

Association of Serum Uric Acid Levels and Diabetes Mellitus: the Importance of Glycosuria

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Background/Aims: To investigate the relationship between blood uric acid (UA) and diabetes mellitus.

Methods: This study used data from the Seventh Korea National Health and Nutrition Examination Surveys conducted in 2016-2017. After exclusion, 11,622 subjects (subjects with diabetes: 1,541, subjects with prediabetes: 4,305, subjects with non-diabetes: 5,776) who had serum UA levels were analyzed.

Results: Serum UA levels were lower in both subjects with diabetes and without diabetes compared to subjects with prediabetes ($P < 0.001$ and $P = 0.004$, respectively). The difference in UA levels between subjects with diabetes and prediabetes disappeared ($P = 0.439$) after adjusting with glycosuria as a confounding factor. Before including glycosuria for adjustment, higher UA levels were significantly associated with lower glycemic markers (fasting glucose and HbA1c) in subjects with diabetes ($P < 0.001$). After adjusting with glycosuria, the negative association between UA levels and glycemic markers disappeared ($P = 0.736$ and $P = 0.050$, respectively). As amount of glycosuria increased, UA levels decreased dose dependently (P for trend < 0.001).

Conclusions: All significant associations of UA and glycemic markers found in subjects with diabetes disappeared after adjustment for glycosuria. Furthermore, change of UA according to glycosuria was dose-dependent. Our results suggest that glycosuria is an important determinant of serum UA levels and suggest that the clinical utility of UA may decrease in subjects with diabetes, especially those with glycosuria.

Figure 2. Serum uric acid levels according to glycosuria level in subjects with diabetes after adjusting for confounding variables. Asterisk (*) means that values are significantly different from negative glycosuria. Values were compared and generated by ANCOVA. Multivariate factors included sex, age, height, weight, current smoking, alcohol intake (> 3 units/day), exercise status (> 30 min/day), estimated glomerular filtration rate and fasting glucose level.

