

# Microscopic hematuria in the gynecologic and obstetric patient

Lazarou George<sup>1</sup>, Stournaras Stamatios<sup>2</sup>, Nousia Konstantina<sup>2</sup>, Zygouris Dimitrios<sup>3</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Stony Brook University, School of Medicine, Winthrop University hospital, Stony Brook, New York, USA

<sup>2</sup>6th Department of Obstetrics and Gynecology, Elena Venizelou hospital, Athens, Greece

<sup>3</sup>Department of Gynecology, Agios Savvas hospital, Athens, Greece

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## Correspondence

Lazarou George

**E - mail:** glazarou@winthrop.org

## Abstract

Microscopic hematuria is a common finding in urinalysis during gynecological - obstetric control. We present the case of a 58 years old woman with recurrent hematuria in annual gynecological check. The literature review highlights a series of tests that must be carried out to investigate these cases. Medical history and physical examination are the first steps approach to identify potential causes and risk factors. The laboratory investigation includes intra-

venous urography, ultrasound, CT and MRI. Moreover cystoscopy contributes to the evaluation of the lower urinary tract and should be performed in all cases over 35 years. Finally, we must always have in mind that in 20% of cases it is not found any cause of the microscopic hematuria.

**Key words:** hematuria; microscopic hematuria; pregnancy

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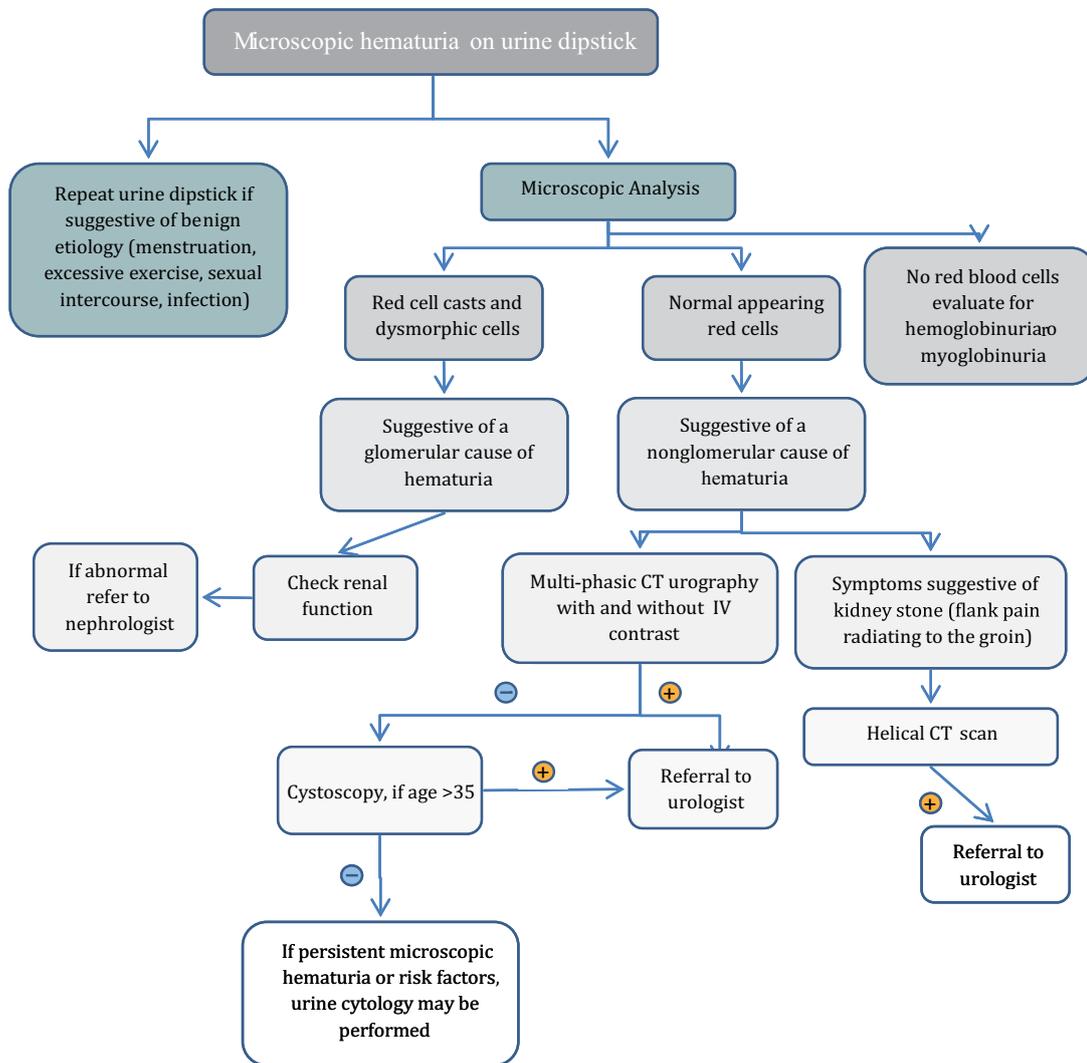
**W**hether it is an annual gynecologic visit in obstetrics or an office visit for evaluation of urinary symptoms, the obstetrician- gynecologist typically evaluates patients with one of the most commonly used diagnostic tests in modern medicine, the urinalysis. Since microscopic hematuria is frequently found on urine dipstick, it is important for the provider to have a good understanding of how to proceed with the finding of microscopic hematuria. This article will focus on the differential diagnosis and work-up for microscopic hematuria in the gynecologic and obstetric patient.

## Case report

A 58 years old female presents with recurrent mi-

croscopic hematuria on urinalysis during her routine annual gynecologic evaluation. She only reports some mild dysuria and urinary incontinence when coughing or sneezing. She is post - menopausal and not taking hormone replacement. She smokes ½ pack of cigarettes for over 20 years. The patient is taking coumadin (therapeutic range) for a recent deep vein thrombosis of her lower extremity. What is the appropriate and current recommended evaluation for her microscopic hematuria?

The patient presented is at higher risk for a urologic malignancy due to her smoking history and age. She was evaluated with multiphasic CT urography with and without IV contrast and cystoscopy revealing a small polypoid tumor in the bladder.



**Figure 1.** Evaluation of microscopic hematuria in women

Cystoscopic transurethral resection revealed superficial low - grade transitional cell carcinoma.

**Discussion**

The American Urologic Society (AUA) has released new 2012 guidelines for diagnosis and evaluation of microscopic hematuria. According to the AUA microscopic hematuria is defined as 3 or more blood cells per high powered field in one centrifuged urinary sediment<sup>1</sup>. Obtaining a clean catch specimen is especially important in women to decrease contamination from the vagina<sup>2</sup>. It is unclear exactly how

prevalent microscopic hematuria is, however studies have reported a broad range from 2.4% to 31.1% of patients depending on their age and sex<sup>1</sup>. In contrast to macroscopic hematuria where 25% of people have urologic cancers only 1 - 10% of patients with microscopic hematuria have urologic cancer . Blood in the urine can arise from any point in the urinary tract; the kidneys, the ureters, the bladder, or the urethral meatus. When microscopic hematuria is found on a urine dipstick the differential diagnosis must include all etiologies for all possible anatomic locations. There are several benign causes

**Table 1. Risk factors for urologic cancers**

Age > 35
Smoking history
History of gross hematuria
Occupational exposure (chemicals and dyes)
Previous urologic disease
Irritative voiding symptoms
Analgesic abuse
History of pelvic irradiation
Benzenes
Aromatic amines
Cyclophosphamide exposure

of microscopic hematuria in women which include menstrual contamination, excessive exercise, sexual intercourse, urinary tract infection, urolithiasis, idiopathic or recent urologic instrumentation. And some times in pregnancy is normal because the changes in the kidney function.

An algorithm of the work-up for microscopic hematuria in women is shown in Figure 1. As with any workup, the approach to microscopic hematuria starts with a complete history and physical examination. A history of trauma may suggest injury to the urinary tract. It is important during the history to determine if microscopic hematuria may be explained by one of the benign causes listed previously. After such benign causes have been ruled out the next step is to determine if there are any symptoms associated with the microscopic hematuria. Most importantly, is the patient experiencing any pain? Pain can indicate inflammation or obstruction in the urinary tract. The specific locations of pain, that are of interest, are abdominal, flank, suprapubic or urethral. Unilateral flank pain which is episodic and radiating to the groin may indicate a high suspicion for a kidney stone. Symptoms such as fever and dysuria may suggest a urinary tract infection. An inflamed urethral caruncle in a post-

menopausal woman may also be a source of microscopic hematuria.

Aspirin or anticoagulant use is not a cause of microscopic hematuria unless the patient is over-anticoagulated<sup>3</sup>. Certain medications such as quinine, anti-inflammatory medications and some antibiotics can cause acute interstitial nephritis which could present as microscopic hematuria<sup>4</sup>. Past medical history of previous urinary pathology or past urologic procedures can indicate current pathology. Microscopic hematuria can be a manifestation of systemic diseases with renal involvement such as lupus erythematosus and the vasculitides. Some familial disorders to inquire about which may cause microscopic hematuria include polycystic kidney disease and hereditary nephritis. Noting any recent travel history is also important because infectious pathogens vary by region and continent.

After the history, a focused physical examination should be performed. Tenderness at the costovertebral angle may indicate renal calculus or pyelonephritis. Pain radiating to the groin from the kidney also may suggest a kidney stone. Suprapubic tenderness indicates the bladder may be involved and a possible cystitis. Finally, urethral tenderness is suspicious of urethritis. Additionally, in all female patients it is important to perform a speculum and bimanual pelvic examination to investigate for non - urinary bleeding from the vagina, cervix or uterus. Women with a history and physical suggestive for benign causes of hematuria should be re - tested after the likely etiology has stopped. Patients with symptomatic microscopic hematuria or those who are at high risk for urologic malignancies (Table 1) should be referred to a urologist for further evaluation.

The differential diagnosis for microscopic hematuria is illustrated in Table 2. It is divided into glomerular and nonglomerular causes. Glomerular causes of hematuria will show red cell casts on microscopy and traditionally present with dysmorphic red blood cells. The glomerular causes of mi-

**Table 2. Causes of microscopic hematuria in women**

<b>Glomerular</b>
IgA nephropathy
Membranous glomerulonephritis
Thin basement membrane disease
Post infectious glomerulonephritis
Alport's syndrome
Focal glomerulonephritis
Mesangioproliferative glomerulonephritis
<b>Non - glomerular</b>
Upper urinary tract causes
Nephrolithiasis
Pyelonephritis
Ureteral transitional cell carcinoma
Renal trauma
Papillary necrosis
Polycystic kidney disease
Renal cell cancer
Ureteral stricture
Sickle cell disease
Renal infarction
Lower urinary tract causes
Cystitis
Urethritis
Bladder or urethral polyps
Bladder cancer
Urethral strictures
<i>Schistosoma haematobium</i>

Microscopic hematuria can also be associated with proteinuria and renal insufficiency. Patients with these findings should be referred to a nephrologist for further evaluation<sup>3</sup>.

The four imaging modalities which are used to evaluate the upper urinary tract are intravenous urography (IVU), ultrasonography, computed tomography (CT) urography and magnetic resonance imaging (MRI) urography. IVU and ultrasonography have fallen out of favor because additional studies are usually needed. IVU is unable to distinguish between solid and cystic masses and ultrasonography is limited in its assessment of small renal masses (<3cm)<sup>1</sup>. Multi - phasic CT urography with and without intravenous (IV) contrast as well as delayed images (CT urogram) is considered the best diagnostic modality for evaluation of microscopic hematuria. The sensitivity for identifying renal pathology is reported as approximately 94%<sup>5</sup>. MRI urography is useful for patients who cannot tolerate the contrast needed for the CT urography. Although the efficacy of MRI urography is equivalent to CT urography for imaging the renal parenchyma, the efficacy of the imaging of the collecting systems has not been studied sufficiently<sup>1</sup>. The AUA recommends multi - phasic CT urography as the preferred radiologic modality of choice for upper urinary tract imaging in patients with microscopic hematuria.

Cystoscopy and urine cytology are two commonly used diagnostic modalities for the evaluation of the lower urinary tract. Cystoscopy should be part of the initial workup for microscopic hematuria in patients over 35 years old<sup>1</sup>. If and when a cystoscopy is being performed, a retrograde pyelogram can be performed intraoperatively under fluoroscopy to evaluate the upper urinary tracts. This can be especially useful in those with contraindications for IV contrast. For patients less than 35 years of age the risk of having a urologic malignancy is very low that a cystoscopy is not typically necessary unless the history and physical examination is significant or additional risk factors exist<sup>1</sup>. Urine

cytology has a sensitivity of approximately 90% for high grade carcinoma however only 50% for low grade lesions<sup>6</sup>. Therefore, the current AUA recommendations do not include routine urine cytology as part of the initial work up for microscopic hematuria however; urine cytology may be included in the evaluation for patients with a negative workup and persistent microscopic hematuria as well as patients with risk factors for urinary malignancies<sup>1</sup>. Those patients who are considered low - risk for urologic malignancy may be followed conservatively<sup>1</sup>.

In approximately 20% of female patients there is no definitive cause for microscopic hematuria after an appropriate workup. Approximately 3% of these patients will eventually be diagnosed with a urologic cancer. It is suggested that those who have persistent microscopic hematuria and have a negative initial work up should have another workup in 3 to 5 years in addition to yearly urinalysis. Those patients who fall into the low risk group can stop the yearly urinalysis after 2 years if the urinalysis is consistently negative<sup>1</sup>. ■

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