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EDITORIAL

Predicting proteinuria in pregnancy: a potential algorithm

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Preeclampsia is one of the leading causes of perinatal morbidity and mortality worldwide.[1] In the United States, although maternal mortality has dropped, preeclampsia still causes 18% of the approximately 350 maternal deaths each year.[2] Further, it is also a leading cause of indicated preterm delivery, subsequently leading to increased neonatal morbidity and mortality.[3] The diagnosis of preeclampsia currently relies on at least two blood pressures above 140/90 6 h apart and proteinuria greater than 300 mg in a 24-h urine collection.[4] However, there are times when a decision regarding when to deliver, or whether to utilize magnesium sulfate for seizure prophylaxis,[5] needs to be made sooner than 24 h.

In such cases, urine dipstick protein or, more recently, the urine protein-to-creatinine ratio has been utilized.[6,7] Historically, the concern with the standard urine dipstick was the accuracy of this one-time measurement. In particular, the urine dipstick has been demonstrated to have a poor sensitivity and, in studies, greater than 50% of women with negative or trace urine dipsticks have been found to have significant proteinuria.[6,8] Although the urine protein/creatinine ratio should alleviate the problem with overall urine concentration, it too has not been found to have a particularly high sensitivity when a ratio of 0.3 has been used as a diagnostic threshold. Lower ratios of 0.15[9] and 0.19[10] have been suggested, but these continue to demonstrate problems with sensitivity, specificity and the corresponding positive and negative predictive values.

In the current edition of the *Journal of Perinatology*, Dwyer *et al.*[11] present a potential algorithm for the efficient diagnosis of significant proteinuria. This current algorithm has the strength of recognizing the potential strengths of urine dipstick and urine protein-to-creatinine ratio as having diagnostic thresholds as well as the potential of a reasonable screening threshold. In this case, diagnostic threshold refers to a numerical threshold above which the positive predictive value is essentially 100%. Alternatively, a potential screening threshold should have a sensitivity close to 100%. As Dwyer *et al*. note, the urine dipstick has a high specificity, but relatively poor sensitivity, but the urine protein-to-creatinine ratio has a high sensitivity in its lower ranges. Their resulting algorithm utilizes these simple steps: (1) all women with a urine dipstick of 1+ or greater are considered to have proteinuria >300 mg in 24 h; (2) all women with a urine dipstick of negative or trace with a urine protein-to-creatinine ratio of 0.28 or greater are considered to have proteinuria >300 mg in 24 h; (3) all women with a urine protein-to-creatinine ratio <0.15 are considered to be negative for significant proteinuria; and (4) women with a urine protein-to-creatinine ratio between 0.15 and 0.27 need to have a 24 h urine collection for formal diagnosis.

As noted above, this relatively simple algorithm notes and uses the strengths and weaknesses of the two simple, one-time urine tests to reliably predict who does and who does not have significant proteinuria and will do so in three out of four patients. The remaining 25% of women will need to undergo the 24-h urine protein collection, and the clinician can utilize other signs and symptoms of preeclampsia to adjust the *a priori* risk of intervening in the pregnancy or utilizing magnesium sulfate for seizure prophylaxis.

This algorithm deserves future investigation in a large, prospective, multi-center study. Although it is unlikely that in a larger study the thresholds described will lead to 100% positive predictive values and 100% sensitivity, one would hope that both values would be in the 96 to 99% range. Meanwhile, because these data have been replicated in other smaller studies, it seems reasonable to utilize these thresholds to guide acute care of women with elevated blood pressures.

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