The Validity of the Criteria to Differentiate the Origin of Hematuria in the Automated Urinary Flow Cytometer

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Table 1. Sensitivity (100%) and specificity (89.4%) of UF-100

Isomorphic Mixed Dysmorphic

Glomerular disease	0	0	19	
Nonglomerular disease		42	3	2

Dear Sir,

We have newly developed an automated urinary flow cytometer which utilizes flow cytometry and an impedance method to detect urinary particles. This analyzer allows us to clearly distinguish urinary red blood cells (RBC), white blood cells, epithelial cells, casts, bacteria, and crystals by their cross-sectional area and length of cells and nuclei in urine. It analyzes and displays automatically the accurate amount of every kind of cell in 40 s without centrifuging. The study to clarify the criteria for differential diagnosis of hematuria has already been undertaken and is presented in Nephron [1]. According to the criteria (Kitasato University Kidney Center Criteria), cases in whom more than 80% of all RBC were equal to or larger than the forward scatter (FSC) intensity 84 were regarded as the nonglomerular type. Cases in whom more than 80% of all RBC were equal to or smaller than 126 were regarded as the glomerular type. Cases in whom less than 80% of all RBC were in either of these two size ranges were regarded as the mixed type. Cases in whom both ranges included equal to or more than 80% of all RBC were regarded as the nonglomerular type. This criterion is applied to differentiate the origin of hematuria in the fully automated urinary flow cytometer (UF-100, a commercial type of the urinary flow cytometer; Toa Medical Electronics Co., Ltd, Kobe, Japan). In this paper, an additional 66 cases who were different from those used to investigate this criterion in the former study [1] were tested to endorse the validity of the criteria by UF-100. Of the 66 subjects, 19 had been clinically diagnosed as having glomerular disease proven by renal biopsy without uro-logical abnormality. The remaining 47 patients were cases with urinary tract stones or who had evident urological hematuria following treatment of urinary tract stones by extracorporeal shock-wave lithotripsy. The hematuria of these 47 cases was checked as

nonglomerular bleeding by light microscopy before UF-100 examination. The sensitivity and specificity of UF-100 in diagnosing glomerular hematuria for these 66 cases were 100 and 89.4% (table 1). This result is thought to be satisfactory for the screening of the origin of hematuria.

Acknowledgement

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Reference

Hyodo T, Kumano K, Haga M, Sakai T: A method for differentiation of glomerular and nonglomerular hematuria by an automated urinary flow cytometer. *Nephron* 1996;73:348.

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