Doncaster and Bassetlaw Teaching Hospitals
NHS Foundation Trust

URINARY TRACT INFECTIONS

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URINARY TRACT INFECTIONS

The diagnosis of urinary tract infection (UTI) is primarily based on symptoms and signs.

Typical symptoms or signs of lower urinary tract infections (**cystitis**) include dysuria, urinary frequency, urgency, haematuria and suprapubic tenderness but no fever.

Acute upper urinary tract infection (**pyelonephritis**) present with signs of loin pain, flank tenderness, nausea/vomiting, pyrexia, rigors with/without symptoms of a lower UTI.

Urosepsis is defined as sepsis whose source is the urogenital tract. It is most often related to an upper urinary tract infection.

Catheter –associated UTI (CAUTI) is difficult to diagnose. Signs and symptoms compatible with CAUTI include new onset fever or worsening fever, rigors, altered mental status, malaise , or lethargy with no other identified cause; flank pain, costo-vertebral angle tenderness, acute haematuria, pelvic discomfort and in those whose catheters have been removed , dysuria, urgent or frequent urination, or supra-pubic pain or tenderness.

Pregnancy: Urinary tract infection in pregnancy has 3 principle presentations – asymptomatic bacteriuria, lower UTI and pyelonephritis. The overall incidence in pregnancy is approximately 8%. If untreated, 30% of women may develop acute pyelonephritis and premature delivery.

Investigations

- Dipstick screening test for nitrites and leucocyte esterase. **DO NOT use dipstick** testing to diagnose UTI in catheterised patients, patients over 65 years or pregnant women (see also Appendix 1 for diagnostic flow chart for use in patients over 65 years).
- Mid-stream urine (MSU) to be taken before starting antimicrobial treatment.
- Catheter specimen of urine (CSU) **only if the patient has clinical** sepsis, not because the appearance or smell of urine suggests that bacteriuria is present.
- Blood culture in suspected acute pyelonephritis or clinical signs of sepsis or temperature > 38^0C
- For epididymo-orchitis, send a urethral swab for *N. gonorrhoeae* culture and first pass urine or urethral swab for *C.trachomatis* NAAT.
- Renal tract ultrasound for suspected sepsis secondary to acute pyelonephritis

If previously or currently positive for *Clostridium difficile* - discuss with a Microbiologist

INFECTION	EMPIRIC FIRST LINE	EMPIRIC ALTERNATIVE	BASED ON SENSITIVITES	DURATION	NOTES
Asymptomatic bacteriuria (Positive urine culture in the absence of symptoms)	Antibiotics are **NOT** indicated in men and non-pregnant females				For pregnant women, see table below.
Lower UTI in non-pregnant Females (aged > 16 years and <65 years)	Oral Nitrofurantoin* 100mg modified-release 12hrly * avoid if eGFR < 45ml/min * avoid in males where prostatitis is suspected. *avoid in breastfeeding mothers of neonates or premature infants (risk of neonatal haemolysis)	Oral Pivmecillinam‡ 400mg initial dose, then 200mg 8hrly (standard dosing) OR 400mg 8-hrly (for recurrent infections) ‡Pivmecillinam is a **beta-lactam** antibiotic	**Only if organism is susceptible (based on culture results), use any of the following orally:** Trimethoprim◊ 200mg 12hrly **OR** Amoxicillin 500mg 8hrly **OR** Cefalexin 500mg 8-12hrly ◊ if eGFR between 15-30ml/min – use half dose after 3 days ◊avoid if eGFR < 15 ml/min or CKD ◊ avoid in patients on methotrexate	3 days	If allergic/resistant to 1st line and alternative, please contact the Microbiologist
Lower UTI in Males (aged >16 years and <65 years)				7 days	

INFECTION	FIRST LINE	ALTERNATIVE	DURATION	NOTES
Asymptomatic bacteriuria (ASB) in pregnancy	Antibiotic treatment is indicated for pregnant women with asymptomatic bacteriuria confirmed by two consecutive urine samples with the same organism Treat based on results of the urine culture/sensitivity testing		7 days	-Dipstick should NOT be used to diagnose UTI or ASB in pregnancy -If allergic/resistant to 1st line and alternative, please contact the Microbiologist -Review antibiotic choice based on urine culture results -Send follow up MSU **7 days after completion of antibiotic** as a test of cure. Give another antibiotic course if infection has not cleared -If Group B streptococcus isolated, ensure antenatal services informed (as will also require intrapartum antibiotic prophylaxis in addition to treatment for UTI) -For pyelonephritis, review suitability of IV to PO switch at 48h
UTI in Pregnant women	**1ST & 2ND TRIMESTER ONLY:** PO Nitrofurantoin* 100mg modified-release 12 hrly *avoid in the third trimester, may produce neonatal haemolysis *avoid if eGFR <45ml/min **OR** **3RD TRIMESTER ONLY:** Oral Cefalexin 500mg 12hrly	**If organism is susceptible (based on culture results) use any of:** Oral Amoxicillin 500mg 8hrly **OR** **2ND & 3RD TRIMESTER ONLY:** Oral Trimethoprim 200mg 12hrly	7 days	
Acute pyelonephritis in pregnancy	IV Cefuroxime 1.5g 8-hrly (can be used in any trimester)	Discuss with Microbiologist	10 - 14 days	

INFECTION		FIRST LINE	ALTERNATIVE	DURATION	NOTES	
Catheter-associated UTI (without sepsis features)		PO Nitrofurantoin* 100mg modified-release 12hrly **(provided there are no upper UTI symptoms)** * avoid if eGFR < 45ml/min **OR** PO Cefalexin 500mg 8-hourly (if UUTI symptoms)	Oral alternative should be based on culture results	7 days if prompt resolution 10 days if delayed response 3 days if catheter removed in females ≤65yr and no fever	• Antibiotics only indicated if there are signs and symptoms compatible with CAUTI. • Susceptibility results, if not reported, are available on request. • Contact Microbiology if patient has had a previous Cephalosporins or Co-amoxiclav in the previous 2 weeks • Review if catheter is still needed. • If catheter still indicated, then replace the catheter within 24 – 48 hours of starting antibiotics.	
Epididymo-orchitis	Under 35 years	Single dose of Ceftriaxone 500mg IM PLUS PO Doxycycline 100mg 12hrly	If allergic to Cephalosporins and/or Doxycycline use : PO Ofloxacin 200mg 12hrly for 14 days	10-14 days	**It is vital that specimens for sensitivity testing are taken prior to antibiotics.**	Usually sexually transmitted in the under 35 years.
	Over 35 years	PO Ciprofloxacin 500mg 12hrly	Discuss with Microbiologist	10 days		Usually due to enteric organisms in the over 35 years.
Acute Prostatitis		PO Ciprofloxacin 500mg 12hrly	IV Ceftriaxone 2g once daily OR Trimethoprim 200mg 12hrly (if low risk of resistance)	28 days	Send MSU	

INFECTION	FIRST LINE	ALTERNATIVE	DURATION	NOTES
Urosepsis including: **- Post prostatic biopsy sepsis** **-Catheter-associated urosepsis** **(Refer to sepsis IPOC)**	IV High dose extended interval Gentamicin *(see policy)* **OR** **<u>Only in suspected/confirmed AKI, severe CKD (CrCl <40 ml/min), or U&E unavailable‡</u>** IV Cefuroxime‡◊ 1.5g 8-hrly ‡ If U&E are not available or in suspected AKI, give a stat dose of cefuroxime which should be switched to gentamicin if the renal function is subsequently within the acceptable range (see Gentamicin policy).	Oral alternative should be based on culture results but **AVOID** Nitrofurantoin and Fosfomycin. Contact Microbiology if unsure	7 days	Contact Microbiology if patient has had a previous 5 day course of Cephalosporins or Co-amoxiclav in the previous 2 weeks. **-Please review all IV antibiotics at 48 hours** **-Duration of treatment should be guided by clinical resolution of symptoms/signs**
Acute pyelonephritis			10 - 14 days	

INFECTION	EMPIRIC FIRST LINE	EMPIRIC ALTERNATIVE	BASED ON SENSITIVITES	DURATION	NOTES
Asymptomatic bacteriuria in older people > 65 years old	ASB is a colonisation of the urinary tract in the absence of clinical features of infection. This is common in older people and does NOT require antibiotic treatment				
Lower UTI in older patients (> 65 years old)	PO Nitrofurantoin* 100mg modified-release 12hrly * avoid if eGFR < 45ml/min * avoid in males where prostatitis is suspected.	PO Pivmecillinam‡ 400mg initial dose, then 200 mg 8hrly (standard dosing) OR 400mg 8-hrly (for recurrent infections) ‡Pivmecillinam is a **beta-lactam** antibiotic	**Only if organism is susceptible (based on culture results), use any of the following orally:** Trimethoprim◊ 200mg 12hrly **OR** Amoxicillin 500mg 8hrly **OR** Cefalexin 500mg 8-12hrly ◊ if eGFR between 15-30ml/min – use half dose after 3 days ◊avoid if eGFR < 15 ml/min or CKD ◊ avoid in patients on methotrexate	3 days for women 7 days for men	Do NOT use dipsticks to diagnose UTI in older patients Send MSU prior to commencing antibiotic If allergic/resistant to 1st line and alternative, please contact the Microbiologist Refer to Appendix 1 for further info

References

-NICE Clinical Knowledge Summaries. Urinary Tract Infection (lower) – women. Published 2015, last revised Feb 2023 https://cks.nice.org.uk/topics/urinary-tract-infection-lower-women/

-NICE Clinical Knowledge Summaries. 2019. Pyelonephritis – acute. Updated Feb 2023.

https://cks.nice.org.uk/topics/pyelonephritis-acute/

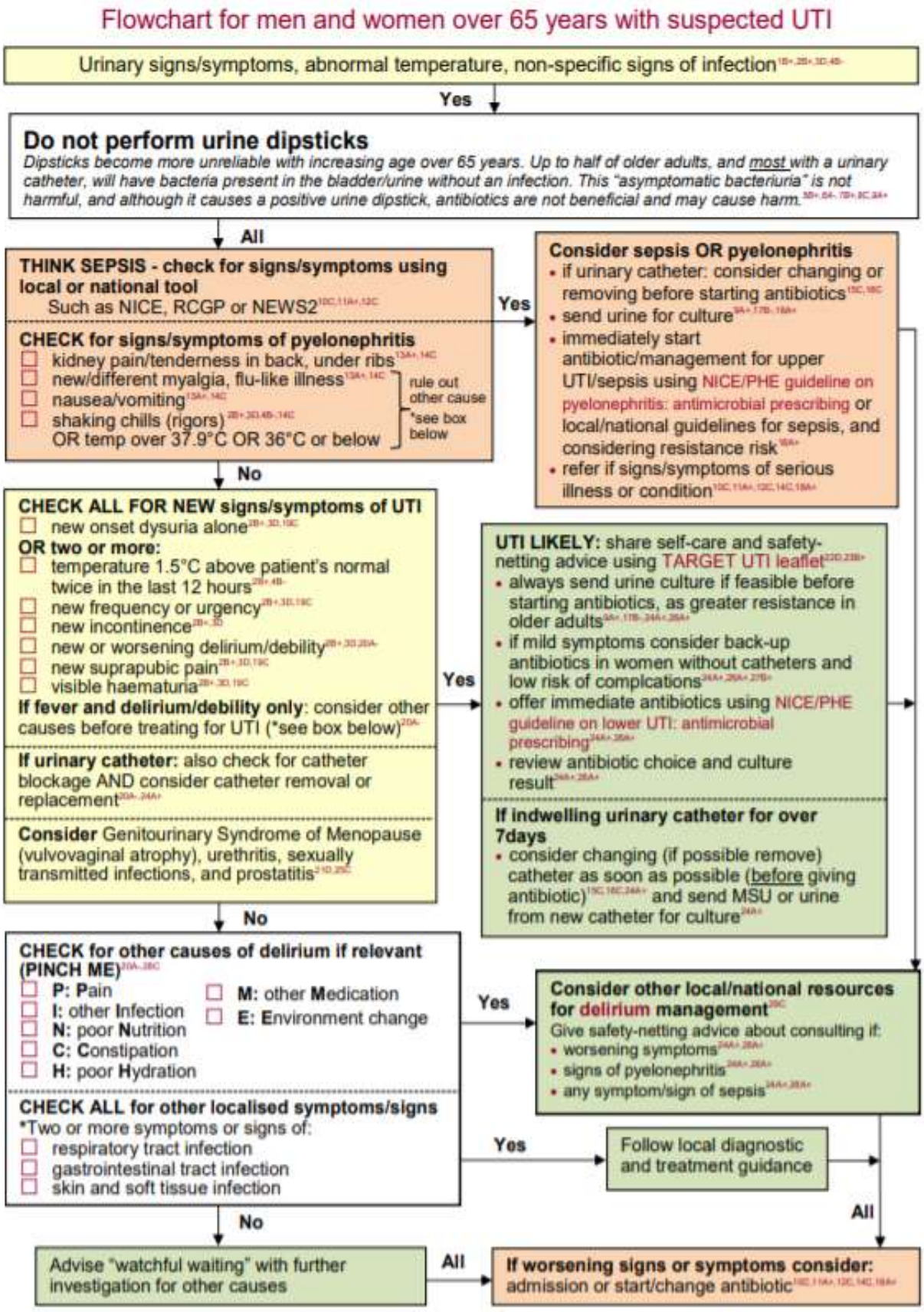
-NICE CKS. Urinary tract infection (catheter-associated): antimicrobial prescribing. Nov 2018.

https://www.nice.org.uk/guidance/ng113/chapter/recommendations

-SIGN 88: Management of suspected bacterial urinary tract infection in adults July 2006 (updated July 2012) https://www.sign.ac.uk/media/1604/sign88_algorithm_older.pdf

-Green Top Guideline No. 36. Prevention of Early-onset Neonatal Group B Streptococcal Disease. Royal College of Obstetricians and Gynaecologist. 2017.

Appendix 1



Reference: https://www.gov.uk/government/publications/urinary-tract-infection-diagnosis