Phosphatidylserine exposing red blood cells in urine: a potential biomarker for diagnosis of glomerular hematuria

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Abstract

Statement of the Problem: Phosphatidylserine (PS) exposure increases as red blood cells (RBC) age, and is an important sign for the senescent cells. Dysmorphic red blood cells (DRBC) are increased in urine of patients with glomerular hematuria (GH), we postulated that this PS exposure, through increased DRBC. In this study, we aimed to determine the number of PS exposing RBC in the urine of patients with GH using flow cytometry. Methodology & Theoretical Orientation: Fresh voiding urine was collected from patients with GH (n=16) and patients with NGH (n=16). The absolute number of DRBC was investigated under microscopy. PS exposing RBC was defined by positive labeling of CD235a and annexin V. All patients with GH were confirmed glomerular bleeding by biopsy-proven. Findings: The number of PS exposing RBCs was statistically significantly higher (P <.001) in patient with GH. Area under the curve of using PS exposing RBCs as a biomarker for diagnosis GH was 0.9 and the cut-off point of >35% was the best number for GH diagnosis. Conclusion & Significance: These findings show an impairment of RBC membrane phospholipid asymmetry in GH patients and quantification of PS exposing RBC by flow cytometry is a more accurate biomarker for diagnosing GH.

Image

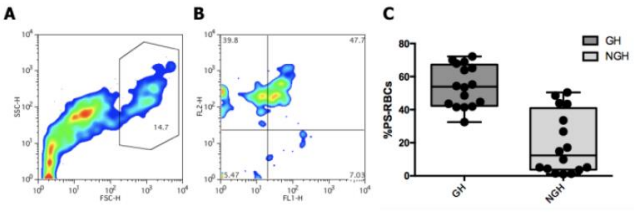


Figure1 scatter plot demonstrating RBC population (A) and RBC subpopulation (B) in urine from patients with GH. Box plot comparing %PS-RBCs between GH and NGH group.

Recent Publications

1. Palasuwan D, Palasuwan A, **Charoensappakit A**, Noulsri E. (2017) A novel flow cytometry-based method of analyzing Heinz bodies. Int J Lab Hematol. Feb;39(1):68-75.



Biography

Mr. Awirut Charoensappakit is studying in master degree program, clinical hematology sciences, department of Clinical Microscopy, faculty of Allied Health Sciences, Chulalongkorn University. He graduated his Bachelor's Degree (Hons) in medical technologist from Chulalongkorn University. He interested in nephrology, hematology, and apply technique in clinical research.

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Notes/Comments: