.