Review: point of care dipstick urinalysis has low accuracy for detecting proteinuria in pregnancy

Waugh JJ, Clark TJ, Divakaran TG, *et al.* Accuracy of urinalysis dipstick techniques in predicting significant proteinuria in pregnancy. *Obstet Gynecol* 2004;**103**:769–77.

Clinical impact ratings FP/GP/Obstetrics ★★★★★★☆ Obstetrics ★★★★★☆☆

Q In pregnant women, is urinalysis at the point of care accurate for detecting proteinuria?

METHODS

Data sources: Medline and EMBASE/Excerpta Medica (1970 to Feb 2002); Cochrane Library; hand searches of *British Journal of Obstetrics and Gynaecology*, *American Journal of Obstetrics and Gynecology*, and *Obstetrics and Gynecology*; reference lists; and contact with experts and manufacturers of urinalysis equipment.

Study selection and assessment: cross-sectional studies that compared a point of care test with a laboratory assay for urine protein in pregnant women. Studies were rated for quality by using a published hierarchy of evidence (level 1 = highest quality).

Outcomes: diagnostic accuracy (summary likelihood ratios).

MAIN RESULTS

7 studies (1841 pregnant women) met the selection criteria. The studies were rated as follows (from best to worst): level 1 (3 studies), 2 (1 study), 3 (1 study), 4 (1 study), and 5 (1 study). 6 studies used the same dipsticks for visual testing (Multistix; Bayer Corporation, Elkhart, IN), and 1 study used a Boehringer dipstick (Boehringer-Mannheim; Mannheim, Germany). The table shows the results for detecting 300 mg/24 hour proteinuria at the ⩾1 + threshold.

CONCLUSION

In pregnant women, urinalysis at the point of care is not accurate for detecting proteinuria.

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Commentary

Pre-eclampsia is characterised by the triad of hypertension, oedema, and proteinuria > 300mg/24 hours. Because of the difficulties in obtaining complete 24 hour collections, point of care dipstick urinalysis is frequently used as a screening tool. In this systematic review, Waugh *et al* make a convincing argument that this approach lacks the accuracy to be used in routine patient care. This excellent review (which addressed a focused question, used appropriate search techniques, and defined appropriate inclusion criteria) is consistent with previous research[1 2] showing that urinary dipstick protein tests are not sufficiently accurate.

Are there potential alternatives to the gold standard 24 hour collection? One is shorter time frames. Comparisons of 8, 12, and 24 hour urine collections show that the 8 hour sample correlates well with 24 hour samples in patients with proteinuria but not in those without, while 12 hour samples correlated significantly with the 24 hour results for patients with no, mild, or severe proteinuria.[3] However, even these collections have a cumbersome time requirement. Sadly, the comparison of 2 and 24 hour urine collections in patients with a dipstick reading ⩾1+ shows only a modest correlation.[4] Another potential and more practical alternative is measuring protein:creatinine ratios of spot urine samples. A study in which 138 women had random protein:creatinine ratios compared with 24 hour urine collection suggested that cut points could be found that would rule out or rule in proteinuria with moderate accuracy.[5] A similar study found the same results.[6] In contrast, other data[7] did not support the use of the protein:creatinine ratio as a screening tool, so this promising test is not yet ready.

The poor operating characteristics of dipstick urinalysis in detecting proteinuria found in this study, together with lack of evidence for an alternative diagnostic approach, mean physicians will need to rely on 24 hour urine protein determinations in hypertensive pregnancies and communicate the importance of accurate collections to their patients.

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Summary estimates of the diagnostic accuracy of point of care dipstick urinalysis for detecting proteinuria*

Level of urine dipstick (number of studies)	Pooled estimates			
	Sensitivity (95% CI)	Specificity (CI)	+LR	−LR
⩾1+ (visual) (6)	55% (37 to 72)	84% (57 to 95)	3.5 (1.7 to 7.3)	0.60 (0.45 to 0.80)
⩾1+ (automatic) (1)	82% (71 to 90)†	81% (71 to 89)†	4.3 (2.8 to 6.6)	0.22 (0.14 to 0.36)

*Reference standard cut point was 300 mg/24 hours. Diagnostic terms defined in glossary.