Implementation Of Split-Bolus CT Protocol To Reduce Radiation Dose In Trauma Patients

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Purpose of Study
Split bolus protocol is a contrast medium injection technique divided into two boluses that provides both arterial and portal venous enhancement with a single pass of the Computed Tomography (CT) gantry. This technique would reduce CT dose to trauma patients who are mostly in the young age group compared to multiphase scans acquired sequentially.

Materials and Methods
A prospective study carried out on adult trauma patients who were randomly selected for multiphase or split bolus CT protocol since January 2017. There were 14 patients (9 men, mean age 32 years) scanned using split bolus protocol and 29 patients (26 men, mean age 34 years) were scanned using multiphase protocol. The CT image quality were evaluated using Likert Scale (1-5) and enhancement of the abdominal organs, portal vein and abdominal aorta were measured in Hounsfield units. CT dose were measured by dose length product (mGy.cm) and effective dose (mSv).

Results
There was significant reduction in radiation dose using split bolus protocol (p=0.05) with 45% reduction compared to multiphase scan. The average dose using split bolus protocol was 12 mSv and average dose for multiphase scan was 22mSv. No significant difference in enhancement of the abdominal organs, portal vein and abdominal organs noted. Image quality score for split bolus protocol was 4 and multiphase scan was 4.4.

Conclusion
Split bolus CT protocol would be an alternative CT protocol for trauma patients with comparable arterial and venous enhancement and significant reduction in dose compared to multiphase scan.