

Computed Tomography Urography: Comparison of Image Quality and Radiation Dose between Single- and Split-Bolus Techniques

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Abstract

Introduction: In this study, we aimed to compare the split-bolus and single-bolus computerised tomography (CT) urography and determine if this offers a reduction in radiation dose without compromising image quality. **Materials and Methods:** A retrospective evaluation was performed on 88 patients undergoing split-bolus CT urography and this was compared to a control group of 101 consecutive patients undergoing single-bolus CT urography. A radiation dose analysis was performed on each subject. Subjects with urinary bladder lesions, hydronephrosis, renal masses or cysts >3 cm in diameter were excluded. All images were classified according to image quality by 2 consultant radiologists. **Results:** Opacification of the renal parenchyma, pelvicalyceal system, proximal ureters and urinary bladder were comparable between the 2 techniques, whilst image quality of the middle and distal third of the ureters was better using the split-bolus technique. The mean dose length product (DLP) for the single-bolus technique was 1324.1 mGy·cm, whilst that of the split-bolus technique was 885.7 mGy·cm. The mean effective dose reduction was calculated to be 31.1% between the 2 groups. **Conclusion:** The split-bolus technique gives a reduced radiation dose without compromising image quality. The associated reduction in images is beneficial for data storage and reporting efficiency. As such, our department will adopt the split-bolus technique for young, low-risk patients.

Ann Acad Med Singapore 2018;47:278-84

Key words: Intravenous pyelogram, Intravenous urogram

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