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Sources Searched: Medline, Embase, CINAHL.

Urinary Dipstick Testing

Summary Points:

- [Urine dipstick has low sensitivity for diagnosis of bacteriuria or UTI in pregnant women](#)
- [Visual dipstick testing cannot rule in or exclude threshold level proteinuria in women during pregnancy](#)
- **False positive dipstick results suggesting "significant" proteinuria are common and may be due to:**
 - alkaline urine (for example, due to urinary tract infection or quaternary ammonium compounds that alter pH of urine)
 - penicillin, sulfonamides, bilirubin, or other compounds that may color the urine
 - dehydration
 - exercise
 - high urine specific gravity
 - contamination with vaginal secretions, pus, or semen
- **false negative results with reagent strips may occur with:**
 - excessive hydration
 - urine proteins other than albumin (for example, Bence-Jones proteins, light chain proteins, heavy chain proteins)
- [With point-of-care urine dipstick analysis, significant proteinuria cannot be accurately detected or excluded with a 1+ threshold and is not recommended for diagnosing pre-eclampsia.](#)
- [If an automated reagent-strip reading device is used to detect proteinuria and a result of 1+ or more is obtained, use a spot urinary protein:creatinine ratio or 24-hour urine collection to quantify proteinuria.](#)

Quantifying Proteinuria in Hypertensive Disorders of Pregnancy

Author(s): Amin S.V.; Illipilla S.; Hebbar S.; Rai L.; Kumar P.; Pai M.V.

Source: International Journal of Hypertension; 2015; vol. 2014

Publication Date: 2015

Available in full text at [International Journal of Hypertension](#) - from National Library of Medicine

Abstract:Background. Progressive proteinuria indicates worsening of the condition in hypertensive disorders of pregnancy and hence its quantification guides clinician in decision making and treatment planning. Objective. To evaluate the efficacy of spot dipstick analysis and urinary protein-creatinine ratio (UPCR) in hypertensive disease of pregnancy for predicting 24-hour proteinuria. Subjects and Methods. A total of 102 patients qualifying inclusion criteria were evaluated with preadmission urine dipstick test and UPCR performed on spot voided sample. After admission, the entire 24-hour urine sample was collected and analysed for daily protein excretion. Dipstick estimation and UPCR were compared to the 24-hour results. Results. Seventy-eight patients (76.5%) had significant proteinuria of more than 300 mg/24 h. Dipstick method showed 59% sensitivity and 67% specificity for prediction of significant proteinuria. Area under curve for UPCR was 0.89 (95% CI: 0.83 to 0.95, $P < 0.001$) showing 82% sensitivity and 12.5% false positive rate for cutoff value of 0.45. Higher cutoff values (1.46 and 1.83) predicted heavy proteinuria (2 g and 3 g/24 h, resp.). Conclusion. This study suggests that random urinary protein: creatine ratio is a reliable investigation compared to dipstick method to assess proteinuria in hypertensive pregnant women. However, clinical laboratories should standardize the reference values for their setup. Copyright © 2014 Sapna V. Amin et al.

Database: EMBASE

Urinary protein-to-creatinine ratio in pregnant women after dipstick testing: Prospective observational study

Author(s): Baba Y.; Ohkuchi A.; Yamada T.; Minakami H.; Obata-Yasuoka M.; Hamada H.; Yasuda S.; Fujimori K.; Ohno Y.; Kawabata K.; Kataoka S.; Minakawa S.; Kudo Y.; Hirai C.; Itakura A.; Kusaka H.; Maeda M.; Murabayashi N.; Ikeda T.; Inde Y.; Nakai A.; Nagura M.; Sagawa N.

Source: BMC Pregnancy and Childbirth; Dec 2015; vol. 15 (no. 1)

Available in full text at [BMC Pregnancy and Childbirth](#) - from ProQuest

Abstract:Background: The dipstick test is widely used as a primary screening test for detection of significant proteinuria in pregnancy (SPIP). However, it often shows a false positive test result. This study was performed to determine which pregnant women should be recommended to undergo determination of urinary protein-to-creatinine ratio (mg/mg, P/Cr test) after dipstick test for confirmation of SPIP. Methods: This was a multicenter, prospective, and observational study of 2212 urine specimens from 1033 pregnant women who underwent simultaneous dipstick and P/Cr tests in the same spot urine samples at least once. SPIP was defined as $P/Cr > 0.27$. Preeclampsia was diagnosed in women with both hypertension and SPIP. Results: Preeclampsia, hypertension alone, and SPIP alone developed in 202 (20%), 73 (7.1%), and 120 (12%) women, respectively. Creatinine concentration [Cr] varied greatly, ranging from 8.1 to 831mg/dL in the 2212 urine samples. Rate of positive dipstick test results increased with increasing [Cr], while SPIP prevalence rate was lower in urine samples with higher [Cr], yielding higher false positive rates in samples with higher [Cr]. Postpartum urine samples had significantly lower [Cr] compared to those obtained antepartum (60 [8.7-297] vs. 100 [10-401] mg/dL, respectively). At the first P/Cr test among women with similar dipstick test results, the risk of having SPIP was consistently and significantly higher for hypertensive women than for normotensive women at any dipstick test result: 18% (14/77) vs. 3.2% (8/251), 47% (26/55) vs. 8.7% (37/425), 91% (82/90) vs. 59% (44/75) for negative/equivocal, 1+, and > 2+ test

results, respectively. The risk of SPIP was 16% (9/55) for normotensive women when two successive antenatal urine samples showed a dipstick test result of 1 + . Conclusions: For prediction of SPIP, the dipstick test was more likely to show a false positive result in concentrated urine samples with higher [Cr]. Hypertensive women with > 1+ as well as normotensive women with > 2+ on dipstick test should be advised to undergo the P/Cr test. Copyright © 2015 Baba et al.

Database: EMBASE

Urinary Dipstick Proteinuria Testing: Does Automated Strip Analysis Offer an Advantage Over Visual Testing?

Author(s): De Silva D.A.; Halstead A.C.; Sabr Y.; von Dadelszen P.; Cote A.-M.; Magee L.A.

Source: Journal of Obstetrics and Gynaecology Canada; 2014; vol. 36 (no. 7); p. 605-612

Publication Date: 2014

Abstract:Objective: To compare the diagnostic test properties of automated and visually read urine dipstick screening for detection of a random protein:creatinine ratio (PrCr) > 30 mg/mmol Methods: Urine samples were collected prospectively from 160 women attending high-risk maternity clinics at a tertiary care facility. Samples were divided into two aliquots; one aliquot was tested using two different urine test strips, one read visually and one by an automated reader. A second aliquot of the same urine was analyzed for urinary protein and creatinine. Performance of visual and automated dipstick results (proteinuria > 1 +) were compared for detection of PrCr. > 30 mg/mmol using non-dilute urine samples (urinary creatinine > 3 mmol/L). Results: Both urine test strips showed low sensitivity (visual 56.0% and automated 53.8%). Positive likelihood ratios were 15.0 for visual dipstick testing (95% CI 5.9 to 37.9) and 24.6 for automated (95% CI 7.6 to 79.6). Negative likelihood ratios were 0.46 for visual dipstick testing (95% CI 0.29 to 0.71) and 0.47 for automated (95% CI 0.31 to 0.72). Conclusion: Automated dipstick testing was not superior to visual testing for detection of proteinuria in pregnant women in a primarily outpatient setting. Sensitivity may depend on the test strips and/or analyzer used. Copyright © 2014 Society of Obstetricians and Gynaecologists of Canada.

Database: EMBASE

Problems in methods for the detection of significant proteinuria in pregnancy

Author(s): Yamada T.; Kojima T.; Akaishi R.; Ishikawa S.; Takeda M.; Kawaguchi S.; Nishida R.; Morikawa M.; Minakami H.

Source: Journal of Obstetrics and Gynaecology Research; Jan 2014; vol. 40 (no. 1); p. 161-166

Publication Date: Jan 2014

Available in full text at [Journal of Obstetrics and Gynaecology Research](#) - from John Wiley and Sons

Abstract:Aim: The aim of this study was to underscore problems associated with the dipstick test and determination of protein concentration alone in spot-urine (P-test) compared with spot-urine protein-to-creatinine ratio (P/Cr test) and to determine whether urine collection for 24-h test was complete. Material and Methods: Dipstick and P/Cr tests were performed simultaneously in 357 random spot-urine specimens from 145 pregnant women, including 35 with pre-eclampsia. Positive results were defined as >1+ on dipstick test, protein concentration >30 mg/dL on P-test, and P/Cr ratio >0.27 (mg/mg) on P/Cr test. Sixty-four 24-h urine tests (quantification of protein in urine collected during 24 h) were performed in 27 of the 145 women. We assumed that P/Cr ratio > 0.27 predicted significant proteinuria (urinary protein > 0.3 g/day). The 24-h urine collection was considered incomplete when urinary creatinine excretion was 25.0 mg/kg/day. Results: Forty-four percent (69/156) of specimens with a positive test result on dipstick test contained protein 0.27,

respectively. Incomplete 24-h urine collection occurred in 15.6% (10/64) of 24-h urine tests. Daily urinary creatinine excretion was 702-1397 mg, while creatinine concentration varied from 16 mg/dL to 475 mg/dL in spot-urine specimens. Conclusion: Dipstick test and P-test were likely to over- and underestimate risks of significant proteinuria, respectively. The 24-h urine collection was often incomplete. © 2013 Japan Society of Obstetrics and Gynecology.

Database: EMBASE

Detection of proteinuria in pregnancy: Comparison of qualitative tests for proteins and dipsticks with urinary protein creatinine index

Author(s): Saxena I.; Kapoor S.; Gupta R.C.

Source: Journal of Clinical and Diagnostic Research; Sep 2013; vol. 7 (no. 9); p. 1846-1848

Publication Date: Sep 2013

Available in full text at [Journal of Clinical and Diagnostic Research : JCDR](#) - from National Library of Medicine

Abstract:Background and Objectives: Excretion of urinary protein increases to 300 mg/d (from up to 150 mg/d) in normal pregnancy. Values above this may be due to disorders that can endanger the patient or her pregnancy. Quantitative analysis of 24-hour urine is considered the gold standard for ascertaining daily protein excretion. Routine laboratory tests performed on spot urine samples indicate protein concentration in the particular sample, and can lead to diagnostic error if urine output is less or more than 1L/d. The Protein Creatinine Index (PCI) shows good correlation with 24-hour protein estimation. However, PCI varies with sex and race. We have correlated the results of qualitative estimation procedures and the dipstick values with protein creatinine index. Material and Methods: We measured protein and creatinine in spot urine samples obtained from 57 pregnant and 80 non-pregnant healthy women of 18-36 years, and calculated PCI. We also tested the samples qualitatively for proteins by routine tests and dipsticks. Results: Normal range of PCI in non-pregnant women, determined by a non-parametric method was 30-150. PCI was increased significantly in pregnancy (maximum increase in the third trimester). Amongst the qualitative tests, heat coagulation test gave the lowest percentage of false positives and a slightly higher percentage of false negatives compared to Heller's nitric acid and sulphosalicylic acid tests, and dipsticks. Interpretations and Conclusions: We conclude that heat coagulation test be used for initial screening, with PCI being performed on all samples testing positive to rule out false positives.

Database: EMBASE

Clinical significance of proteinuria determined with dipstick test, edema, and weekly weight gain ≥ 500 g at antenatal visit.

Author(s): Chiba, Kentaro; Yamada, Takashi; Kawaguchi, Satoshi; Takeda, Masamitsu; Nishida, Ryutaro; Yamada, Takahiro; Morikawa, Mamoru; Minakami, Hisanori

Source: Pregnancy hypertension; Jul 2013; vol. 3 (no. 3); p. 161-165

Publication Date: Jul 2013

Abstract:To determine how urine dipstick test, edema, and/or excessive weight gain (EWG, defined as ≥ 500 g/week) at antenatal visits predict significant proteinuria (defined as a protein-to-creatinine ratio [P/Cr, mg/mg] ≥ 0.27) and preeclampsia. Data from 3279 antenatal visits between 30 and 36 weeks of gestation were studied in 783 women with singleton pregnancies. In 24 preeclamptic pregnancies, data from 89 antenatal visits at and before diagnosis of preeclampsia were used. Spot P/Cr was determined in women with repeated positive dipstick test results in two successive antenatal visits or in those with a positive dipstick test result tested in the presence of hypertension.

Proteinuria on dipstick test, edema, and EWG appeared often in both women with and without preeclampsia; 66.7% vs. 27.7%, 83.3% vs. 44.1%, and 91.7% vs. 81.6%, respectively. However, repeated positive dipstick test results in two successive antenatal visits yielded sensitivity of 45.5%, specificity of 95.2%, and positive and negative predictive values of 30.0% and 97.4%, respectively, for detection of significant proteinuria and corresponding figures of 33.3%, 94.1%, 14.0%, and 98.0% for prediction of preeclampsia. Repeated positive dipstick test results in two successive antenatal visits warrant a need for a confirmation test of significant proteinuria. Copyright © 2013 International Society for the Study of Hypertension in Pregnancy. Published by Elsevier B.V. All rights reserved.

Database: Medline

Predictive value of 3+ spot urinary protein value measured by dipstick in hypertensive pregnant patients.

Author(s): Şükür, Yavuz Emre; Yalçın, Ibrahim; Kahraman, Korhan; Bayramov, Vugar; Ozmen, Batuhan; Atabekoğlu, Cem Somer; Söylemez, Feride

Source: Hypertension in pregnancy; May 2013; vol. 32 (no. 2); p. 139-145

Publication Date: May 2013

Abstract:To evaluate whether the spot urinary protein (SUP) level has predictive value on pregnancy outcomes in hypertensive pregnant patients. Retrospective case-control study of 109 pregnant patients with hypertension and spot urinary proteinuria measured by dipstick. Presence of 24 h proteinuria was higher in patients with 3+ SUP. Gestational age at delivery was significantly lower in patients with 3+ SUP when compared with patients with ≤2+ SUP (p = 0.009). Rate of SGA babies was higher in patients with 3+ SUP when compared with patients with ≤2+ SUP (p < 0.001). Although it cannot replace 24 h urinary protein determination, 3+ proteinuria with dipstick may have a prognostic value, particularly in emergency cases.

Database: Medline

In low-risk pregnant women, does routine office urine dipstick proteinuria ≥ mg/dL predict the development of preeclampsia?

Author(s): Miller, Emily R.; Nunes, Natalie; Bartholomew, Betsy

Source: Evidence-Based Practice; Dec 2012; vol. 15 (no. 12); p. 11-11

Publication Date: Dec 2012

Database: CINAHL

PIERS Proteinuria: Relationship With Adverse Maternal and Perinatal Outcome

Author(s): Payne B.; Magee L.A.; Hutcheon J.A.; Li J.; Menzies J.M.; von Dadelszen P.; Cote A.-M.; Kyle P.M.; Pullar B.; Peter Moore M.; Parker C.; Walters B.N.; Douglas M.J.; Walley K.R.; Russell J.A.; Lee S.K.; Gruslin A.; Smith G.N.; Moutquin J.-M.; Brown M.A.; Davis G.; Sass N.; Duan T.; Zhou J.; Mahajan S.; Noovao A.; McCowan L.A.; Moore M.P.; Bhutta S.Z.; Bhutta Z.A.; Hall D.R.; Steyn D.W.; Broughton Pipkin F.; Loughna P.; Robson S.; de Swiet M.; Walker J.J.; Grobman W.A.; Lindheimer M.D.; Roberts J.M.; Mark Ansermino J.; Benton S.; Cundiff G.; Hugo D.; Joseph K.S.; Lalji S.; Lott P.; Ouellet A.B.; Shaw D.; Keith Still D.; Tawagi G.; Wagner B.; Biryabarema C.; Mirembe F.; Nakimuli A.; Tsigas E.; Merialdi M.; Widmer M.

Source: Journal of Obstetrics and Gynaecology Canada; 2011; vol. 33 (no. 6); p. 588-597

Publication Date: 2011

Abstract:Objective: To examine the ability of three different proteinuria assessment methods (urinary dipstick, spot urine protein:creatinine ratio [Pr/Cr], and 24-hour urine collection) to predict adverse pregnancy outcomes. Methods: We performed a prospective multicentre cohort study, PIERS (Preeclampsia Integrated Estimate of RiSk), in seven academic tertiary maternity centres practising expectant management of preeclampsia remote from term in Canada, New Zealand, and Australia. Eligible women were those admitted with preeclampsia who had at least one antenatal proteinuria assessment by urinary dipstick, spot urine Pr/Cr ratio, and/or 24-hour urine collection. Proteinuria assessment was done either visually at the bedside (by dipstick) or by hospital clinical laboratories for spot urine Pr/Cr and 24-hour urine collection. We calculated receiver operating characteristic area under the curve (95% CI) for each proteinuria method and each of the combined adverse maternal outcomes (within 48 hours) or adverse perinatal outcomes (at any time). Models with AUC > 0.70 were considered of interest. Analyses were run for all women who had each type of proteinuria assessment and for a cohort of women ("ALL measures") who had all three proteinuria assessments. Results: More women were proteinuric by urinary dipstick (> 2. +, 61.4%) than by spot urine Pr/Cr (> 30g/mol, 50.4%) or 24-hour urine collection (> 0.3g/d, 34.7%). Each proteinuria measure evaluated had some discriminative power, and dipstick proteinuria (categorical) performed as well as other methods. No single method was predictive of adverse perinatal outcome. Conclusion: The measured amount of proteinuria should not be used in isolation for decision-making in women with preeclampsia. Dipstick proteinuria performs as well as other methods of assessing proteinuria for prediction of adverse events. Copyright © 2011 Society of Obstetricians and Gynaecologists of Canada.

Database: EMBASE

Asymptomatic bacteriuria in pregnancy: evaluation of reagent strips in comparison to microbiological culture.

Author(s): Awonuga, D O; Fawole, A O; Dada-Adegbola, H O; Olola, F A; Awonuga, O M

Source: African journal of medicine and medical sciences; Dec 2011; vol. 40 (no. 4); p. 377-383

Publication Date: Dec 2011

Abstract:Screening for asymptomatic bacteriuria during pregnancy, the major risk factor for symptomatic urinary tract infection during pregnancy have been recommended. This cross sectional study was conducted to determine prevalence of asymptomatic bacteriuria in Ibadan and evaluate the diagnostic accuracy and relative cost effectiveness of dipstick tests for nitrite and leucocyte esterase in comparison to laboratory culture. Two hundred and five patients, presenting for their first antenatal visit at the University College Hospital, Ibadan, participated in the study. Urine samples obtained from the participants were subjected to two tests; reagent dipstick test for nitrite and leucocyte esterase and routine laboratory culture, which is the gold standard for diagnosis. Main outcome measures were sensitivity, specificity, positive and negative predictive values of the reagent dipstick tests as well as likelihood ratios. The prevalence of asymptomatic bacteriuria in pregnancy with routine laboratory culture and using combined leucocyte esterase and nitrite strip tests were 10.7% and 11.7% respectively. Compared with laboratory culture, combined strip tests had sensitivity, specificity and negative predictive values of 50%, 92.9% and 93.9% respectively, indicating a statistically significant lower level of accuracy ($P < 0.05$). The corresponding likelihood ratios for positive and negative strip tests (LR+ and LR-) were 7 and 0.5 respectively. The study concludes that combined Leucocyte esterase-nitrite dipstick test is not sufficiently sensitive and specific to be used for routine screening of bacteriuria in pregnancy in place of laboratory culture, though may be more cost effective in low resource settings.

Database: Medline

Diagnostic accuracy of urine dipsticks for detection of albuminuria in the general community

Author(s): White S.L.; Chadban S.J.; Yu R.; Craig J.C.; Polkinghorne K.R.; Atkins R.C.

Source: American Journal of Kidney Diseases; Jul 2011; vol. 58 (no. 1); p. 19-28

Publication Date: Jul 2011

Abstract:Background: Urine dipsticks, an inexpensive accessible test for proteinuria, are widely advocated for mass screening; however, their diagnostic accuracy in the general community is largely unknown. Study Design: Evaluation of diagnostic test accuracy in a cross-sectional cohort. Setting & Participants: AusDiab, a representative survey of Australian adults 25 years and older (conducted in 1999/2000). Stratified cluster random sampling from 11,247 individuals participating in the biomedical examination; complete urinalysis data available for 10,944. Index Test: Urine dipsticks (Bayer Multistix), with a positive result defined as <1+ or trace or higher protein. Reference Test: Albumin-creatinine ratio (ACR), measured on a random spot urine sample. Reference test positivity was defined as ACR <30 mg/g or ACR <300 mg/g. Results: Numbers of participants with ACR <30, 30-300, and <300 mg/g were 10,219 (93.4%), 634 (5.8%), and 91 (0.8%), respectively. The area under the receiver operating characteristic curve (AUC) for dipstick detection of ACR <30 mg/g was 0.8451 +/- 0.0129 (SE) in men and 0.7775 +/- 0.0131 in women (P < 0.001). The AUROC for dipstick detection of ACR <300 mg/g was 0.9904 +/- 0.0030 in men and 0.9950 +/- 0.0016 in women (P = 0.02). Dipstick result <1+ identified ACR <30 mg/g with 57.8% sensitivity (95% CI, 54.1%-61.4%) and 95.4% specificity (95% CI, 95.0%-95.8%) and identified ACR <300 mg/g with 98.9% sensitivity (99% CI, 92.1%-100%) and 92.6% specificity (99% CI, 92.0%-93.3%). A dipstick result of trace or higher identified ACR <30 mg/g with 69.4% sensitivity (95% CI, 65.9%-72.7%) and 86.8% specificity (95% CI, 86.1%-87.4%) and identified ACR <300 mg/g with 100% sensitivity (99% CI, 94.3%-100%) and 83.7% specificity (99% CI, 82.8%-84.6%). A negative dipstick result (less than trace) had a negative predictive value of 97.6% (95% CI, 97.2%-97.9%) for ACR <30 mg/g and a negative predictive value of 100% (99% CI, 99.9%-100%) for ACR <300 mg/g. The probability of an ACR <30 mg/g confirmed on laboratory investigation was 47.2% (95% CI, 43.9%-50.5%) based on a dipstick result <1+ and 27.1% (95% CI, 25.1%-29.2%) based on a trace or higher result. Limitations: Isolated urine samples precluded assessment of test reproducibility. Urine specific gravity and pH were not recorded; therefore, the effect of urine concentration on test performance was not assessed. Conclusions: A dipstick test result <1+ or less than trace has a high negative predictive value in the general community setting, with minimal risk of a missed diagnosis of macroalbuminuria. High false-positive rates emphasize the need for laboratory confirmation of positive results. © 2011 National Kidney Foundation, Inc.

Database: EMBASE

Accuracy of the spot urinary microalbumin:creatinine ratio and visual dipsticks in hypertensive pregnant women

Author(s): Gangaram R.; Moodley J.; Naicker M.

Source: European Journal of Obstetrics Gynecology and Reproductive Biology; Jun 2009; vol. 144 (no. 2); p. 146-148

Publication Date: Jun 2009

Abstract:Objectives: New developments in proteinuria assessment have included the use of spot urinary microalbumin to creatinine ratio measurements. This study determines the accuracy of spot urinary microalbumin to creatinine ratio dipsticks and conventional visual dipsticks compared to the 24 h urinary protein (gold standard) to detect significant proteinuria in hypertensive pregnant women. Study design: 163 women presenting with pregnancy hypertension were recruited from

antenatal clinics. On admission each participant had a spot urine sample tested using a semi-quantitative visual dipstick and a spot midstream urine sample collected and analysed using the semi-quantitative urinary microalbumin to creatinine ratio dipsticks read instrumentally on the Clinitek 50 urine chemistry analyser. A 24 h urinary protein estimation was then performed. The results of the urinary microalbumin to creatinine ratio dipsticks and the conventional visual dipsticks were compared to the 24 h urine protein. A urinary microalbumin to creatinine ratio of >300 mg/g (1+ to 4+ on urine dipsticks) was considered a positive result >0.3 g/24 h was considered significant proteinuria. Results: The visual dipstick had a sensitivity of 51% (95% CI [0.41-0.61]) and specificity of 91% (95% CI [0.81-0.96]). The PPV and NPV was 89% (95% CI [0.77-0.95]) and 58% (95% CI [0.48-0.67]), respectively. The urinary microalbumin to creatinine ratio dipsticks had a sensitivity of 63% (95% CI [0.52-0.72]) and specificity of 81% (95% CI [0.70-0.89]). The PPV was 82% (95% CI [0.71-0.90]) and NPV was 62% (95% CI [0.51-0.71]). Conclusion: Neither the visual dipstick nor the urinary microalbumin to creatinine ratio dipstick read on the Clinitek 50 system is accurate when compared to the total 24 h urinary protein. Differences between the urinary microalbumin to creatinine ratio and 24 h total urinary protein may be due to the variation in the albumin fraction of the total urinary protein of pre-eclampsia, technical problems with imprecision of the assay technique, and clinical causes of false positives and negatives. The improved sensitivity of the automated urinary microalbumin to creatinine ratio dipstick over the visual dipstick suggests it may be a suitable substitute for the visual dipstick in clinical practice. © 2009 Elsevier Ireland Ltd. All rights reserved.

Database: EMBASE

Diagnostic accuracy of nitrite dipstick testing for the detection of bacteriuria of pregnancy

Author(s): Kodikara H.; Seneviratne H.; Kaluarachchi A.; Corea E.

Source: Public Health; May 2009; vol. 123 (no. 5); p. 393-394

Publication Date: May 2009

Database: EMBASE

Inadequacy of Dipstick Proteinuria in Hypertensive Pregnancy: Evidence for a change to alternatives

Author(s): Ebeigbe P.N.

Source: The Nigerian postgraduate medical journal; Mar 2009; vol. 16 (no. 1); p. 46-49

Publication Date: Mar 2009

Abstract:BACKGROUND: The presence of proteinuria in pregnancy induced hypertension has been shown to increase maternal and perinatal morbidity and mortality. Hence early and accurate screening for proteinuria with prompt management holds one of the keys to reducing the morbidity and mortality associated with the disease.OBJECTIVE: To examine the options for detection of proteinuria in hypertensive pregnancy available to the obstetrician in the light of current evidence in literature. METHOD OF LITERATURE SEARCH: A review of journal articles identified through a search of the following electronic databases: Medline, Cinahl, Biomed Central and Ajol.CONCLUSION: There is overwhelming evidence that urinary dipstick results correlate poorly with 24-hour urinary protein excretion values in pregnant women with hypertension. In the light of current evidence, the random urine protein:creatinine ratio quantitatively or test strips offers the best option for screening for proteinuria in hypertension in pregnancy.

Database: EMBASE

Accuracy of diagnostic tests to detect asymptomatic bacteriuria during pregnancy.

Author(s): Mignini, Luciano; Carroli, Guillermo; Abalos, Edgardo; Widmer, Mariana; Amigot, Susana; Nardin, Juan Manuel; Giordano, Daniel; Merialdi, Mario; Arciero, Graciela; Del Carmen Hourquescos, Maria; World Health Organization Asymptomatic Bacteriuria Trial Group

Source: Obstetrics and gynecology; Feb 2009; vol. 113 (no. 2); p. 346-352

Publication Date: Feb 2009

Available in print at [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#) - from Obstetrics and Gynecology

Available in full text at [Obstetrics and Gynecology](#) - from Ovid

Abstract: A dipslide is a plastic paddle coated with agar that is attached to a plastic cap that screws onto a sterile plastic vial. Our objective was to estimate the diagnostic accuracy of the dipslide culture technique to detect asymptomatic bacteriuria during pregnancy and to evaluate the accuracy of nitrate and leucocyte esterase dipsticks for screening. This was an ancillary study within a trial comparing single-day with 7-day therapy in treating asymptomatic bacteriuria. Clean-catch midstream samples were collected from pregnant women seeking routine care. Positive and negative likelihood ratios and sensitivity and specificity for the culture-based dipslide to detect and chemical dipsticks (nitrites, leukocyte esterase, or both) to screen were estimated using traditional urine culture as the "gold standard." : A total of 3,048 eligible pregnant women were screened. The prevalence of asymptomatic bacteriuria was 15%, with *Escherichia coli* the most prevalent organism. The likelihood ratio for detecting asymptomatic bacteriuria with a positive dipslide test was 225 (95% confidence interval [CI] 113-449), increasing the probability of asymptomatic bacteriuria to 98%; the likelihood ratio for a negative dipslide test was 0.02 (95% CI 0.01-0.05), reducing the probability of bacteriuria to less than 1%. The positive likelihood ratio of leukocyte esterase and nitrite dipsticks (when both or either one was positive) was 6.95 (95% CI 5.80-8.33), increasing the probability of bacteriuria to only 54%; the negative likelihood ratio was 0.50 (95% CI 0.45-0.57), reducing the probability to 8%. A pregnant woman with a positive dipslide test is very likely to have a definitive diagnosis of asymptomatic bacteriuria, whereas a negative result effectively rules out the presence of bacteriuria. Dipsticks that measure nitrites and leukocyte esterase have low sensitivity for use in screening for asymptomatic bacteriuria during gestation. ISRCTN, isrctn.org, 1196608 II.

Database: Medline

Reagent strip testing for antenatal screening and first meaningful of asymptomatic bacteriuria in pregnant women.

Author(s): Kovavisarach, Ekachai; Vichairuck, Maytina; Kanjanahareutai, Suwattana

Source: Journal of the Medical Association of Thailand = Chotmaihet thangkaet; Dec 2008; vol. 91 (no. 12); p. 1786-1790

Publication Date: Dec 2008

Abstract: To evaluate the diagnostic performance of reagent strip test as a screening test for asymptomatic bacteriuria (ABU) in pregnant women. Three hundred and sixty asymptomatic pregnant women who attended their first antenatal appointment at Rajavithi Hospital from August 1st to October 31st, 2005 were enrolled. Those with symptoms of urinary tract infection within one month, those who had been prescribed antibiotics during the previous 7 days, and those with medical or obstetric complications, vaginal bleeding and a history of urinary tract diseases were excluded. Urine specimens were collected by clean-catch midstream urine technique for urine dipstick and culture. The prevalence of ABU was 10.0%. The urine dipstick nitrite leukocyte esterase and combined test had a sensitivity of 16.7%, 75.0% and 16.7%, specificity of 99.1%, 67.9% and 99.4%, positive predictive value of 66.7%, 20.6% and 75.0%, negative predictive value of 91.5%, 96.1%

and 91.5%, accuracy of 90.8%, 68.6% and 91.1%, respectively. Reagent strip testing indicated a fair sensitivity for routine antenatal screening for asymptomatic bacteriuria in pregnant women

Database: Medline

Accuracy of urine dipsticks, 2-h and 12-h urine collections for protein measurement as compared with the 24-h collection

Author(s): Abebe J.; Eigbefoh J.; Isabu P.; Okogbenin S.; Eifediyi R.; Okusanya B.

Source: Journal of Obstetrics and Gynaecology; Jul 2008; vol. 28 (no. 5); p. 496-500

Publication Date: Jul 2008

Available in full text at [Journal of Obstetrics and Gynaecology](#) - from Taylor & Francis

Abstract:The presence of protein in hypertensive disorders of pregnancy is a sign of a worsening condition and thus requires early intervention to prevent adverse consequences. Accurate assessment of proteinuria in patients with pre-eclampsia will ensure prompt and timely intervention to reduce or prevent the maternal and perinatal morbidity and mortality associated with pre-eclampsia. This study compared the reliability and validity of the more rapid diagnostic tests, such as the dipstick, 2-h and 12-h protein estimations with the 24-h protein. The result of the dipstick, 2-h and 12-h urine were also compared with the 24-h urine results using confidence interval (CI) for proportions with a value of $p < 0.05$ considered significant (CI 95%). When compared with the gold standard, there was a high degree of correlation between the 2-h ($p = 0.244$, CI 95%) and 12-h ($p < 0.0255$, CI 95%) with the 24-h sample in the quantification of proteinuria in women with pre-eclampsia. The most sensitive and specific test was the 12-h protein estimation, (89%) and (93%), respectively. The least sensitive and specific test was the dipstick test; (81%) and (47%), respectively. The 12-h protein estimation test had the highest positive predictive value (84%). The 12-h protein test also had the lowest false positive rate (12%) and false negative rates (11%), respectively. The most accurate test was the 12-h protein estimation (88%). The dipstick tests were however much cheaper and the results were faster. It is recommended that routine rapid quantisation of proteinuria in patients with pre-eclampsia be done using either the 2-h or 12-h urine sample. © 2008 Informa UK Ltd.

Database: EMBASE

The diagnostic accuracy of the rapid dipstick test to predict asymptomatic urinary tract infection of pregnancy.

Author(s): Eigbefoh, J O; Isabu, P; Okpere, E; Abebe, J

Source: Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology; Jul 2008; vol. 28 (no. 5); p. 490-495

Publication Date: Jul 2008

Available in full text at [Journal of Obstetrics and Gynaecology](#) - from Taylor & Francis

Abstract:Untreated urinary tract infection can have devastating maternal and neonatal effects. Thus, routine screening for bacteriuria is advocated. This study was designed to evaluate the diagnostic accuracy of the rapid dipstick test to predict urinary tract infection in pregnancy with the gold standard of urine microscopy, culture and sensitivity acting as the control. The urine dipstick test uses the leucocyte esterase, nitrite and test for protein singly and in combination. The result of the dipstick was compared with the gold standard, urine microscopy, culture and sensitivity using confidence interval for proportions. The reliability and validity of the urine dipstick was also evaluated. Overall, the urine dipstick test has a poor correlation with urine culture ($p = 0.125$, CI 95%). The same holds true for individual components of the dipstick test. The overall sensitivity of

the urine dipstick test was poor at 2.3%. Individual sensitivity of the various components varied between 9.1% for leucocyte esterase and the nitrite test to 56.8% for leucocyte esterase alone. The other components of the dipstick test, the test of nitrite, test for protein and combination of the test (leucocyte esterase, nitrite and proteinuria) appear to decrease the sensitivity of the leucocyte esterase test alone. The ability of the urine dipstick test to correctly rule out urinary tract infection (specificity) was high. The positive predictive value for the dipstick test was high, with the leucocyte esterase test having the highest positive predictive value compared with the other components of the dipstick test. The negative predictive value (NPV) was expectedly highest for the leucocyte esterase test alone with values higher than the other components of the urine dipstick test singly and in various combinations. Compared with the other parameters of the urine dipstick test, singly and in combination, leucocyte esterase appears to be the most accurate (90.25%). The dipstick test has a limited use in screening for asymptomatic bacteriuria. The leucocyte esterase test component of the dipstick test appears to have the highest reliability and validity. The other parameters of the dipstick test decreases the reliability and validity of the leucocyte esterase test. A positive test merits empirical antibiotics, while a negative test is an indication for urine culture. The urine dipstick test if positive will also be useful in follow-up of patient after treatment of urinary tract infection. This is useful in poor resource setting especially in the third world where there is a dearth of trained personnel and equipment for urine culture.

Database: Medline

Clinical significance of proteinuria in pregnancy.

Author(s): Airoidi, James; Weinstein, Louis

Source: Obstetrical & gynecological survey; Feb 2007; vol. 62 (no. 2); p. 117-124

Publication Date: Feb 2007

Available in full text at [Obstetrical and Gynecological Survey](#) - from Ovid

Abstract: Urinary protein excretion is considered abnormal in pregnant women when it exceeds 300 mg/24 hours at anytime during gestation, a level that usually correlates with 1+ on urine dipstick. Proteinuria documented before pregnancy or before 20 weeks' gestation suggests preexisting renal disease. The National High Blood Pressure Education Program Working Group recommended that the diagnosis of proteinuria be based on the 24-hour urine collection. Preeclampsia is the leading diagnosis that must be excluded in all women with proteinuria first identified after 20 weeks of gestation. Given the vasospastic nature of this condition, when it is present, the degree of proteinuria may fluctuate widely from hour-to-hour. Hypertension or proteinuria may be absent in 10-15% of patients with HELLP syndrome and in 38% of patients with eclampsia. The acute onset of proteinuria and worsening hypertension in women with chronic hypertension is suggestive of superimposed preeclampsia, which increases adverse outcomes. However, because proteinuria is not independently predictive of adverse outcome, an exclusive proteinuric criterion as an indication for preterm delivery in preeclampsia should be discouraged. Obstetricians & Gynecologists, Family Physicians. After completion of this article, the reader should be able to state that measurement of urinary protein levels by simple techniques are not sensitive or specific, recall that both hypertension and proteinuria may be absent in patients with preeclampsia, and explain that proteinuria is not predictive of adverse outcomes and that delivery should not be based on protein excretion alone.

Database: Medline

Evaluation of rapid urine screening tests to detect asymptomatic bacteriuria in pregnancy

Author(s): Kacmaz B.; Cakir O.; Akkir A.; Biri A.

Source: Japanese Journal of Infectious Diseases; 2006; vol. 59 (no. 4); p. 261-263

Publication Date: 2006

Available in full text at [Japanese Journal of Infectious Diseases](#) - from Free Access Content

Abstract:In order to compare the performance of leukocyte esterase and nitrite urine dipstick tests with enhanced urinalysis (uncentrifuged urine white blood cell count/mm³ plus Gram stain) in detecting asymptomatic bacteriuria in obstetric patients, clean-catch midstream urine specimens were collected from 250 consecutive asymptomatic pregnant women. Ten of the women (4.0%) showed urine culture results indicating significant bacteriuria. The nitrite test was the most specific (99.2%) of these tests, however, its sensitivity was found to be the lowest (60.0%). The sensitivity of the leukocyte esterase test was 70.0%, on the other hand, while its positive predictive value was 28.0%. The sensitivity and specificity of enhanced urinalysis were found to be 50.0 and 96.7%, respectively. None of the rapid tests was found to be a reliable alternative for culture screening of all pregnant women. Nitrite tests are useful screening tests for detecting asymptomatic bacteriuria only if their limitations are fully understood, while leukocyte esterase and enhanced urinalysis tests are not suitable for screening for asymptomatic bacteriuria. Our findings support previous conclusions that quantitative urine cultures are required to rule out asymptomatic bacteriuria in pregnant women.

Database: EMBASE

The accuracy of urine dipsticks as a screening test for proteinuria in hypertensive disorders of pregnancy.

Author(s): Gangaram, R; Ojwang, P J; Moodley, J; Maharaj, D

Source: Hypertension in pregnancy; 2005; vol. 24 (no. 2); p. 117-123

Publication Date: 2005

Abstract:Proteinuria is used as a criterion in the classification system for hypertensive disorders of pregnancy including preeclampsia. The aim of the study was to evaluate the accuracy of dipstick urinalysis in a single voided urine sample and in an aliquot of a 24-hour urine collection in the assessment of proteinuria in hypertensive pregnant women, using the 24-hour urine protein excretion as the gold standard. One hundred ninety-eight women who presented with hypertension in pregnancy were recruited at the antenatal clinic at King Edward VIII Hospital in Durban, South Africa, a tertiary referral center. Exclusion criteria included women with eclampsia, urinary tract infection, and chronic renal disease. Routine dipstick urinalysis (Bayer) was performed by midwives for proteinuria, and a 24-hour urine specimen was collected for quantitative protein assessment. A laboratory technician performed urine dipstick test for protein on a mixed aliquot of the 24-hour urine specimen. This result, together with that of the screening dipstick urinalysis, was compared to the 24-hour urine protein excretion. The results of the 198 patients were analyzed, of the total, 72 had preeclampsia. Using a value of ≥ 0.3 g protein excretion per 24 hours (1+ to 4+ on urine dipsticks) as positive, sensitivity, specificity, and predictive values for dipstick urinalysis were calculated. The positive predictive value for dipstick urinalysis ranged from 64.9% (single voided urine sample) to 94.2% (24-hour urine aliquot). The negative predictive value ranged from 75.2% (single voided urine sample) to 84.2% (24-hour urine aliquot). Dipstick urinalysis is not very accurate: therefore, all women presenting with hypertension during pregnancy should have a 24-hour urine protein measurement.

Database: Medline

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

Author(s): Walerstein S

Source: Evidence Based Medicine; Feb 2005; vol. 10 (no. 1); p. 25-25

Publication Date: Feb 2005

Available in full text at [Evidence-Based Medicine](#) - from Free Access Content

Available in full text at [Evidence-Based Medicine](#) - from Highwire Press

Available in full text at [Evidence-Based Medicine](#) - from Highwire Press

Database: CINAHL

Screening for asymptomatic bacteriuria in pregnancy.

Author(s): Mclsaac, Warren; Carroll, June C; Biringer, Anne; Bernstein, Paul; Lyons, Elliott; Low, Donald E; Permaul, Joanne A

Source: Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstétrique et gynécologie du Canada : JOGC; Jan 2005; vol. 27 (no. 1); p. 20-24

Publication Date: Jan 2005

Abstract:To compare the following 4 screening strategies for detecting asymptomatic bacteriuria (ABU) in pregnancy: urine testing with leukocyte-esterase-nitrite (LEN) strips at each prenatal visit followed by a urine culture if positive; a single urine culture at fewer than 20 weeks' gestation; 2 urine cultures, at fewer than 20 weeks' gestation and at 28 weeks' gestation; or 3 urine cultures, at fewer than 20 weeks', at 28 weeks', and at 36 weeks' gestation. Participants were pregnant women presenting to 2 obstetricians and 6 family physicians at outpatient family medicine and obstetrical clinics in a large Canadian urban teaching hospital. LEN dipstick urine testing was conducted at each prenatal visit. A midstream urine culture was obtained from all women before 20 weeks' gestation and at 28 weeks' and 36 weeks' gestation, as well as for positive LEN tests. Any positive urine culture in an asymptomatic woman was designated a case of ABU. The total number of ABU cases that would be detected by each of the 4 strategies (LEN dipstick testing only, a single urine culture, 2 cultures, and 3 cultures) was determined and compared. There were 49 cases of ABU among 1050 women (4.7%). LEN testing at each prenatal visit identified 7 cases (14.3%), compared with 20 cases (40.8%) with 1 urine culture, 31 (63.3%) with 2 urine cultures, and 43 (87.8%) with 3 urine cultures. A single urine culture before 20 weeks' gestation missed more than one-half the ABU cases. A culture in each trimester identified most ABU cases.

Database: Medline

A prospective study of the impact of automated dipstick urinalysis on the diagnosis of preeclampsia

Author(s): Phelan L.K.; Brown M.A.; Davis G.K.; Mangos G.

Source: Hypertension in Pregnancy; 2004; vol. 23 (no. 2); p. 135-142

Publication Date: 2004

Abstract:Objective: To determine prospectively in hypertensive pregnant women 1) the accuracy of dipstick testing for proteinuria using automated urinalysis, 2) factors that might affect such accuracy, and 3) the potential impact of automated dipstick testing on the accuracy of diagnosis of preeclampsia according to acceptance of proteinuria at either 1+ or 2+ level. Design: Prospective study. Setting: Antenatal day assessment unit and antenatal ward of St George Hospital, a teaching hospital in Sydney, Australia. Population: 170 hypertensive pregnant women attending as

outpatients or inpatients. Methods: 503 midstream urine samples were collected prospectively on separate occasions from 170 women. Full urinalysis was recorded using the Bayer Clinitek 50 automated urinalysis device and Multistix 10SG urinalysis strips (Bayer Diagnostics, Victoria, Australia). Each MSU was analysed for spot protein/creatinine ratio and also for culture and sensitivity if symptoms of a urinary tract infection were present or dipstick included positive nitrites. Urinalysis protein results were compared with spot urinary protein/creatinine ratio (previously shown to correlate with 24-hr urine protein excretion) to determine the accuracy of urinalysis. True proteinuria was defined as a ratio > 30 mg protein/mmol creatinine. Results: False positive dipstick tests ranged from 7% at 3+ level to 71% at 1+ proteinuria level while false negative rates were 7% for "nil" and 14% for "trace" proteinuria, 9% overall. Accepting the dipstick proteinuria result at face value led to an incorrect diagnosis of preeclampsia or gestational hypertension in 85 (50%) women. Dipstick proteinuria was significantly more likely to be correct (true positive/true negative) if diastolic blood pressure was elevated > 90 mmHg (p = 0.032) and in the absence of ketonuria (p 0.001). Accepting a diagnosis of preeclampsia on the basis of de novo hypertension and dipstick testing alone was accurate less often (70%) when > 1+ was used as a discriminant value than at the 82% of presentations when > 2+ was used (p = 0.001). Conclusion: Accepting "nil" or "trace" proteinuria as a true negative dipstick results fails to identify approximately 1 in 11 hypertensive pregnant women with true proteinuria, a false negative rate that may be acceptable provided these women are subject to ongoing vigilant clinical review. Even with automated urinalysis the false positive rate for dipstick levels > 1+ is very high, particularly in the presence of ketonuria and relying on this alone to diagnose preeclampsia leads to significant errors in diagnosis. Accepting > 2+ dipstick proteinuria improves overall diagnostic accuracy for preeclampsia at the expense of a higher false negative rate. This study emphasizes the need to confirm dipstick proteinuria with a further test such as a spot urine protein/creatinine ratio in all hypertensive pregnant women, particularly in research studies.

Database: EMBASE

The urine dipstick test useful to rule out infections. A meta-analysis of the accuracy.

Author(s): Devillé, Walter L J M; Yzermans, Joris C; van Duijn, Nico P; Bezemer, P Dick; van der Windt, Daniëlle A W M; Bouter, Lex M

Source: BMC urology; Jun 2004; vol. 4 ; p. 4

Publication Date: Jun 2004

Available in full text at [BMC Urology](#) - from BioMed Central

Available in full text at [BMC Urology](#) - from National Library of Medicine

Available in full text at [BMC Urology](#) - from National Library of Medicine

Abstract: Many studies have evaluated the accuracy of dipstick tests as rapid detectors of bacteriuria and urinary tract infections (UTI). The lack of an adequate explanation for the heterogeneity of the dipstick accuracy stimulates an ongoing debate. The objective of the present meta-analysis was to summarise the available evidence on the diagnostic accuracy of the urine dipstick test, taking into account various pre-defined potential sources of heterogeneity. Literature from 1990 through 1999 was searched in Medline and Embase, and by reference tracking. Selected publications should be concerned with the diagnosis of bacteriuria or urinary tract infections, investigate the use of dipstick tests for nitrites and/or leukocyte esterase, and present empirical data. A checklist was used to assess methodological quality. 70 publications were included. Accuracy of nitrites was high in pregnant women (Diagnostic Odds Ratio = 165) and elderly people (DOR = 108). Positive predictive values were >=80% in elderly and in family medicine. Accuracy of leukocyte-esterase was high in studies in urology patients (DOR = 276). Sensitivities were highest in family medicine (86%). Negative predictive values were high in both tests in all patient groups and settings, except for in family

medicine. The combination of both test results showed an important increase in sensitivity. Accuracy was high in studies in urology patients (DOR = 52), in children (DOR = 46), and if clinical information was present (DOR = 28). Sensitivity was highest in studies carried out in family medicine (90%). Predictive values of combinations of positive test results were low in all other situations. Overall, this review demonstrates that the urine dipstick test alone seems to be useful in all populations to exclude the presence of infection if the results of both nitrites and leukocyte-esterase are negative. Sensitivities of the combination of both tests vary between 68 and 88% in different patient groups, but positive test results have to be confirmed. Although the combination of positive test results is very sensitive in family practice, the usefulness of the dipstick test alone to rule in infection remains doubtful, even with high pre-test probabilities.

Database: Medline

Accuracy of urinalysis dipstick techniques in predicting significant proteinuria in pregnancy.

Author(s): Waugh, Jason J S; Clark, T Justin; Divakaran, T G; Khan, Khalid S; Kilby, Mark D

Source: Obstetrics and gynecology; Apr 2004; vol. 103 (no. 4); p. 769-777

Publication Date: Apr 2004

Available in print at [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#) - from Obstetrics and Gynecology

Available in full text at [Obstetrics and Gynecology](#) - from Ovid

Abstract:To estimate the accuracy of point-of-care dipstick urinalysis in predicting significant proteinuria in pregnancy. Literature from 1970 to February 2002 was identified via 1). general bibliographic databases, that is, MEDLINE and EMBASE, 2). Cochrane Library and relevant specialist register of the Cochrane Collaboration, and 3). checking the reference lists of known primary and review articles. Studies were selected if the accuracy of dipstick urinalysis techniques in predicting total protein excretion was estimated compared with a reference standard (laboratory estimation of protein excretion). The tests included visually read color-change dipsticks and automated dipstick urinalysis. Study selection, quality assessment, and data abstraction were performed independently and in duplicate. Data from selected studies were abstracted as 2 x 2 tables comparing the test result with the reference standard. Test accuracy was expressed as likelihood ratios. Summary likelihood ratios were generated as measures of diagnostic accuracy to determine posttest probabilities. The electronic search produced 1543 citations. After independent review of published articles, a total of 34 articles was obtained for further scrutiny, and 7 studies were considered eligible for inclusion in the review. The 6 studies evaluating visual dipstick urinalysis produced a pooled positive likelihood ratio of 3.48 (95% confidence interval 1.66, 7.27) and a pooled negative likelihood ratio of 0.6 (95% confidence interval 0.45, 0.8) for predicting 300 mg/24-hour proteinuria at the 1+ or greater threshold. The accuracy of dipstick urinalysis with a 1+ threshold in the prediction of significant proteinuria is poor and therefore of limited usefulness to the clinician. Accuracy may be improved at higher thresholds (greater than 1+ proteinuria), but available data are sparse and of poor methodological quality. Therefore, it is not possible to make meaningful inferences about accuracy at higher urine dipstick thresholds. There is an urgent need for research in this area of common obstetric practice.

Database: Medline

Urinary tract infection during pregnancy--dipstick urinalysis vs. culture and sensitivity.

Author(s): D'Souza, Zoë; D'Souza, D

Source: Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology; Jan 2004; vol. 24 (no. 1); p. 22-24

Publication Date: Jan 2004

Available in full text at [Journal of Obstetrics and Gynaecology](#) - from Taylor & Francis

Abstract:Although it is important not to ignore clinical symptoms suggestive of a urinary tract infection (UTI), especially in antenatal patients, samples which have no abnormalities detected on bedside urinalysis may not need to be sent to the laboratory for culture and sensitivity (C&S) testing. If leucocytes, blood and/or protein are found in the samples, then they may need to be sent to the laboratory for further assessment, but no treatment needs to be instigated before obtaining the culture and sensitivity result, unless indicated clinically. The presence of nitrites in the sample is, however, much more suggestive of a bacterial infection and samples must be sent to the laboratory. In these cases, treatment with antibiotics prior to results may be warranted. Of the 100 samples tested in this study, only two had positive cultures for bacterial infection (*Escherichia coli*) and these were the only samples which had been strongly positive for nitrites using the Nephur6Labsticks. These bedside screening tests may be a useful and cost-effective way of reducing the numbers of mid-stream urine samples sent to the laboratory for further testing.

Database: Medline

Assessing proteinuria in hypertensive pregnancy.

Author(s): Davies L; Waugh J; Kilby M

Source: British Journal of Midwifery; Jul 2002; vol. 10 (no. 7); p. 441-445

Publication Date: Jul 2002

Available in print at [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#) - from British Journal of Midwifery

Available in full text at [British Journal of Midwifery](#) - from EBSCOhost

Abstract:The development of proteinuria in a hypertensive pregnancy is significant, as the likelihood of both maternal and fetal complications increases when proteinuria is present. Pregnancies complicated by gestational hypertension only have been shown to have a similar outcome to normotensive pregnancies. Accurate, rapid detection and quantitation of proteinuria is therefore essential for the management of these high-risk patients. However, at present, a variety of different 'screening tests' can be employed and there is no universally accepted 'gold standard' laboratory assay. The prevalence of proteinuria is thus dependent upon the accuracy of the screening test and the total amount of protein in a 24-hour collection is dependent on the biochemical assay employed in the laboratory. Owing to the discrepancies between dipsticks and laboratory assays, there can be confusion when evaluating results from investigations and comparisons between studies are difficult to interpret.

Database: CINAHL

The role of observer error in antenatal dipstick proteinuria analysis.

Author(s): Bell, S C; Halligan, A W; Martin, A; Ashmore, J; Shennan, A H; Lambert, P C; Taylor, D J

Source: British journal of obstetrics and gynaecology; Nov 1999; vol. 106 (no. 11); p. 1177-1180

Publication Date: Nov 1999

Available in print at [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#) - from British Journal of Obstetrics and Gynaecology (BJOG)

Abstract:To determine the role of inter-observer error and the influence of training upon dipstick urine analysis. A two phase observational and training study. Five standard solutions of serum albumin were used to test the accuracy of midwives and nursing auxiliaries involved in dipstick urine analysis at a maternity hospital. The standard solutions were chosen such that they should have resulted in negative (n = 2) and positive (n = 3) dipstick test results, respectively. A teaching maternity hospital and academic department of obstetrics and gynaecology. Twenty midwives, 20 nursing auxiliaries and nine laboratory technicians. For the two nonproteinuric solutions, a higher false positive rate was observed for nursing auxiliaries (40% and 55%), compared with midwives (5% and 30%) (P = 0.020 and P = 0.20, respectively). Before training, laboratory technicians recorded high false positive rates (67% and 89%), but after training these were reduced to 0% and 22% (P = 0.25 and P = 0.023, respectively). Both nursing auxiliaries and midwives recorded false negative rates of between 10% and 45% for the three proteinuric solutions. Observer error may be reduced by assigning midwives to urine dipstick analysis or by the implementation of directed training. Classification of pre-eclampsia or other hypertensive diseases of pregnancy on the basis of the presence and degree of proteinuria should be confirmed with a 24-hour quantitative protein collection.

Database: Medline

Urinalysis. When--and when not--to order.

Author(s): Misdraji J; Nguyen PL; Misdraji, J; Nguyen, P L

Source: Postgraduate Medicine; Jul 1996; vol. 100 (no. 1); p. 173-180

Publication Date: Jul 1996

Abstract:Although routine urinalysis is common, the results are important in management of only certain diseases. Screening urinalysis to detect asymptomatic bacteriuria is recommended in adults 60 years of age or older, diabetic patients of any age, pregnant women, and adolescents. A positive result for protein on dipstick urinalysis should be evaluated in conjunction with other clinical and laboratory data (eg, the patient's age, physical findings, renal function, results of microscopic urinalysis). Evaluation of hematuria should always include dipstick analysis and microscopic examination of urine. Diabetes screening is best done with measurement of plasma glucose levels. Other available urinalysis tests include measurement of pH, specific gravity, ketones, bilirubin, and urobilinogen. In patients with renal or urinary tract disease, microscopic examination of urinary sediment is important.

Database: CINAHL

The value of routine urine dipstick screening for protein at each prenatal visit

Author(s): Gribble R.K.; Fee S.C.; Berg R.L.

Source: American Journal of Obstetrics and Gynecology; 1995; vol. 173 (no. 1); p. 214-217

Publication Date: 1995

Abstract:OBJECTIVE: Our purpose was to determine whether dipstick urinalysis for protein, when performed as a routine screening test at each prenatal visit, predicts subsequent gestational outcome. STUDY DESIGN: All 3217 low-risk obstetric patients had dipstick urinalysis for protein at each prenatal visit. When there were any objective findings of a possible hypertensive disorder, the urine protein test for that visit was considered an indicated diagnostic test. Otherwise it was considered a routine screening test. Subjects were grouped according to whether those urine tests considered routine screening tests were positive for protein. The groups were then compared with regard to relevant pregnancy outcomes. RESULTS: There were no significant differences in the

measured pregnancy outcomes between the groups. **CONCLUSIONS:** In low-risk women with no objective signs of a possible hypertensive disorder, routine dipstick proteinuria screening at each prenatal visit did not provide any clinically important information regarding pregnancy outcome.

Database: EMBASE

Inadequacy of dipstick proteinuria in hypertensive pregnancy

Author(s): Brown M.A.; Buddle M.L.

Source: Australian and New Zealand Journal of Obstetrics and Gynaecology; 1995; vol. 35 (no. 4); p. 366-369

Publication Date: 1995

Available in print at [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#) - from Australian and New Zealand Journal of Obstetrics and Gynaecology

Abstract:The objective of this study was to determine the accuracy of ward urinalysis and the sensitivity of dipstick testing in the assessment of proteinuria in hypertensive pregnant women. Subjects were 230 consecutive hypertensive pregnant women who were admitted to hospital over a 2-year period. Routine ward urinalyses for protein, obtained on a mid-stream sample before and after a 24-hour urine collection for quantitating proteinuria, were compared with the 24-hour urine protein excretion. As a control for dipstick accuracy, urinalysis was also performed on a mixed aliquot of each of the 24-hour samples by a single observer experienced in urinalysis. True proteinuria was considered as > 300 mg/day. The positive predictive value for urinalysis ranged from 38% (for the precollection test) to 60% (for tests on the aliquot). Negative predictive values were 86-88%. The false negative rates at 'nil' or 'trace' proteinuria ranged from 8-18%. The false positive rates at '3+' (3 g/L) or '4+' (> 20 g/L) ranged from 0-17%, at '2+' (1 g/L) from 18-50% and at '1+' (0.3 g/L) from 67-83%. Best results for urinalysis were obtained on the aliquot testing but even under these ideal circumstances there was a high false positive rate (67%) at '1+' (0.3 g/L) urinalysis level. These studies show that in routine clinical practice 'nil' or 'trace' proteinuria will miss significant proteinuria in approximately 1 out of 8 hypertensive pregnant women while '3+'(3 g/L) or '4+'(> 20 g/L) will rarely be a false positive. At urinalysis of '1+' or '2+' a 24-hour urine collection is required to be certain about the presence or absence of proteinuria. Research studies should demand 24-hour urine protein quantitation and not rely solely upon urinalysis results.

Database: EMBASE

Urinary dipstick protein: a poor predictor of absent or severe proteinuria.

Author(s): Meyer, N L; Mercer, B M; Friedman, S A; Sibai, B M

Source: American journal of obstetrics and gynecology; Jan 1994; vol. 170 (no. 1); p. 137-141

Publication Date: Jan 1994

Abstract:Our purpose was to compare urinary protein dipstick values with standard 24-hour urinary protein excretion in women with hypertension in pregnancy. Urinary protein dipstick determinations and concurrent 24-hour urinary protein excretion measurements were compared by review of 300 urine samples obtained from women with hypertension in pregnancy. One hundred twenty-three samples had negative to trace protein on dipstick on two occasions at least 6 hours apart. Eight-one (66%) of these patients had significant proteinuria (> or = 300 mg per 24 hours). Seventy-six samples revealed 3+ to 4+ protein on dipstick in at least two samples. Of these, 27 (36%) had heavy proteinuria (> or = 5 gm per 24 hours), and 42 (55%) had nephrotic range proteinuria of > or = 3.5 gm per 24 hours. One hundred one patients had urine dipstick values of 1+ to 2+, of whom 89 (88%) had significant proteinuria. Urinary protein dipstick values > or = 1+ have a positive predictive value of

92% (162/177) for predicting ≥ 300 mg per 24 hours. In contrast, a dipstick of negative to trace should not be used to rule out significant proteinuria because its negative predictive value is only 34% (42/123) in hypertensive patients. Moreover, urine dipstick values of 3+ to 4+ should not be used to diagnose severe preeclampsia because their positive predictive value is only 36% (27/76).

Database: Medline

Validity of dipstick analysis as a method of screening for proteinuria in pregnancy.

Author(s): Abuelo, J G

Source: American journal of obstetrics and gynecology; Dec 1993; vol. 169 (no. 6); p. 1654

Publication Date: Dec 1993

Database: Medline

Strategy 93593

#	Database	Search term	Results
1	Medline	exp URINALYSIS/	6096
2	Medline	(urinalysis OR "urine culture*").ti,ab	10284
3	Medline	exp URINALYSIS/ OR (urinalysis OR "urine culture*").ti,ab	15226
4	Medline	(repeat*).ti,ab	427875
5	Medline	(retest*).ti,ab	9
6	Medline	(repeat*).ti,ab OR (retest*).ti,ab	427884
7	Medline	(pregn*).ti,ab	386581
8	Medline	exp PREGNANCY/	788480
9	Medline	(pregn*).ti,ab OR exp PREGNANCY/	872190
10	Medline	((exp URINALYSIS/ OR (urinalysis OR "urine culture*").ti,ab) AND ((repeat*).ti,ab OR (retest*).ti,ab)) AND ((pregn*).ti,ab OR exp PREGNANCY/)	29
11	Medline	(dipstick* OR "dip stick*").ti,ab	2859
12	Medline	((repeat*).ti,ab OR (retest*).ti,ab) AND ((pregn*).ti,ab OR exp PREGNANCY/) AND (dipstick* OR "dip stick*").ti,ab	12
13	Medline	("false positiv*").ti,ab	49007

14	Medline	((pregn*).ti,ab OR exp PREGNANCY/) AND (dipstick* OR "dip stick*).ti,ab) AND ("false positiv*).ti,ab	17
15	Medline	exp "FALSE POSITIVE REACTIONS"/	25388
16	Medline	((pregn*).ti,ab OR exp PREGNANCY/) AND (dipstick* OR "dip stick*).ti,ab) AND exp "FALSE POSITIVE REACTIONS"/	3
17	Medline	exp "REAGENT STRIPS"/	3014
18	Medline	((pregn*).ti,ab OR exp PREGNANCY/) AND exp "FALSE POSITIVE REACTIONS"/) AND exp "REAGENT STRIPS"/	8
19	Medline	((pregn*).ti,ab OR exp PREGNANCY/) AND ("false positiv*).ti,ab) AND exp "REAGENT STRIPS"/	10
20	EMBASE	(dipstick* OR "dip stick*).ti,ab	4044
21	EMBASE	exp URINALYSIS/	91754
22	EMBASE	exp "FALSE POSITIVE RESULT"/	20590
23	EMBASE	("false positiv*).ti,ab	64032
24	EMBASE	(pregn*).ti,ab	533451
25	EMBASE	exp PREGNANCY/	713557
26	EMBASE	exp "FALSE POSITIVE RESULT"/ OR ("false positiv*).ti,ab	72236
27	EMBASE	(pregn*).ti,ab OR exp PREGNANCY/	852847

28	EMBASE	(((dipstick* OR "dip stick*").ti,ab 20 AND exp URINALYSIS/) AND (exp "FALSE POSITIVE RESULT"/ OR ("false positiv*").ti,ab)) AND ((pregn*).ti,ab OR exp PREGNANCY/)	
29	EMBASE	exp "SENSITIVITY AND SPECIFICITY"/	269887
30	EMBASE	(((dipstick* OR "dip stick*").ti,ab 30 AND exp URINALYSIS/) AND (exp "FALSE POSITIVE RESULT"/ OR ("false positiv*").ti,ab)) AND exp "SENSITIVITY AND SPECIFICITY"/	
31	EMBASE	((dipstick* OR "dip stick*").ti,ab 62 AND (exp "FALSE POSITIVE RESULT"/ OR ("false positiv*").ti,ab)) AND exp "SENSITIVITY AND SPECIFICITY"/	
32	Medline	exp "SENSITIVITY AND SPECIFICITY"/	469581
33	Medline	(((pregn*).ti,ab OR exp PREGNANCY/) AND (dipstick* OR "dip stick*").ti,ab) AND exp "SENSITIVITY AND SPECIFICITY"/	81
34	EMBASE	exp "URINE REAGENT STRIP TEST"/	51
35	EMBASE	((exp "FALSE POSITIVE RESULT"/ OR ("false positiv*").ti,ab) AND ((pregn*).ti,ab OR exp PREGNANCY/)) AND exp "URINE REAGENT STRIP TEST"/	0

36	EMBASE	((pregn*).ti,ab OR exp PREGNANCY/) AND exp "URINE REAGENT STRIP TEST"/	6
37	EMBASE	(Dipstick ADJ2 proteinuria).ti,ab	308
38	EMBASE	((pregn*).ti,ab OR exp PREGNANCY/) AND (Dipstick ADJ2 proteinuria).ti,ab	42
39	Medline	(Dipstick ADJ2 proteinuria).ti,ab	274
40	Medline	((pregn*).ti,ab OR exp PREGNANCY/) AND (Dipstick ADJ2 proteinuria).ti,ab	36
41	Medline	(dipstix OR "dip stix").ti	1
42	Medline	(dipstix OR "dip stix").ti	1
43	CINAHL	(dipstick* OR "dip stick*").ti,ab	326
44	CINAHL	(pregn*).ti,ab	51631
45	CINAHL	exp PREGNANCY/	108368
46	CINAHL	(pregn*).ti,ab OR exp PREGNANCY/	119731
47	CINAHL	(dipstick* OR "dip stick*").ti,ab AND ((pregn*).ti,ab OR exp PREGNANCY/)	33