

ABSTRACT

One of the advantages of computed tomography scan compared to other modalities is its ability to distinguish low contrast lesions. One practical method that can be used to analyze the detectability of low contrast objects is 4-alternative forced choice (4-AFC). This study aims to analyze low contrast detectability in CT images with the 4-AFC method and analyze the effect of dose variation and the use of iterative reconstruction (IR) on the detectability of low contrast objects in CT images. AAPM CT Performance module 610-06 phantom image with a 2.5 mm object size was imaged with doses of 35.8 mGy, 54.1 mGy and 72.1 mGy, and then reconstructed using IR with a variation of IR levels from 0 to 100%, with a 10% increase every time. Five medical physicists and three radiology specialists were asked to be observers to assess the images. The total number of questions given was 330. In each question, there was a choice of one image containing an object and three images without an object. The results of the 4-AFC test showed that the detectability of low contrast objects by both medical physicists and radiologists increased with increasing IR dose and level. In addition, increasing the IR level can reduce noise by 46% at a dose of 35.8 mGy, 38% at a dose of 54.1 mGy, and 44% at a dose of 72.1 mGy. Therefore, the use of IR not only reduces the noise level, but also increases the detectability of low contrast objects without having to increase the radiation dose.

Keywords: *low contrast detectability, AFC, iterative reconstruction*