

Recurrent Lower Urinary Tract Infections in Women
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Strength of Evidence
1. Rubin RH, Tolkoff-Rubin NE, Conran RS. Urinary tract infection, pyelonephritis, and reflux nephropathy. In: Brenner BM, Rector Jr FC, eds. <i>The kidney</i> . 4th edition. Philadelphia, Pa: WB Saunders; 1991:1369-1429.	15 (Guidelines)	N/A	Evaluate the etiologies, clinical presentations, and therapy of urinary tract infections (UTI).	Guidelines for diagnosis and therapy of UTI.	4
2. Bailey RR. Management of lower urinary tract infections. <i>Drugs</i> 1993; 45 Suppl 3:139-144.	7	N/A	Review on effective treatment for lower urinary tract infection in otherwise healthy women.	Failure of single dose prescription may need additional investigation or additional therapy.	4
3. Stamey TA. Pathogenesis and treatment of urinary tract infections. Baltimore, MD: Williams & Wilkins. 1980:43-47; 179-199; 475-554.	15 (Guidelines)	N/A	Evaluate the etiologies, clinical presentations, and therapy of UTI.	Guidelines for diagnosis and therapy of UTI.	4
4. Stamm WE, McKeivitt M, Roberts PL, White NJ. Natural history of recurrent urinary tract infections in women. <i>Rev Infect Dis</i> 1991; 13(1):77-84.	4	51	Evaluate the natural history of uncomplicated UTI in women.	Antimicrobial prophylaxis was highly effective in preventing acute cystitis, asymptomatic bacteriuria, and acute pyelonephritis, even when used for as long as 5 years	3
5. Stapleton A, Moseley S, Stamm WE. Urovirulence determinants in Escherichia coli isolates causing first-episode and recurrent cystitis in women. <i>J Infect Dis</i> 1991; 163(4):773-779.	3b	139	Assess the prevalence of urovirulence among E. Coli isolates in women with acute uncomplicated cystitis.	Diaphragm use by women may allow a compromise in host resistance-greater infection by less virulent E. Coli.	2
6. Browne RF, Zwirowich C, Torreggiani WC. Imaging of urinary tract infection in the adult <i>Eur Radiol</i> 2004; 14 Suppl 3:E168-183.	12	N/A	Review imaging of UTI in adults	CT is now accepted as a sensitive modality for diagnosis and follow-up of complicated renal tract infection. Contrast-enhanced CT allows different phases of excretion to be studied. Nuclear medicine has a limited role in the evaluation of UTI in adults. MRI has a limited but increasing role.	4
7. Schaeffer AJ. Infections of the urinary tract. In: Walsh JP, et al., eds. <i>Campbell's urology</i> . 6th ed. Philadelphia, Pa: WB Saunders; 1992:731-806.	15 (Guidelines)	N/A	Evaluate the etiologies, clinical presentations, and therapy of UTI.	Guidelines for diagnosis and therapy of UTI.	4
8. Stamm WE. Cystitis and urethritis. In: Schrier RW, Gottschalk CW, eds. <i>Diseases of the kidney</i> . 5th ed. Boston, Mass: Little, Brown; 1993:1007-1027.	15 (Guidelines)	N/A	Evaluate the etiologies, clinical presentations, and therapy of UTI.	Guidelines for diagnosis and therapy of UTI.	4
9. Fair WR, McClennan BL, Jost RG. Are excretory urograms necessary in evaluating women with urinary tract infection? <i>J Urol</i> 1979; 121(3):313-315.	10	164	Evaluate the yield of IVP in identifying significant urinary tract abnormalities; women with recurrent UTI.	Routine use of the IVP in women with recurrent UTI has little justification and a negative cost/benefit.	2

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10. Engel G, Schaeffer AJ, Grayhack JT, Wendel EF. The role of excretory urography and cystoscopy in the evaluation and management of women with recurrent urinary tract infection. <i>J Urol</i> 1980; 123(2):190-191.	9	153	Evaluate the role of IVP and cystoscopy in managing recurrent UTI in otherwise healthy young women.	IVP limited to those patients who have risk factors other than recurrent UTI.	2
11. Fairchild TN, Shuman W, Berger RE. Radiographic studies for women with recurrent urinary tract infections. <i>J Urol</i> 1982; 128(2):344-345.	13	78	Selection of the high-risk patient for radiographic examination and eliminating unnecessary radiographs in the low risk patient.	Radiographic evaluation is beneficial in select patients (ie, those with additional risk factors).	3
12. Fowler JE, Jr., Pulaski ET. Excretory urography, cystography, and cystoscopy in the evaluation of women with urinary-tract infection: a prospective study. <i>N Engl J Med</i> 1981; 304(8):462-465.	9	126	Analysis of the effects of the findings of excretory urography, cystography, and cystoscopy on treatment.	Radiography and endoscopy will rarely help in the treatment of UTI in this group.	2
13. De Lange EE, Jones B. Unnecessary intravenous urography in young women with recurrent urinary tract infections. <i>Clin Radiol</i> 1983; 34(5):551-553.	13	201	Analysis of the benefit of IVU in young women (ages 15-30 years) with recurrent UTI.	Other risk indications are necessary to justify the cost, gonadal irradiation and workload of IVU.	2
14. el-Khatib MT, Becker GJ, Kincaid-Smith PS. Reflux nephropathy and primary vesicoureteric reflux in adults. <i>Q J Med</i> 1990; 77(284):1241-1253.	13	293	Clinical features and course of reflux nephropathy (RN) and/or primary vesicoureteral reflux; male/female difference.	Main result: risk factors for deteriorating renal function. Commonest first symptom in females with RN=UTI.	2
15. Pollack HM, Banner MP, Martinez LO, Hodson CJ. Diagnostic considerations in urinary bladder wall calcification. <i>AJR Am J Roentgenol</i> 1981; 136(4):791-797.	13	19	Review of the causes of bladder wall calcifications with emphasis on the clinical and radiographic features.	A correct diagnosis is possible by combining history, clinical exam, lab and radiograph; Cystoscopy with biopsy is almost necessary.	3
16. Caoili EM, Cohan RH, Korobkin M, et al. Urinary tract abnormalities: initial experience with multi-detector row CT urography. <i>Radiology</i> 2002; 222(2):353-360.	9	65	Comparative study on findings from CT urography, urinalysis, cystoscopy and/or ureteroscopy, and/or surgery to determine the usefulness of multi-detector row CT urography in detecting urinary tract abnormalities.	Multi-detector row CT urography is a useful method for detecting urinary tract abnormalities.	2
17. Chow LC, Sommer FG. Multidetector CT urography with abdominal compression and three-dimensional reconstruction. <i>AJR</i> 2001; 177(4):849-855.	13	N/A	Analysis on the use of CT urography in evaluating patients with hematuria.	CT urography is an evolving technique and is subject to controversy. Although in theory it seems an ideal method, its ability to detect disease has not yet been proven by prospective studies.	4
18. Dillman JR, Caoili EM, Cohan RH. Multi-detector CT urography: a one-stop renal and urinary tract imaging modality. <i>Abdom Imaging</i> 2007; 32(4):519-529.	12	N/A	Review on CT urography.	While the concept of CT urography has been utilized for nearly a decade, there is still no universally accepted technique.	4

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19. Baumgarten DA, Baumgartner BR. Imaging and radiologic management of upper urinary tract infections. <i>Urol Clin North Am</i> 1997; 24(3):545-569.	12	N/A	To determine the best way to image the severity and extent of complicated UTI.	CT is the study of choice to define the extent of disease and to help direct percutaneous intervention.	4
20. Mindelzun RE, Jeffrey RB. Unenhanced helical CT for evaluating acute abdominal pain: a little more cost, a lot more information. <i>Radiology</i> 1997; 205(1):43-45.	12	N/A	Analysis of literature data to assess cost-effective imaging triage of patients with acute abdominal pain.	Unenhanced CT provides clinically relevant information in most patients at a reasonable cost.	4
21. Smith RC, Rosenfield AT, Choe KA, et al. Acute flank pain: comparison of non-contrast-enhanced CT and intravenous urography. <i>Radiology</i> 1995; 194(3):789-794.	9	20	To compare non-contrast-enhanced CT and IVP in patients with acute flank pain.	Non-contrast enhanced CT is more effective than IVP in identifying ureteric stones.	3
22. Smith RC, Verga M, McCarthy S, Rosenfield AT. Diagnosis of acute flank pain: value of unenhanced helical CT. <i>AJR Am J Roentgenol</i> 1996; 166(1):97-101.	10	292	To determine the value of unenhanced CT in the diagnosis of acute flank pain and accuracy of stone detection.	Ureteral stones detected with a sensitivity of 97%, specificity of 96%, and accuracy of 97%.	1
23. Stunell H, Buckley O, Feeney J, Geoghegan T, Browne RF, Torreggiani WC. Imaging of acute pyelonephritis in the adult. <i>Eur Radiol</i> 2007; 17(7):1820-1828.	12	N/A	Review on the role of CT and MRI techniques in the imaging of acute pyelonephritis and its complications.	Imaging may not only aid in making the diagnosis of acute pyelonephritis, but may help identify complications such as abscess formation.	4
24. McNicholas MM, Griffin JF, Cantwell DF. Ultrasound of the pelvis and renal tract combined with a plain film of abdomen in young women with urinary tract infection: can it replace intravenous urography? A prospective study. <i>Br J Radiol</i> 1991; 64(759):221-224.	9	94	Compare the value of US and abdominal radiograph with IVP in young women with recurrent UTI.	US of the pelvis/renal tract combine with abdominal radiograph should be the radiological exam of choice.	2
25. Choyke PL. The urogram: are rumors of its death premature? <i>Radiology</i> 1992; 184(1):33-34.	9	N/A	Comparison of US and IVP in patients with urinary stones and renal colic.	In the United States, US is useful in selected cases but IVP is the exam of choice.	3
26. Abdel-Wahab MF, Ramzy I, Esmat G, el Kafass H, Strickland GT. Ultrasound for detecting <i>Schistosoma haematobium</i> urinary tract complications: comparison with radiographic procedures. <i>J Urol</i> 1992; 148(2 Pt 1):346-350.	9	40	Compare screening for Schistosomiasis with US vs abdominal x-ray, IVP and cystoscopy.	US is less sensitive than IVP to detect bladder wall calcifications but may be complementary.	3

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27. Amar AD, Das S. Vesicoureteral reflux in women with primary bladder diverticulum. <i>J Urol</i> 1985; 134(1):33-35.	13	12	Management of women with chronic UTI, vesicoureteral reflux and vesical diverticulum.	Bladder diverticula may perpetuate reflux and their detection is important in planning treatment.	3
28. Yoder IC, Papanicolaou N. Imaging the urethra in men and women. <i>Urol Radiol</i> 1992; 14(1):24-28.	12	N/A	Review radiologic techniques, normal anatomy, and common abnormalities seen with urethral imaging.	Voiding cystourethrography and retrograde urethrography are most common imaging modal.	4
29. Keefe B, Warshauer DM, Tucker MS, Mittelstaedt CA. Diverticula of the female urethra: diagnosis by endovaginal and transperineal sonography. <i>AJR Am J Roentgenol</i> 1991; 156(6):1195-1197.	10	5	Examination of higher frequency (5 MHz) endovaginal or transperineal US for diagnosis of urethral diverticula.	US may be useful as a noninvasive screening technique for urethral diverticula.	4
30. Kim B, Hricak H, Tanagho EA. Diagnosis of urethral diverticula in women: value of MR imaging. <i>AJR Am J Roentgenol</i> 1993; 161(4):809-815.	9	20	Comparative study to determine the role of MRI in the diagnosis of urethral diverticula in women.	MRI is accurate but costly and should be considered only when other exams are equivocal.	3
31. Zoeller G, May C, Vossenrich R, et al. Digital radiography in urologic imaging: radiation dose reduction on urethrocytography. <i>Urol Radiol</i> 1992; 14(1):56-58.	9	19	To determine the extent of radiation dose reduction possible in urethrocytography with digital radiography.	Radiation dose of digital radiography was reduced by about 90% compared to conventional screen film.	3
32. Pontari MA, McMillen MA, Garvey RH, Ballantyne GH. Diagnosis and treatment of enterovesical fistulae. <i>Am Surg</i> 1992; 58(4):258-263.	9	44	Evaluate presentations and the benefits of diagnostic modalities and compare single vs multistage surgery.	1) CT, cystoscopy, and oral charcoal are the most effective modalities for diagnosis; and 2) single stage surgery best.	3
33. Kirsh GM, Hampel N, Shuck JM, Resnick MI. Diagnosis and management of vesicoenteric fistulas. <i>Surg Gynecol Obstet</i> 1991; 173(2):91-97.	13	56	Diagnostic methods and management of vesicoenteric fistulas with comparison to literature.	Combination of cystoscopy, cystography, and barium enema resulted in diagnosis in all patients.	3
34. Rifkin MD. Ultrasonography of the lower genitourinary tract. <i>Urol Clin North Am</i> 1985; 12(4):645-656.	12	N/A	US evaluation of changes in the bladder wall that may occur in the presence of a neuropathic bladder.	US may be very useful in evaluating the neuropathic bladder in the presence of recurrent UTI.	4
35. Shapeero LG, Friedland GW, Perkash I. Transrectal sonographic voiding cystourethrography: studies in neuromuscular bladder dysfunction. <i>AJR Am J Roentgenol</i> 1983; 141(1):83-90	9	32	Evaluate efficacy of transrectal US voiding cystourethrography in patients with numerous bladder dysfunctions.	A very useful diagnostic tool in men with neuro-muscular disease. (Note: women were not in study).	3
36. American College of Radiology. <i>Manual on Contrast Media</i> . Available at: http://www.acr.org/SecondaryMainMenuCategories/quality_safety/contrast_manual.aspx .	15	N/A	Guidance document on contrast media to assist radiologists in recognizing and managing risks associated with the use of contrast media.	N/A	3

Evidence Table Key

Study Type Key

Numbers 1-7 are for studies of therapies while numbers 8-15 are used to describe studies of diagnostics.

1. Randomized Controlled Trial — Treatment
2. Controlled Trial
3. Observation Study
 - a. Cohort
 - b. Cross-sectional
 - c. Case-control
4. Clinical Series
5. Case reviews
6. Anecdotes
7. Reviews

8. Randomized Controlled Trial — Diagnostic
9. Comparative Assessment
10. Clinical Assessment
11. Quantitative Review
12. Qualitative Review
13. Descriptive Study
14. Case Report
15. Other (Described in text)

Strength of Evidence Key

- Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis and results.
- Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.
- Category 3 - The conclusions of the study may be valid but the evidence supporting the conclusions is inconclusive or equivocal.
- Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.