Utility of Serum and Urine Protein Electrophoresis in Evaluation of Chronic Kidney Disease Patients

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ABSTRACT

Background: Electrophoresis is defined as a method of separating proteins based on their physical properties. The pattern of serum/urine protein electrophoresis (SPEP/UPEP) outcomes depends on the fractions of two significant types of protein: albumin and globulins. This laboratory examination can identify the number of specific proteins present either in the serum or in the urine. Thus, it can help in screening and discovering a specific pathological condition.

Current guidelines for evaluating chronic kidney disease (CKD) do not include routine screening with serum and urine protein electrophoresis (SPEP and UPEP). The converse question of how often the patients presenting to the general kidney clinic as a case of CKD or protein in urine need screening tests to detect M-protein have no clear answer. In addition, the utility of specific tests can have an essential role in forming clinical pathways to evaluate patients with various conditions. Best practices for monoclonal protein testing and screening for paraprotein in patients with CKD are not well established. For this reason, our study aims to examine the use of screening SPEP and UPEP in the evaluation of CKD patients.

Methodology: This is a retrospective study (Chart Review) of 149 sequential incident patients referred to a teaching General Nephrology clinic to evaluate CKD between Jan and Nov 2018. The SPEP and UPEP testing frequency and proportion with M-spike were obtained by chart review, along with the routinely performed clinical, blood and urine tests, imaging, and reports of any Hematology consultation, renal and bone marrow biopsies performed.

Results: Screening by SPEP/ UPEP test was done in 104 (70 %) patients. M-spike was present in Eleven of them (10.6 %, 96 % CI 5.4 – 18.8 %), 2 IgG-κ, 5 IgG-λ, 1 IgA-λ, 2 LC-κ, and 1 LC-λ. Eight of the Eleven patients had a Hematology consultation, Six had bone marrow biopsy, and Three had a renal biopsy. Diagnoses were seven have MGUS, Two have myelomas (MM), One has amyloid (AL), and One has MM + AL. On the other hand, of the 45 (30%) patients without SPEP/UPEP, six had a renal biopsy, then One patient was diagnosed with amyloid. Fisher's Exact test has shown no significant association between screening with SPEP/UPEP and hematological conditions.

Conclusion: In summary, the prevalence of M-spike in CKD is higher than what has been reported in the literature among the general population. Also, compared to previous studies in CKD, it is considered slightly high. The race of patients, average age, and sample size could affect the results. Until further notice, we suggest screening CKD patients based on clinical presentation. More extensive prospective studies are needed to identify subgroups with a higher likelihood of M-spike to target testing. Also, more work is needed to find if there is an association between the screening and the clinical outcome of the patients. The cost-efficacy is also an area for further studies.

Keywords: Electrophoresis, Hematology, Screening, Paraprotein

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