

Bibliographic Cite	PMID Link	Literature Type	Level of Evidence	Purpose	Population	Intervention and Outcome Measures	Results/ Recommendations	Study Limitations
Moore CL, Carpenter CR, Heilbrun ME, et al. Imaging in suspected renal colic: Systematic review of the literature and multispecialty consensus. J Am Coll Radiol. 2019; 16(9 Pt A):1132-1143.	31402228	Systematic Review and Multispecialty Consensus	Low	To convene a multispecialty group with representation from national organizations including emergency medicine, urology, and radiology to perform a systematic literature review and seek consensus on imaging approaches in specific clinical scenarios in which renal colic was suspected, with an emphasis on situations in which CT may not be required.	For the literature review, of 6,337 publications screened, 232 were deemed relevant with acceptable methodology. Of key articles provided by authors blinded to the search results, 100% (95% confidence interval [CI] 93%-100%) were identified, indicating excellent capture of relevant articles.	In conjunction with the American College of Emergency Physicians (ACEP) eQual network, we formed a nine-member panel with three physician representatives each from ACEP, the ACR, and the American Urology Association. A systematic literature review was used as the basis for a three-step modified Delphi process to seek consensus on optimal imaging in 29 specific clinical scenarios.	At the completion of the Delphi process consensus, agreement was rated as perfect in 15 (52%), excellent in 8 (28%), good in 3 (10%), and moderate in 3 (10%) of the 29 scenarios. There were no scenarios where at least moderate consensus was not reached. CT was recommended in 7 scenarios (24%), with ultrasound in 9 (31%) and no further imaging needed in 12 (45%). The authors conclude that evidence and multispecialty consensus support ultrasound or no further imaging in specific clinical scenarios, with reduced radiation dose CT to be employed when CT is needed in patients with suspected renal colic.	There could be nearly unlimited permutations of the clinical presentation described in the vignettes. Twenty-nine questions were included because it was felt to be the best balance of major factors with the number of questions the group felt was within a reasonable scope to address. However, not all clinical scenarios were included.
Rob S, Bryant T, Wilson J et al. Ultra-low-dose, low-dose, and standard-dose CT of the kidney, ureters, and bladder: Is there a difference? Results from a systematic review of the literature. Clin Radiol. 2017;72(1):11-15.	27810168	Systematic Review	Moderate	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.	Adults presenting with urolithiasis or flank pain imaged with standard dose (SD), low dose (LD), or ultra low dose (ULD) CT KUB. A total of 417 prospective studies were identified, and after screening, seven articles (1,104 patients) were included in the present study with a male:female ratio of 3:2.	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 ultra-low-dose (ULD CT) and low-dose CT KUB (LD CT) was defined as a radiation dose < 1.9 and < 3.5 mSv, respectively.	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. 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.	High risk of bias; detection/selection bias; limited generalizability due to patient population
Rodger F, Roditi G, Aboumarzouk OM. Diagnostic accuracy of low and ultra-low dose CT for identification of urinary tract stones: A systematic review. Urol Int. 2018; 100(4):375-385.	29649823	Systematic Review	Low	To investigate the diagnostic accuracy of low dose (LD) and ultra-low dose (ULD) CT of the urinary tract for detection of urinary tract stones in patients with renal colic.	A total of 12 studies were included following screening. A total of 1,529 patients were included in the review (475 in the LD group and 1,054 in the ULD group). The study included all studies that compared LD or ULD CT for the detection of urinary tract stones compared to a reference standard. Reference standard was defined as either a standard dose CT KUB or physical stone finding (e.g., as seen in ureteroscopy).	The systematic review and meta analysis was performed according to the Cochrane diagnostic accuracy review guidelines. A literature search was performed in August 2017 of several databases. No limitations were placed on language, region, or publication type. The following search terms were utilised: stones, calculi, urolithiasis, urinary calculi, renal colic, CT, CT KUB, LD, ULD, and radiation. These were combined with Boolean operators (AND, OR) to gain results.	Using standard dose CT KUB as the reference standard, the sensitivity of LD CT KUB ranged from 90 to 98% and specificity from 88 to 100%. The sensitivity of ULD CT KUB ranged from 72 to 99% and the specificity ranged from 86 to 100%. The diagnostic accuracy for LD CT was 94.3% and for ULD CT was 95.5%. The authors conclude that LD and ULD CT KUB provide effective methods of identifying urinary tract stones. High diagnostic accuracy, sensitivity, and specificity are maintained despite significant radiation dose reduction in comparison to standard dose CT.	Papers were grouped into LD and ULD CT groups on the basis of dosage in mSv. However, in each group, there was marked variation in the radiological protocol used across the studies. There is also methodological variation in the determination of dose as differing conversion factors used in several of the studies predating the most recent ICRP recommendations of 2008 in which the abdominal conversion factor remained the same, (0.015), but that for the pelvis decreased from 0.015 to 0.013, due to lower weighting factors for gonads and bladder.
Taylor JJ, Souter LH, Barocas DA, et al. Diagnostic imaging in the evaluation of asymptomatic microhematuria: Systematic review and meta-analysis. J Urol. 2023; 209(6):1099-1106.	36883858	Systematic Review and Meta-Analysis	Moderate	To summarize the diagnostic test characteristics of computed tomography urography, renal ultrasound, and magnetic resonance urography in comparison with surgical pathology for the diagnosis of upper urinary tract cancer in microhematuria and gross hematuria patients.	The search identified 20 studies which reported the prevalence of malignant and benign diagnoses in relation to imaging modality, of which 6 were included in the quantitative analysis.	This analysis used PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines from evidence collected for the 2020 AJA Microhematuria Guidelines report, including studies assessing imaging following diagnosis of hematuria published from January 2010 through December 2019.	For the detection of renal cell carcinoma and upper urinary tract carcinoma in patients with microhematuria and gross hematuria, computed tomography urography had a sensitivity of 94% (95% CI, 84%-98%) and a specificity of 99% (95%CI, 97%-100%) with a certainty of evidence rating of very low and low, respectively when 4 studies were pooled. In comparison, ultrasound demonstrated a sensitivity ranging from 14%-96% (low certainty of evidence) and a specificity of 99%-100% in 2 studies (moderate certainty of evidence), while magnetic resonance urography demonstrated a sensitivity of 83% and specificity of 86% in 1 study with a low certainty of evidence.	The major limitation is the small number of studies evaluating the diagnostic ability of each available imaging modality when compared with a gold standard of surgical pathology. Additionally, the certainty of evidence for the sensitivities and specificities reported in the evidence base ranged from moderate to very low and translates to an evidence strength of "C" by the AJA for any single modality. Furthermore, given the low prevalence of UUTCC, specificity is likely not a reliable indicator of test accuracy as there are very few false-negatives with rare disease. Additionally, the post-test probabilities for patients with MH alone are only calculated from 1 study using CTU, and thus, the expected yield of each diagnostic test in patients with MH specifically should be considered with caution.