

Antenatal Screening for Asymptomatic Bacteriuria

Guidelines	Level of evidence	References
Early in pregnancy, all women should be given appropriate written information about this test and be given an opportunity to discuss it with their midwife or doctor.	IV	14a
All pregnant women should be offered screening for Asymptomatic Bacteriuria (ASB) at 12-16 weeks gestation or at booking.	III - 2	9a - 13a 1a, 15a, 16a
It is recommended that a midstream urine (MSU) sample be sent for microscopy, culture and sensitivity.	III - 2	5a-10a
When ASB is detected it should be treated to improve outcomes with respect to pyelonephritis, pre-term birth and low birth weight	I	3,4
Good Practice Notes		
Women may also need to be screened for chronic renal disease (CRD) using dipstick testing, as CRD will not be picked up by culture alone.		
Evidence suggests it is cost effective to screen women using MSU, microscopy and culture.	IV	1

Aim

The aim of these guidelines is to assist midwives and doctors in the detection of asymptomatic bacteriuria in pregnant women and decrease associated outcomes of urinary tract infections, pre-term birth and low birth weight in infants.

Introduction

The 3 Centres Collaboration contracted the Royal Women's Hospital (RWH) Clinical Practice Improvement Unit to conduct a comprehensive search and critical appraisal of publications addressing the topic of antenatal screening for asymptomatic bacteriuria published between January 2000 and March 2005, to inform the proposed review of the 2001 3 Centres Consensus Guidelines on Antenatal Care.

Asymptomatic bacteriuria (ASB) is the persistent bacterial colonisation of the urinary tract without urinary tract symptoms. Studies conducted in the USA state the incidence of ASB is between 2 and 10 %, higher among women of lower socio-economic status. In the United Kingdom, studies report incidence between 2 and 5 % of pregnant women¹.

If untreated, ASB can lead to serious episodes of acute urinary tract infection later in the pregnancy, as well as to pre-term birth and low birth weight in infants. The prevalence of infection is most closely dependent on socioeconomic status and is similar in both pregnant and non-pregnant women .

In 1992 meta-analyses of 19 studies showed that mothers with asymptomatic bacteriuria had a 54 % higher risk of having a low birth weight infant and twice the risk of low birth weight. High level evidence indicates that antibiotic prophylaxis of asymptomatic bacteriuria reduces the risk of pyelonephritis, pre-term delivery and low birth weight .

Research questions addressed

1. Does routine screening for asymptomatic bacteriuria during

pregnancy (and treatment of those found to be positive) result in improved outcomes (less urinary tract infections, preterm birth and low birth weight) compared with no screening?

2. In pregnant women, which method is more accurate at detecting asymptomatic bacteriuria – dipstick reagent testing or laboratory culturing of a voided MSU specimen?
3. Is it more cost effective to screen women for asymptomatic bacteriuria using dipstick reagent testing or laboratory culturing of a voided MSU specimen?
4. Is it more effective to screen for asymptomatic bacteriuria (by the most effective detection method) at booking or only in later pregnancy (after 26 weeks) in terms of urinary tract infections, preterm birth and low birth weight?

Evidence

1. **Does routine screening for asymptomatic bacteriuria during pregnancy (and treatment of those found to be positive) result in improved outcomes (less urinary tract infections, preterm birth and low birth weight) compared with no screening?**

The incidence of ASB in pregnancy is 6%.⁵ Untreated in pregnancy, ASB risks include pyelonephritis (20%) and preterm birth (10%). Compared with no screening, routine screening for ASB in pregnancy appears to result in improved outcomes of 40% reduced risk of preterm delivery or low-birth weight babies, and 80% reduced risk of development of pyelonephritis. Long-term outcomes have not been thoroughly investigated. This evidence is primarily drawn from existing guidelines.^{1,2} More recent evidence raises concerns regarding the number needed to treat where there is improved perinatal care. Additional concerns are that treatment may be altering the profile of microbiosis.

Recommendation (Grade A)

The routine screening for ASB during pregnancy and treatment of those found to be positive is recommended to improve outcomes with respect to less urinary tract infections, preterm birth and low birth weight.

2. **In pregnant women, which method is more accurate at detecting asymptomatic bacteriuria – dipstick reagent testing or laboratory culturing of a voided MSU specimen?**

Culture of voided MSU specimen remains the gold standard for detecting ASB in pregnancy. The drawbacks of urine culture include delay in result availability and cost. Advantages include being able to identify causative organisms and ability to determine antibiotic sensitivities.¹

Reagent strip testing will detect 50% of women with ASB, and uriscreeen (enzymatic test) will detect 60%^{1,8}. The specificity of reagent strip testing of 90% is reassuring in that only 10% of women without ASB will require confirmatory testing with urine culture of a MSU specimen.⁷

Therefore evidence suggests that dipstick testing is a reasonable method of exclusion of ASB as the specificity and negative predictive value in low risk women appears to be in excess of 90%. However, culture remains the gold standard, and should definitely be performed if dipstick testing is positive.

Recommendation (Grade B-C)

Laboratory culturing of a voided MSU specimen is more accurate at detecting ASB in pregnant women. However, this recommendation should consider the cost and time which may make dipstick reagent testing or enzymatic testing more attractive options for routine screening for ASB in pregnancy.

3. **Is it more cost effective to screen women for asymptomatic bacteriuria using dipstick reagent testing or laboratory culturing of a voided MSU specimen?**

It is more cost effective to screen women for ASB, with respect to prevention of preterm

delivery, by midstream urine specimen culture. Laboratory culture appears to be more cost effective than dipstick reagent testing due to the poor sensitivity of the dipstick reagent testing of 50%.¹

Recommendation (Grade C)

It is more cost effective to screen women for ASB with respect to prevention of preterm delivery using laboratory culture rather than dipstick reagent testing.

4. **Is it more effective to screen for asymptomatic bacteriuria (by the most effective detection method) at booking or only in later pregnancy (after 26 weeks) in terms of urinary tract infections, preterm birth and low birth weight?**

Guidelines continue to recommend screening for ASB at 12-16 weeks gestation based on historical evidence. The evidence for this is not explicit. The only relevant new citation identified found that testing prior to 20 weeks gestation missed over half ASB cases and recommended a culture in each trimester for the greatest detection of ASB. The detection rate for ASB is improved 2-fold with testing each trimester.¹³

This raises issues related to cost, which have not been specifically evaluated in the literature.

Recommendation (C)

The 3 Centre Collaboration reaffirms the existing guidelines which recommend screening at 12-16 weeks gestation.

Methods of Search and Appraisal

Search strategy

- Guidelines developed by specific Colleges of Obstetricians and Gynaecologists were searched including:
 - Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG)
 - Royal College of Obstetricians and Gynaecologists (RCOG),
 - and

Society of Obstetricians and Gynaecologists Canada (SOGC).

- Guidelines developed by other groups were searched for via the internet, on the:
 - United States National Guidelines Clearinghouse, and
 - TRIP database.
- The OVID interface was used to search the following electronic databases:
 - MEDLINE: 2003 – January 2005
 - CINAHL: 2003 – January 2005
 - EBM Reviews: June 2003 – January 2005
- Cochrane Database: 2005 Issue 1
- Review of article citations and Cochrane Library references for additional citations

Search terms

Terms used to identify relevant citations are outlined in Appendix I. In summary, the search was conducted using and combining terms for:

Asymptomatic bacteriuria / urinary tract infection
Pregnancy
Urinalysis
Cost effectiveness
Screening

Initial search

Three guidelines were retrieved. The AGREE tool was applied by the project team and as a result the first two were included as key citations.

- Royal College of Obstetricians and Gynaecologists (RCOG). Clinical Guideline: Antenatal care: routine care for the healthy pregnant woman¹.
- United States Preventive Services Task Force (USPSTF). Recommendation statement: Screening for Asymptomatic Bacteriuria².
- Institute for Clinical Systems Improvement (ICSI). Health Care Guideline: Routine prenatal care.

Key citation selection

The 71 citations identified in the initial search were triaged into those:

- Possibly containing relevant evidence or authoritative opinion (29 citations), and
- Unlikely to contain relevant evidence or authoritative opinion (42 citations). These citations were either too general or not relevant to the topics to be addressed and were not considered further.

The 29 citations were retrieved and further screened to identify those studies with respect to quality of methodology and relevance to Australian obstetric practice. As a result of this exercise 14 articles were classified as key citations, and were subjected to systematic critical appraisal by the project team and those not meeting the criteria were discarded.

The evidence within these 14 key citations fell into the following levels:

- Level I evidence: 2 publications (one included in the original literature review)
Level II evidence: 0 publications,
Level III evidence: 8 publications, and
Level IV evidence: 4 publications.

References

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- 1a. *Smaill F. Antibiotics for asymptomatic bacteriuria in pregnancy. The Cochrane Library Issue 3, 2000. (Level I)
2. United States Preventive Services Task Force (USPSTF) Screening for asymptomatic bacteriuria: recommendation statement Rockville (MD): Agency for Healthcare Research and Quality (AHRQ) 2004. (Level IV)
- 2a. Romero R, Oyarzun E, Mazor M, Sirtori M, Hobbins JC, Bracken M. Meta-analysis of the relationship between asymptomatic bacteriuria and preterm delivery/low birth weight. *Obstetrics and Gynaecology* 1989; 73: 576-582. (Level I)
3. *Smaill F. Antibiotics for asymptomatic bacteriuria in pregnancy. *The Cochrane Database of Systematic Reviews* 2001, Issue 2. Art. No CD000490. DOI: 10.1002/14651858. CD000490. (Level I)
- 3a. Mittendorf R, Williams MA, Kass EH. Prevention of preterm delivery and low birth weight associated with asymptomatic bacteriuria. *Clin Inf Diseases* 1992;14(4):927-932. (Level I)
4. +Villar J, Widmer M, Lydon-Rochelle MT et al. Duration of treatment for asymptomatic bacteriuria during pregnancy. *The Cochrane Database of Systematic Reviews* 2000, Issue 2. Art. No CD000491. DOI: 10.1002/14651858. CD000491. (Level I)
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- in urine specimens from pregnant women. *Journal of Clinical Microbiology* 2004;42(8):3834-6. (Level III-2)
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- Note: **References with an "a" are original 2001 references**
***Reference identified in 2001 and 2005**
+Reference identified in 2001 and 2005