Abstract ID: 17211 Title: Patient Dose Calculations in Fluoroscopy

A growing public perception of radiation risks from fluoroscopic procedures has led to an increased demand for accurate radiation dose calculations to meet new requirements from regulatory agencies, accreditation bodies such as the Joint Commission, and hospital administrators. Estimates are required both for effective doses, which can be related to long-term cancer risks, and for entrance skin doses, which drive deterministic cutaneous injuries such as erythema, epilation, and skin necrosis. These calculations may not be straightforward because the physicist is often faced with having limited information to obtain the desired result. The purpose for the dose estimate and the available data can also influence the computational approach taken. Modern fluoroscopes are required to display the cumulative air kerma for a procedure as determined at a defined reference point, but this is a dose index and not a patient dose. This presentation discusses practical techniques to employ in going from such dose indices to realistic patient doses, particularly for cases in which high skin doses may have been delivered. The multiple sources of information—dose indices displayed on the console, DICOM image data, machine logs, vendor-generated dose information, and personnel interviews—that can contribute to making an accurate estimate will be considered. Sources of error and uncertainty for these radiation dose calculations will also be addressed. Case studies will be presented to illustrate the approaches outlined in the presentation. Methods for verifying dose values on either a spot or continuing basis will be described.

Learning Objectives

1) Review the basis of effective dose and entrance skin dose estimation in fluoroscopic cases.
2) Summarize ranges over which deterministic skin injuries may occur.
3) Discuss the types of data available for fluoroscopic dose calculations and the limitations associated with each.
4) Outline pitfalls encountered in fluoroscopic dose calculations.
5) Describe methods to verify or enhance fluoroscopic dose estimation procedures.