



Occurrence and Characterization of Crystalluria in Renal Stone Formers with and Without Urinary Tract Infection

Keeratikan Konchan¹, Yuphaphan Srikham¹, Sahapat Barusrux¹, Porntip Pinlaor¹, Aroonlug Lulitanond¹, Pipat Sribenjalux¹, Seksit Sungkeeree¹, Phitsamai Saisud¹, Orathai Tunkamnerdthai², Vitoon Prasongwatana³, Ratreer Tavichakorntrakool^{1*}

¹Centre for research and development of Medical Diagnostic Laboratories, Faculty of Associated Medical Sciences, Khon Kaen University, Khon Kaen 40002, Thailand

Department of Physiology² and Biochemistry³, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand

* Corresponding author, E-mail: ratree.t@gmail.com

Background and objective: Urinary crystal precipitation is necessary for the initial step of stone formation. Urinary tract infections (UTI) are known to be associated with renal stone (RS) disease, particularly struvite stone. We simultaneously examined both semi-quantitative amount and types of crystal in the urine of RS formers with and without UTI.

Methods: The subjects were recruited from two hospitals in Northern Thailand. RS and UTI were diagnosed by the physicians. The subjects were divided into four groups; group 1 (RS subjects without UTI; n=94), group 2 (RS subjects with UTI; n=83), group 3 (UTI subjects; n=210) and group 4 (healthy subjects; n=100). The semi-quantitative amount and types of crystal and bacteriuria of mid-stream urine were evaluated after centrifugation under light microscopy and urinalysis was also performed.

Results: The semi-quantitative amount of crystalluria was not significantly different among the four groups. How-

ever, the common types of crystalluria were calcium oxalate, uric acid and triple phosphate, respectively. Calcium oxalate crystal was the most common crystal found in all groups (75%). Uric acid crystals were found in 13% 5% and 25% in group 1,2 and 3, respectively. Triple phosphate crystal was found 2% only in group 3. Calcium oxalate and uric acid crystals were found in urinary pH 5-7, whereas triple phosphate crystal was found only in urinary pH 9. In addition, triple phosphate crystal was found in the subjects with UTI, while the calcium oxalate and uric acid crystals were found in both subjects with and without UTI.

Conclusions: Urinary pH and bacteriuria were associated with crystal types. These data may explain the pathogenesis of RS formation on the basic knowledge of UTI and types of crystal formation.

Keywords: crystalluria, urinary tract infection and renal stone disease