Nomogram to Predict Uric Acid Kidney Stones Based on Patient’s Age, BMI and 24-Hour Urine Profiles: A Multicentre Validation

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INTRODUCTION: We performed a multicentre validation of a nomogram to predict uric acid kidney stones in two populations.

METHODS: We reviewed the kidney stone database of two institutions, searching for patients with kidney stones who had stone composition analysis and 24-hour urine collection from January 2010 to December 2013. A nomogram to predict uric acid kidneys stones based on patient age, body mass index (BMI), and 24-hour urine collection was tested. Receiver-operating curves (ROC) were performed.

RESULTS: We identified 445 patients, 355 from Cleveland, United States, and 90 from Sao Paulo, Brazil. Uric acid stone formers were 7.9% and 8.9%, respectively. Uric acid patients had a significantly higher age and BMI, as well as significant lower urinary calcium than calcium stone formers in both populations. Uric acid had significantly higher total points when scored according to the nomogram. ROC curves showed an area under the curve of 0.8 for Cleveland and 0.92 for Sao Paulo. The cutoff value that provided the highest sensitivity and specificity was 179 points and 192 for Cleveland and Sao Paulo, respectively. Using 180 points as a cutoff provided a sensitivity and specificity of 87.5% and 68% for Cleveland, and 100% and 42% for Sao Paulo. Higher cutoffs were associated with higher specificity. The main limitation of this study is that only patients from high volume hospitals with uric acid or calcium stones were included.

CONCLUSION: Predicting uric acid kidneys stone based on a nomogram, which includes only demographic data and 24-hour urine parameters, is feasible with a high degree of accuracy.