

AbstractID: 3548 Title: Image Quality and Dose Characteristics of a New 85-cm Multislice CT Scanner: A Comparison Study

Purpose: The purpose of this study was to compare the image quality and dose performance of a new 85 cm 16-slice CT scanner with a standard 70 cm 16-slice CT scanner from the same company (Philips Medical Systems, Cleveland, Ohio), both used in a radiation oncology setting.

Method and Materials: Image quality and dose performance tests were performed on a new 85 cm bore 16-slice CT scanner (Brilliance Big Bore) and a 70 cm bore 16-slice CT scanner (Brilliance 16 Power). The image quality tests were performed using the manufacturer-supplied phantoms provided with each scanner, as well as with a commercially available CT image performance phantom. The following tests were performed to evaluate image quality: slice width accuracy, CT number accuracy and linearity, CT number uniformity and noise, low contrast resolution, and high contrast (spatial) resolution. The computed tomography dose index (CTDI) measurements were performed using a standard CT dose phantom. The same head and body protocols were used for both scanners. To validate our results, images were sent to a third party company for independent analysis.

Results: Slice width accuracy was within acceptable limits (± 0.5 mm). Both scanners exhibited comparable CT number uniformity, accuracy, and linearity. The 85 cm bore scanner showed slightly higher noise. With equivalent mAs settings, large bore scanner low contrast resolution was comparable to the conventional scanner. High contrast resolution between the two scanners also demonstrated minimal differences. The head and body CTDI was 0.5-1.0 cGy higher with the 85 cm bore than for the standard 70 cm bore scanner.

Conclusion: The overall image quality and dose performance of the new 85 cm bore 16-slice CT scanner are comparable to those of the standard 70 cm bore diagnostic quality multislice scanner. Therefore, the new big bore CT is appropriate for diagnostic radiology and radiotherapy applications.