

Evaluation and Workup of Hematuria in Adults



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KEYWORDS

- Adults • Microscopic hematuria • Gross hematuria • Guidelines • Evaluation
- Best practice

KEY POINTS

- Hematuria is the presence of blood in the urine and can be stratified into glomerular or nonglomerular causes as well as microscopic or gross hematuria.
- Nonglomerular hematuria can represent urologic disease ranging from infection to trauma to malignancy and requires further workup by a urologist.
- The use of laboratory and imaging testing is necessary to discern the cause of hematuria especially in those with high risk for malignancy.
- Triple-phase computed tomography urography is the gold standard in initially visualizing the urinary tract for stones or other lesions in the upper and lower urinary tract.
- For asymptomatic microscopic hematuria, cystoscopy should be performed on all patients older than 35 years or those with risk factors for urothelial malignancy (ie, chemical exposure, smoking history).

DEFINITION

Hematuria is defined as the presence of an abnormal quantity of red blood cells (RBCs) in the urine. It is classified as follows:

- *Microscopic Hematuria*

Microscopic hematuria is defined as ≥ 3 RBCs per high-power field ($\times 400$ magnification) in a single properly collected urine sample.¹

- *Gross Hematuria*

Gross hematuria is defined as blood in the urine visible by the naked eye. Patients often present to the emergency department or at the physician's office after

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such an episode. Gross hematuria must be differentiated from other causes of discolored urine.² Causes of abnormal urine color are shown in **Table 1**.²

EPIDEMIOLOGY

The incidence and prevalence of hematuria varies widely depending on age, gender, and the population screened. Britton and colleagues^{3,4} reported the prevalence between 13% and 20% in men older than 60 years; however, according to Messing and colleagues,⁵⁻⁷ microscopic hematuria (detected by urinary dipstick) was found in 10% to 21% of high-risk and asymptomatic men older than 50. The prevalence of microhematuria in adults ranges from 2.5% to 21.1%.⁸ Thorough examination and evaluation of these patients is necessary, as 5% of patients with microscopic hematuria⁹ and 20% to 40% of patients with gross hematuria are likely to have an underlying malignant condition.¹⁰

ETIOLOGY

Hematuria can represent underlying disease, the causes of which can be benign or malignant. Microscopic hematuria is further classified into glomerular (hematuria from the glomeruli suggesting intrinsic renal disease and is not discussed further being beyond the scope of this article) managed by nephrologists and nonglomerular (hematuria from nonglomerular sites, such as renal pelvis, ureter, and bladder, suggesting a urologic etiology) managed by urologists. Glomerular from nonglomerular causes can be distinguished by the color or urine, presence/absence of RBC casts, degree of proteinuria, and presence of clots (**Table 2**). The most commonly reported causes of hematuria may include urinary tract infections (UTIs), urinary tract stones, bladder and kidney tumors, urethritis, benign prostatic hyperplasia (BPH), and prostate cancer.

The following are some of the common causes of hematuria classified by symptom and location (**Table 3**):

- *Infection*: cystitis, tuberculosis, prostatitis, urethritis, schistosomiasis.
- *Malignancy*: renal carcinoma, Wilms tumor, carcinoma of the bladder, prostate cancer, urethral cancer, or endometrial cancer.

Color	Foods	Drugs	Condition/Substances
Red/Brown	Beets, blackberries, rhubarb, fava beans, aloe	Laxatives (eg, Ex-Lax phenolphthalein), tranquilizers (eg, chlorpromazine, thioridazine, propofol)	Porphyria (eg, lead, mercury poisoning), globins (eg, hemoglobin, myoglobin)
Orange	Carotene-containing foods (eg, carrots, winter squash)	Beta carotene supplements, vitamin B supplements, warfarin, rifampin, Pyridium	Urochrome (eg, dehydration)
Green/Blue	Asparagus	Amitriptyline, indomethacin, cimetidine, promethazine	
Black		Methyldopa	

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