Comparison of radiation dose from conventional and triple bolus CT urography protocols in the diagnosis and management of renal cortical neoplasms

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\textbf{Purpose:} Triple bolus computed tomography (TBCT) is a recently introduced low radiation dose protocol that allows arterial, venous and urographic phases to be captured in a single acquisition. We compared the radiation dose of TBCT and conventional CT (CCT) urography protocols, analyzed the effects of body mass index (BMI) on radiation dose in each group and assessed image quality.

\textbf{Methods:} We retrospectively reviewed the images of patients who underwent CCT or TBCT imaging in the management of renal cortical neoplasms (RCN). We used standard volumetric CT dose index (CTD\textsubscript{vol}) and dose length product (DLP) to estimate radiation exposure. Additionally, two urologists rated the quality of 20 CT images from each group using a survey on a five point Likert scale. The survey consisted of 10 questions relating to the ability of the scan to identify relevant renal anatomy.

\textbf{Results:} A total of 120 patients were included in the study. CTD\textsubscript{vol} and DLP were 28.7\% and 40.4\% lower in the TBCT protocol respectively (p<0.001, p<0.001). Increased BMI was associated with a higher DLP for the CCT group when compared to the TBCT group (p<0.001). There was no difference between CCT and TBCT groups with regards to effect of BMI on CTD\textsubscript{vol}. There was no difference in urologist’s assessment of CT image quality.

\textbf{Conclusions:} In patients with RCN, TBCT provides comparable image quality to CCT with lower ionizing radiation exposure without compromising image quality. Obese patients may benefit more from TBCT scans.

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