AIM: To investigate whether reducing the radiation dose of computed tomography (CT) of the kidney, ureters, and bladder (KUB) for acute renal colic impacts upon the specificity, sensitivity, and detection of urolithiasis.

MATERIALS AND METHODS: A systematic review of the literature over a 20-year period between 1995 and 2015 was conducted of all prospective studies in the English language reporting on adult patients who underwent CT KUB or non-contrast CT for renal colic or urolithiasis. Retrospective studies and those that included pregnant females, children, non-human test subjects, cadaveric use, and simulations were excluded. Data were collected using an Excel spreadsheet and the literature search was conducted using OVID Medline and Cochrane Library databases. A total of 417 articles were identified, and after screening, seven articles (1,104 patients) were included in the present study with a male:female ratio of 3:2. Of the four studies with ULD CT for both males and females, the prevalence of urolithiasis ranged from 36% and 73%, with additional pathologies found in 12-15%. The effective radiation dose of ULD CT ranged from 0.5-1.9 mSv. Overall, ULD CT and LD CT had a sensitivity of 90-100% and a specificity of 86-100% across all studies.

CONCLUSIONS: ULD CT and LD CT are effective techniques and yield high sensitivity and specificity. Although they yield comparable results against standard-dose CT KUB in detecting alternative diagnoses, they may not be as effective in detecting stones <3 mm in size or in patients with a body mass index of >30 kg/m²; however, this should be the first-line investigation for the majority of renal colic patients in the modern era.

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