Urinalysis by Dipstick for Proteinuria

Guideline	Level of evidence	New references
Early in pregnancy all women should be offered appropriate written information about urine testing and be given an opportunity to discuss it with their midwife or doctor	IV	11a
There is no evidence to support routine dipstick screening for proteinuria in **LOW RISK** pregnant women.	IV	4, 2a, 4a -6a
Assessment of proteinuria for women who are hypertensive requires estimation of total protein in a 24-hour collection of urine (gold standard) or further testing via a spot albumin/creatinine ratio.	IV	1, 2, 10, 14,15,16, 17 1a, 2a, 4a, 9a
Good Practice Notes		
Where differentiation between high risk and low risk women is impractical in a busy multi risk clinic, it is acceptable practice to screen all women for proteinuria by dipstick.		
If a woman has hypertension or other risk factors present then urinalysis by dipstick for proteinuria should be included in her care.		9, 10
Screening for chronic renal disease is best done by the use of multi-stick testing of urine at the first antenatal visit. (Note also the 3 Centres guideline on Screening for Asymptomatic Bacteriuria)		19
Women may be taught to test their own urine.	III-2	20

Aim

The aim of these guidelines is to assist midwives and doctors in their decisions about methods to detect pre-eclampsia, chronic renal disease and urinary tract infections.

This guideline should be read in conjunction with the guideline for antenatal screening for asymptomatic bacteriuria.

Introduction

In Australia, analysis of urine by dipstick for proteinuria is one of the most common antenatal tests, usually performed at every antenatal visit. Proteinuria may be used to screen for asymptomatic urinary infection, renal disease and pre-eclampsia. The presence of proteinuria is central to the diagnosis of pre-eclampsia in a hypertensive pregnancy and a component of classification systems for hypertensive disorders in pregnancy. Hypertension with proteinuria is associated with an increased rate of fetal growth restriction, perinatal mortality and poorer maternal prognosis. The gold standard for assessing proteinuria is laboratory biochemical measurement of total protein excretion over 24 hours. However, this method is unsuitable for use as a universal-screening tool. The most commonly employed method for screening for proteinuria is dipstick urinalysis of a randomly voided specimen.

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

The new evidence was discussed by the Guideline Advisory Group and a new draft guideline produced. The Guideline Advisory Group, an expert multidisciplinary group, was appointed by the 3 Centres Steering Group to review the evidence produced by the CPIU, debate issues and to draft guidelines. Members of the Guideline Advisory Group were: 3 midwives, 3 obstetricians, 2 consumers and a general practitioner from a rural practice. Guidelines drafted by the Guideline Advisory group were approved by the 3 Centres Steering Group.

Research Questions Addressed

1. Does the practice of testing urine for increased proteinuria by dipstick lead to better detection of pre-eclampsia, other hypertensive disorders and chronic renal disease than not testing urine (by dipstick) at all?

2. Does the practice of testing urine (for increased proteinuria) by dipstick throughout pregnancy lead to better detection of pre-eclampsia, other hypertensive disorders and chronic renal disease than no further urinalysis until after 26 weeks?

3. Does the practice of women interpreting the results of their dipstick testing lead to worse outcomes (detection of pre-eclampsia, hypertension and chronic renal disease) than if carers interpret the results?

4. Does the practice of women interpreting the results of their dipstick testing lead to better satisfaction with care or perceptions of the procedure than if carers interpret the results?

Evidence

1. Does the practice of testing urine for increased proteinuria by dipstick lead to better detection of pre-eclampsia, other hypertensive disorders and chronic renal disease than not testing urine (by dipstick) at all?

The Australasian Society for the Study of Hypertension in Pregnancy (ASSHP) Consensus statement[1] and the Royal College of Obstetricians and Gynaecologists (RCOG) guidelines[2] state that dipstick for proteinuria is a screening test only with very high false positive rates and recommend that dipstick proteinuria should always be confirmed with either 24 hour urine collection or spot protein creatinine ratio. In addition, RCOG

comment that the considerable observer error in dipstick urinalysis for proteinura can be overcome by automated readers with significantly improved false positive and false negative rates.[2,10]
The RCOG Evidence Based Guidelines for Antenatal Care[3] recommend routine dipstick urinalysis for protein at every antenatal assessment where blood pressure is taken, but conclude that further research is required to determine the role of screening for proteinuria.

In a 1995 US study, Gribble et al examined the routine use of the dipstick test in antenatal care and subsequent outcome in 3,217 low risk women. They found no statistically significant differences in the rates of pregnancy associated hypertension, fetal distress, or neonatal outcomes in those with absent, mild or marked proteinuria by dipstick. The authors concluded that the test provided no clinically important information regarding pregnancy outcome when used in a low risk population[3a] .

One significant 2002 Australian study conducted by Murray, Homer et al, evaluated the outcomes for 1000 antenatal women with routine dipstick urinalysis throughout pregnancy. They concluded that in the absence of hypertension routine dipstick urinalysis during pregnancy did not result in better detection of pre-eclampsia. Six women developed proteinuria prior to development of hypertension, half of whom had recognized risk factors for pre-eclampsia. They comment that their study was underpowered for significant maternal and perinatal outcomes but question the benefit of the detection of 3/1000 with proteinuria in whom pre-eclampsia would be diagnosed at a subsequent antenatal visit[4].

Murphy and Redman comment that this potentially leaves proteinuria undetected for up to 4 weeks between antenatal visits and reinforces the need for randomized controlled data powered to detect relevant maternal and perinatal outcomes[5].

Regarding the detection of chronic renal disease, an Australian population study by Chadban revealed a prevalence of 16% in a non-pregnant mix-gender cohort[6]. No evidence was identified to support routine screening in young adults for proteinuria to detect chronic renal disease[7]. In addition, Boulware found it is not cost effective to screen for chronic renal disease in a low risk population[8]. The CPIU team noted there was a lack of studies specifically relating to pregnant women and screening for renal disease.

There are two studies that support dipstick urinalysis to detect proteinuria when hypertension has been diagnosed[9, 10].

There is a significant correlation between a formal 24 hour total protein excretion and 2 hour urinary protein quantification[11, 12].

Recommendations (Grade B)

- Further studies are required to specifically answer this question.
- There may be improved detection of chronic renal disease, but this is not supported by evidence of improved outcomes (maternal, perinatal or cost).
- Dipstick for proteinuria in the presence of hypertension appears to be of benefit in detection of pre-eclampsia. There are cost and safety concerns for routine dipstick testing otherwise.

2. Does the practice of testing urine (for increased proteinuria) by dipstick throughout pregnancy lead to better detection of pre-eclampsia, other hypertensive disorders and chronic renal disease than no further urinalysis until after 26 weeks?

The evidence is not conclusive. When dipstick urinalysis for proteinuria is undertaken at the first antenatal assessment there is a possibility of improved detection of chronic renal disease[19].

Recommendation (Grade B)
Further studies are required to ascertain the value of routine dipstick urinalysis for proteinuria prior to 26 weeks gestation.

3. Does the practice of women interpreting the results of their dipstick testing lead to worse outcomes (detection of pre-eclampsia, hypertension and chronic renal disease) than if carers interpret the results?

One recent study concludes women interpreting the results of their dipstick urinalysis have an equivalent false negative and higher false positive detection rate than of dedicated midwifery / nursing staff performing the same test. However, the authors suggest women self testing of urine during the antenatal phase can be:

- practicable
- easily implemented
- taught to women using verbal instructions at their first antenatal clinic visit
- less confusing for women if the dipstick tests only for protein (not a multiple analysis dipstick), and
- checked or retested by a trained member of staff if there is significant proteinuria (1+ or more) [20].

There is no evidence regarding outcomes for mother and baby.

Recommendation (Grade B)
There is insufficient evidence to not support a guideline for women to self-test.

4. Does the practice of women interpreting the results of their dipstick testing lead to better satisfaction with care or perceptions of the procedure than if carers interpret the results?

There is no new evidence to support or discourage the practice of women interpreting their own urine dipstick results in terms of perceptions of care.

Methods of Search and Appraisal

Search strategy

- The OVID interface was used to search the following electronic databases:
  - MEDLINE: 2000 – January 2005
  - CINAHL: 2000 – January 2005
  - EBM Reviews: June 2000 – January 2005
- Cochrane Database: 2005 Issue 1
- Review of article citations and Cochrane Library references for additional citations
- 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)
  - Society of Obstetricians and Gynaecologists Canada (SOGC), and
  - American College of Obstetricians and Gynecologists.
- Guidelines developed by other groups were searched for via the internet, on the:
  - United States National Guidelines Clearinghouse, and
  - TRIP database.

Search terms

The search was conducted in three sections:

- Pregnancy/antenatal
- Dipstick
- Satisfaction

The initial search retrieved 125 citations and 8 guidelines.
These citations were triaged into those:

- Possibly containing relevant evidence or authoritative opinion (48 publications – Appendix III), and
- Unlikely to contain relevant evidence or authoritative opinion (85 publications). These were not considered further.

The abstracts and publications from the 48 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 20 articles were classified as key citations, and were subjected to systematic critical appraisal by the Project Team (Appendix IV).

The evidence within these 20 key citations fell into the following levels (see Appendix IV for definitions):

- Level I evidence: 0 publications
- Level II evidence: 0 publications
- Level III evidence: 15 publications
- Level IV evidence: 3 publications, and
- One letter

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