A Method for Differentiation of Glomerular and Nonglomerular Hematuria by an Automated Urinary Flowcytometer

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Dear Sir,

There is increasing interest in the examination of urine sediment in order to differentiate between glomerular and nonglomerular hematuria [1-6]. The purpose of this study was to prepare diagnostic criteria for the determination of the source of hematuria for newly developed automated urinary flow cytometer (a prototype of UF100, TOA Medical Electronics, Kobe, Japan), which clearly recognized red blood cells, white blood cells, epithelial cells, bacteria and crystals by their cell size and fluorescent intensity within 60 min. The subjects were 98 patients with hematuria from known bleeding sites, 64 males and 34 females aged 16-75 years. Of these patients, 31 had glomerular disorders and 67 had nonglomerular disorders, all of them showing 2 or more erythrocytes per microscopic field (× 400) using this analyzer.

With the automated urinary flowcytometer, erythrocytes derived from glomeruli were distributed in a smaller size range, and those not derived from glomeruli in a larger size range. However, there was an overlap zone, and its forward scatter (FSC) intensity was 84-126, which corresponded to the erythrocyte size of 4-6 µm. The diagnostic criteria (Kitasato University Kidney Center Criteria) were established on the basis of these findings. Hematuria was regarded as nonglomerular type when 80% or more erythrocytes were disturbed in an FSC intensity range of 84 (lower limit of the overlap zone) or above, as glomerular type when 80% or more erythrocytes were distributed in an FSC intensity range of 126 (upper limit of the overlap zone) or less, and as mixed type when neither erythrocytes in the FSC intensity range of 126 or less nor those in the FSC intensity of 84 or above occupied 80% or more of all erythrocytes. The hematuria type was regarded as nonglomerular when both erythrocytes with the FSC intensity of 126 or less and those with the FSC intensity of 84 or above occupied 80% or more of all erythrocytes. The sensitivity of this method was 100% and the specificity was 92.54%, for glomerular disorders in the 98 patients examined in this study.

This apparatus allows discrimination between glomerular and nonglomerular hematurias. It is expected to be useful as a routine examination for differential diagnosis of hematuria.
because a larger number of samples can be examined in a short period (60 s/sample) and no special technique or knowledge is needed for the examination.

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References