

ABSTRACT

This study aims to analyze the difference between radiation dose estimation displayed on the CT-Scan console using the Computed Tomography Dose Index volume (CTDIvol) parameter and the actual patient dose calculated using the Size-Specific Dose Estimate (SSDE) method. The study was conducted on 50 adult patients undergoing non-contrast abdominal CT-Scan examinations by considering patient physical characteristics, including anteroposterior (AP) diameter, lateral (LAT) diameter, and effective diameter (Deff).

The results showed that the mean CTDIvol value was 12,29 mGy, while the mean SSDE value was 17,64 mGy. This difference indicates an average dose deviation of 47,16 %, with all deviation values being negative, suggesting that CTDIvol systematically overestimates the actual patient dose. Statistical analysis revealed a significant difference between CTDIvol and SSDE). In addition, a very strong correlation was found between the effective diameter (Deff) and the percentage of dose deviation, which indicates that the smaller the patient's body size, the greater the deviation that occurs.

From a medical physics perspective, this discrepancy is caused by the use of a standard 32 cm diameter phantom as the reference in CTDIvol calculation, while the average patient size in this study was only 25,31 cm. This mismatch results in dose estimations that do not accurately represent actual patient conditions. Therefore, the use of SSDE is essential to obtain more accurate and patient-specific dose estimations.

Based on these findings, it is recommended that radiology departments implement SSDE calculations routinely in patient dose reporting as part of radiation protection optimization following the ALARA.

Keywords: CTDIvol, SSDE, radiation dose, CT-Scan, effective diameter, patient dosimetry