Service Priorities and Programmes

Electronic Presentations

Convention ID: 802
Submitting author: Dr Yee Tak Alta LAI
Post title: Resident, Pamela Youde Nethersole Eastern Hospital, HKEC

Reduction of Radiation Dose and Scan Time using the Split-Bolus Protocol for MDCT Urography

Lai YTA (1), Lai MHB (1), Fung KPV (1), Tam CWA (1), Kan WK (1)
(1) Department of Radiology, Pamela Youde Nethersole Eastern Hospital

Keywords:
Radiation dose reduction
Scan time reduction
MDCT

Introduction

The radiation dose of a traditional single contrast bolus multiphase contrast CT urography (CTU) is relatively high. Split contrast bolus CTU is a technique which yields synchronous nephrographic and excretory phase enhancement, resulting in one fewer phase of image acquisition, and in turn potentially reducing the radiation dose.

Objectives

To assess the feasibility of reducing the radiation dose and scan duration of CTU using split-bolus protocol while achieving comparable image quality in terms of urinary tract opacification compared with single-bolus protocol.

Methodology

123 consecutive split-bolus and 105 consecutive single-bolus CTU examinations from January to October 2014 were retrospectively reviewed. DLPs and scanning durations were recorded. Axial images were reviewed. The urinary tract was divided into four segments on each side: renal calyces, renal pelvis, upper ureter proximal to the iliac crest, and distal ureter. The degree of opacification of each segment was recorded and compared between the two protocols, excluding cases with hydronephrosis or hydroureter hindering urinary tract opacification.

Result

Results: The DLP and the scanning duration of the split-bolus protocol were 15.38% ($p=0.0198$) and 12.89% ($p<0.0001$) lower than those of the single-bolus protocol respectively. Opacification rate is lowest in the distal ureter in both single-bolus and split-bolus protocols (83.72% and 85.59% respectively), a known limitation of CTU often reported in the literature. The single-bolus and split-bolus protocols have no

statistically significant difference in opacification rates of the respective aforementioned segments (single-bolus: 100%, 99%, 91.62%, 83.72%; split-bolus: 98.68%, 98.25%, 86.46%, 85.59%. p=0.251, 0.689, 0.088, 0.595). Conclusion: Comparable image quality of the urinary tract can be achieved with split-bolus compared with single-bolus CTU while allowing a significantly lower radiation dose and shorter scan time.