AbstractID: 8610 Title: Contrast detail curves in head CT examinations.

The purpose of this study was to generate CT based contrast detail curve using a representative head CT image from each of five clinical head CT examinations. We measured detection of 4 to 12.6 mm sized lesions using a 2 Alternate Forced Choice (2-AFC) experimental. In each experiment the observer identifies the lesion location in one of two regions of interest; after 128 such observations, it is possible to determine the contrast (I) corresponding to a 92% accuracy ($I_{92\%}$) of lesion detection. For each lesion size, we performed four repeat detection experiments, and the order of the 100 AFC experiments (i.e., 5 patients x 5 lesion sizes x 4 repeats) was randomized to eliminate experimental bias (i.e., learning curve and/or observer fatigue). Average values of $I_{92\%}$ were obtained for one observer at each lesion size. Contrast detail curves were generated with log($I_{92\%}$) plotted versus log(lesion size). There were major differences in contrast detail curves for the five patients depending on the presence of anatomical structure in the image. The coefficient of variation in lesion detection, averaged over the five images and five lesion sizes, was found to be 33%. The slope of the contrast detail curve averaged over five patients was -0.14; this slope is a factor of seven lower than the value of -1.0 predicted by the Rose model of lesion detection. Results from our pilot study of low contrast lesion detection in clinical head CT suggest that that anatomical structure is of greater importance than quantum mottle.