

# Common Causes of Hematuria in Children

## 4.51 PEDIATRICS

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### DEFINITION AND RECOGNITION OF HEMATURIA

#### • Hematuria

- A common issue faced by primary physicians who care for children
- While it can cause great anxiety in the patient and family when it presents grossly, rarely does hematuria alone herald a serious illness during childhood.
- Despite a thorough evaluation, no cause can be found in a large percentage of children who have hematuria.

#### • Microscopic hematuria

- Persistent presence of >5 RBCs/hpf in an uncentrifuged urine

#### • Macroscopic (gross) hematuria

- Blood or any discolored urine visible to the human eye
- A dramatic symptom usually brought to medical attention

#### • Evaluation of hematuria

- Nearly 40% of children who present with gross hematuria and 80% of patients with persistent isolated microscopic hematuria have no identifiable cause despite a thorough workup.
- Raises the question of how investigation should be performed on a child particularly if it is an isolated microscopic hematuria because the evaluation can be costly and, at times, invasive.
- How extensive an evaluation is appropriate depends much on the context.
- Children who are symptomatic and present with hematuria will deserve a thorough evaluation because they are the ones who are more likely to have an unidentifiable cause and include the subset that has an acute or potentially serious illness that can progress to significant morbidity or sequelae if not identified and treated.
  - This is where clinical judgment should be guided by a thorough history and physical examination.



Figure 1. Hematuria

#### • Dipstick test for blood

- Based on the peroxidase-like activity of hemoglobin
- Red cells are lysed on contact with a strip allowing free hemoglobin to catalyze the liberation of oxygen from organic peroxide.
- Tetramethylbenzidine is oxidized producing a color change from orange to green-blue.
- If intact red cells do not lyse, they may produce speckles on the pad.
- Sensitivity of dipsticks for hemoglobin: **0.015–0.062 mg/dL**.
  - This concentration corresponds to 5–21 RBCs/ $\mu$ L or 1–4 RBCs/hpf of concentrated urine sediment.

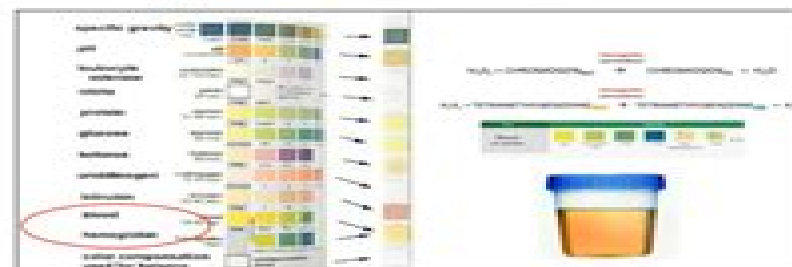


Figure 2. Dipstick test

#### • Normal excretion of blood in urine

- In healthy individuals, fewer than a thousand red cells are excreted in the urine per minute.
  - 3,000–4,000 RBCs/min = 2–3 RBCs/hpf
- Quantitative studies demonstrate that normal children can excrete as much as  $\geq 500,000$  RBCs in a 12-hour period.
  - This increases with fever and/or exercise.

### CLINICAL APPROACH TO PATIENTS WITH HEMATURIA



Figure 3. Simplified algorithm for hematuria

#### • Urinalysis: first step when presented with a patient with hematuria

- If no hemoglobin is found on macroscopic urinalysis, then other causes of urine discoloration need to be considered.

# March Hematuria Manual Guide

**Xiang Xie**



## **March Hematuria Manual Guide:**

## Enjoying the Song of Term: An Psychological Symphony within **March Hematuria Manual Guide**

In a global taken by monitors and the ceaseless chatter of immediate connection, the melodic splendor and mental symphony developed by the prepared word usually diminish in to the backdrop, eclipsed by the relentless sound and disturbances that permeate our lives. However, nestled within the pages of **March Hematuria Manual Guide** a marvelous fictional treasure full of natural emotions, lies an immersive symphony waiting to be embraced. Constructed by a wonderful composer of language, that captivating masterpiece conducts visitors on a psychological journey, skillfully unraveling the concealed melodies and profound influence resonating within each carefully constructed phrase. Within the depths of this moving review, we shall examine the book is main harmonies, analyze their enthralling publishing model, and surrender ourselves to the profound resonance that echoes in the depths of readers souls.

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