Urinary Tract infection

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BEST meeting

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Are you sure it's a UTI?

- Definition
- Microbiology
- Antimicrobial
- Scenarios
- Key Summaries

Definition

Uncomplicated UTI	Infection in a structurally and functionally normal urinary tract
Complicated UTI	Infection in a structurally and functionally ABNORMAL urinary tract UTIs in men, pregnancy and children are ALL complicated
Female Urethral syndrome	**The UTI That Isn't A UTI**: characterised by dysuria and urgency. Not caused by bacteria. inflammation and irritation of the bladder and urethra

Asymptomatic bacteriuria

Significant levels of bacteria ($>10^5$cfu/ml)

No symptoms of UTI

Only relevant to pregnant women

Not routinely treated, in women who are not pregnant, men, young people and children

Asymptomatic bacteriuria is rare in men <65yrs

Patients 65+ years OR with a Urinary Catheter **DO NOT DIPSTICK**

Asymptomatic bacteriuria is common in patients aged 65+, and those with a urinary catheter.

Dipsticks cannot differentiate between this and the presence of pathogenic bacteria – they should NOT be used to diagnose or rule out a UTI in these patients

Patients 16-64 years (1 or None)
DIPSTICK HELPFUL

In patients aged 16-64 years old, a urine dipstick is helpful **in combination with clinical information (1 or none)** to help diagnose a UTI

Send urine for culture

Most common pathogens

Common	Escherichia coli Proteus species Klebsiella species Enterobacter species
Pregnancy	Above plus: Staphylococcus saprophyticus
Catheter associated	As for common plus: Pseudomonas species Enterococcus species Staphylococcus aureus

Method for culture interpretation

- Step 1: look at the **WBC** count to see if there is inflammation
- Step 2: Look for **epithelial cells** which indicate contact of urine with perineal skin and therefore probable contamination with perineal flora
- Step 3: Look at the culture result to see if a **pure pathogen** has been grown which is a normal cause of UTI. Mixed cultures usually indicate contamination with perineal flora

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: Mid-stream urine , Clin Dets:Pain urinating,frequencysizzy,new confusion

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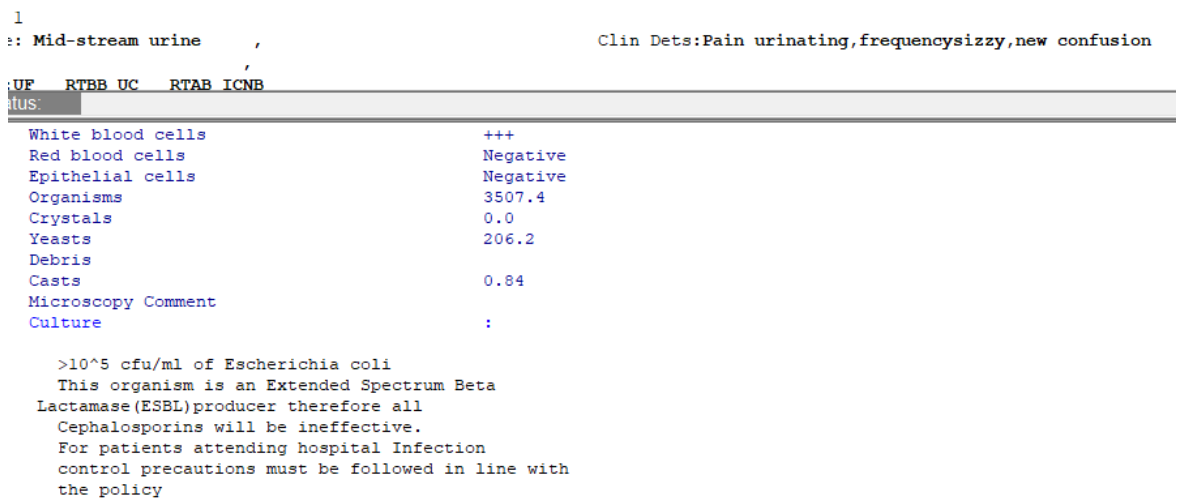
UF RTBB UC RTAB ICNB

tus:

White blood cells	+++
Red blood cells	Negative
Epithelial cells	Negative
Organisms	3507.4
Crystals	0.0
Yeasts	206.2
Debris	
Casts	0.84
Microscopy Comment	
Culture	:

>10^5 cfu/ml of Escherichia coli
This organism is an Extended Spectrum Beta
Lactamase(ESBL)producer therefore all
Cephalosporins will be ineffective.
For patients attending hospital Infection
control precautions must be followed in line with
the policy



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High WBC: inflammation in the urinary tract

Absence of epithelial cells, urine sample have not been contaminated

Escherichia coli one of the bacteria expected to be grown for UTI

In the presence of **urinary tract symptoms** in the clinical detail

* CONFIRM UTI *

: Mid-stream urine , Clin Dets:

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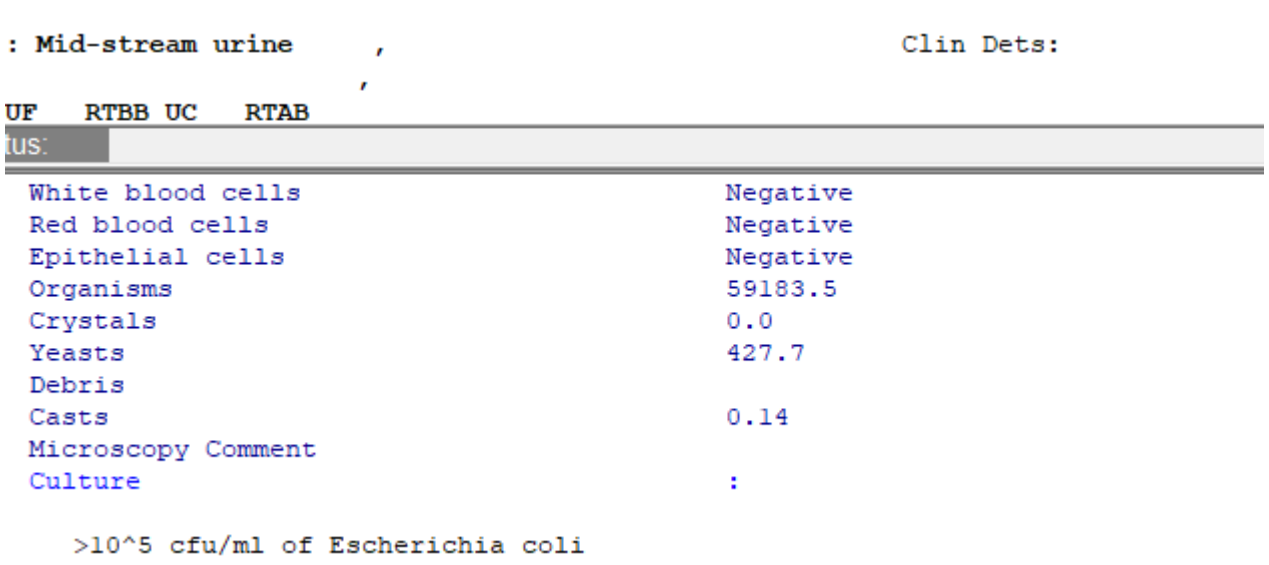
tus:

White blood cells	Negative
Red blood cells	Negative
Epithelial cells	Negative
Organisms	59183.5
Crystals	0.0
Yeasts	427.7
Debris	
Casts	0.14
Microscopy Comment	
Culture	:

>10^5 cfu/ml of Escherichia coli



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Absence of **WBC** shows there is no evidence of inflammation in the urinary tract

No epithelial cells to indicate contact with skin of the perineum , the growth of Escherichia coli in the **absence of inflammation**

No clinical detail provided for interpretation

Contamination and not infection

Resistance of *E. coli*

Main causative organism of UTIs for patients >65

BH laboratory-processed urine specimens antibiotics:

- Nitrofurantoin: <5%
- Trimethoprim: 25%
- Pivmecillinam (Penicillin): <5%
- Co-amoxiclav (Penicillin): 15%

Nitrofurantoin eGFR

- Not systemically active
- Required adequate renal function to ensure antibiotic is excreted into the urine where it becomes active
- Used with caution if eGFR 30-44ml/min to treat

*Uncomplicated lower UTI caused by suspected or proven multidrug resistant bacteria (ESBL) and only if potential benefit outweighs risk

Trimethoprim resistance

Lower risk:

- Not used past 3 months
- Previous MSU sensitive (& not used)
- Younger people where local resistance is low

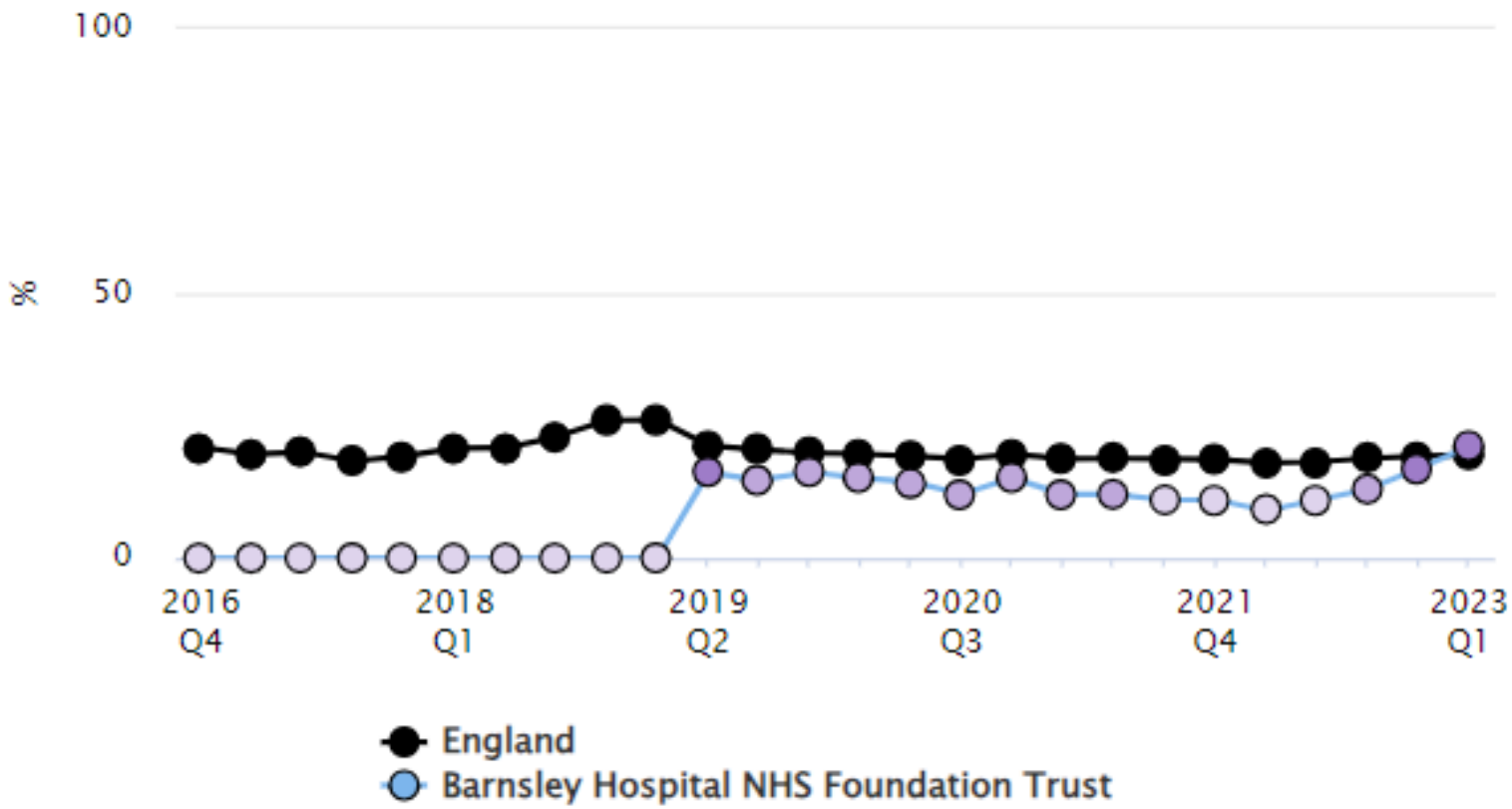
Higher risk:

- Recent use
- Elderly in residential facilities

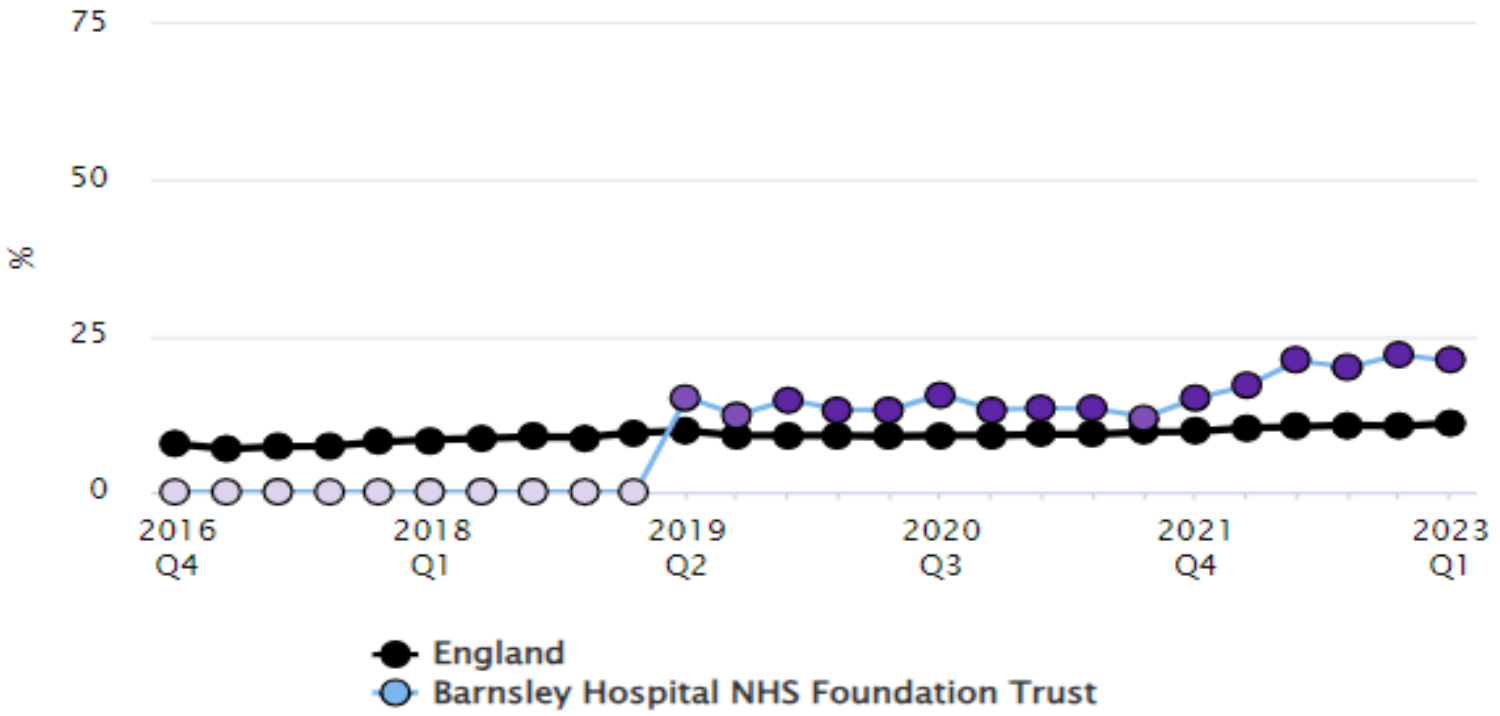
Risk factors for increased resistance include:

- Care-home resident
- Recurrent UTI
- Hospitalisation for >7 days in the last 6 months
- Unresolving urinary symptoms
- Recent travel to a country with increased resistance
- Previous UTI resistant to trimethoprim, cephalosporins, or quinolones

Estimate the rate of E.coli blood stream infections Ciprofloxacin

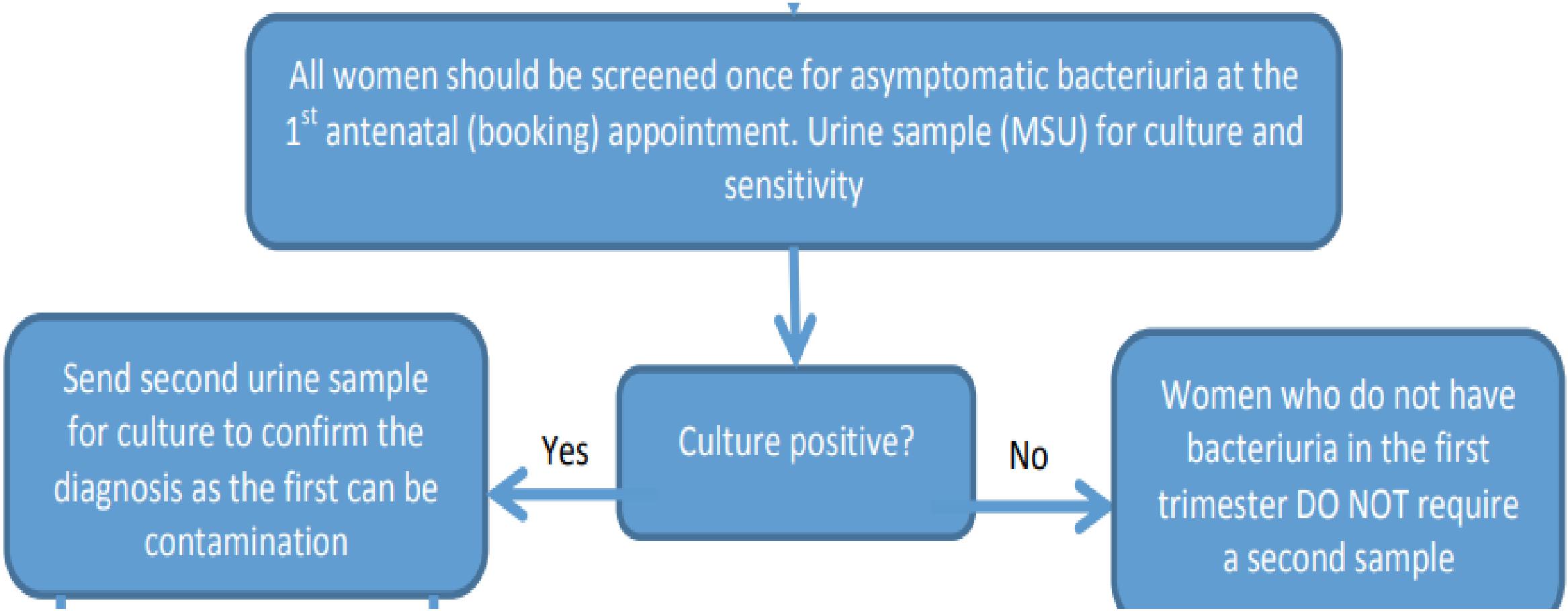


Estimate the rate of E.coli blood stream infections Piperacillin/Tazobactam



Pregnant women

- Asymptomatic bacteriuria (30%), acute cystitis (8%) and pyelonephritis
- Routinely screened for and treated with antibiotics
- Risk factor for pyelonephritis, premature delivery and stillbirth
- Treatment courses are usually 7 days, and urine culture should be performed 7 days after completion of treatment as a test of cure


All women should be screened once for asymptomatic bacteriuria at the 1st antenatal (booking) appointment. Urine sample (MSU) for culture and sensitivity
Culture positive?
Yes
Send second urine sample for culture to confirm the diagnosis as the first can be contamination
No
Women who do not have bacteriuria in the first trimester DO NOT require a second sample

UTI (lower): duration of treatment

3 days: Women (non-pregnant), if uncomplicated

Complicated UTI (7 days treatment) includes:

- Structural/functional abnormality
- Underlying disease, which increases risk of more serious outcome/ treatment failure
- Pregnancy (urine culture should be performed 7 days after completion of treatment as a test of cure)
- Male
- Urine catheter

When should asymptomatic bacteriuria be treated?

a) Prior to orthopaedic operation
b) People with indwelling urinary catheters
c) Children
d) Pregnancy
e) None of the above

Which of the following would NOT be suitable to treat pyelonephritis?

a) Trimethoprim (known sensitivity)
b) Cefalexin
c) Nitrofurantoin
d) Fosfomycin
e) Pivmecillinam

Antibiotics that don't achieve adequate levels in **renal tissue** e.g. Nitrofurantoin, Fosfomycin & Pivmecillinam are to be avoided in treatment of pyelonephritis

29yrs has an appointment to review her cystitis symptoms which didn't get better with Nitrofurantoin prescribed 5 days ago.

- No vaginal discharge.
- Dipstick test shows nitrite & blood.
- Penicillin allergy, 2/12 ago Trimethoprim

I  Persisting lower UTI & agree to treat Immediately

What do you do?

a) Send MSU
b) Prescribe Trimethoprim
c) Prescribe Cefalexin
d) Prescribe Fosfomycin
e) Prescribe Pivmecillinam

a) Send MSU: Yes, always following initial treatment failure If symptoms & signs are mild you may suggest awaiting culture before prescribing.

Antibiotic according to susceptibility results

MSU

- ❑ All men
- ❑ Pregnant women
- ❑ Suspected acute pyelonephritis or sepsis
- ❑ Children if unexplained temp >38, Symptoms & signs UTI
- ❑ Women who present with atypical symptoms
- ❑ ✓Treatment failure, symptoms worsen or do not improve
- ❑ Recurrent UTI or high risk of resistance

Catheter UTI

87 yr old man, cognitive impairment, long-term indwelling catheter. HV request, more confused, positive urine dip

Why dipped?

Fever?

Suprapubic pain, flank pain?

Confusion: Duration & details, other causes?

PINCH ME

- Do not use dipstick testing to diagnose UTIs in adults with urinary catheters
- Send urine for culture
- The patient's clinical need for catheterisation should be reviewed regularly and the urinary catheter removed as soon as possible

PINCH ME: other causes of delirium

- P: Pain
- I: other Infection
- N: poor Nutrition
- C: Constipation
- H: poor Hydration
- M: other Medication
- E: Environment change

In which of the following may back-up antibiotic prescribing be appropriate?

- ❑26 yr-old woman with symptoms of cystitis, to use within 5d if symptoms not improving
- ❑40 yr-old woman with symptoms of cystitis, to use within 2d if symptoms not improving
- ❑ 52 yr-old woman had 3 courses of antibiotics in last 12 months, with symptoms of cystitis, to use within 2d if symptoms not improving

26 yr-old woman with symptoms of cystitis, to use within 5d if symptoms not improving

 **No (**worse outcome if delayed 48+hrs)

40 yr-old woman with cystitis symptoms, to use within 2d if symptoms not improving  **Consider**

52 yr-old woman had 3 courses of antibiotics in last 12 mths, with symptoms of cystitis, to use within 2d if symptoms not improving  **Consider**

Prophylactic antibiotics *Recurrent UTI in adults*

- Two or more episodes of lower urinary tract infection in the last **6 months**
- Three or more lower urinary tract infection episodes in the last **12 months**
- It does not include bacteriuria in the absence of symptoms or catheterised patients **(asymptomatic bacteriuria)**

Red Flags for Referral to Urology

- All men
- Frank haematuria, even in the context of confirmed UTI
- Neurological disease e.g., spinal cord injury, spina bifida
- Pneumaturia or faecaluria
- Proteus on repeat urine cultures
- Suspected stone
- Obstructive symptoms, or structural/functional abnormality, causing >200ml residual urine on bladder scan

In pregnancy: All recurrent UTIs in pregnancy should be discussed with the Obstetrics team

Suspected Cancer

Suspected cancer 45yrs+:	• **Unexplained visible haematuria** • **No UTI, visible haematuria recurs after successful treatment**
UTI 60yrs+:	**Unexplained non-visible haematuria & either dysuria or raised WCC (blood)**
60yrs+:	**(non-urgent) recurrent or persistent unexplained UTI**

Self-care reminders

- Drink plenty
- Avoid use of scented washes/wipes
- For sexually active women:
- Advise post-coital voiding
- Avoid use of contraceptive diaphragm and spermicide
- Perineal hygiene i.e., wiping front to back.
- Avoid using flannels. A clean unscented disposable wipe is preferable.
- Over-the-counter products – limited evidence

  D-mannose

  Cranberry tablets (Contraindicated in patients on Warfarin)

Antibiotic	Dose	Cautions and monitoring
Trimethoprim	200 mg one dose post-coital (off-label) or 100 mg nightly	• Hyperkalaemia: caution when prescribing medications such as spironolactone, ACE inhibitor or angiotensin inhibitors. • Renal Impairment: Avoid if eGFR <30ml/min. It may increase serum creatinine. • Risk of blood disorders and advised to seek attention if fever, sore throat, purpura, mouth ulcers, bruising or bleeding occurs.
Nitrofurantoin	100 mg immediate release one dose post-coital (off-label) Or 50 mg nightly	• Avoid if renal function eGFR <45ml/min. Consider checking renal function especially in the elderly. • Avoid if G6PD deficiency. • Use with caution in anaemia, diabetes, vitamin B or folate deficiencies. • Monitor bloods every 3-6 months. • Risk of pulmonary and hepatic fibrosis and the symptoms Reactions can develop acutely or insidiously. •Risk of peripheral and optic neuropathy

Summary of Prescribing Strategy Options	
Consider prescribing a vaginal oestrogen in peri- and post-menopausal women.	
Standby Antibiotics	A 'self-start' course of antibiotics if <1 episode per month
Post Coital Antibiotics	For rUTIs that are triggered by sexual intercourse
Continuous Antibiotic Prophylaxis	Continuous low-dose antibiotic prophylaxis
Continuous Urinary Antiseptic Prophylaxis	Continuous prophylaxis with methenamine hippurate as a first-line alternative to continuous antibiotic prophylaxis

Methenamine Hippurate

- Methenamine (1g BD) may now be offered as a first line alternative to continuous antibiotic therapy for UTI prevention in women.
- It may be initiated in primary care in women without urinary tract abnormalities or neuropathic bladder.
- Treatment should be reviewed at 6 months with a view to stopping.
- **For prophylaxis and not for treatment.**

- 59yrs attends for medication review. She has been taking antibiotics for 15 months for recurrent UTIs.
- What do you want to consider during the review?

Review antibiotic prophylaxis for recurrent UTI at least every 6 months

Considerations:

- Has she had investigation for underlying cause?
- Discussing whether to continue, stop or change antibiotic
- Any breakthrough (acute) UTIs?
- Reminders about self care, behavioural & personal hygiene measures
- Recent MSU – does this alter prophylactic choice?

	Pregnant	Women <65yrs 3 KEYS: DYSURIA, NEW NOCTURIA AND CLOUDY Other SEVERE: Frequency, Urgency, Haematuria, Suprapubic tenderness			Men under 65 years	Over 65 years NEW Dysuria alone 2 or more: NEW Frequency NEW Urgency NEW urinary incontinence NEW Suprapubic pain NEW/WORSENING delirium or mobility Visible haematuria Fever/Rigors	Catheterised adult (any age) Fever/Rigors NEW Suprapubic /Flank pain NEW/WORSENING delirium or mobility
Urinary symptoms	✓	2 or more KEY Symptoms	1 KEY Symptoms	No KEY but Other symptoms	✓	✓NEW Dysuria alone/ 2 or more	✓
						Fever and delirium/debility only: consider other causes (LRTI/GI/SKIN SOFT TISSUE) before treating for UTI	Fever and delirium/debility only: consider other causes (LRTI/GI/SKIN SOFT TISSUE) before treating for UTI
						Delirium: PINCH ME	Delirium: PINCH ME
Urine Dipstick	X	X	✓	✓if NEGATIVE consider alternative diagnosis	X	X	X
Urine Culture	✓ Always	✓ Risk of antimicrobial resistance	✓ To confirm diagnosis	✓To confirm diagnosis (NOT FOR NEGATIVE DIP)	✓ Always	✓ Always	✓ Always
Immediate antibiotic	✓	✓	✓	✓(NOT FOR NEGATIVE DIP)	✓	✓	✓ Check for catheter blockage AND consider catheter removal or replacement
Delayed antibiotic	X	✓ Mild symptoms	✓Mild symptoms	✓(NOT FOR NEGATIVE DIP) Mild symptoms	X	✓Mild symptoms	✓Mild symptoms. Check for catheter blockage AND consider catheter removal or replacement
Asymptomatic bacteriuria + Antibiotic	✓	X	X	X	X	X	X

Thank You for Listening. Questions…