Stratifying Risk of Urinary Tract Malignant Tumors in Patients with Asymptomatic Microscopic Hematuria


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OBJECTIVE: To identify patients who could safely avoid unnecessary radiation and instrumentation after the detection of microscopic hematuria.

PATIENTS AND METHODS: We conducted a prospective cohort study of patients who were referred to urologists and underwent a full evaluation for asymptomatic microscopic hematuria during a 2-year period in an integrated care organization in 3 regions along the West Coast of the United States. A test cohort and validation cohort of patients with hematuria evaluations between January 9, 2009, and August 15, 2011, were identified. Patients were followed passively through their electronic health records for a diagnosis of urothelial or renal cancer. The degree of microscopic hematuria, history of gross hematuria, smoking history, age, race, imaging findings, and cystoscopy findings were evaluated as risk factors for malignant tumors.

RESULTS: The test cohort consisted of 2630 patients, of whom 55 (2.1%) had a neoplasm detected and 50 (1.9%) had a pathologically confirmed urinary tract cancer. Age of 50 years or older and a recent diagnosis of gross hematuria were the strongest predictors of cancer. Male sex was also predictive of cancer, whereas smoking history and 25 or more red blood cells per high-power field on a recent urinalysis were not statistically significant. A Hematuria Risk Index developed from these factors had an area under the receiver operating characteristic curve of 0.809. In the validation cohort of 1784 patients, the Hematuria Risk Index performed comparably (area under the curve = 0.829). Overall, 32% of the population was identified as low risk and 0.2% had a cancer detected; 14% of the population was identified as high risk, of whom 11.1% had a cancer found.

CONCLUSION: These results suggest that a considerable proportion of patients could avoid extensive evaluations with the use of the Hematuria Risk Index.