ABSTRACT

A study on Low Contrast Detectability (LCD) in images reconstructed by Filtered Back Projection (FBP) and Iterative Reconstruction (IR) using the Four Alternative Forced Choice (4-AFC) method has been performed. This study aims to analyze the effectiveness of the 4-AFC method in assessing LCD optimization and examines the impact of FBP and IR as a image reconstruction method upon variations in object size. The phantom image of the AAPM CT Performance Model 610 was obtained using the GE Healthcare Revolution Evo 128 Slice CT Scanner in 120 kV tube voltage and 300 mA of tube current, subsequently undergoing reconstructed using FBP and IR 50%. This study involved two groups of observers: Medical Physicists and Physics Master's students focusing in Medical Physics. The observers must assess a total of 440 questions that each of them consist one object image and three background images. The results of this study show that the 4-AFC method is effectively used as a low contrast detection method. The object size, the image reconstruction method, and the clinical experience of the observer affect the results of LCD. Smaller objects tend to be more difficult to identify, so the use of IR image reconstruction methods proved effective in improving their visibility compared to FBP. The use of the IR image reconstruction method increased the detection rate by 6.98% in the Medical Physicist observer group and 4.79% in the Physics Master's Student observer group.

***Keywords**: low contrast detectability, AFC, filtered back projection, iterative reconstruction*