

Poster #: 27

Title of Factors leading to high dose CT scans at a tertiary care center: can we avoid them?

Abstract:

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Modality: CT

Organ System: GI

Intro: Radiation exposure related to CT scans is a rising concern, All efforts need to be made to minimize the dose. Each institution has outliers in terms of the radiation exposure related to CT scans. If we can identify these outliers and the reasons for the high dose of scans, attempts can be made to reduce the dose.

Purpose: To identify patients scanned with above acceptable radiation levels for CT abdomen and pelvis examinations (CTAP) and assess the reasons for high-dose scans.

Methods Used: CTAP examinations between July 2012 and March 2013 on 64-slice (Sensation 64, Siemens) scanners were reviewed. All scans were acquired using automatic tube current modulation. Remaining scan parameters were held constant at pitch 1, slice thickness 5mm, collimation 10 and kVp 120 except for very large patients. The acquisition details (mean mAs, kVp, scan length, effective patient diameter) and dose details including CTDIvol, effective dose, size specific dose estimate (SSDE), dose length product (DLP), organ specific effective doses for these scans were extracted using a commercial software (eXposure, Version 1). The "above acceptable radiation dose" was defined as ≥ 2 standard deviations above the respective means. All patients who underwent the CT scan with ≥ 2 standard deviations above the mean DLP, effective dose and SSDE were identified. These scans were reviewed on PACS to identify the reason for high doses.

Results of 1685 scans (995 females, 690 males) were included in the study. The mean DLP, effective dose and
Abstract: SSDE for these scans were 734.7 ± 338.5 mGy-cm, 13.2 ± 6.4 mGy-cm and 15.6 ± 3.8 mGy. The scans with doses greater than DLP of 1411.6 (35; 6M, 29F); effective dose of 25.9 (29; 12M, 17F); and SSDE of 23.1 (47; 7M, 40 F) were identified. The reasons for high effective dose were patient size (17/35), 140 kVp scans for very large patients (5/35), longer scan length for coverage of perineum (2/35) and repeats because of patient motion, off centering, abdominal wall excluded from FOV (11/35). Similarly, patient size (9/29), 140 kVp (3/29), scan length (3/29) and repeats (12/29) accounted for high DLP. For high SSDE, patient size (19/47), 140 kVp (7/47), scanning with arms by side (24/47) and patient off centering (17/47) were the identifiable factors.

Discussion: Patient size, 140 kVp, repeats, patient off centering and scanning with arms by side account for higher than acceptable radiation dose. Of these, patient off centering and repeats are avoidable factors. Scanning with arms by the side may be avoidable in certain circumstances.

Scientific and/or Clinical Significance? Technologists can be given feedback/ in-service training reiterating the role of proper patient positioning, avoiding repeats and scanning with arms above head to avoid unnecessary radiation exposure.

Relationship to existing work

NA