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Editorial

Watch Out the Pitfalls of Proteinuria Detection by Protein- or Albumin-to-Creatinine Ratio: The Postzone Effect

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Proteinuria is a preliminary sign implying that renal function could be impaired. Hence, screening and evaluation of proteinuria is commonplace in clinical practice, especially in the outpatients. With the advance of laboratory technology, there are various tools and methodologies for detection of proteinuria. Among these, quantitative estimation of urine protein-to-creatinine ratio (uPCR) and albumin-to-creatinine ratio (uACR) are two common examinations for determination of proteinuria in laboratories. Unlike the urine strip, both uPCR and uACR are virtually not affected by the variation of concentration in the urine specimen [1-3]. Proteinuria/albuminuria should be considered as uPCR is greater than 150 mg/g creatinine or uACR greater than 30 mg/g creatinine [4]. Once proteinuria was detected, further evaluation should be conducted for diagnostic establishment of renal diseases. Also, both uPCR and uACR could be used for monitoring disease progression and therapeutic effects.

For providing the correct testing results to clinicians, the maintenance of a quality management system is essential and crucial to medical laboratories. However, certain errors that are pre- or post-analytical sometimes occur, and thus affect the testing results and mislead to inappropriate management in clinical. Postzone effect, for instance, is one of the interferences plaguing certain immunoassays or nephelometric assays due to antigen excess. The so-called "postzone" arises from the precipitation curve of antigen-antibody complex formation in contrast to "prozone", in which antibody excess occurs [5]. The presence of antigen excess eventually results into falsely negative data. In situation of assessing uACR, extremely high concentration of albumin in the urine specimen could lead to inaccurately low results if not properly diluted. Therefore, there is a risk of misdiagnosis in patients who have significant proteinuria. If uPCR testing is prescribed and conducted concomitantly, clinicians may be confused when the discrepancy between uACR and uPCR is presented. And the discrepancy may lead to improper diagnosis of globulinuria, with the presence of high uPCR and low uACR, and subsequently a series of unnecessary evaluation and inappropriate management.

To summarize, clinicians and laboratory workers should be aware of the postzone effect on laboratory examinations of proteinuria such as uPCR and uACR, as postzone effect could affect the accuracy of laboratory values and lead to inappropriate diagnosis and/or management.

Author Contribution

Chih-Chun Chang and Jung-Li Ho drafted the manuscript and contributed equally as co-first authors; Chih-Chun Chang revised the manuscript and contributed as the corresponding author. All authors approved the final manuscript.

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