

ABSTRACT

Non-contrast head CT is a widely used imaging modality for the evaluation of neurological conditions due to its ability to provide rapid and accurate anatomical information. One of the technical parameters affecting image quality is slice thickness, which influences contrast, noise, and the Contrast-to-Noise Ratio (CNR). This study aimed to analyze differences in CNR values among various slice thicknesses and to determine the optimal slice thickness for non-contrast head CT examinations. A retrospective quantitative design was employed using secondary data from CT images of 20 adult patients in DICOM format. The slice thicknesses evaluated were 0.6 mm, 1 mm, 1.5 mm, 2 mm, 3 mm, 4 mm, and 5 mm. Contrast, noise, and CNR measurements were performed using IndoQCT software. Statistical analyses included the Shapiro–Wilk test, Repeated Measures ANOVA, and Bonferroni-corrected Pairwise Comparison. The results showed a significant difference in CNR values among the slice thickness variations ($p < 0.001$). Pairwise Comparison analysis indicated that almost all slice thickness pairs differed significantly ($p < 0.05$), except for the pairs of 1 mm and 1.5 mm, and 4 mm and 5 mm. Based on image quality analysis and statistical findings, a slice thickness of 1–2 mm provided the best balance between contrast, noise, and CNR, and is therefore recommended as the optimal slice thickness for non-contrast head CT examinations.

Keywords: Head CT, slice thickness, CNR, image quality.