URINARY TRACT INFECTION: ANTIBIOTIC TREATMENT FOR NON PREGNANT WOMEN

For “Acute Cystitis in Adults” refer to electronic Therapeutic Guidelines Australia [1]:
- Use the search term “cystitis”

For “Acute Pyelonephritis in Adults” refer to electronic Therapeutic Guidelines Australia [2]:
- Use the search term “pyelonephritis”

URINARY TRACT INFECTION IN PREGNANT WOMEN

Screening [3-5]
- Pregnant women with asymptomatic bacteriuria are at higher risk of pyelonephritis and pre-labour premature rupture of membranes
- All women should be offered screening for asymptomatic bacteriuria at 12-16 weeks gestation or first antenatal visit
- Send a midstream urine specimen (dipstick is NOT sufficient to rule out asymptomatic bacteriuria)

Asymptomatic Bacteriuria [3-5]
- Asymptomatic bacteriuria is the presence of greater than 10^8/L bacteria, with no evidence of contamination (contamination is suggested by the presence of epithelial cells or vaginal flora on microscopy)
- Ideally the presence of bacteriuria should be confirmed with a second urine culture, particularly with difficult to treat organisms e.g. multi-resistant bacteria, *Pseudomonas aeruginosa*
- Treat all pregnant women with asymptomatic bacteriuria with antibiotics to prevent pyelonephritis
- Treatment should be based on the susceptibility results. If the isolate is reported susceptible to amoxicillin then PO amoxicillin 250-500mg 8 hourly should be the first choice. Otherwise use an antibiotic listed in table 1
- Standard treatment duration is 5-7 days
• Perform a test of cure midstream urine 7 days (or at least 48 hours) after cessation of antibiotics

• Women with confirmed bacteriuria should have repeat cultures sent at each antenatal visit or monthly to monitor for recurrent bacteriuria. Ongoing prophylaxis for the duration of the pregnancy should be offered to women with persistent bacteriuria after two or more treatment courses (see table 3)

• If group B Streptococcus (GBS) is isolated in urine prophylactic antibiotics must be offered during labour, as GBS bacteriuria indicates high colonisation levels

**Acute Cystitis** [1, 3-5]

• Collect a midstream urine specimen prior to commencement of antibiotic therapy

• Commence an antibiotic listed in table 1

• Standard treatment duration is 5-7 days, but may be extended if there is a slow clinical response or a recurrent episode

• Perform a test of cure midstream urine 7 days (or at least 48 hours) after cessation of antibiotics

• Due to the high risk of recurrence, repeat cultures should be sent at each antenatal visit or monthly to detect and treat bacteriuria. In women at higher risk of recurrence (e.g. history of UTIs, maternal co-morbidities, underlying renal tract abnormality) ongoing prophylaxis should be prescribed after the first UTI for the duration of the pregnancy. Otherwise suppressive therapy should be offered if bacteriuria is found on any follow up culture (see table 3). Postcoital prophylaxis may be used if UTIs are sexually related

• If group B Streptococcus is isolated in urine prophylactic antibiotics must be offered during labour, as GBS bacteriuria indicates high colonisation levels
### Table 1- Antibiotic choices for acute cystitis

**Note**: dose adjustment may be required in renal failure.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dose</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrofurantoin</td>
<td>100mg 12 hourly</td>
<td>Try to avoid close to delivery if another option available as there is a small risk of haemolytic anaemia in the mother and fetus who are G6PD deficient</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>500mg 12 hourly</td>
<td>Considered safe in pregnancy at any trimester, but this is a broad spectrum antibiotic and if possible nitrofurantoin should be used in preference</td>
</tr>
<tr>
<td>Amoxicillin/ clavulanate</td>
<td>500/125mg 12hourly</td>
<td>Generally considered to be safe in pregnancy, but there may be an increased risk of necrotising enterocolitis in the neonate.** This is a broad spectrum antibiotic and if possible nitrofurantoin should be used in preference</td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>300mg 24 hourly</td>
<td>Avoid in the 1st trimester if another option available as there is weak evidence for birth defects, in women who are folate deficient. Give concurrent folic acid 5 mg daily if it is the first trimester of pregnancy and no other oral antibiotic option is available</td>
</tr>
</tbody>
</table>

- Follow up microbiology results and adjust antimicrobial therapy appropriately.
- For multi-drug resistant organisms please contact the on call clinical microbiologist for treatment options.

**The ORACLE trials demonstrated an increased risk of necrotising enterocolitis in women with preterm, premature rupture of membranes (and to a lesser extent those with preterm labour) who received amoxicillin/clavulanate compared to those who did not [6]. A much smaller study also reported an increased risk of necrotising enterocolitis with amoxicillin/clavulanate [7], but a retrospective study of**
ampicillin/sulbactam+amoxicillin/clavulanate compared with cephazolin/cephalexin/erythromycin demonstrated no difference in rates of necrotising enterocolitis [8]. Many expert sources do not suggest avoiding amoxicillin/clavulanate in pregnancy [1-5]

**PYELONEPHRITIS**

- Pyelonephritis is suggested by fever, nausea/vomiting and flank pain, with or without symptoms of cystitis
- All pyelonephritis in pregnancy should be treated with IV therapy initially, irrespective of severity
- Send a midstream urine specimen and, if febrile, a blood culture specimen
- Follow up the microbiology results and change treatment as required
- Switch to oral therapy once patient is afebrile for 48h and has definite clinical improvement
- If there is ongoing fever or symptoms at 48h then send another urine culture and perform an ultrasound of the urinary tract
- Standard treatment duration is a total of 14 days (of both IV and PO therapy), but may be extended e.g. if there is a slow clinical response, renal abscess/nephronia or presence of foreign body (e.g. stent)
- Due to the high risk of recurrence, women with one episode of pyelonephritis should be offered ongoing prophylaxis for the duration of the pregnancy (see table 3)
- A midstream urine may be sent in third trimester to ensure breakthrough bacteriuria has not occurred
- If group B Streptococcus is isolated in urine prophylactic antibiotics must be offered during labour, as GBS bacteriuria indicates high colonisation levels
Table 2- Antibiotic choices for pyelonephritis

<table>
<thead>
<tr>
<th>Antibiotic</th>
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<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftriaxone</td>
<td>1g 24 hourly</td>
<td>Considered safe in pregnancy at any trimester</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does not cover <em>Pseudomonas</em> or <em>Enterococcus</em> species</td>
</tr>
<tr>
<td>Amoxicillin plus gentamicin</td>
<td>Amoxicillin 2g 6 houry Gentamicin 5mg/kg see gentamicin dosing protocol: insert link</td>
<td>Prolonged gentamicin may cause ototoxicity/nephrotoxicity in the woman. All gentamicin use should be reviewed at 72 hours and consider changing to an alternative agent if ongoing IV therapy required [9]</td>
</tr>
<tr>
<td>Piperacillin/tazobactam (Tazocin)</td>
<td>4.5g 8 hourly</td>
<td>2nd line agent. Option for therapy where gentamicin is unsuitable. Considered safe in pregnancy at any trimester</td>
</tr>
</tbody>
</table>

- Follow up microbiology results and adjust antimicrobial therapy appropriately.
- For multi-drug resistant organisms please contact the on call clinical microbiologist for treatment options.

Table 3 - Antibiotic prophylaxis choices

<table>
<thead>
<tr>
<th>Antibiotic</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Nitrofurantoin</td>
<td>50-100mg nocte</td>
<td>Try to avoid close to delivery if another option available as there is a small risk of haemolytic anaemia in the mother and fetus who are G6PD deficient</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>250mg nocte</td>
<td>Considered safe in pregnancy at any trimester, but this is a broad spectrum antibiotic and if possible nitrofurantoin should be used in preference</td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>150mg nocte</td>
<td>Avoid in the 1st trimester if another option available as there is weak evidence for birth defects, in women who are folate deficient. Give concurrent folic acid 5 mg daily if it is the first trimester of pregnancy and no other oral antibiotic option is available</td>
</tr>
</tbody>
</table>

- Follow up microbiology results and adjust antimicrobial therapy appropriately.
- For multi-drug resistant organisms please contact the on call clinical microbiologist for treatment options.
REFERENCES (STANDARDS)


3. Hooton TM. Urinary tract infections and asymptomatic bacteriuria in pregnancy. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA (accessed 15th September 2014).


National Standards – 1- Care provided by the clinical workforce is guided by current best practice

4 Medication Safety

Legislation - Nil
Related Policies - Nil
Other related documents – Gentamicin Dosing and Monitoring

RESPONSIBILITY
Policy Sponsor AMS
Initial Endorsement October 2001
Last Reviewed September 2014
Last Amended
Review date September 2017

Do not keep printed versions of guidelines as currency of information cannot be guaranteed.
Access the current version from the WNHS website.