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Sources Searched: Medline, Embase, Cochrane Library, DynaMed

Morning Voids and Proteinuria

Summary Points:

- The 24-hour urine collection test is considered 'the gold standard' for testing for proteinuria in women during pregnancy, although it is often inconvenient for pregnant women to undertake a 24-hour urine collection.
- [First morning voids are preferred over random sampling due to reduction in potential confounding factors such as hydration, physical exercise.](#)
- [Spot protein:creatinine ratio appears to have moderate accuracy for detecting proteinuria in women with suspected preeclampsia](#)
- [Spot protein:creatinine ratio may help rule out proteinuria in hypertensive pregnant women but optimal cutoff point unclear](#)
- [Random urine protein:creatinine ratio < 130-150 mg/g or > 600 mg/g in pregnant patients with suspected preeclampsia may eliminate need for 24-hour urine collection](#)

Source: DynaMed [Internet]. Ipswich (MA): EBSCO Information Services. 1995 - . Record No. 115535, Proteinuria; [updated 2014 Dec 18, cited **2/12/16**]; [about 16 screens]. Available from <http://search.ebscohost.com/login.aspx?direct=true&db=dnh&AN=115535&site=dynamed-live&scope=site> . Registration and login required.

The urinary protein-to-creatinine ratio in Canadian women at risk of preeclampsia: does the time of day of testing matter?

Author(s): Lamontagne, Annie; Côté, Anne-Marie; Rey, Evelyne

Source: Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstétrique et gynécologie du Canada : JOGC; Apr 2014; vol. 36 (no. 4); p. 303-308

Publication Date: Apr 2014

URL: [http://www.jogc.com/article/S1701-2163\(15\)30605-8/pdf](http://www.jogc.com/article/S1701-2163(15)30605-8/pdf)

Abstract: To determine the performance of a protein-to-creatinine ratio threshold of 30 mg/mmol in pregnant women investigated for hypertension according to the time of day of the sample. This prospective study included ambulatory pregnant women investigated for hypertensive disorders. A single voided random urine specimen was obtained to determine the protein-to-creatinine ratio, followed immediately by a 24-hour urine collection. Statistical analyses included Spearman correlation, sensitivity, specificity, predictive values, likelihood ratios, and receiver-operator characteristic curves with 95% confidence intervals. A P value < 0.05 was considered statistically significant. Among the 91 specimens analyzed, 47.3% showed significant proteinuria in the 24-hour collection and 33% were first morning samples. The protein-to-creatinine ratio and 24-hour urinary protein excretion were highly correlated ($r = 0.92$, $P < 0.001$). The diagnostic accuracy of the protein-to-creatinine ratio threshold of 30 mg/mmol was lower in first morning samples than in samples obtained during the rest of the day, with sensitivity 58% and 90%, specificity 93% and 100%, positive predictive value 88% and 100%, negative predictive value 72% and 92%, positive likelihood ratio 8 and not calculable, and negative likelihood ratio 0.45 and 0.1, respectively. The receiver-operator characteristic area under the curve was 0.94 (95% CI 0.86 to 1) for first morning samples and 1.0 (95% CI 0.99 to 1) for other samples. A protein-to-creatinine ratio threshold of 30 mg/mmol reliably identifies significant proteinuria, but its reliability is reduced in first morning samples. Consequently, such samples should not be used for this purpose.

Database: Medline

Variation in the urinary protein/creatinine ratio at four different periods of the day in hypertensive pregnant women.

Author(s): Gonsales Valério, Edimárlei; Lopes Ramos, José Geraldo; Martins-Costa, Sérgio H; Müller, Ana Lúcia Letti

Source: Hypertension in pregnancy; 2005; vol. 24 (no. 3); p. 213-221

Publication Date: 2005

Abstract: To assess the urine protein/creatinine ratio in urine samples of pregnant women with hypertension in regard to: 1) the presence of significant variation at different periods of the day; 2) the differences if they exist, to identify the most reliable period of the day for sampling; and 3) whether the first sample, obtained when the patient arrives at the clinic, correlates with the same accuracy, with the 24-hour proteinuria. Cross-sectional study. Obstetrics Emergency Department, Hospital de Clínicas de Porto Alegre, a teaching hospital in Porto Alegre, Brazil. Seventy-five women with hypertension with 20-week gestation or over. Urine samples for determination of the protein/creatinine ratio were obtained on arrival (first specimen) and every 6 hours thereafter, totaling four samples in 24 hours. Four sampling periods were established: 1) from 8 am to 2 pm, 2) from 2 pm to 8 pm, 3) from 8 pm to 2 am, and 4) from 2 am to 8 am. The protein/creatinine ratio in the four different day periods were compared with the 24-hour proteinuria obtained simultaneously. The results were analyzed by the Spearman correlation and the receiver-operator

characteristic (ROC) curve. The urine protein/creatinine ratio is strongly correlated (Spearman correlation equal to 0.8 or greater) with the 24-hour proteinuria at all four periods of the day ($p < 0.001$), as well as the first sample obtained on arrival ($p = 0.003$). These findings were corroborated by the ROC curve in which the values of four day periods and that of the first sample were equal to or greater than 0.930. In hypertensive pregnant women, the single voided urine sample protein/creatinine ratio, irrespective of sampling time, is strongly correlated with the 24-hour proteinuria, as is the sample obtained on arrival.

Database: Medline

First morning voids are more reliable than spot urine samples to assess microalbuminuria

Author(s): Witte E.C.; Bakker S.J.L.; De Jong P.E.; Heerspink H.J.L.; De Zeeuw D.; Gansevoort R.

Source: Journal of the American Society of Nephrology; Feb 2009; vol. 20 (no. 2); p. 436-443

Publication Date: Feb 2009

Available in full text at [Journal of the American Society of Nephrology](#) - from Highwire Press

Abstract: Measurement of urinary albumin excretion (UAE) in a 24-h collection is the gold standard method to determine the presence of microalbuminuria. We sought to compare more practical alternatives—measurement of urinary albumin concentration (UAC) or albumin:creatinine ratio (ACR)—in a first morning void or in a spot urine sample with this gold standard. We asked 241 participants of a prospective cohort study to make three 24-h urine collections, a first morning void, and a spot urine sample. Regression analysis showed that the ACR in a first morning void best agreed with 24-h UAE. The prevalence of microalbuminuria determined by data from a first morning void (7.5%, whether by UAC or ACR) nearly equaled the prevalence of microalbuminuria determined by 24-h UAE (10.0%), whereas the prevalence was higher when determined by spot urine samples (25.4% for UAC and 22.4% for ACR; both $P < 0.001$ versus 24-h UAE). The intraindividual coefficients of variation of the ACR in a first morning void and 24-h UAE were similar (19%). Intraindividual coefficients of variations of all other measurements of albuminuria were significantly greater. In conclusion, measurement of albuminuria in a first morning void, preferably as the ACR, is more reliable than a spot urine sample to diagnose and monitor microalbuminuria. Copyright © 2009 by the American Society of Nephrology.

Database: EMBASE

The first morning urine sample is not appropriate for the evaluation of proteinuria

Author(s): Lindic J.; Purg D.; Skamen J.; Krsnik M.; Skoberne A.; Pajek J.; Kveder R.; Bren A.; Kovac D.

Source: Nephrology Dialysis Transplantation; May 2014; vol. 29

Publication Date: May 2014

Available in full text at [Nephrology Dialysis Transplantation](#) - from Oxford University Press ;

Abstract: Introduction and Aims: Proteinuria and albuminuria are early signs of chronic renal disease and important risk factors for its progression. On the basis of the results of epidemiological studies, the first morning urine sample analysis is recommended for in patients with risk factors for chronic kidney disease. The aim of this prospective study was to evaluate which urine sample is the most appropriate for the evaluation of glomerular, tubular and total proteinuria, if compared to 24-hour proteinuria. Methods: We evaluated 20 patients with chronic glomerulonephritis, 7 women and 13 men, aged from 44.5 +/- 11.3 years, with an estimated glomerular filtration rate of 85.2 +/- 5.2 ml/min/1.73 m² and mild to nephrotic proteinuria (urinary protein to creatinine 198.9 +/- 45.8 g/mol, range 19.4-695.8 g/mol). They collected 24-hour urine and on the same day the samples of the first and second morning urine, as well as samples at 12 a.m., 3, 6 and 9 p.m. In the urinary samples and in the 24-hour urine, the ratios of albumin to creatinine, immunoglobulin G to

creatinine, alpha-1-microglobulin to creatinine, N-acetyl-beta-D-glucosaminidase to creatinine and protein to creatinine were determined. Results: The second morning urine sample was the most appropriate for the assessment of glomerular proteinuria - albuminuria ($R = 0.989$, $p < 0.001$) and immunoglobulin G excretion ($R = 0.990$, $p < 0.001$), the sample taken at 3 p.m. for N-acetyl-beta-D-glucosaminidase ($R = 0.897$, $p < 0.001$), the sample taken at 6 p.m. for alpha-1-microglobulin ($R = 0.921$, $p < 0.001$), and the sample taken at 9 p.m. for total proteinuria ($R = 0.997$, $p < 0.001$). Glomerular, tubular and total proteinuria were underestimated in the first morning sample. Conclusions: The second morning urine was superior for the detection of glomerular proteinuria, and the late evening sample at 9 p.m. the most appropriate one for the estimation of overall proteinuria. The first morning sample underestimated glomerular, tubular and total proteinuria; therefore, its use for the screening purposes or evaluation is questionable.

Database: EMBASE

Diagnostic accuracy of first morning versus 9am spot urine PCR in estimating 24hr proteinuria

Author(s): Naresh C.; Eris J.; Snelling P.; Gillin A.; Wyburn K.; Gracey D.; Whitman G.; Levidiotis V.; Chadban S.; Craig J.; Hayen A.; Harris D.

Source: Nephrology; Sep 2010; vol. 15 ; p. 32

Publication Date: Sep 2010

Available in full text at [Nephrology](#) - from John Wiley and Sons

Abstract: Aim: To determine whether first morning (EMU) or 9am urinary spot protein: creatinine ratio (spotPCR) most accurately reflects 24-hour urinary protein excretion. Background: Accurate measurement of proteinuria is a core element in the management of chronic kidney disease (CKD). The gold standard test, to measure total proteinuria (TP) is a 24-hour urine collection which is cumbersome, subject to collection errors and provides delayed data. Spot urine PCR is a simple and convenient alternative, however optimal timing of sample collection remains controversial. Methods: 190 outpatients from a CKD clinic were prospectively studied between July 2007 and April 2010. There were 112 males and 78 females. The median age was 56 yr and median creatinine-clearance 55 mls/min. The mean TP excretion was 0.69 grams/day (range =0.07-25 grams/day). Three urine samples were collected: a first morning void (EMU), a spot sample at 9am and a concurrent 24-hour specimen. Urine protein and creatinine were measured on the Roche Hitachi modular analyzer using the Roche Hitachi reagent and kinetic Jaffe method respectively. The variability, correlation and agreement between the log-EMU-PCR, log-9am-PCR and log-TP were determined. Results: 143 paired results were analysed. Mean log-EMU-PCR was higher than the mean log-9am-PCR (-2.9 ± 1.2 vs -2.7 ± 1.3 , mean difference 0.20 [95% CI =0.12 to 0.28], $p = 0.00$). The median log-spotPCR intra-assay coefficient of variation (cv) was -6.05%. There was a higher correlation between log-9am-PCR with log-TP than log-EMU-PCR with log-TP (Spearman's correlation $r = 0.92$ and $r = 0.88$ respectively). There was good agreement between log-24hrPCR and log-EMU-PCR, and log-24hrPCR and log-9am-PCR. Conclusion: Although the mean spot9amPCR was slightly lower than the EMU-spotPCR, it had a higher correlation with the reference standard, 24hrTP. Spot PCR from a 9am urine void is an accurate test for total proteinuria.

Database: EMBASE

Albuminuria prevalence in first morning void compared with previous random urine from adults in the national health and nutrition examination survey, 2009-2010

Author(s): Saydah S.H.; Pavkov M.E.; Burrows N.R.; Williams D.E.; Zhang C.; Lacher D.A.; Eberhardt M.S.; Narva A.S.; Eggers P.W.

Source: Clinical Chemistry; Apr 2013; vol. 59 (no. 4); p. 675-683

Publication Date: Apr 2013

Available in full text at [Clinical Chemistry](#) - from ProQuest

Abstract:Background: Albuminuria, defined as urine albumin/creatinine ratio (ACR) >30 mg/g, is a diagnostic component of chronic kidney disease (CKD). National estimates of ACR and CKD prevalence have been based on single random urine samples. Although 2 urine samples or a first morning void are known to produce different estimates of ACR, the impact of differing urine sampling schemes on nationally estimated rates of CKD is unknown. Methods: In 2009-2010, the National Health and Nutrition Examination Survey (NHANES) participants provided 2 untimed urine samples for sequential ACR measurement: an initial random urine collected in the NHANESmobile examination center and a subsequent first morning void collected at home. Rates of albuminuria were calculated in the overall population and broken down by demographics, diagnosed diabetes and hypertension status, and estimated glomerular filtration rate (eGFR). Results: Overall, 43.5% of adults with increased ACR (>30 mg/g) in a random urine also had increased ACR in a first morning urine. This percentage was higher among individuals >50 years old (48.9%), males (53.3%), participants with diagnosed diabetes (56.3%) and hypertension (51.5%), and eGFR ≥ 2 (56.9%). The use of confirmed increased ACR (defined as the presence of ACR >30 mg/g in both samples taken within 10 days) to define CKD resulted in a lower overall prevalence (11.6%) than first morning urine (12.7%) or random spot urine only (15.2%). Conclusions: ACR measured on random urine samples appears to overestimate the prevalence of albuminuria compared to first morning urine collections. Copyright © 2013 American Association for Clinical Chemistry.

Database: EMBASE

Diagnostic accuracy of spot urinary protein and albumin to creatinine ratios for detection of significant proteinuria or adverse pregnancy outcome in patients with suspected pre-eclampsia: systematic review and meta-analysis.

Author(s): Morris, R K; Riley, R D; Doug, M; Deeks, J J; Kilby, M D

Source: BMJ (Clinical research ed.); Jul 2012; vol. 345 ; p. e4342

Publication Date: Jul 2012

Available in full text at [The BMJ](#) - from Highwire Press

Abstract:To determine the diagnostic accuracy of two "spot urine" tests for significant proteinuria or adverse pregnancy outcome in pregnant women with suspected pre-eclampsia. Systematic review and meta-analysis. Searches of electronic databases 1980 to January 2011, reference list checking, hand searching of journals, and contact with experts. Diagnostic studies, in pregnant women with hypertension, that compared the urinary spot protein to creatinine ratio or albumin to creatinine ratio with urinary protein excretion over 24 hours or adverse pregnancy outcome. Study characteristics, design, and methodological and reporting quality were objectively assessed. Study results relating to diagnostic accuracy were extracted and synthesised using multivariate random effects meta-analysis methods. Twenty studies, testing 2978 women (pregnancies), were included. Thirteen studies examining protein to creatinine ratio for the detection of significant proteinuria were included in the multivariate analysis. Threshold values for protein to creatinine ratio ranged between 0.13 and 0.5, with estimates of sensitivity ranging from 0.65 to 0.89 and estimates of specificity from 0.63 to 0.87; the area under the summary receiver operating characteristics curve was 0.69. On average, across all studies, the optimum threshold (that optimises sensitivity and specificity combined) seems to be between 0.30 and 0.35 inclusive. However, no threshold gave a summary estimate above 80% for both sensitivity and specificity, and considerable heterogeneity existed in diagnostic accuracy across studies at most thresholds. No studies looked at protein to creatinine ratio and adverse pregnancy outcome. For albumin to creatinine ratio, meta-analysis was not possible. Results from a single study suggested that the most predictive result, for

significant proteinuria, was with the DCA 2000 quantitative analyser (>2 mg/mmol) with a summary sensitivity of 0.94 (95% confidence interval 0.86 to 0.98) and a specificity of 0.94 (0.87 to 0.98). In a single study of adverse pregnancy outcome, results for perinatal death were a sensitivity of 0.82 (0.48 to 0.98) and a specificity of 0.59 (0.51 to 0.67). The maternal "spot urine" estimate of protein to creatinine ratio shows promising diagnostic value for significant proteinuria in suspected pre-eclampsia. The existing evidence is not, however, sufficient to determine how protein to creatinine ratio should be used in clinical practice, owing to the heterogeneity in test accuracy and prevalence across studies. Insufficient evidence is available on the use of albumin to creatinine ratio in this area. Insufficient evidence exists for either test to predict adverse pregnancy outcome.

Database: Medline

Diagnostic accuracy of urinary spot protein:creatinine ratio for proteinuria in hypertensive pregnant women: Systematic review

Author(s): Cote A.-M.; Lam E.; Firoz T.; Brown M.A.; Von Dadelszen P.; Liston R.M.; Magee L.A.

Source: BMJ; May 2008; vol. 336 (no. 7651); p. 1003-1006

Publication Date: May 2008

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

Available in full text at [The BMJ](#) - from Highwire Press

Abstract:Objective: To review the spot protein:creatinine ratio and albumin:creatinine ratio as diagnostic tests for significant proteinuria in hypertensive pregnant women. Design: Systematic review. Data sources: Medline and Embase, the Cochrane Library, reference lists, and experts. Review methods: Literature search (1980-2007) for articles of the spot protein:creatinine ratio or albumin:creatinine ratio in hypertensive pregnancy, with 24 hour proteinuria as the comparator. Results: 13 studies concerned the spot protein:creatinine ratio (1214 women with primarily gestational hypertension). Nine studies reported sensitivity and specificity for eight cut-off points, median 24 mg/mmol (range 17-57 mg/mmol; 0.15-0.50 mg/mg). Laboratory assays were not well described. Diagnostic test characteristics were recalculated for a cut-off point of 30 mg/mmol. No significant heterogeneity in cut-off points was found between studies over a range of proteinuria. Pooled values gave a sensitivity of 83.6% (95% confidence interval 77.5% to 89.7%), specificity of 76.3% (72.6% to 80.0%), positive likelihood ratio of 3.53 (2.83 to 4.49), and negative likelihood ratio of 0.21 (0.13 to 0.31) (nine studies, 1003 women). Two studies of the spot albumin:creatinine ratio (225 women) found optimal cut-off points of 2 mg/mmol for proteinuria of 0.3 g/day or more and 27 mg/mmol for albuminuria. Conclusion: The spot protein:creatinine ratio is a reasonable "rule-out" test for detecting proteinuria of 0.3 g/day or more in hypertensive pregnancy. Information on use of the spot albumin:creatinine ratio in these women is insufficient.

Database: EMBASE

Protein/creatinine ratio in preeclampsia: A systematic review

Author(s): Papanna R.; Mann L.K.; Kouides R.W.; Glantz J.C.

Source: Obstetrics and Gynecology; Jul 2008; vol. 112 (no. 1); p. 135-144

Publication Date: Jul 2008

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

Abstract:Objective: To estimate the accuracy of the protein/creatinine ratio in predicting 300 mg of protein in 24-hour urine collection in pregnant patients with suspected preeclampsia. Data Sources: Articles were identified through electronic databases (MEDLINE, CINHALL, and Cochrane) using the

terms "preeclampsia," "protein/creatinine ratio," and "diagnosis," during the period January 1966 to October 2007. The relevant citations were hand searched. Methods of Study Selection: Included studies evaluated patients for suspected preeclampsia with a 24-hour urine sample and a protein/creatinine ratio. Only English-language articles were included. Studies including patients with only chronic illness such as chronic hypertension, diabetes mellitus, or renal impairment were excluded. Using the Quality Assessment of Diagnostic Accuracy Studies questionnaire, we created group 1 satisfying all the required criteria and group 2 not satisfying all of it. Two researchers independently extracted the accuracy data. A graph comparing six receiver operating characteristic curves was plotted. Tabulation, Integration, and Results: Twenty-one studies were identified, but only seven met our inclusion criteria (1,717 total patients). Group 1, with three studies, had 510 patients. The studies evaluated different cut points for positivity of protein/creatinine ratio from 130 mg/g to 700 mg/g. For protein/creatinine ratio 130-150 mg/g, sensitivity ranged from 90-99%, and specificity ranged from 33-65%; for protein/creatinine ratio 300 mg/g, sensitivity ranged from 81-98% and specificity ranged from 52-99%; for protein/creatinine ratio 600-700mg/g, sensitivity ranged from 85-87%, and specificity ranged from 96-97%. Conclusion: Random protein/creatinine ratio determinations are helpful primarily when they are below 130-150 mg/g, in that 300 mg or more proteinuria is unlikely below this threshold. Midrange protein/creatinine ratio (300 mg/g) has poor sensitivity and specificity, requiring a full 24-hour urine for accurate results. Higher thresholds have not been adequately studied. © 2008 by The American College of Obstetricians and Gynecologists. Published by Lippincott Williams & Wilkins.

Database: EMBASE

Albuminuria assessed from first-morning-void urine samples versus 24-hour urine collections as a predictor of cardiovascular morbidity and mortality

Author(s): Lambers Heerspink H.J.; De Zeeuw D.; Brantsma A.H.; Bakker S.J.L.; De Jong P.E.; Gansevoort R.T.

Source: American Journal of Epidemiology; Oct 2008; vol. 168 (no. 8); p. 897-905

Publication Date: Oct 2008

Available in full text at [American Journal of Epidemiology](#) - from Oxford University Press ; Collection notes: To access please select Login with Athens and search and select NHS England as your institution before entering your NHS OpenAthens account details.

Available in full text at [American Journal of Epidemiology](#) - from Highwire Press

Abstract: Screening for albuminuria has been advocated because it is associated with cardiovascular morbidity and all-cause mortality. The "gold standard" to assess albuminuria is 24-hour urinary albumin excretion (UAE). Because 24-hour urine collection is cumbersome, guidelines suggest measuring albuminuria in a first morning void, either as urinary albumin concentration (UAC) or adjusted for creatinine concentration, the albumin:creatinine ratio (ACR). To decide which albuminuria measure to use in clinical practice, it is essential to know which best predicts clinical outcome. In a sample representative of the Groningen (the Netherlands) population (n = 3,414), the authors compared UAC, ACR, and UAE as predictors of cardiovascular events and all-cause mortality. During a median follow-up of 7.5 years, which ended December 31, 2005, they observed 278 events (a major adverse cardiovascular event or mortality). The area under the receiver operating characteristic curve predicting events was 0.65 for UAE, 0.62 for UAC (P = 0.06 vs. UAE), and 0.66 for ACR (P = 0.80 vs. UAE; P = 0.01 vs. UAC). When sex-specific subgroups were considered, UAE was superior to UAC in predicting outcome (P = 0.04) for females, whereas, for males as well as females, no difference was found between ACR and UAE. To predict cardiovascular morbidity and all-cause mortality, measuring ACR in a first-morning-void urine sample is a good alternative to measuring 24-hour UAE. © The Author 2008. Published by the Johns Hopkins Bloomberg School of Public Health. All rights reserved.

Database: EMBASE

Diagnostic accuracy of spot urine protein-to-creatinine ratio for proteinuria and its association with adverse pregnancy outcomes in Chinese pregnant patients with pre-eclampsia.

Author(s): Cheung, H C; Leung, K Y; Choi, C H

Source: Hong Kong medical journal = Xianggang yi xue za zhi; Jun 2016; vol. 22 (no. 3); p. 249-255

Publication Date: Jun 2016

Available in full text at [Hong Kong Medical Journal](#) - from Free Access Content

Abstract:International guidelines have endorsed spot urine protein-to-creatinine ratio of >30 mg protein/mmol creatinine as an alternative to a 24-hour urine sample to represent significant proteinuria. This study aimed to determine the accuracy of spot urine protein-to-creatinine ratio in predicting significant proteinuria and adverse pregnancy outcome. This case series was conducted in a regional obstetric unit in Hong Kong. A total of 120 Chinese pregnant patients with pre-eclampsia delivered at Queen Elizabeth Hospital from January 2011 to December 2013 were included. Relationship of spot urine protein-to-creatinine ratio and 24-hour proteinuria; accuracy of the ratio against 24-hour urine protein at different cut-offs; and relationship of such ratio and adverse pregnancy outcome were studied. Spot urine protein-to-creatinine ratio was correlated with 24-hour urine protein with Pearson correlation coefficient of 0.914 ($P < 0.0001$) when the ratio was <200 mg/mmol. The optimal threshold of spot urine protein-to-creatinine ratio for diagnosing proteinuria in Chinese pregnant patients (33 mg/mmol) was similar to that stated in the international literature (30 mg/mmol). A cut-off of 20 mg/mmol provided a 100% sensitivity, and 52 mg/mmol provided a 100% specificity. There was no significant difference in spot urine protein-to-creatinine ratio between cases with and without adverse pregnancy outcome. Spot urine protein-to-creatinine ratio had a positive and significant correlation with 24-hour urine results in Chinese pre-eclamptic women when the ratio was <200 mg/mmol. Nonetheless, this ratio was not predictive of adverse pregnancy outcome.

Database: Medline

The Utility of 12-Hour Urine Collection for the Diagnosis of Preeclampsia: A Systematic Review and Meta-analysis.

Author(s): Stout, Molly J; Conner, Shayna N; Colditz, Graham A; Macones, George A; Tuuli, Methodius G

Source: Obstetrics and gynecology; Oct 2015; vol. 126 (no. 4); p. 731-736

Publication Date: Oct 2015

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

Abstract:To systematically review the literature and synthesize data on the diagnostic performance of a 12-hour urine collection for proteinuria in pregnant women with suspected preeclampsia. We performed a literature search of PubMed, Embase, Scopus, ClinicalTrials.gov, and CINAHL through February 2014 using key words related to gestational hypertension, preeclampsia, and proteinuria. Studies that contained results of both the 12-hour and 24-hour urine collection in the same patients were eligible. Three independent reviewers abstracted test performance characteristics from each study for the performance of a 12-hour urine collection for the diagnosis of proteinuria defined as 300 mg in 24 hours. Diagnostic meta-analysis was performed to obtain summary statistics. Heterogeneity was assessed using the Cochrane Q or I. Receiver operating characteristic curve analysis was used to assess the optimal diagnostic cutpoint for proteinuria from a 12-hour urine collection. Stratified analysis was performed based on whether patients were on bed rest during urine collection. A total of seven studies met inclusion criteria. The 12-hour urine protein was overall

highly predictive of proteinuria on 24-hour urine collection area under receiver operating characteristic curve: 0.97 (95% confidence interval [CI] 0.95-0.98). The pooled sensitivity was 92% (95% CI 86-96) and specificity was 99% (95% CI 75-100). The optimal cutpoint based on the receiver operating characteristic curve was 150 mg of protein on 12-hour collection. A 12-hour urine collection compares favorably with a 24-hour urine collection for the diagnosis of proteinuria in women with suspected preeclampsia and has the advantage of convenience and improved clinical efficiency.

Database: Medline

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

Spot protein/creatinine ratio in preeclampsia as an alternative for 24-hour urine protein

Author(s): Demirci O.; Kumru P.; Arinkan A.; Ardic C.; Arisoy R.; Tozgir E.; Tandogan B.; Ayvaci H.; Tugrul A.S.

Source: Balkan Medical Journal; 2015; vol. 32 (no. 1); p. 51-55

Publication Date: 2015

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

Abstract:Background: Proteinuria is a major component of preeclampsia. Urine protein measurement after 24-hour urine collection is the traditional standard method for the detection of proteinuria. It is time consuming. As an alternative, random spot sampling for a urine protein to creatinine (P/C) ratio has been investigated. Aims: The aim of the study was to determine the diagnostic accuracy of the protein to creatinine ratio (P/C) compared with 24-hour urine collection for the detection of remarkable proteinuria and to evaluate the P/C ratio for different proteinuria ranges in patients with preeclampsia. Study Design: Case-control study. Methods: Two hundred and eleven pregnant women who met the criteria of preeclampsia comprised the study group and fifty

three pregnant women were taken as the control group. Spot urine specimens for measuring P/C ratio were obtained taken immediately before 24-hour urine collection. The correlation between the P/C ratio in the spot urine samples and urinary protein excretion in the 24-hour collections was examined using the Spearman correlation test. Results: It was found a good positive correlation between the P/C ratio and 24-hour protein excretion, with a correlation coefficient (r) of 0.758. The best cut-off which gave the maximum area under the curve was 0.45 for 300 mg, 0.9 for 1000 mg, 1.16 for 2000 mg, 1.49 for 3000 mg, 2.28 for 4000 mg and 2.63 for 5000 mg per 24h. A P/C ratio above 0.9 strongly predicts significant proteinuria for more than 1 gram (AUC 0.97, 95% CI: 0.94-0.99 and sensitivity, specificity, positive and negative predictive value of 91%, 95.4%, 95.2%, and 91.2%, respectively). Conclusion: The P/C ratio can be used as a screening test as a good predictor for remarkable proteinuria. The P/C ratio seems to be highly predictive for diagnosis to detect proteinuria over one gram and it could be used as a rapid alternative test in preeclamptic patients not to delay implementation treatment. Copyright © 2015 Trakya University Faculty of Medicine.

Database: EMBASE

Utilization of 4 and 8 hr urine collections compared to spot urine protein/creatinine (P/C) ratio and 24 hr urine protein collections for diagnosis of preeclampsia

Author(s): Hatfield T.; Stephenson M.; Chung J.; Wing D.

Source: American Journal of Obstetrics and Gynecology; Jan 2015; vol. 212 (no. 1)

Publication Date: Jan 2015

Abstract:OBJECTIVE: Criteria for the diagnosis of proteinuria in patients with preeclampsia have long relied on the gold standard 24 hr urine protein quantification. Recent guidelines suggest the use of a spot P/ C ratio of >300mg is sufficient to meet diagnostic criteria for proteinuria despite varied results among studies. We sought to determine the predictability of a shorter collection period (4 or 8 hrs) as compared to and in conjunction with a spot P/C ratio to predict 24 hr protein quantification. STUDY DESIGN: A prospective study of 117 subjects from Long Beach Memorial and University of California Irvine Medical Centers. Subjects 24-42 weeks undergoing inpatient evaluation for preeclampsia with a 24 hr urine collection were eligible for participation. A single spot P/C ratio was obtained on admission followed by the 24 hr urine collection analyzed in three timed samples (1st 4 hrs, 2nd 4 hrs and last 16 hrs). Protein (mg) was quantified from each sample and subsequently summed to obtain the 8hr and 24hr result. 4 and 8 hr urine protein collections were multiplied by 6 and 3 respectively to give a projected 24 hour value. Values >300mg on any test met criteria for proteinuria. RESULTS: 88 of 117 subjects had complete samples for analysis. Sensitivity, specificity, PPV, NPV of the timed samples and P/C ratios and are shown in Table 1. Timed collections of both 4 and 8 hrs were more predictive than the P/C ratio alone. Utilizing the initial P/C ratio or timed collection increased the predictability of the 24 hr urine collection beyond that of either test alone. CONCLUSION: These findings suggest that the diagnosis of preeclampsia could be obtained more efficiently and reliably with a shorter urine collection interval. This would be particularly useful for those patients in which the P/C ratio is indeterminate or close to the 300mg threshold. Patients could obtain a diagnosis of preeclampsia in a more timely fashion for improved pregnancy management. (Table presented) .

Database: EMBASE

A random protein-creatinine ratio accurately predicts baseline proteinuria in early pregnancy

Author(s): Hirshberg A.; Draper J.; Curley C.; Schwartz N.; Sammel M.D.

Source: Journal of Maternal-Fetal and Neonatal Medicine; Dec 2014; vol. 27 (no. 18); p. 1834-1838

Publication Date: Dec 2014

Available in full text at [Journal of Maternal-Fetal and Neonatal Medicine, The](#) - from Taylor & Francis

Abstract:Objective: Data surrounding the use of a random urine protein:creatinine ratio (PCR) in the diagnosis of preeclampsia is conflicting. We sought to determine whether PCR in early pregnancy can replace the 24-hour urine collection as the primary screening test in patients at risk for baseline proteinuria. Methods: Women requiring a baseline evaluation for proteinuria supplied a urine sample the morning after their 24-hour collection. The PCR was analyzed as a predictor of significant proteinuria (>150mg). A regression equation to estimate the 24-hour protein value from the PCR was then developed. Results: Sixty of 135 subjects enrolled completed the study. The median 24-hour urine protein and PCR were 90mg (IQR: 50-145) and 0.063 (IQR: 0.039-0.083), respectively. Fifteen patients (25%) had significant proteinuria. PCR was strongly correlated with the 24-hour protein value ($r=0.99$, $p<0.001$) and highly predictive of significant proteinuria (AUC=0.86). A PCR cut-point of 0.079 yielded a sensitivity of 93.3% and a specificity of 57.8%. The resulting regression equation [total protein=46.5+904.2*PCR] accurately estimates the actual 24-hour protein (95% CI: +/-88mg). Conclusion: A random urine PCR accurately estimates the 24-hour protein excretion in the first half of pregnancy and can be used as the primary screening test for baseline proteinuria in at-risk patients. Copyright © 2014 Informa UK Ltd. All rights reserved.

Database: EMBASE

Variation of urinary protein to creatinine ratio during the day in women with suspected pre-eclampsia

Author(s): Verdonk K.; Niemeijer I.C.; Steegers E.A.P.; Visser W.; Van Den Meiracker A.H.; Hop W.C.J.; De Rijke Y.B.

Source: BJOG: An International Journal of Obstetrics and Gynaecology; Dec 2014; vol. 121 (no. 13); p. 1660-1665

Publication Date: Dec 2014

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

Abstract:Objective: To investigate the stability throughout the day of the protein to creatinine ratio (PCR) in spot urine, to demonstrate whether the PCR is a valid alternative for 24-hour protein investigation in pregnant women. Design: Prospective study. Setting: Tertiary referral university centre. Population: Women suspected of having pre-eclampsia, admitted to the Erasmus Medical Centre. Methods: Twenty-four-hour urine collections and simultaneously three single voided 5-ml aliquots were obtained at 8 a.m., 12 a.m. (noon) and 5 p.m. A PCR was measured in each specimen and compared with the 24-hour protein excretion. Main outcome measures: The 24-hour proteinuria and PCR measured in spontaneous voids. Results: The PCRs correlated strongly with each other and with the 24-hour protein excretion but did show variation throughout the day (mean coefficient of variation 36%; 95% confidence interval 31-40%). The coefficient of variation was unrelated to the degree of 24-hour proteinuria. Receiver operating characteristics curves to discriminate between values below and greater than or equal to the threshold of 0.3 g protein per 24-hour had an area under the curve of respectively 0.94 (8 a.m.), 0.96 (noon) and 0.97 (5 p.m.). Sensitivities at 8 a.m., noon and 5 p.m. were respectively 89%, 96% and 94%; specificities were 75%, 78% and 78% with the proposed PCR cut-off of 30 mg/mmol (0.26 g/g) (National Institute for Health

and Care Excellence guidelines). There is no evidence of a difference between the three measurement times regarding the sensitivities and specificities. Conclusion: The PCR determined in spot urine varies throughout the day but is a valid alternative for 24-hour urine collections in pregnant women. It is especially useful to rapidly identify clinically relevant proteinuria. Copyright © 2014 Royal College of Obstetricians and Gynaecologists.

Database: EMBASE

Appropriate methods of urine protein estimation for predicting significant proteinuria in pregnancy complicated by hypertension

Author(s): Nipanal H.V.; Maurya D.; Ananthanarayanan P.H.

Source: BJOG: An International Journal of Obstetrics and Gynaecology; Apr 2014; vol. 121 ; p. 97

Publication Date: Apr 2014

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

Abstract: Introduction Significant proteinuria in pregnancy is defined as presence of 300 mg or more of protein in 24-h urine. The gold standard 24-h urine protein estimation has errors related to variable and incomplete collection. It is inconvenient and delays diagnosis. Various methods used like sulphosalicylic acid test, urine dipstick test and protein to creatinine ratio. The objectives were to compare efficacy of: sulphosalicylic acid test, urine dipstick test and spot urine protein to creatinine ratio with 24-h protein estimation and to establish the cut-off value of urine protein to creatinine ratio in predicting significant proteinuria, in pregnancy complicated by hypertension. Methods Comparative study consisting of single group, of 509 admitted pregnant women after 20 weeks of gestation with hypertension of >140/90 mm Hg. Women with pre-existing renal diseases, diabetes or urinary tract infection were excluded. First voided morning urine sample was taken for sulphosalicylic acid test, dipstick test, urine protein and creatinine estimation and urine culture. Subsequent urine samples were collected for 24 h protein estimation. Urine protein estimation was done by colorimetric method and creatinine estimation by modified Jaffe's method using auto analyzer. The receiver-operator characteristics (ROC) was used for comparison. With >300 mg proteinuria as true positive and <300 mg proteinuria as true negative. Results The mean age of subjects was 25.09 years (range 18- 39 years). For significant proteinuria sulphosalicylic acid test with 1+ proteinuria has sensitivity, specificity, positive and negative predictive value of 59%, 48%, 39%, 67% where as 2+ proteinuria has 44%, 88%, 75% and 67% respectively. When dipstick test is used it is 71%, 52%, 54%, 70% for 1+ proteinuria and 49%, 87%, 75% and 69% for 2+ proteinuria respectively. An excellent correlation coefficient ($r = 0.93$) existed with 95% confidence interval between spot urine, protein to creatinine ratio (mg/mg) and 24-h urine protein (mg/day) as calculated by Pearson's method. Coefficient of determination (r^2) is 0.86 ($P < 0.0001$). The area under the ROC curve is 0.995 (95% confidence interval). The cut off value of 0.285 has sensitivity 100%, specificity 99.65%, positive predictive value 99.56%, negative predictive value 100%. Conclusion Sulphosalicylic acid test and dipstick test are poor in predicting significant proteinuria. An excellent degree of correlation existed between the spot urine protein to creatinine ratio and 24 h protein in hypertensive disorders of pregnancy. The cut-off value of spot urine protein to creatinine ratio is 0.285 mg protein/mg creatinine. The level below this is not associated with significant proteinuria and further testing is unnecessary.

Database: EMBASE

The protein-to-creatinine ratio for the prediction of significant proteinuria in patients at risk for preeclampsia: a meta-analysis.

Author(s): Sanchez-Ramos, Luis; Gillen, Geoffrey; Zamora, Javier; Stenyakina, Anastasia; Kaunitz, Andrew M

Source: Annals of clinical and laboratory science; 2013; vol. 43 (no. 2); p. 211-220

Publication Date: 2013

Available in full text at [Annals of Clinical and Laboratory Science](#) - from Highwire Press

Abstract:To investigate the diagnostic accuracy of the protein-to-creatinine ratio from random urine collections to confirm the presence of proteinuria in women being evaluated for preeclampsia. Eligible studies, published between January 1966 and April 2010, were retrieved through general bibliographic databases. Accuracy of the protein-to-creatinine ratio was estimated compared with a 24-hour urine collection. Pooled estimates of diagnostic measures were calculated. A random-effects bivariate model was employed. Twenty-four trials with 3,186 aggregate participants met inclusion criteria. Pooled sensitivities and specificities were 91.0% (95%CI 87.0 - 93.9) and 86.3% (95% CI 78.4 - 91.7) respectively. Pooled positive likelihood ratio was 6.7 (95% CI 4.1, 10.9) and pooled negative likelihood ratio 0.10 (95%CI 0.07, 0.16). Meta-regression analysis found that test accuracy was not affected by any of the co-variables explored. A random urine protein-to-creatinine ratio provides useful evidence to rule out the presence of significant proteinuria in patients at risk for preeclampsia. It appears that a cut-off value of > 0.30 is associated with the best accuracy. The protein-to-creatinine ratio from a random urine sample provides useful evidence to rule out the presence of significant proteinuria in patients at risk for preeclampsia.

Database: Medline

Comparison of 24-hour urinary protein and protein-to-creatinine ratio in women with preeclampsia

Author(s): Kayatas S.; Erdogan E.; Cakar E.; Yilmazer V.; Arinkan S.A.; Dayicioglu V.E.

Source: European Journal of Obstetrics Gynecology and Reproductive Biology; Oct 2013; vol. 170 (no. 2); p. 368-371

Publication Date: Oct 2013

Abstract:Objective: To compare the spot urine protein-to-creatinine (P/C) ratio and 24-hour urine protein excretion in pregnant women with preeclampsia and also to determine the best discriminator values of the spot P/C ratios for 300 mg and 2000 mg protein per 24 h. Study design: Prospective study of 200 pregnant women with new onset hypertension at or greater than 140/90 mmHg after 20 weeks of gestation. Women were instructed to collect urine during a 24-hour period, and after the 24-hour urine sample collection was completed a mid-stream urine specimen was obtained for P/C ratio determination. The correlation between 24-hour urine protein excretion and spot urine P/C ratio was calculated. The receiver operating characteristic (ROC) curve was used to identify the cut-off values of the spot P/C ratios for 300 mg and 2000 mg protein per 24 h. Areas under ROC curves were calculated. Results: There was a significant correlation between 24-hour protein excretion and the urine P/C ratio ($r = 0.828$, $p < 0.001$). For 2000 mg/day were 0.74 (95% CI 0.66-0.80) and 0.99 (95% CI 0.95-0.99), respectively. Conclusions: Spot P/C ratio is a poor predictor of 24-hour proteinuria but can predict proteinuria >2000 mg better than 300-2000 mg. © 2013 Elsevier Ireland Ltd. All rights reserved.

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

Correlation of random urinary protein to creatinine ratio in 24-hour urine samples of pregnant women with preeclampsia

Author(s): Mohseni S.M.; Moez N.; Abbasi M.; Khodashenas Z.; Naghizadeh M.M.

Source: Journal of Family and Reproductive Health; Jun 2013; vol. 7 (no. 2); p. 95-101

Publication Date: Jun 2013

Available in full text at [Journal of Family and Reproductive Health](#) - from ProQuest

Available in full text at [Journal of Family and Reproductive Health](#) - from National Library of Medicine

Available in full text at [Journal of Family and Reproductive Health](#) - from Free Access Content

Abstract:Objective: To determine the value of random urinary protein to creatinine ratio (UPCR) for diagnosis of proteinuria in pregnant women with preeclampsia. Preeclampsia is the most common complication of pregnancy and one of the main causes of maternal mortality. So, early diagnosis of preeclampsia is very important. Materials and methods: In this cross-sectional study 66 pregnant women suspected preeclampsia at >24 week of gestational age and BP>140/90 mm/Hg were checked by two urine samples of 10am and 4pm to determine random UPCR, as well as a 24-hour urine sample to evaluate 24-hour protein excretion. Results: The result revealed that 74.2% of the studied population had significant proteinuria. There was a correlation between UPCR and 24-hour urine protein excretion. Pearson's correlation coefficient was 0.502 at 10am and 0.428 at 4pm. The best cutoff for the random urine protein to creatinine ratio at 10am was 0.470 with sensitivity and specificity equal to 87.5% and 84.2%, respectively. The best cutoff for the random UPCR at 4pm was

0.595 with sensitivity and specificity equal to 91.7% and 94.7%, respectively. Conclusion: Result of 24-hour urine collection showing random UPCR is considered as an appropriate situated method for emergency time.

Database: EMBASE

Diagnostic accuracy of spot protein creatinine ratio(PCR) in comparison to 24 hour urine protein

Author(s): Chandrasekaran N.; Bhide A.

Source: Archives of Disease in Childhood: Fetal and Neonatal Edition; Apr 2013; vol. 98

Publication Date: Apr 2013

Available in full text at [Fetal and Neonatal](#) - from Highwire Press

Abstract:Objective To review the use of spot protein creatinine ratio as a diagnostic test for preeclampsia in comparison to 24 hour urine. Methods This was a retrospective observational study on 100 pregnant women referred to the day assessment unit with new onset hypertension. A spot test for PCR and a 24 hour collection were commenced at the same time. Patients with renal disease, proven UTI and diabetes were excluded. Data was analysed using Microsoft Excel. Significant proteinuria was defined as a PCR value of 30 mg/mmol and 300 gms/24 hours or more with 24 hour urine. With 24 hour urine as a standard, having excluded the under and over collections, the co-relation between PCR and 24 hour urine protein was determined by Spearman correlation coefficients. The sensitivity, specificity, NPV and PPV were calculated. Results Of the 100 women, 7 were excluded due to proven UTI 43 patients were subsequently excluded as the 24 hour urine collections were incomplete as deemed by the urinary creatinine excretion. Among the rest of the 50 patients, The PCR values were found to correlate well with the 24 hour collection results. The test is found to have a sensitivity of 90% and a specificity of 84% with a positive likelihood ratio (LR) of 5.2 and a negative LR of 0.1. Conclusion The 24 hr collection is cumbersome, time consuming and there can be errors in collection, while the spot PCR test compares very well to the 24 hour protein test, is easier to perform.

Database: EMBASE

Random urine protein/creatinine ratio readily predicts proteinuria in preeclampsia.

Author(s): Park, Jung-Hwa; Chung, Dawn; Cho, Hee-Young; Kim, Young-Han; Son, Ga-Hyun; Park, Yong-Won; Kwon, Ja-Young

Source: Obstetrics & gynecology science; Jan 2013; vol. 56 (no. 1); p. 8-14

Publication Date: Jan 2013

Available in full text at [Obstetrics and Gynecology Science](#) - from National Library of Medicine

Abstract:To assess the diagnostic accuracy of random urine protein-creatinine (P/C) ratio for prediction of significant proteinuria in preeclampsia as an alternative to the time-consuming 24-hour urine protein collection. Retrospective record analysis was performed on 140 pregnant women who were admitted with suspicion for preeclampsia from January 2006 to June 2011. Random urine protein and/or 24-hour urine protein levels were assessed and their correlation to random urine P/C ratio and 24-hour urine protein excretion was evaluated. Out of 140 patients, random urine P/C ratio or/and 24-hour urine protein was performed in 79 patients to evaluate significant proteinuria. Of 79 patients, 46 (58%) underwent both tests whereas in 33 women (42%) 24-hour urine collection was not available due to urgent delivery. In 39 cases (85%), significant proteinuria (≥ 300 mg/24 hr) was detected with 6 cases (13%) having values over 5,000 mg/24 hr, corresponding to the diagnosis of severe preeclampsia. Random urine P/C ratio highly correlated with 24-hour urine protein excretion ($r=0.823$, $P<0.01$). The optimal random urine P/C ratio cutoff points were 0.63 and 4.68 for 300

mg/24 hr and 5,000 mg/24 hr of protein excretion, respectively. with each sensitivity, specificity, and positive and negative predictive values of 87.1%, 100%, 100%, and 58.3%; and 100%, 85%, 50%, and 100%, for significant and severe preeclampsia, respectively. Random urine P/C ratio is a reliable indicator of significant proteinuria in preeclampsia and may be better at providing earlier diagnostic information than the 24-hour urine protein excretion with more accuracy than the urinary dipstick test.

Database: Medline

Spot urinary protein analysis for excluding significant proteinuria in pregnancy.

Author(s): Wilkinson, C; Lappin, D; Vellinga, A; Heneghan, H M; O'Hara, R; Monaghan, J

Source: Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology; Jan 2013; vol. 33 (no. 1); p. 24-27

Publication Date: Jan 2013

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

Abstract:The aim of this research was to compare the accuracy of urinary protein/creatinine ratio (PCR) and albumin/creatinine ratio (ACR) in defining optimal cut-off points to rule-out significant proteinuria (>300 mg/24 h) in pregnancy. The secondary outcome measure was to determine the investigation of choice to evaluate proteinuria used by maternity units in the UK. PCR and ACR were calculated on first (PCR1, ACR1) void urine samples of the 24-hour urinary protein collection (24UP). Sensitivity and specificity was calculated for different cut-off points for PCR1 and ACR1 to rule-out significant proteinuria. An online survey was sent to RCOG members questioning them on their investigation of choice to evaluate proteinuria. We concluded from our results that both PCR and ACR are good rule-out tests for significant proteinuria in pregnancy using cut-off points of <20 mg/mmol and <2.5 mg/mmol. PCR is the investigation of choice in 56% of UK units studied.

Database: Medline

PP024. Random urine albumin: Creatinine ratio in high-risk pregnancy - Is it clinically useful?

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

Source: Pregnancy hypertension; Jul 2012; vol. 2 (no. 3); p. 253-255

Publication Date: Jul 2012

Abstract:The albumin:creatinine ratio (ACr) is the newest of available methods of proteinuria assessment in pregnancy. Published cut-offs for detection of ≥ 0.3 g/d proteinuria vary from 2mg/mmol to 8mg/mmol. Up to 20% of women have an elevated ACr in pregnancy but normal outcome. In addition, it is our impression that the urine albumin component of the ACr is frequently below the detection limit of the assay. To evaluate the frequency with which a measurable ACr can be obtained in a high-risk outpatient maternity population. In this prospective cohort study, consecutive inpatients or outpatients (attending primarily morning high-risk maternity clinics) were evaluated at a tertiary care facility. Random midstream urine samples were obtained as part of normal clinical care. In the hospital laboratory, urinary albumin was measured using an immunoturbidimetric method, and urinary creatinine by an enzymatic method, both on an automated analyser (Vitros[®] 5,1 FS or Vitros[®] 5600, Ortho-Clinical Diagnostics, Rochester NY). ACr was calculated for samples with measurable urine albumin, and for samples with albumin below the assay range, ACr was calculated using the assay cut-off for albumin of 6.00mg/L. One hundred and sixty women (81.9% outpatients) were screened at one/more antenatal visits, providing a total of 233 urine samples for analysis. 68 (29.2%) urine samples were dilute (i.e., had urinary creatinine 2mg/mmol and 34 (29.1%) had ACr >8mg/mmol. For the 116/233 (49.8%) samples with urine

albumin below the assay detection limit, ACr was calculated using 6.00mg/L as the value for urine albumin. All of the 55 dilute samples had an ACr >2mg/mmol and 3 (2.6%) had an ACr >8mg/mmol. If dilute samples were excluded, none of the remaining 61 samples had an ACr value >2mg/mmol. Among a population of pregnant women attending primarily morning high-risk maternity clinics, urine is often dilute and urine albumin is often below the assay detection limit. This combination may result in uninterpretable ACr values if an ACr cut-off of 2mg/mmol is used as the decision limit for proteinuria ≥ 0.3 g/d. ACr may be best performed on first voided (concentrated) urine if ACr is used to assess proteinuria in pregnancy. Copyright © 2010. Published by Elsevier B.V.

Database: Medline

Random urine albumin: Creatinine ratio in high risk pregnancy - Is it clinically useful?

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

Source: Pregnancy Hypertension; Jul 2012; vol. 2 (no. 3); p. 253-255

Publication Date: Jul 2012

Abstract: Introduction: The albumin:creatinine ratio (ACr) is the newest of available methods of proteinuria assessment in pregnancy. Published cut-offs for detection of >0.3 g/d proteinuria vary from 2 mg/mmol to 8 mg/mmol. Up to 20% of women have an elevated ACr in pregnancy but normal outcome. In addition, it is our impression that the urine albumin component of the ACr is frequently below the detection limit of the assay. Objectives: To evaluate the frequency with which a measurable ACr can be obtained in a high-risk outpatient maternity population. Methods: In this prospective cohort study, consecutive inpatients or outpatients (attending primarily morning high-risk maternity clinics) were evaluated at a tertiary care facility. Random midstream urine samples were obtained as part of normal clinical care. In the hospital laboratory, urinary albumin was measured using an immunoturbidimetric method, and urinary creatinine by an enzymatic method, both on an automated analyser (Vitros 5,1 FS or Vitros 5600, Ortho-Clinical Diagnostics, Rochester NY). ACr was calculated for samples with measurable urine albumin, and for samples with albumin below the assay range, ACr was calculated using the assay cut-off for albumin of 6.00 mg/L. Results: One hundred and sixty women (81.9% outpatients) were screened at one/more antenatal visits, providing a total of 233 urine samples for analysis. 68 (29.2%) urine samples were dilute (i.e., had urinary creatinine 2 mg/mmol and 34 (29.1%) had ACr >8 mg/mmol. For the 116/233 (49.8%) samples with urine albumin below the assay detection limit, ACr was calculated using 6.00 mg/L as the value for urine albumin. All of the 55 dilute samples had an ACr >2 mg/ mmol and 3 (2.6%) had an ACr >8 mg/mmol. If dilute samples were excluded, none of the remaining 61 samples had an ACr value >2 mg/mmol. Conclusion: Among a population of pregnant women attending primarily morning high-risk maternity clinics, urine is often dilute and urine albumin is often below the assay detection limit. This combination may result in uninterpretable ACr values if an ACr cut-off of 2 mg/mmol is used as the decision limit for proteinuria >0.3 g/d. ACr may be best performed on first voided (concentrated) urine if ACr is used to assess proteinuria in pregnancy.

Database: EMBASE

Random urine protein to creatinine ratio as a diagnostic tool of significant proteinuria in pre-eclampsia

Author(s): Basharat A.; Ayub S.; Usmani A.T.

Source: BJOG: An International Journal of Obstetrics and Gynaecology; Jun 2012; vol. 119 ; p. 22

Publication Date: Jun 2012

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

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

Abstract:Objective: To determine the frequency of correct results of random urine protein:creatinine ratio in comparison to 24-h urine protein estimation in the diagnosis of significant proteinuria in preeclampsia. Study design: Cross-sectional study. Setting: The study was carried out at Department Of Obstetrics & Gynaecology, Benazir Bhutto Hospital (RGH), Rawalpindi. Methods: Hundred and fifty pregnant women with preeclampsia defined as a BP > 140/90 and 1+ proteinuria at a gestational age >20 weeks were recruited through outpatient and emergency department by performing a dipstick examination. The first sample on the first post-admission day provided a spot midstream urine sample for urine P:C ratio. From the next voided specimen till the first sample on next morning were collected for a 24-h urinary protein determination. Results: The mean age of the patients was 27.56 +/- 4.4 years and the mean gestational age was 34.9 +/- 2.87 weeks. 115 (76.67%) patients had positive 24-h urine protein test for significant proteinuria. Out of these 115 (100%) also had a positive spot urine protein creatinine ratio test and none (0%) had a negative spot urine protein creatinine ratio test. Thirty-five (23.3%) patients had negative 24-h urine protein test for significant proteinuria. Out of these 1 (2.8%) had a positive spot urine protein creatinine ratio test and 34 (97.2%) had a negative spot urine protein creatinine ratio test. Spot urine protein creatinine ratio test had an accuracy of 99.3%. The mean 24-h urine protein of the patients was 1909.5 +/- 1437 mg/day and the mean spot urine protein creatinine ratio was 1.85 +/- 1.5. Both had a positive linear correlation, which was statistically significant (Pearson Correlation coefficient 0.896; P = 0.00). The calculated sensitivity and specificity of the Spot urine protein creatinine ratio test in comparison to 24-h urine protein test was 100% and 97.14% respectively and a positive predictive value (PPV) and negative predictive value (NPV) of 99.1% and 100% respectively. Conclusion: We conclude that the P:C in spot urine specimens is an accurate method to estimate the protein excretion in urine and there is a strong correlation between the protein:creatinine ratio in a random urine sample and 24-h protein excretion.

Database: EMBASE

Creatinine ratio and preeclampsia

Author(s): Maldonado A.E.

Source: Journal of Perinatal Medicine; Nov 2011; vol. 39

Publication Date: Nov 2011

Abstract:OBJECTIVE: To evaluate the protein/creatinine ratio (PCR) in urine for preeclampsia diagnosis in women admitted for hypertensive disorders of pregnancy (HDP). MATERIAL AND METHODS: Prospective study of 365 women admitted for HDP between January 2008 and January 2011. PCR was determined in urine discarding the first morning micturition and proteinuria from the urine of the last 24 hours. 300mg was taken for preeclampsia diagnosis. RESULTS: A total of 246 (67%) women were classified as preeclampsia. ROC curve analysis shows 0.15g/g as the best cut for PCR, but 0.30 has a PPV 99% and confirms the presence of proteinuria and 0.10 with a NPV 100% rules out proteinuria. CONCLUSION: There is good correlation between the PCR and 24h proteinuria.

Preeclampsia was 4 times more likely with PCR >0.15g/g, the best cutoff point that correlates with proteinuria. A PCR 0.30g/g has high specificity and assumes proteinuria. A PCR 0.10g/g rules out proteinuria.

Database: EMBASE

A comparison of 4- and 24-hour urine samples for the diagnosis of proteinuria in pregnancy

Author(s): Amirabi A.; Danaii S.

Source: Iranian Journal of Medical Sciences; Sep 2011; vol. 36 (no. 3); p. 167-171

Publication Date: Sep 2011

Available in full text at [Iranian Journal of Medical Sciences](#) - from National Library of Medicine

Available in full text at [Iranian Journal of Medical Sciences](#) - from ProQuest

Available in full text at [Iranian Journal of Medical Sciences](#) - from Free Access Content

Abstract:Background: Preeclampsia is a serious complication of pregnancy, and it is vital to diagnosis the condition as early as possible. Proteinuria is an important symptom of preeclampsia, and repeated urine analysis to screen for the condition is part of the standard antenatal care. The purpose of this study was to determine the correlation between 4- and 24-hour urine total protein values to examine whether the 4-hour urine samples could be used for the diagnosis of proteinuria in hypertensive disorders of pregnancy. Methods: A cross-sectional study was performed on 110 pregnant (after gestational week 20 of pregnancy) patients who were hypertensive (blood pressure >140/90 mmHg) and had proteinuria as defined by positive urinary protein of at least 1+ in dipstick. Patients' urine samples were collected over 24 hours; the first 4 hours were collected separately from the next 20-hours. Patients, who did not collect the 24-hour urine, were excluded from the study. One hundred patients met the criteria, and were included in the study. The urine volume, total protein and creatinine levels of 4- and 24-hours samples were measured. The correlation between 4-hour and 24-hour samples was examined using Pearson correlation test. Results: Of the 100 patients, 42 had no proteinuria, 44 had mild proteinuria, and 14 had severe proteinuria. The urine protein values of 4-hour samples correlated with those of the 24- hours samples for patients with mild and severe forms of the disease ($P<0.001$, $r=0.86$). Conclusion: This study showed there was a correlation between 4-hour and 24-hour urine proteins. The finding indicates that a random 4-hour sample might be used for the initial assessment of proteinuria.

Database: EMBASE

Protein/creatinine ratio on random urine samples for prediction of proteinuria in preeclampsia

Author(s): Fatemeh V.; Sedigheh A.; Zohreh Y.; Faezeh P.; Pouran M.

Source: Clinical Biochemistry; Sep 2011; vol. 44 (no. 13)

Publication Date: Sep 2011

Abstract:Introduction: Because of the importance of preeclampsia and proteinuria in pregnancy, a fast and simple diagnostic method is needed. The most prevalent and gold standard quantitative assessment of the amount of protein excreted in the urine for the diagnosis of preeclampsia is a 24-hour urine collection. However, the collection and analysis of 24-hour urine specimens are time consuming for both the patient and the laboratory. The aim of this study is evaluating protein/creatinine ratio on random urine samples for prediction of proteinuria in preeclampsia. Materials and methods: This study is a cross-sectional descriptive, analytical and prospective study. This study was performed on 150 pregnant women who were hospitalized as preeclampsia in Ghaem Hospital during 2006. At first, a 24-hour urine sample was collected for each patient to

determine protein/creatinine ratio. Then, 24-hour urine collection was analyzed for the evaluation of proteinuria. Statistical analysis was performed with SPSS software. Results: A total of 150 patients entered the study. There was a significant relation between the 24-hour urine protein and protein/creatinine ratio ($r=0.659$, $P<0.001$). Conclusion: Since the measurement of protein/creatinine ratio is more accurate, reliable, and cost-effective, it can be replaced by the method of measurement of the 24-hour urine protein.

Database: EMBASE

Evaluation of spot urine protein-creatinine ratio to predict significant proteinuria during pregnancy

Author(s): Garcia de Guadiana L.; Gonzalez M.; Martin E.; Albaladejo M.D.; Martinez J.; Lopez R.

Source: Clinical Chemistry and Laboratory Medicine; May 2011; vol. 49

Publication Date: May 2011

Abstract:Background. To assess the diagnostic performance of the spot urine protein/creatinine (P/C) ratio to predict the absence or presence of significant proteinuria (3300 mg per 24 hours) among outpatient pregnant women with suspected or previous diagnosis of preeclampsia. Methods. P/C ratio was calculated in 106 single voided urine samples, obtained after the completion of the 24-hour collection, from 66 outpatient pregnant women admitted to the Maternal Fetal Care Unit to follow-up of hypertension gestational. ROC curves analysis was used to evaluate the diagnostic performance and to determinate the best cutoff to predict the absence or presence of significant proteinuria. Results. Significant proteinuria on 24 hour collection urine was identified in 31 urines from 22 pregnant women. ROC curves analysis revealed an AUC for spot P/C ratio of 0,838, greater than urine dipstick (0,629). No single P/C ratio cutoff was appropriate to rule-out or predict significant proteinuria; however, use of dipstick and spot urine P/C ratio, with two cutoffs, 120 mg/g to predict the absence of significant proteinuria and 240 mg/g to confirm it, clasified correctly 44,3% of urines and avoided the collection of 24 hours urine in 51% of the cases. Conclusions. Spot urine P/C ratio, in conjunction with dipstick urianalysis, is a useful test in the initial screen for rule-out and predict significant proteinuria in outpatient pregnant women with hypertensive pregnancy or preeclampsia, but it should not be used as an alternative to 24-hour total protein evaluation in midrange P/C ratio, requiring a full 24-hour urine for accurate Results.

Database: EMBASE

Prediction of proteinuria and microalbuminuria in diabetic pregnancies with a random single void.

Author(s): Eddib, Abeer; Allaf, M Baraa; Ogunleye, Oluseyi; Rodgers, Bruce

Source: The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians; Apr 2011; vol. 24 (no. 4); p. 583-586

Publication Date: Apr 2011

Available in full text at [Journal of Maternal-Fetal and Neonatal Medicine, The](#) - from Taylor & Francis

Abstract:To determine whether a single urine specimen could effectively replace the 24 hour (24-h) urine collection in screening for microalbuminuria and proteinuria in pregnant women with pregestational diabetes. A total of 42 pregnant women with pregestational diabetes mellitus were involved in the eventual analysis. Demographic and clinical variables were collected and analyzed. Urinary Protein (P) to Creatinine (Cr) ratio and microalbumin (MA) to Cr ratios were measured for the spot sample, and the total P, total MA, and serum Cr were measured for the 24-h urine sample. Analysis was done using linear regression and the Pearson correlation coefficient (r). Mean maternal

age was 30.8 years, and the mean gestational age at collection was 19.8 weeks. A strong correlation exists between the spot MA to Cr value and 24-h MA, with an $r=0.81$ ($P<0.0001$). The association between the spot P to Cr ratio and 24-h urinary P was not as strong, $r=0.58$ ($P<0.0001$). A strong association between spot MA to Cr ratio and 24-h urinary microalbuminuria may suggest a predictive role for random urine assessment of MA in pregnant pregestational diabetic patients. However, based on our data, the spot P to Cr ratio may be inadequate for assessing proteinuria in pregestational diabetic pregnancies.

Database: Medline

A systematic review and meta-analysis of the diagnostic accuracy of the spot urinary Protein Creatinine Ratio (PCR) and the spot urinary Albumin Creatinine Ratio (ACR) in the management of suspected pre-eclampsia

Author(s): Morris R.K.; Kilby. M.D.; Doug M.

Source: Reproductive Sciences; Mar 2011; vol. 18 (no. 3)

Publication Date: Mar 2011

Abstract:Objective To determine the diagnostic accuracy of the ACR and PCR compared to the 24 hTU and how well they predict adverse outcomes for mother and baby in women with suspected pre-eclampsia. Methods Systematic searches in Medline, Embase, Cinahl, Cochrane Library, MEDION, Web of Science reference lists, and contact with experts. All studies reporting on ACR and/or PCR in hypertensive pregnant women with suspected pre-eclampsia compared to 24 hour urine collection or to predict adverse outcome and with data for a 2x2 table were selected. No language restrictions. Independent selection of studies, data extraction, and quality assessment. Bivariate meta-analysis was conducted when appropriate. Results A total of 3111 citation were identified and 103 papers selected for detailed evaluation. Twenty papers were selected for inclusion in the review including a total of 2978 women. Fifteen studies examined the PCR compared to 24 hour urine collection, 4 looked at ACR compared to 24 collection TU and one at ACR compared to adverse outcomes. Figure 1 shows the results of metaanalysis for PCR to predict significant proteinuria on 24 hour urine collection ($>0.3g/day$). For ACR meta-analysis was not possible due to different thresholds and study characteristics. Thus the results from one of the studies in a hypertensive pregnant population were sensitivity 0.94 (95% CI 0.85-0.98) and specificity 0.94 (95% CI 0.88-0.94). Conclusion The results suggest that PCR and in particular ACR may be valuable point of care tests in the management of suspected pre-eclampsia. Further work needs to be performed to look at their role in the management of this condition in particular in the prediction of adverse outcomes for mother and baby and which is the most cost-effective threshold to use.

Database: EMBASE

Use of random protein to creatinine ratio as a diagnostic tool in preeclampsia

Author(s): Abdul-Khalek R.; Warren W.; Zenenberg R.

Source: American Journal of Obstetrics and Gynecology; Jan 2011; vol. 204 (no. 1)

Publication Date: Jan 2011

Abstract:OBJECTIVE: To determine if a random spot protein to creatinine ratio (P/C) can be used to diagnose preeclampsia, to analyze the P/C stability over time, and to establish a P/C cut-off to predict significant proteinuria in pregnancy. STUDY DESIGN: Study patients included 28 women admitted for preeclampsia and a control group consisting of five women admitted for observation for preterm labor at St. Barnabas Medical Center, Livingston, NJ Data was collected prospectively from July, 2008 until October, 2009. A spot urine P/C was obtained prior to the 24 hour urine

collections (Pre P/C). A second P/C was obtained at the end of the 24hr urine collections (Post P/C). Correlation between the Pre and Post P/C were calculated to determine if the values changed over time. Correlations between the Pre and Post P/C and the 24hr urine protein were also calculated. Receiver operator characteristic (ROC) curves were constructed to determine best P/C cut-offs for 300 mg and 5000 mg protein per 24hrs. The study was approved by the hospital IRB and signed informed consent was obtained. RESULTS: 17 out of 28 patients had significant proteinuria leading to the diagnosis of preeclampsia; 11 had mild preeclampsia and 6 had severe preeclampsia. A strong correlation between the 24hr urine protein and Pre P/C was found ($R=0.93$, $r^2=.865$, $p<0.01$) as well as the Post P/C and 24hr protein ($R=0.85$, $r^2=.729$, $p<0.01$). There was no significant difference between the Pre P/C and Post P/C. Optimizing sensitivity and specificity, we found 500 mg/gm to be the optimal cut-off value for the P/C in the detection of mild preeclampsia with a sensitivity 94%, specificity 93%, PPV 94%, NPV 93% and area under the ROC curve 0.961. We also found 5000 mg/gm to be the optimal cut-off value for the P/C for severe preeclampsia with sensitivity 100%, specificity 100%, PPV 100%, NPV 100% and area under the curve of 1. CONCLUSIONS: A random urine P/C of 500 mg/gm can be used to accurately diagnose preeclampsia with high sensitivity and specificity. Furthermore, the P/C does not change significantly over 24 hours accentuating its utility as a diagnostic tool. (Graph presented).

Database: EMBASE

Protein/creatinine ratio in random urine as a rapid valuable criterion in diagnosis of pre-eclampsia in pregnant women

Author(s): Taheripanah R.; Kordlu F.; Hosseini M.

Source: Iranian Journal of Reproductive Medicine; 2010; vol. 8 ; p. 7-8

Publication Date: 2010

Available in full text at [Iranian Journal of Reproductive Medicine](#) - from Free Access Content

Available in full text at [Iranian Journal of Reproductive Medicine](#) - from ProQuest

Abstract: Introduction: The purpose of this study was to determine the value of the protein - creatinine ratio in prediction of 24-hour urine total protein among women with suspected preeclampsia Materials and Methods: A total 154 pregnant women who were suspected to preeclampsia were enrolled in observational analytic study. The gestational age was 24 or more. Exclusion criteria were no concurrent diagnosis of chronic hypertension, diabetes mellitus or preexisting renal disease. A protein-creatinine (pr/cr) ratio was obtained in a random sample, and protein of 24 hours urine was measured by collection of urine during 24 hours. Sensitivity and specificity of the protein-creatinine ratio for significant and severe proteinuria that was based on 24-hour urine total protein were calculated. Results: A total of 154 women were evaluated. The random pr/cr ratio was strongly correlated with 24-hour urine protein levels. The optimal pr/cr ratio was 0.19. In 9 patients 24-hour urine protein levels were 2gr/day or more and the pr/cr ratio were > 0.8 . Conclusion: There is strongly correlation between random urine pr/cr ratios with 24-hour urine protein in diagnosis of severe pre-eclampsia. Therefore, this test can be a rapid and sensitive test for diagnosis and management of the patients and reducing the maternal morbidity.

Database: EMBASE

Quantification of proteinuria in mild preeclampsia with random albumin creatinine ratio

Author(s): Aziz A.; Elshahawy Y.; Sany D.; Elmandooch M.

Source: NDT Plus; Jun 2010; vol. 3

Publication Date: Jun 2010

Available in full text at [NDT Plus](#) - from Oxford University Press

Available in full text at [Clinical Kidney Journal](#) - from Highwire Press

Abstract:Introduction and Aims: There has been considerable discussion regarding the best way to measure daily urinary excretion of protein in preeclampsia. Collection of 24-hours urine samples is still a burden, alternatively, random spot urine albumin creatinine ratio (ACR) has been used for some time as an accurate representation of the 24-h urine collection. The aim of this study was to evaluate the correlation between albuminuria measured as ACR and amount of protein in 24-hour urine samples in women with pre-eclampsia and significant albuminuria. Methods: 80 hypertensive pregnant women of more than 20 weeks gestational age were enrolled in this study. All had positive urinary test strip for proteinuria of +1 or +2. Women with a concurrent diagnosis of upper urinary tract infection, chronic hypertension (hypertension before pregnancy and persistent elevation of blood pressure before the 20th week of gestation), diabetes mellitus and pre-existing renal disease were excluded. 24 hours urine collection for proteinuria was done for all patients. In addition two urine samples (5 ml each) were collected for measurement of urine albumin creatinine ratio; one was in the morning before starting 24 hours urine collection, and the other one was taken during daytime of 24 hour urine collection. First voided urine samples were discarded. Results: Two of 80 were excluded because of incorrect sampling of urine for ACR measurement. The morning systolic blood pressure varied from 140 to 158 mmHg (mean, 150 mmHg) and the diastolic blood pressure varied from 90 to 105 mmHg (mean, 114 mmHg). The total volume of urine produced during the 24-hour collection varied between 600 and 3000 ml with mean value 1580 ml. The mean total protein was 1961.46+/-1683 mg/24h, and the ACR in random samples was 781.31+/-1041, while in the morning sample ACR was 886.43+/-1180.9. There was a statistically significant positive correlation between 24 hours urinary protein and urine albumin/creatinine ratio in both daytime random urine sample and morning urine sample. Test result variables and ROC curve showed that the best cutoff point for ACR in daytime random urine sample was 262.5 mg/dl with a sensitivity of 85.5% and a specificity of 81.8%, the positive predictive value was 96.7% and negative predictive value was 47.4%. Meanwhile the best cutoff point for ACR in morning sample was 240 mg per mg/dl with a sensitivity of 94.2% and a specificity of 63.6%, the positive predictive value was 94.2% and negative predictive value was 63.6%. Conclusions: Albumin/Creatinine ratio is not an ideal diagnostic test but it can be used as a screening test for the detection of significant proteinuria in early preeclampsia.

Database: EMBASE

Is the protein:creatinine ratio in a single spot urine sample accurate enough to replace the 24-hour urine protein collection in the post partum follow-up of preeclampsia?

Author(s): Berks D.; Visser W.; Steegers E.A.P.; Duvekot. H.; Hoedjes M.; Franx A.

Source: Reproductive Sciences; Mar 2010; vol. 17 (no. 3)

Publication Date: Mar 2010

Abstract:Introduction: Formerly preeclamptic women are at increased risk for cardiovascular disease in later life. To find the association between these two conditions and timely institute intervention measures, women must be properly followed up after preeclampsia to detect (latent) cardiovascular risk factors. One of these risk factors is proteinuria with its gold standard measure 24-hour urinary protein excretion (24h-UPE). However, this test is inconvenient and in an outpatient setting lacks reliability. A protein:creatinine (P:C) ratio in a single spot urine sample is much easier to obtain. Both

measures correlate well when testing for significant proteinuria as in cases of hypertensive pregnancy. So far, the correlation of these measures has not been tested in a postpartum follow-up setting. Methods: A prospective follow-up study was carried out between February 2006 and July 2009. In 232 formerly preeclamptic women 465 measurements of 24h-UPE in combination with a P:C ratio in an overnight fasting single spot urine sample were performed during follow-up visits between 6 weeks and 13 months postpartum. Significant proteinuria was defined as protein loss \geq 0.3 g/day in a 24-hours urine collection sample. Spearman correlation, regression analysis and ROC-curves were analyzed using SPSS. Results: The correlation between the P:C ratio and the 24h-UPE was 0,818 ($p < 0.001$). Regression analysis showed no confounding by race or time after delivery. The AUC of the ROC curve for predicting proteinuria with the P:C ratio was 0.906 ($p < 0.001$). With a P:C ratio cutoff set at 17.97 mg/mmol, the sensitivity to test for proteinuria was 80%, with a specificity of 90%. The positive predictive value was 38%; the negative predictive value was 98%. Conclusion: P:C ratio in a single spot urine sample correlates well with the 24h-UPE in a postpartum follow-up setting. Its high negative predictive value makes it very useful for screening for persistent proteinuria after preeclampsia. However, because of its due low positive predictive value a high P:C ratio must be confirmed by a 24h-urine collection sample.

Database: EMBASE

The role of protein/creatinine ratio in random urine sample in the diagnosis of preeclampsia

Author(s): Rimon E.; Shelf M.; Dovjic S.; Lessing J.B.; Kupfermirc M.J.

Source: Reproductive Sciences; Mar 2010; vol. 17 (no. 3)

Publication Date: Mar 2010

Abstract: Introduction: The presence of more than 300 mg protein in 24 -hour (24-h) urine collection is considered as an indication for proteinuria among pregnant women suspected to have preeclampsia. Several studies have suggested that protein/creatinine (p/c) ratio in a random urine specimen might be a predictor of proteinuria. Objective: To investigate the accuracy of p/c ratio in prediction of proteinuria. Methods: We collected random urine specimens from all women before they started the 24-h urine collection. Importantly, the p/c ratio was not available to the laboratory or clinical staff. 20 women gave a second urine specimen 6-8 hours later to evaluate the variability of the test. Results: We analyzed data obtained from 305 sets of p/c ratio and 24-h urine collection tests. A comparison of 20 pairs of p/c ratio values in 2 random urine samples revealed variability of 5-15%. The negative predictive values (NPV) were 98%, 96%, 94% and 93% at p/c ratio 0.15, 0.2, 0.25 and 0.3, respectively. Most of the women who were defined as false negative using cut-off of 0.2, 0.25 or 0.3 had less than 500 mg protein at 24-h test and none of them had severe preeclampsia during the follow up. All women (11) who had p/c ratio > 4 were found to have severe proteinuria (> 5000 mg at 24-h urine collection). Accuracy of protein/ creatinine ratio in the diagnosis proteinuria above 300mg/dL in 24-hour urine collection

Protein/creatinine ratio	Sensitivity	Specificity	PPV	NPV
False negative group	n	range of values	mean	+/- sd
500 mg				

P/C ratio > 0.5 is a good indicator for significant proteinuria and p/c ration > 4 was associated with severe proteinuria at 24-h urine collection.

Database: EMBASE

Albumin/creatinine ratio for prediction of 24-hour albumin excretion of > or =2 g in manifest preeclampsia.

Author(s): Al, R A; Borekci, B; Yapca, O; Keles, S; Kadanali, S

Source: Clinical and experimental obstetrics & gynecology; 2009; vol. 36 (no. 3); p. 169-172

Publication Date: 2009

Abstract:To compare whether albumin/creatinine ratios obtained from random or 8-hour urine collected in different periods of day differ in prediction of albumin excretion > or =2 g in 24-hour urine collection in preeclampsia. From a total of 70 women, 24-hour urine collected by three consecutive periods of eight hours and three random urine samples were taken before each period. The variation of albumin-creatinine ratios in samples across the day was analyzed by the Friedman and inter-assay coefficient variation. For each sample, receiver operator characteristic (ROC) curves were constructed to determine an optimal albumin/creatinine ratio value in the prediction of albuminuria > or =2 g. The albumin/creatinine ratio did not vary significantly over time when all samples pooled. However, there was considerable intra-individual variation in both random and timed urine samples. On ROC analysis, the albumin/creatinine ratio in both random and timed urine samples predicted the 24-hour urine results and there was no difference between samples in prediction of albuminuria > or =2 g. A single optimal cut-off point was not available between samples. The positive and negative predictive values for optimal cut-offs ranged from 48%-88% and 94%-100%, respectively. The random urine albumin/creatinine ratio was a poor predictor for proteinuria a 2 g in patients with preeclampsia.

Database: Medline

Comparison of pregnancy outcomes in women with hypertensive disorders of pregnancy using 24-hour urinary protein and urinary microalbumin to creatinine ratio

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

Source: International Journal of Gynecology and Obstetrics; Oct 2009; vol. 107 (no. 1); p. 19-22

Publication Date: Oct 2009

Abstract:Objective: To determine the role of proteinuria estimated using the 24-hour urinary protein test and the spot urinary microalbumin to creatinine ratio on the outcomes of pregnancy in women with hypertensive disorders of pregnancy. Methods: A total of 163 hypertensive women were recruited. Maternal and perinatal outcomes in women with and without significant proteinuria were compared using the diagnostic accuracy of the two tests. Results: Women with significant proteinuria determined using the 24-hour urinary protein test delivered at an earlier gestational age, had higher rates of induced labor, and lower birth weights compared with women who had gestational hypertension. No significant differences in outcomes were noted using the diagnostic accuracy of the spot urinary microalbumin to creatinine ratio dipstick. Conclusion: The spot urinary microalbumin to creatinine ratio dipstick is a good screening test to rule out clinically significant proteinuria. © 2009 International Federation of Gynecology and Obstetrics.

Database: EMBASE

Can urinary protein creatinine ratio predict outcome of pregnancy in women with pre-eclampsia?

Author(s): Memtsa M.; Cartwright J.; West P.; Fakokunde A.; Yoong W.

Source: International Journal of Gynecology and Obstetrics; Oct 2009; vol. 107

Publication Date: Oct 2009

Abstract:Objective: In pre-eclampsia, significant proteinuria is associated with adverse maternal and fetal outcomes. Spot protein creatinine ratio (PCR) is thought to correlate strongly with 24 hour urinary protein levels and can be used as a tool to swiftly assess the severity of pre-eclampsia. Method: Pre-eclamptic women presenting with proteinuria on urinary dipstick had their urinary PCR quantified. These were then classified as normal (200). The data from their eventual maternal and fetal outcomes were then collected and stratified according to their PCR values. Results: Women with the highest range of PCR had the lightest babies and were more likely have premature deliveries under 32 weeks (p 200 mg/mmol were not more likely to have adverse fetal outcomes.(Table presented) Conclusions: Urinary PCR has some predictive value but larger prospective studies are required.

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: International Journal of Gynecology and Obstetrics; Oct 2009; vol. 107

Publication Date: Oct 2009

Abstract:Background: The 24 hour urinary collection is used to quantify proteinuria in hypertensive pregnant women; however it is an impractical screening test. The most commonly employed screening method for proteinuria antenatally is a semi-quantitative dipstick urinalysis, but this has been shown to be inaccurate. New developments in proteinuria assessment have included the use of spot urinary microalbumin to creatinine ratio measurements. We therefore embarked on a study to determine the accuracy of spot urinary microalbumin to creatinine ratio dipsticks and conventional visual dipsticks compared to a 24 hour urine protein collection (gold standard) to detect significant proteinuria in hypertensive pregnant women. Methods: 163 women presenting with hypertension during pregnancy after 20 weeks of gestation were recruited from antenatal clinics at hospitals serving the Durban Metropolitan region in South Africa. On admission each participant had a spot urine sample that was tested by trained midwives for proteinuria using a semi-quantitative visual dipstick (Makromed). Participants were admitted to the ward where a spot midstream urine sample was collected and analysed using the semi-quantitative urinary microalbumin to creatinine ratio dipsticks (CLINITEK Microalbumin, Bayer Healthcare LLC, USA) read instrumentally on the Clinitek 50 urine chemistry analyser. A 24 hour urine collection was then commenced and a quantitative measurement of protein in the urine measured. The results of the spot urinary microalbumin to creatinine ratio dipsticks and conventional visual dipsticks was compared to the 24 hour urine protein collection (gold standard) to detect significant proteinuria. A negative result was considered to be a spot urinary albumin to creatinine ratio of <300 mg/g (nil and trace on urine dipsticks). A positive result was a spot urinary albumin to creatinine ratio of 300 mg/g (1+ to 4+ on urine dipsticks). 0.3 g/24 hrs was considered significant proteinuria on the 24 hr total urinary protein measurement. 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 spot urinary albumin 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: Both the visual dipstick (Makromed) and the spot urinary microalbumin to creatinine ratio dipstick read on the Clinitek 50 system are not

accurate when compared to the total 24 hour urinary protein. Differences between the spot urinary microalbumin to creatinine ratio and 24 hour 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. Whether the spot urinary microalbumin to creatinine ratio correlates better to other clinical measurements of disease severity or clinical outcomes need to be investigated further.

Database: EMBASE

Pregnancy outcomes in hypertensive disorders of pregnancy using the diagnostic accuracy of the 24 hour urinary protein and urinary microalbumin: Creatinine ratio

Author(s): Gangaram R.; Moodley J.; Manogaran N.

Source: International Journal of Gynecology and Obstetrics; Oct 2009; vol. 107

Publication Date: Oct 2009

Abstract:Background: The spot urinary microalbumin to creatinine ratio has been suggested as a screening test for proteinuria in hypertensive pregnancies. We therefore determined the role of proteinuria estimated by 24 hour urinary protein and the spot urinary microalbumin to creatinine ratio dipstick read on the Clinitek 50 system, on obstetric outcomes in hypertensive disorders of pregnancy. Methods: 163 women were recruited. Maternal and perinatal outcomes in those with and without significant proteinuria were compared using the diagnostic accuracy of the two tests. Results: Significant proteinuria determined by the 24 hour urinary protein was associated with delivery at an earlier gestational age, increased induction of labour and lower birth weights compared to the group with gestational hypertension. There was also a trend towards an increased maternal morbidity and perinatal mortality. When the groups were classified into pre-eclampsia and gestational hypertension using the urinary microalbumin to creatinine ratio dipsticks, there were no differences in the clinical outcomes between the false negatives and true negatives except that there was a trend towards a higher caesarean section rate in the false negatives. Conclusion: The UAC dipstick is a good screening test to rule out clinically significant proteinuria.

Database: EMBASE

The 24-hour urine collection: gold standard or historical practice?

Author(s): Cote A.-M.; Lam E.M.; von Dadelszen P.; Magee L.A.; Firoz T.; Mattman A.

Source: American Journal of Obstetrics and Gynecology; Dec 2008; vol. 199 (no. 6); p. 625

Publication Date: Dec 2008

Abstract:Objective: The objective of the study was to determine completeness of 24-hour urine collection in pregnancy. Study Design: This was a retrospective laboratory/chart review of 24-hour urine collections at British Columbia Women's Hospital. Completeness was assessed by 24-hour urinary creatinine excretion (UcreatV): expected according to maternal weight for single collections and between-measurement difference for serial collections. Results: For 198 randomly selected pregnant women with a hypertensive disorder (63% preeclampsia), 24-hour urine collections were frequently inaccurate (13-54%) on the basis of UcreatV of 97-220 $\mu\text{mol/kg}$ per day (11.0-25.0 mg/kg per day) or 133-177 $\mu\text{mol/kg}$ per day (15.1-20.1 mg/kg per day) of prepregnancy weight (respectively). Lean body weight resulted in more inaccurate collections (24-68%). The current weight was frequently unavailable (28%) and thus not used. For 161 women (81% proteinuric) with serial 24-hour urine levels, a median [interquartile range] of 11 [5-31] days apart, between-

measurement difference in UcreatV was 14.4% [6.0-24.9]; 40 women (24.8%) had values 25% or greater, exceeding analytic and biologic variation. Conclusion: Twenty-four hour urine collection is frequently inaccurate and not a precise measure of proteinuria or creatinine clearance. © 2008 Mosby, Inc. All rights reserved.

Database: EMBASE

A prospective comparison of random urine protein-creatinine ratio vs 24-hour urine protein in women with preeclampsia

Author(s): Aggarwal N.; Suri V.; Soni S.; Chopra V.; Kohll H.S.

Source: MedGenMed Medscape General Medicine; 2008; vol. 10 (no. 4)

Publication Date: 2008

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

Abstract:Objective: To assess the diagnostic accuracy of random urine protein-creatinine ratio for the prediction of significant proteinuria patients with preeclampsia. Study design: 155 pregnant patients diagnosed to have hypertension in late pregnancy were instructed to collect urine during a 24-hour period. Protein-creatinine ratio was evaluated in a random urinary specimen. Out of these, 120 patients fulfilled the inclusion criteria. The predictive value of the random urinary protein-creatinine ratio for the diagnosis of significant proteinuria was estimated by using a 300-mg protein level within the collected 24-hour urine as the gold standard. Results: 104 patients (86.67%) had significant proteinuria. There was significant association between 24-hour protein excretion and the random urine protein-creatinine ratio ($r=0.596$, $P < .01$). With a cut-off protein-creatinine ratio greater than 1.14 as a predictor of significant proteinuria, sensitivity and specificity were 72% and 75%, respectively. The positive predictive value was 94.9% and negative predictive value was 29.2%. Conclusion: The random urine protein-creatinine ratio was not a good predictor of significant proteinuria in patients with preeclampsia. ©2008 Medscape.

Database: EMBASE

A practical approach to using spot urine protein/creatinine ratios for assessing proteinuria in pregnancy.

Author(s): Marnoch, Catherine A; Larson, Lucia; Weitzen, Sherry; Phipps, Maureen G; Sung, C James; Powrie, Raymond O

Source: Obstetric medicine; Sep 2008; vol. 1 (no. 1); p. 18-23

Publication Date: Sep 2008

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

Abstract:The aim of this study is to assess the diagnostic accuracy of the spot urine protein/creatinine ratio compared with the 24-hour urine protein in pregnancy. In this prospective cohort study of inpatient pregnant women, the protein/creatinine ratio and dipstick protein were assessed from a single urine sample collected at the start of the 24-hour urine. Both tests were compared with the 24-hour urine protein for correlation and test characteristics. In the 196 specimens analysed, we found a strong correlation between the spot urine protein/creatinine ratio and 24-hour urine protein ($r(2) = 0.78$, $P < 0.01$). A protein/creatinine ratio < 0.1 ruled out significant proteinuria (≥ 300 mg/day) with sensitivity and negative predictive value 100%. A protein/creatinine ratio ≥ 0.4 detected significant proteinuria (specificity and positive predictive value of 100%). A protein/creatinine ratio ≥ 4.6 had a specificity and positive predictive value of 100% for detecting severe proteinuria (≥ 5000 mg/day). Urine dipsticks correlated poorly with the 24-hour urine protein ($r(2) = 0.40$, $P = 0.826$). Nineteen percent of dipsticks reading nil or trace were false-negative results.

The spot urine protein/creatinine ratio correlated well with the 24-hour urine protein and performed better than the urine dipsticks. Significant proteinuria in pregnancy was excluded if the protein/creatinine ratio was <0.1 and identified when it was ≥ 0.4 .

Database: Medline

A comparison of spot urine protein-creatinine ratio with 24-hour urine protein excretion in women with preeclampsia

Author(s): Shahbazian N.; Hosseini-Asl F.

Source: Iranian journal of kidney diseases; Jul 2008; vol. 2 (no. 3); p. 127-131

Publication Date: Jul 2008

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

Abstract:INTRODUCTION: Proteinuria is an important diagnostic component of preeclampsia. We prospectively compared the results of spot urine protein-creatinine (P/C) ratio with 24-hour urine protein excretion in women with preeclampsia. MATERIALS AND METHODS: A total of 81 pregnant women with preeclampsia were prospectively studied for proteinuria. Urine P/C ratio was determined in a spot mid-stream urine sample, and the amount of protein excretion was measured in 24-hour urine collected on the subsequent day. The correlation between the spot P/C ratio and 24-hour urine protein excretion was assessed. Diagnostic value of P/C ratio was expressed in terms of specificity and sensitivity. The receiver operating characteristic curve analysis was used to determine the best discriminator values of the spot urine P/C ratios for preeclampsia (proteinuria $>$ or $= 300$ mg/24 h). RESULTS: There was a strong correlation between the spot P/C ratio and 24-hour urine protein excretion ($r = 0.84$; $P < .001$). The optimal spot P/C ratio cutoff point was 0.20 for 300 mg/24 h of protein excretion (preeclampsia), with a sensitivity, specificity, positive predictive value, and negative predictive value of 91.2%, 87.8%, 94.4%, and 96.8%, respectively. The spot P/C ratios less than 0.19 yielded a sensitivity of 100% for exclusion of preeclampsia. CONCLUSIONS: We found that there is a significant correlation between the spot urine P/C ratio and 24-hour urine protein excretion in women with preeclampsia. Urine P/C ratio could be used for exclusion of preeclampsia.

Database: EMBASE

Protein:creatinine ratio in random urine samples is a reliable marker of increased 24-hour protein excretion in hospitalized women with hypertensive disorders of pregnancy.

Author(s): Leañós-Miranda, Alfredo; Márquez-Acosta, Janeth; Romero-Arauz, Fernando; Cárdenas-Mondragón, Guadalupe M; Rivera-Leañós, Roxana; Isordia-Salas, Irma; Ulloa-Aguirre, Alfredo

Source: Clinical chemistry; Sep 2007; vol. 53 (no. 9); p. 1623-1628

Publication Date: Sep 2007

Available in full text at [Clinical Chemistry](#) - from Free Access Content

Available in full text at [Clinical Chemistry](#) - from ProQuest

Abstract:The protein:creatinine ratio in random, untimed urine samples correlates with 24-h protein excretion in pregnant women with and without hypertension. Nevertheless, whether this ratio is appropriate as a screening test for proteinuria is still unclear, in part because of the paucity of large studies. We measured protein:creatinine ratios in random urine samples and protein contents of 24-h urine samples in a cross-sectional study of 927 hospitalized pregnant women at ≥ 20 -weeks of gestational age and in a 2nd cohort of 161 pregnant women. In the 2nd group, urine specimens were obtained before and after completion of the 24-h collections, avoiding 1st-morning void specimens. Protein excretion was ≥ 300 mg/24 h in 282 patients (30.4%). The urine protein:creatinine ratio and

the 24-h protein excretion were significantly correlated ($r = 0.98$, $P < 0.001$). The sensitivity and specificity were 98.2% and 98.8%, respectively. Positive and negative predictive values were 97.2% and 99.2%, respectively, and positive and negative likelihood ratios were 79.2 and 0.02, respectively. The diagnostic accuracy of the urinary protein:creatinine ratio was corroborated in the 2nd cohort of patients, which also showed no statistically significant difference in protein:creatinine ratio between samples obtained >24 h apart. Random urinary protein:creatinine ratio is a reliable indicator of significant proteinuria (>300 mg/day) in nonambulatory pregnant women, irrespective of sampling time during the daytime. The protein:creatinine ratio may be reasonably used as an alternative to the 24-h urine collection method.

Database: Medline

Usage of spot urine protein to creatinine ratios in the evaluation of preeclampsia.

Author(s): Wheeler, Thomas L; Blackhurst, Dawn W; Dellinger, Eric H; Ramsey, Patrick S

Source: American journal of obstetrics and gynecology; May 2007; vol. 196 (no. 5); p. 465

Publication Date: May 2007

Abstract:The objective of the study was to prospectively compare spot urine protein to creatinine (P:C) ratios with 24 hour urine collections for protein in women being evaluated for preeclampsia. A spot urine P:C ratio was obtained at the beginning of 24 hour urine collections from 126 patients admitted to evaluate for preeclampsia. Correlation between the spot P:C ratio with the 24 hour urine collections was calculated. Receiver operator characteristic curves were constructed to determine best P:C cut-offs for 300 mg and 5000 mg protein per 24 hours. Random spot P:C ratios were strongly correlated with 24 hour urine protein levels (Pearson $r = 0.88$). The optimal P:C cut-offs were 0.21 (300 mg per 24 hours) and 3.0 (5000 mg per 24 hours). A P:C ratio of less than 0.21 (300 mg per 24 hours) had a negative predictive value (NPV) of 83.3% and a P:C ratio of less than 3.0 (5000 mg per 24 hours) had 100% NPV. Urine spot P:C ratio correlated well with 24 hour urine collections for protein but was not justified as a substitute for timed collections.

Database: Medline

Urine albumin/creatinine ratio for the assessment of albuminuria in pregnancy hypertension

Author(s): Nisell H.; Trygg M.; Back R.

Source: Acta obstetrica et gynecologica Scandinavica; 2006; vol. 85 (no. 11); p. 1327-1330

Publication Date: 2006

Available in full text at [Acta Obstetrica Et Gynecologica Scandinavica](#) - from John Wiley and Sons

Available in full text at [Acta Obstetrica et Gynecologica Scandinavica](#) - from John Wiley and Sons

Abstract:BACKGROUND: An accurate method to assess albuminuria in pregnancy is mandatory to diagnose pre-eclampsia. Twenty-four-hour urine collection is still the only universally accepted method. This is, however, a cumbersome and inconvenient method. Therefore, the present study aimed at assessing the accuracy of a spot urine albumin/creatinine ratio in pregnant women with hypertension. MATERIAL AND METHODS: In 54 pregnant women with blood pressure $\geq 140/90$ mmHg, 24-h albumin excretion and subsequent albumin/creatinine ratio on morning spot urine were analyzed in the individual patients. Altogether 75 paired samples were included. Receiver operating characteristic curves, relating different albumin/creatinine ratio cut-off values to 24-h albumin excretion >300 mg were constructed. Correlations were assessed by Spearman rank correlation tests. RESULTS: The area under the receiver operating characteristic curve was 0.985. At the optimal cut-off albumin/creatinine ratio value of 27 mg/mmol the sensitivity, specificity, positive

and negative predictive value for detecting albuminuria >300 mg/24 h were: 95, 100, 100 and 86% respectively. There was a close correlation between albumin/creatinine ratio and 24-h albumin excretion values ($r=0.95$; $p<0.001$). CONCLUSIONS: It is suggested that in most cases the more cumbersome 24-h urine collection can be replaced by the more convenient albumin/creatinine ratio on spot urine.

Database: EMBASE

Alternate evaluations of proteinuria in the gravid hypertensive patient

Author(s): Schubert F.P.; Abernathy M.P.

Source: Journal of Reproductive Medicine for the Obstetrician and Gynecologist; Sep 2006; vol. 51 (no. 9); p. 709-714

Publication Date: Sep 2006

Abstract:OBJECTIVE: To determine if the 12-hour urine total protein value correlates with the 24-hour value and to evaluate the random protein:creatinine ratio as a predictor of significant proteinuria (> 300 mg/24 h) for use in diagnosing preeclampsia. STUDY DESIGN: The study population included 15 patients with hypertensive disorders of pregnancy. The patients' urine was collected over 24 hours in 2 12-hour aliquots. The urine volume, total protein and creatinine were measured. The patients' initial voids were collected and evaluated for random urine protein and creatinine and calculation of the protein:creatinine ratio. The protein:creatinine ratio and 12-hour results were compared to the 24-hour results using simple regression analysis. RESULTS: Of the 15 patients, 6 had no proteinuria, 5 had mild proteinuria, and 4 had severe proteinuria (60% with significant proteinuria). The 12-hour protein results correlated with the 24-hour results for patients with mild disease ($p = 0.00007$, first 12 hours, and $p = 0.012$, second 12 hours) and severe disease ($p = 0.014$ and $p = 0.007$). The results for no disease were mixed: for the first 12 hours there was a poor correlation, but the results for the second 12 hours correlated well. The protein:creatinine ratio had a significant correlation ($p = 0.02$), using a cutoff of 0.15, returned specificity of 50%, sensitivity of 100%, positive predictive value of 75% and negative predictive value of 100%. CONCLUSION: Total protein values for 12- and 24-hour urine samples correlate well for the diagnosis of preeclampsia. A protein:creatinine ratio of <0.15 rules out significant proteinuria. In combination, these 2 tests may allow more rapid diagnosis of preeclampsia. © Journal of Reproductive Medicine, Inc.

Database: EMBASE

Random albumin/creatinine ratio for quantification of proteinuria in manifest pre-eclampsia.

Author(s): Wikström, A-K; Wikström, J; Larsson, A; Olovsson, M

Source: BJOG : an international journal of obstetrics and gynaecology; Aug 2006; vol. 113 (no. 8); p. 930-934

Publication Date: Aug 2006

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

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

Abstract:1) To assess the correlation between urine albumin/creatinine ratio (ACR) and 24-hour urine albumin excretion in women with pre-eclampsia, 2) to study the influence of potential confounders on this correlation and 3) to assess the variability of ACR between voids during a 24-hour period. Prospective study. Fetal maternity ward, university hospital. Women with pre-eclampsia scheduled for quantitative albumin measurement with a 24-hour urine collection.

Random urine samples were obtained for analysis of ACRs during the time of 24-hour urine collections in 31 women. ACRs were also measured from the complete 24-hour collections. In five additional women, serial urine samples were obtained during the 24-hour collection. Correlation between ACRs and albumin amount in 24-hour urine samples. Variability of the ACRs during a 24-hour collection. The random ACR was poorly correlated to 24-hour excretion of urine albumin ($R(2)=0.42$). Adjustment for maternal age and nifedipine medication significantly ($P=0.044$ and $P=0.023$, respectively) improved the correlation ($R(2)=0.60$). The mean variability (highest/lowest) of ACR during a 24-hour period was 222%. The ACR from the 24-hour collection had an excellent correlation to 24-hour excretion of urine albumin ($R(2)=0.96$). In women with pre-eclampsia, random ACR is not stable during the day and cannot predict 24-hour urine protein excretion accurately. ACR from the 24-hour collection is an accurate predictor of total albumin amount and can be used to minimise errors from incomplete collections.

Database: Medline

Random urine protein-creatinine ratio to predict proteinuria in new-onset mild hypertension in late pregnancy

Author(s): Al R.A.; Baykal C.; Karacay O.; Geyik P.O.; Altun S.; Dolen I.

Source: Obstetrics and Gynecology; Aug 2004; vol. 104 (no. 2); p. 367-371

Publication Date: Aug 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:OBJECTIVE: The aim of this study was to evaluate the diagnostic accuracy of random urine protein-creatinine ratio for prediction of significant proteinuria (> 300 mg/24 h) in patients with new-onset mild hypertension in late pregnancy. METHODS: Medical records of 185 consecutive pregnant patients with new onset of mild hypertension in late pregnancy were reviewed. Random urine samples were taken before 24-hour urine collection. The predictive values of the random urine protein-creatinine ratio for diagnosis of significant proteinuria were estimated by using at least a 300-mg protein level within the collected 24-hour urine as the gold standard. RESULTS: Thirty-nine patients (21%) had significant protein-uria. There was a significant association between 24-hour protein excretion and the random urine protein-creatinine ratio ($r_s = 0.56$, $P < .01$). With a cutoff protein-creatinine ratio greater than 0.19 as a predictor of significant proteinuria, sensitivity and specificity were 85% and 73%, respectively. Positive and negative predictive values of the test were 46% and 95%, respectively. CONCLUSION: The random urine protein-creatinine ratio was a poor predictor for significant proteinuria in patients with new-onset mild hypertension in late pregnancy. © 2004 by The American College of Obstetricians and Gynecologists.

Database: EMBASE

A comparison between 24-hour and 2-hour urine collection for the determination of proteinuria.

Author(s): Somanathan, N; Farrell, T; Galimberti, A

Source: Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology; Jul 2003; vol. 23 (no. 4); p. 378-380

Publication Date: Jul 2003

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

Abstract:Proteinuria is one of the fundamental criteria for the diagnosis of pre-eclampsia with quantitative assessment based on the 24-hour urine protein estimation as the gold standard. This study was undertaken to determine whether a 2-hour protein estimation correlated with that of a formal 24-hour collection. Thirty women with proteinuric hypertension were recruited. There was significant correlation between the 2-hour and 24-hour urine protein levels (Pearson's correlation coefficient 0.76 (P 0.000). A positive 2-hour test was associated more closely with significant levels of 24-hour proteinuria than dipstick analysis alone. We conclude from this study that a random 2-hour sample could be used for the initial assessment of proteinuria and so avoid the delay associated with 24-hour quantification of urinary protein.

Database: Medline

Assessing urinary albumin excretion in pre-eclamptic women: which sample to use?

Author(s): Kieler, Helle; Zettergren, Tattan; Svensson, Hanna; Dickman, Paul W; Larsson, Anders

Source: BJOG : an international journal of obstetrics and gynaecology; Jan 2003; vol. 110 (no. 1); p. 12-17

Publication Date: Jan 2003

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

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

Abstract:To evaluate whether the gold standard of 24-hour urine collection for measuring albumin excretion in pre-eclamptic women could be substituted by shorter collection periods. Prospective study. Fetal maternity ward, university hospital. Thirty women with pre-eclampsia and a positive urinary test strip for protein of at least 2+. From each woman, within a 25-hour period, three spot, two 12-hour (day and night) and one 24-hour urine sample were collected. Urine albumin concentrations in milligrammes per litre were analysed by rate nephelometry on a Beckman Array protein system. The urinary albumin concentrations in the spot and the 12-hour samples were compared with the concentration in the 24-hour urine collection. Urinary albumin concentrations in spot and 12-hour samples measured against the standard 24-hour albumin excretion. Albumin concentrations in the day and night collection fitted closely with the concentrations of the 24-hour collection. The median difference between the 24-hour and the day collection was -3 mg/L (interquartile range -264 to 116 mg/L). The median difference between the 24-hour and the night collection was 17 mg/L (interquartile range -186 to 210 mg/L). The association of urinary albumin concentration in the 24-hour collection and the spot samples was much weaker. Of the spot urine samples, the albumin concentration in the sample taken on the morning after admission to hospital was closest to the 24-hour urinary albumin excretion, with a median difference of -62 mg/L (interquartile range -1131 to 285 mg/L). The gold standard of 24-hour urinary excretion for assessment of albuminuria in pre-eclamptic women can be substituted with a 12-hour collection. Spot urine samples were inaccurate and are therefore not recommended for quantification of albumin excretion.

Database: Medline

Correlation between random urinary protein-to-creatinine ratio and quantitation of 24-hour proteinuria in preeclampsia

Author(s): Yamasmit W.; Charoenvidhya D.; Wongkitisophon K.; Uerpairojkit B.; Chaithongwongwatthana S.

Source: Journal of the Medical Association of Thailand; Jan 2003; vol. 86 (no. 1); p. 69-73

Publication Date: Jan 2003

Abstract:Objective: To determine whether random urinary protein-to-creatinine ratio correlated with the quantitation of 24-hour proteinuria in cases of preeclampsia. Design: Cross-sectional descriptive study. Subjects: Pregnant patients hospitalized in the obstetric ward, King Chulalongkorn Memorial Hospital due to preeclampsia. Method: The random urine specimens were obtained from the eligible subjects for protein-to-creatinine ratio determination, the subjects were then instructed to collect 24-hour urine samples for protein measurement. Results: Twenty-five pregnant patients completed the study. There was a strong correlation between the random urinary protein-to-creatinine ratio and the quantitation of 24-hour proteinuria ($r = 0.929$, $p < 0.001$). Conclusion: The presented data support a strong correlation between random urinary protein-to-creatinine ratio and quantitation of 24-hour proteinuria in hospitalized pregnant patients with preeclampsia.

Database: EMBASE

Use of a random urinary protein-to-creatinine ratio for the diagnosis of significant proteinuria during pregnancy

Author(s): Rodriguez-Thompson D.; Lieberman E.S.

Source: American Journal of Obstetrics and Gynecology; 2001; vol. 185 (no. 4); p. 808-811

Publication Date: 2001

Abstract:OBJECTIVE: The purpose of this study was to evaluate whether a random urinary protein-to-creatinine ratio is a clinically useful predictor of significant proteinuria (300 mg/24 hour). STUDY DESIGN: The medical records of 138 women who completed both a random urinary protein-to-creatinine ratio and a 24-hour urine collection for the evaluation of preeclampsia were reviewed. Urine samples for the random protein-to-creatinine ratio were collected before the 24-hour urine collection. With the use of a protein level of at least 300 mg in the 24-hour urine sample as the gold standard, the sensitivity and specificity of the random protein-to-creatinine ratio for the diagnosis of significant proteinuria were determined with a range of cutoffs. RESULTS: Fifty percent of the study population had significant proteinuria. The data suggest that a cutoff below 0.14 ruled out significant proteinuria. The best cutoff of >0.19 yields a sensitivity of 90% and a specificity of 70%. All of the false-negative test results had 24-hour urine protein levels below 400 mg; 13 of the 21 false-positive results had levels that ranged from 250 to 300 mg. CONCLUSION: The random urinary protein-to-creatinine ratio is strongly associated with the 24-hour total protein excretion. A level below 0.14 can rule out significant proteinuria. A best cutoff of >0.19 is a good predictor of significant proteinuria. With further study, the random urinary protein-to-creatinine ratio could replace the 24-hour urine collection as a simpler, faster, more useful method for the diagnosis of significant proteinuria.

Database: EMBASE

Use of single voided urine samples to estimate quantitative proteinuria.

Author(s): Ginsberg, J M; Chang, B S; Matarese, R A; Garella, S

Source: The New England journal of medicine; Dec 1983; vol. 309 (no. 25); p. 1543-1546

Publication Date: Dec 1983

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

Available in full text at [New England Journal of Medicine](#) - from Massachusetts Medical Society ;
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Abstract:Quantitation of urinary protein excretion is used extensively for diagnostic and prognostic purposes and to assess the effects of therapy. The method most commonly used to measure urinary protein relies on 24-hour urine collections, which are time consuming, cumbersome, and often inaccurate. We reasoned that the urinary protein/creatinine ratio in a single voided urine sample should correlate well with the quantity of protein in timed urine collections. In a study of 46 specimens we found an excellent correlation between the protein content of a 24-hour urine collection and the protein/creatinine ratio in a single urine sample. The best correlation was found when samples were collected after the first voided morning specimen and before bedtime. We conclude that the determination of the protein/creatinine ratio in single urine samples obtained during normal daylight activity, when properly interpreted by taking into consideration the effect of different rates of creatinine excretion, can replace the 24-hour urine collection in the clinical quantitation of proteinuria. In the presence of stable renal function, a protein/creatinine ratio of more than 3.5 (mg/mg) can be taken to represent "nephrotic-range" proteinuria, and a ratio of less than 0.2 is within normal limits.

Database: Medline