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Title: Optimising cervical spine imaging with digital radiography for the trauma patient.

PURPOSE: The principal advantage of digital radiography is optimisation of image contrast through look-up-tables. However, debate still surrounds the use of grids for imaging of the antero-posterior cervical spine (AP c-spine).

The aim of this study was to compare images of the AP c-spine, with and without grids (stationary and bucky) processed using linear-look-up-tables (L-LUT) and c-spine-look-up-tables (C-LUT).

METHODS: A tissue-equivalent anthropomorphic-phantom was used to obtain images at 115cm source-to-image-receptor distance. Collimation was kept constant throughout. A Siemens Multix-Top x-ray tube and a Konica Regius-150 computed-radiography system was used. 73kVp was used with 18mAs for both the stationary grid and the bucky, and 6.3mAs for no grid.

10 images and 20 dose measurements were obtained for each parameter (improving statistical validity). Entrance-dose measurements were undertaken using a Barracuda dosimeter (RTI). Image-quality was assessed by two separate, blinded, readers using a 21-point grading system, (14=diagnostic quality).

RESULTS: Images acquired using the C-LUT were assessed as having a higher image quality (16.46,SD=1.82) when compared with the L-LUT images (14.92,SD=0.86). Images taken using the C-LUT without a grid scored 17.3,SD=1.74 compared with 14.4,SD=2.58 for the stationary grid and 17.75,SD=1.65 for the bucky.

The difference in dose between non-grid and grid/bucky exposures (307.17 μ Gy (SD=0.30) and 878.65 μ Gy (SD=0.62) respectively), were statistically significant ($p<0.0001$, t-test).

CONCLUSION: This study's findings suggest that the use of digital radiography when imaging c-spine patients may eliminate the need for a stationary grid without a perceivable impact upon image quality, with the further advantage of a reduced patient dose.

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