

Perinatal Practice Guideline

Clinical Guideline

Urinary Tract Infections in Pregnancy

Policy developed by: SA Maternal, Neonatal & Gynaecology Community of Practice

Approved SA Health Safety & Quality Strategic Governance Committee on: 01 March 2017

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Summary The purpose of the Urinary Tract Infections in Pregnancy Perinatal Practice Guideline is to provide clinicians with information and treatment guidelines for recognition and management of urinary tract infections in pregnancy.

Keywords Urinary Tract infections in pregnancy, Perinatal Practice Guideline, bacteriuria, cystitis, pyelonephritis, urinary alkalisers, urinary tract infection, dysuria, urgency, frequency, haematuria, MSSU, UTI, clinical guideline

Policy history Is this a new policy? **N**
Does this policy amend or update an existing policy? **Y v2.0**
Does this policy replace an existing policy? **N**

Applies to All Health Networks
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS

Staff impact All Clinical, Medical, Midwifery, Nursing, Students, Allied Health, Emergency, Mental Health, Pathology

PDS reference CG255

Version control and change history

Version	Date from	Date to	Amendment
1.0	18 May 2010	29 April 2013	Original version
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South Australian Perinatal Practice Guidelines

Urinary Tract Infections in Pregnancy

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Note:

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Explanation of the aboriginal artwork:

The aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the aboriginal culture. The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant women. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.



Australian Aboriginal Culture is the oldest living culture in the world yet Aboriginal people continue to experience the poorest health outcomes when compared to non-Aboriginal Australians. In South Australia, Aboriginal women are 2-5 times more likely to die in childbirth and their babies are 2-3 times more likely to be of low birth weight. The accumulative effects of stress, low socio economic status, exposure to violence, historical trauma, culturally unsafe and discriminatory health services and health systems are all major contributors to the disparities in Aboriginal maternal and birthing outcomes. Despite these unacceptable statistics the birth of an Aboriginal baby is a celebration of life and an important cultural event bringing family together in celebration, obligation and responsibility. The diversity between Aboriginal cultures, language and practices differ greatly and so it is imperative that perinatal services prepare to respectively manage Aboriginal protocol and provide a culturally positive health care experience for Aboriginal people to ensure the best maternal, neonatal and child health outcomes.

Purpose and Scope of PPG

The purpose of this guideline is to provide clinicians with information and treatment guidelines for recognition and management of urinary tract infections in pregnancy.

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Summary of Practice Recommendations

- > Asymptomatic bacteriuria occurs in 2 % to 10 % of all pregnancies. If untreated, up to 30 % of mothers may develop acute cystitis and up to 50 % acute pyelonephritis^{1,2,3}
- > *Escherichia coli* is the most common pathogen associated with asymptomatic bacteriuria (more than 80 % of isolates).
- > Asymptomatic bacteriuria has been associated with low birthweight and preterm birth³
- > Shortest possible antibiotic treatment is associated with better fetal outcomes in asymptomatic bacteriuria or uncomplicated UTI⁹ⁱ
- > Intravenous antibiotic treatment in cases of acute pyelonephritis or acute cystitis should be guided by urine culture and sensitivity reports
- > If the woman is bacteraemic, intravenous antibiotics are recommended for a minimum of 48 hours. A minimum of 10-14 days total antibiotics (IV plus oral), is recommended for pyelonephritis
- > Increase fluid intake (may require intravenous fluids if clinically dehydrated)
- > Monitor urine output to assess complete emptying of the bladder
- > Urinary alkalisers are safe in pregnancy
- > There is no clear consensus in the literature on antibiotic choice or duration of treatment for urinary tract infection^{4,5,6}

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Abbreviations

et al	and others
AB	Asymptomatic bacteriuria
<i>E. coli</i>	<i>Escherichia coli</i>
mg	milligram/s
mL	millilitre/s
MSSU	Mid-stream specimen of urine
UTI	Urinary tract infection

Definitions

Asymptomatic bacteriuria	True bacteriuria (more than 100,000 colony forming units (CFU) / mL) in the absence of specific symptoms of acute urinary tract infection
Symptomatic UTI	Symptomatic UTIs are divided into lower tract (acute cystitis) or upper tract (pyelonephritis) infections
Acute cystitis	Significant bacteriuria with associated bladder mucosal invasion, and is distinguished from asymptomatic bacteriuria by the presence of symptoms such as dysuria, urgency, frequency, nocturia, haematuria and suprapubic discomfort in afebrile women with no evidence of systemic illness ^{1,6}
Pyelonephritis	The identification of at least 100,000 bacteria / mL of a single uropathogen in a midstream specimen of urine (MSSU) culture with associated inflammation of the renal parenchyma, calices and pelvis in the presence of systemic illness. Symptoms include flank or renal angle pain, pyrexia, rigor, chills, nausea and vomiting ^{1,6}

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Urinary Tract Infections in Pregnancy

Background

- > Urinary tract infection may present as asymptomatic bacteriuria, acute cystitis (bladder infection) or pyelonephritis (kidney infection)¹
- > Asymptomatic bacteriuria occurs in 2 % to 10 % of all pregnancies. If untreated, up to 30 % of mothers may develop acute cystitis and up to 50 % acute pyelonephritis^{1,2,3}
- > *Escherichia coli* is the most common pathogen associated with asymptomatic bacteriuria (more than 80 % of isolates). *Staphylococcus saprophyticus* is the second most frequently cultured uropathogen while other Gram-positive cocci, such as group B streptococci, are less common. Other organisms include Gram-negative bacteria such as *Klebsiella*, *Proteus* or other Enterobacteriaceae^{1,2}
- > Asymptomatic bacteriuria has been associated with low birthweight and preterm birth³
- > Obstruction to the flow of urine in pregnancy leads to stasis and increases the likelihood that pyelonephritis will complicate asymptomatic bacteriuria (AB)³
- > Smooth muscle relaxation leads to decreased bladder and ureteral tone and dilatation of the renal pelvis and ureters, which increases bladder volume, urinary stasis, residual volume and vesicoureteric reflux. Differences in urine pH and osmolality and pregnancy-induced glycosuria and aminoaciduria may facilitate bacterial growth
- > Sexual activity can traumatise the urothelium of the distal urethra, resulting in increased bacterial invasion
- > Antibiotic treatment is effective in reducing the risk of pyelonephritis in pregnancy³
- > There is no clear consensus in the literature on antibiotic choice or duration of treatment for urinary tract infection^{4,5,6}

Antenatal screening

- > Routine midstream specimen of urine (MSSU) for all women at 1st visit (booking)

Indications for repeat screening

- > Contaminated specimen
- > History of recurrent infections outside of pregnancy
- > Known and unknown structural abnormality of the urinary tract

Antenatal education

- > Explain that urinary tract infections are common in pregnancy; the risk beginning in week 6 and peaking during weeks 22 to 24
- > If experiencing symptoms (sense of urgency, painful and frequent urination of small volumes, often through straining often with a residual feeling of incomplete emptying), contact their maternity care provider or GP

Risk factors

- > Low socio-economic status
- > Sickle cell trait
- > Diabetes mellitus
- > Neurogenic bladder retention
- > History of previous urinary tract infections
- > Structural abnormality of urinary tract
- > Presence of renal stones

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Diagnosis

- > Quantitative MSSU culture is the only gold standard for diagnosis of ALL suspected urinary tract infections

Asymptomatic bacteriuria

- > More than 100,000 bacteria / mL with less than 20 white cells, generally indicates asymptomatic bacteriuria
- > A bacteria count of more than 100,000, with 2 or more organisms, indicates contamination rather than bacteriuria

Acute cystitis

In addition to MSSU, clinical diagnosis is based on symptoms such as:

- > Dysuria, urinary frequency, strangury
- > Lower abdominal pain or supra-pubic pain without fever
- > Pyuria may also be present

Pyelonephritis

Pyelonephritis usually presents as an acute episode. In addition to midstream MSSU, clinical diagnosis should include:

- > Full maternal clinical history and examination
- > Assessment of fetal wellbeing
- > Blood cultures (aerobic and anaerobic)
- > Low and high vaginal swabs
- > Complete blood count, renal function test including creatinine, urea and electrolytes
- > Urinalysis for proteinuria
- > Women with pyelonephritis often have pyuria or leukocyte casts

Symptoms include:

- > Pyrexia, chills, rigor
- > Flank or renal angle pain
- > Nausea and vomiting
- > Usually dehydration
- > Less commonly dysuria, frequency
- > Fetal tachycardia may also be present

Treatment

- > A five day course of oral antibiotic for uncomplicated UTI or asymptomatic bacteraemia is normally sufficient in pregnant women.
- > Intravenous antibiotic treatment is recommended in all cases of acute pyelonephritis and therapy should be guided by urine culture and sensitivity reports as soon as available.
- > A minimum of 10-14 days total antibiotics (IV plus oral), is recommended for pyelonephritis in the literature including the Therapeutic Guidelines: Antibiotic.
- > If the woman is bacteraemic, intravenous antibiotics are recommended for at least 48 hours. Intravenous antibiotics can be switched to oral antibiotics once the patient is afebrile for a minimum of 24 hours, inflammatory markers are settling, repeat blood cultures are negative and patient is clinically improving. Also seek Infectious Diseases advice. Check if appropriate oral step down options are available.
- > Increase fluid intake (may require intravenous fluids if clinically dehydrated)
- > Monitor urine output to assess complete emptying of the bladder (assists antimicrobial treatment)
- > Urinary alkalisers are safe in pregnancy, however they should not be used in combination with nitrofurantoin as it can result in a loss of treatment efficacy⁹

Asymptomatic bacteriuria (directed therapy based on sensitivities)

E. coli

1. Cephalexin 500 mg oral twice daily for 5 days¹⁰

OR

2. Nitrofurantoin 100 mg oral twice daily for 5 days

OR

3. Trimethoprim 300 mg oral daily for 5 days (avoid in first trimester and in pregnant women with established folate deficiency, low dietary folate intake, or for women taking other folate antagonists)

OR

4. Amoxicillin + clavulanate 500 + 125 mg oral, twice daily for 5 days (if < 20 weeks of gestation)

Note: In view of childhood outcomes – (ORACLE II trial and 7 year follow-up), which showed an associated increase in necrotising enterocolitis, functional impairment (low), and cerebral palsy, it is recommended that amoxicillin / clavulanate is only used if no alternative treatment is available^{11,12}

Staphylococcus saprophyticus

1. Cephalexin 500 mg oral twice daily for 5 days¹⁰

OR

2. Amoxicillin 500mg TDS for 5 days

Pseudomonas

- > Norfloxacin 400 mg oral twice daily for 5 days
- > Repeat MSSU 48 hours after treatment completed

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Group B streptococcus as a single organism

- > Penicillin V 500 mg oral twice daily for 5 days
- > If patients hypersensitive to penicillin (excluding immediate hypersensitivity)
 - > Cephalexin 500 mg oral twice daily 5 days
- > If immediate hypersensitivity to penicillin
 - > Clindamycin 450 mg three times daily for 5 days
- > For further information see 'Neonatal sepsis prevention and treatment (including maternal Group B Streptococcal colonisation)' in the A to Z index at www.sahealth.sa.gov.au/perinatal

Acute cystitis (empiric therapy)

1. Cephalexin 500 mg oral twice daily for 5 days

OR

1. Nitrofurantoin 100 mg oral, 12 hourly for 5 days

OR

2. Amoxicillin + clavulanate 500 + 125 mg oral, twice daily for 5 days (if < 20 weeks of gestation)

Note: In view of childhood outcomes – (ORACLE II trial and 7 year follow-up), which showed an associated increase in necrotising enterocolitis, functional impairment (low), and cerebral palsy, it is recommended that amoxicillin / clavulanate is only used if no alternative treatment is available^{11,12}

OR

3. Trimethoprim 300 mg oral daily for 5 days (avoid in first trimester and in pregnant women with established folate deficiency, low dietary folate intake, or for women taking other folate antagonists)

- > Repeat MSSU at least 48 hours after completion of treatment

Pyelonephritis

- > Admit for antimicrobial treatment for a minimum of 48 hours intravenous therapy
- > Dehydration is common. Administer intravenous fluids and monitor urine output
- > Cooling blankets and antipyretics to alleviate pyrexia as required
- > Monitor for signs of preterm labour and treat accordingly (For further information see 'Preterm labour' in the A to Z index at www.sahealth.sa.gov.au/perinatal)
- > Parenteral treatment should be continued until the woman is afebrile for a minimum of 24 hours

1. Amoxicillin 2 g intravenous every 6 hours

AND

Gentamicin 5 mg/kg (for further information see 'Peripartum prophylactic antibiotics' in the A to Z index at www.sahealth.sa.gov.au/perinatal)

Note: These are the recommended antibiotics

OR

2. Ceftriaxone 1 g intravenously once a day

Note: Does not provide cover for pseudomonas, enterococcus, staphylococcal infections or ESBL organisms

Note: In women with anaphylactic penicillin allergy consult Infectious Diseases for advice

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As soon as clinically indicated based on susceptibilities switch to oral antibiotics:

1. Cephalexin 500 mg oral every 6 hours for 10 days

OR

2. Trimethoprim 300 mg oral once a day for 10 days (avoid in first trimester and in pregnant women with established folate deficiency, low dietary folate intake, or for women taking other folate antagonists)

OR

3. Amoxicillin + clavulanate 500 + 125 mg oral twice daily for 10 days (if < 20 weeks of gestation)

Note: In view of childhood outcomes – (ORACLE II trial and 7 year follow-up), which showed an associated increase in necrotising enterocolitis, functional impairment (low), and cerebral palsy, it is recommended that amoxicillin / clavulanate is only used if no alternative treatment is available^{11,12}

Recurrent infections

- > Treat according to bacterial sensitivity
- > Repeat MSSU at every visit
- > Exclude urinary tract anomalies

Antibiotic prophylaxis

Indicated after 2 or more documented separate episodes of cystitis or single episode of pyelonephritis

- > Nitrofurantoin 50 mg oral at night
 - > Caution should be exercised when administering nitrofurantoin at term, or with possible preterm birth, because of the possibility of producing haemolytic anaemia in patients with glucose-6-phosphate dehydrogenase (G6PD) deficiency and due to immature enzyme systems in the early neonatal period

OR

- > Cephalexin 250 mg oral at night

OR

- > Trimethoprim 150 mg oral at night (avoid in first trimester and in pregnant women with established folate deficiency, low dietary folate intake, or for women taking other folate antagonists)

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Useful website

Managing bacterial urinary tract infection in adults. Patient booklet. Available from URL: <http://www.sign.ac.uk/pdf/pat88.pdf>

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