AbstractID: 14426 Title: Dose and Image Quality in C-arm CT Rotational Angiography

Conebeam CT using C-arm mounted large area flat panels (FPs) is becoming more commonly used in neuro- and body-interventional suites. The ability to visualize vascular geometry in 3D along with soft tissue *during* an intervention is providing information that may increase accuracy, shorten procedure time and may even change the course of treatment. However, acquisition of the projection data required for volume imaging requires dose to the patient, and understanding the trade-offs between acquisition parameters, dose and image quality is critical to the appropriate adoption of this imaging technique.

Unlike conventional CT, the beam length in conebeam CT can cover the entire length of the object to be imaged or can be varied with the use of collimation, and the concept of CTDI is not, therefore, the metric of choice for measurement of dose. In addition, most C-arm conebeam CT systems use a short-scan (pi plus fan-angle) acquisition, and the dose distribution within the object is not cylindrically symmetric. Finally, since FP design has been optimized for fluoroscopy, image quality when used for CT must be carefully evaluated.

This lecture will describe a dose metric that is appropriate for conebeam CT and allows direct comparison with the CTDIw of conventional CT, and will summarize dose-image quality trade-offs. A discussion of measured dose metrics and recently published Monte Carlo-based Effective Dose calculations for head and body applications will be presented. New results from our ongoing clinical study investigating the overall dose impact of 3D C-arm CT on body interventions will be summarized.

Research sponsored by Siemens AG, Healthcare Sector, by NIH grant R01 HL087917 and by the Lucas Foundation.

Educational Objectives:

1. Understand how differences in acquisition geometry between conebeam and conventional CT affect dose measurement and dose distribution.
2. Understand the necessary dose-image-quality trade-offs when using C-arm CT in the interventional suite