

AbstractID: 8943 Title: Cone-beam CT of vessels phantoms: comparison of image intensifier and high-resolution micro-angiographic systems

Successful treatment of vascular diseases often relies on accurate placement of devices, such as stents, within the vessel lumen. Image intensifier (II) images are usually employed for such placements and evaluations, and II-based rotational angiography systems are being used to generate 3D vascular renderings. To visualize the smaller vessels in the cerebrovasculature, we have developed a micro-angiographic system (43 micron pixels), and we have used this system to develop a micro-cone-beam-CT system for evaluation of stent placement and positioning. In this study, we investigated the relative characteristics of II- and micro-angio-based systems. An elastomer vessel phantom with a sidewall aneurysm was stented with a modified Tri-Star stent (a low porosity stainless steel mesh was mounted on one side) and filled with 50% contrast. The phantom was placed on a rotary stage, and images (4.5" II and micro-angio) were acquired every 2° for a full 360°. A Feldkamp algorithm was used to do the 3D reconstruction. The individual stent wires (120 micron) and the position of the mesh relative to the aneurysm orifice was discernable only in the micro-angio data. The relatively lower resolution of II obscured the boundaries between the orifice, the vessel wall, and the mesh. Rotational angiography with an II may be sufficient for evaluation of certain aspects of endovascular procedures; however, micro-angio-CT is required for accurate evaluation of device placement. Support received from NIH Grant 1RO1NS38746, the Toshiba Corporation, Guidant Corp. and the Oishei Foundation.