

ABSTRACT

CT scan is a clinical imaging modality that produces high-resolution anatomical images of the body. However, the complexity of its algorithms and geometric inaccuracies can cause image distortion. To ensure geometric accuracy and minimize distortion, distance accuracy testing using the American College of Radiology (ACR) phantom is required. This testing is generally performed manually and depends on observer subjectivity. Therefore, IndoQCT has developed an automated method for distance measurement that is faster, more objective, and more accurate. However, its advantages and limitations have not been evaluated. This study aims to evaluate the automated IndoQCT method by comparing its measurement result with phantom distance parameters and manual methods using MicroDicom and the manual feature of IndoQCT, expressed in terms of error percentage and differences. The evaluation was conducted using 54 retrospective data of ACR phantom image from Quality Control (QC) results of various CT scan vendors in hospitals across Indonesia. Distance accuracy testing was performed automatically using IndoQCT with an image segmentation process, while manual measurements were conducted using MicroDicom and the manual IndoQCT feature by drawing a region of interest (ROI) line between two ball bearings (BBs) on the ACR phantom image. The results showed that the error percentage of the IndoQCT automated method against the phantom parameters, as well as the percentage difference with the manual methods on IndoQCT and MicroDicom, was below 1%. This finding proves that the automated method high accuracy with minimal differences. Thus, IndoQCT is suitable for use as image quality testing software, particularly for automatic distance measurement.

Keywords: *Distance accuracy, CT, Automatic Method, IndoQCT, MicroDicom, ACR Phantom*