

PROTEINURIA

Holly Champagne, MSN, RNC-OB, CNS, Kaiser Permanente, Roseville

BACKGROUND

Proteinuria may be identified and quantified by chemstick “dip”, timed urine collection or protein/creatinine ratio. A 24-hour urine collection is considered the gold standard for quantification of urine protein.^{1,2} Past studies identified inconsistent results from one-time urine chemstick tests.^{3,4} However, recent articles confirmed the accuracy and value of urine dipstick tests as a method to assess proteinuria.^{5,6} Timed urine collections of 2-hours (h), 4-h, and 12-h have shown to correlate well with 24-h urine results and may be an acceptable alternative when there is not enough time to collect a 24-h urine.⁷⁻⁹ Chemstick testing of urine, while approved as a FDA Clinical Laboratory Improvement Amendments (CLIA) waived test, nevertheless requires considerable resources to meet the College of American Pathologists (CAP) accreditation standards.¹⁰ Some facilities routinely screen all patients who arrive for evaluation in triage with a chemstick dip while others send a sample for urinalysis to the laboratory for evaluation. Either method of assessment appears to be adequate for initial patient assessment.

The urine protein/creatinine ratio is a measurement designed to compensate for the variation in protein concentration in urine by comparing the amount of protein to the concentration of creatinine present (Figures 1, 2). Recent recommendations do not prove one method of urine testing for proteinuria superior to another and each is acceptable to use. Clinicians need to be aware of what testing methods are used by the laboratories in their practice setting(s).

Similar to gestational hypertension, isolated new onset proteinuria, in the absence of urinary tract infection (UTI), is associated with a significantly increased risk for development of preeclampsia/atypical preeclampsia.¹¹

Table 1. Proteinuria Values in Preeclampsia

Preeclampsia	Dipstick	24-hour urine (UNIT)	Protein: Creatinine ratio (See Figures 2,3 for how to calculate)
Preeclampsia	1+	≥ 300 mg/24 hours	≥ 0.3 mg/dL

For diagnosis: Urine dipstick samples should be obtained twice, four hours apart and in absence of infection.^{1,2}

RECOMMENDATIONS FOR QUALITY IMPROVEMENT:

1. Urine dipstick is an acceptable initial screen. If positive (1+ or more) further evaluation is warranted. The 24-hour urine collection is the gold standard and should be used to confirm significant proteinuria if time allows.
2. Alternative testing may include 2, 4, 12-hour urine collection or protein/creatinine ratio, if these methods are available for use at the institution.
3. The amount of proteinuria should not be used to classify preeclampsia as preeclampsia without severe features (mild) or severe, and should not be otherwise used to predict severity of disease or guide patient management.¹²⁻¹⁴ Refer to Special Circumstances: Severe Preeclampsia at < 34 weeks for additional considerations for < 34 week gestation).
4. The level of proteinuria should not be used as a criterion for management decisions.
5. Do not delay care in order to obtain 24-hour urine results; proceed with treatment/management if other criteria for severe preeclampsia are present.
6. Obtain baseline 24-hour urine protein or validated equivalent from those patients with proteinuria present in early or pre-pregnancy. Use heightened surveillance, carefully evaluate for symptoms of severe preeclampsia, and monitor for an increase in excreted protein in this population.
7. Preeclampsia, eclampsia, severe gestational hypertension, and/or HELLP syndrome, may occur without proteinuria.^{10-13,15,16} Close monitoring remains necessary for non-proteinuric pregnant patients with blood pressures ≥ 140 systolic and/or ≥ 90 diastolic.
8. The presence of new onset proteinuria in the absence of elevated blood pressure requires careful and more frequent patient surveillance (weekly to twice weekly) for the possible development of preeclampsia.^{11,17,18}

Figure 1: Calculation of creatinine ratio

<p>Calculation of urine protein: creatinine ratio (Urine protein x 0.088) ÷ (urine creatinine)</p>

Figure 2: Online calculator for creatinine ratio

<p>Online Calculator for urine protein: creatinine ratio http://www.easycalculation.com/medical/urinaryprotein.php</p>
