HPH Guidelines for Initial Evaluation of a Pediatric Patient with a Heme-Positive Dipstick

Effective February 27, 2017

Purpose of this Clinical Tool:
Heme-positive dipstick is often found incidentally during office evaluation of pediatric patients. Urinalysis was once part of AAP's recommended routine screening, but was removed from the recommendations in 2007 in light of the lack of clear benefit relative to its associated costs and risks. This algorithm outlines the approach to a pediatric patient with a heme-positive dipstick recommended by the Pediatric Nephrologists and Urologists of Kapi'olani Medical Specialists.

Definitions:

- **Hematuria** is the abnormal presence of red blood cells (RBCs) in the urine.
- **Gross hematuria** is blood in the urine that can be seen by the naked eye. Gross hematuria can result from as little as 1 mL of blood in 1 L of urine.
- **Microscopic hematuria** is blood in the urine that can only be detected by use of a microscope or a clinical test such as a urine dipstick. However, a urine dipstick alone is not sufficient to diagnose hematuria. Although many different cutoffs have been suggested in the literature, we define microscopic hematuria as >5 RBCs/high-power field on microscopic examination of a centrifuged fresh urine specimen.
- **Heme-positive dipstick** is a positive test for blood on a urine-testing reagent strip such as Multistix. This testing method detects the biochemical structure known as a heme group, and reacts to intact RBCs, free hemoglobin, and myoglobin.

General Considerations for the Pediatric Patient with Heme-Positive Dipstick:

- The urine dipstick detects heme with a sensitivity close to 100% and specificity of 99.3%.
- The dipstick detects free hemoglobin and myoglobin as well as intact RBCs.
    - Free hemoglobin ("hemolyzed blood") may result from intravascular hemolysis or from lysis of intact blood if the urine sample sits long enough prior to testing.
    - Myoglobin may result from rhabdomyolysis.
    - Intact RBCs may come from the kidneys/urinary tract but also from non-urinary sources of blood (menses, perineal lesion).
- False-positive results can be seen due to highly alkaline urine (pH ≥ 9.0) and improper storage or use of the test strips.
- Heme-positive dipstick alone is **not** sufficient for a diagnosis of hematuria.
    - Result must be confirmed by microscopic evidence of increased RBCs.
- Transient hematuria and heme-positive dipstick are common in children.
    - 4% of healthy school-age children tested positive in at least 1 out 4 serial urine specimens.
    - Of these subjects, 6% tested positive in 4/4 serial samples.
    - Current recommended practice is to test at least 3 specimens on separate occasions. Confirmation by repeat testing takes into account the intermittent nature of hematuria found in some conditions, and aids in distinguishing persistent from transient hematuria.

For questions regarding these guidelines, contact Kenneth Nakamura, MD: (808) 369-1237;
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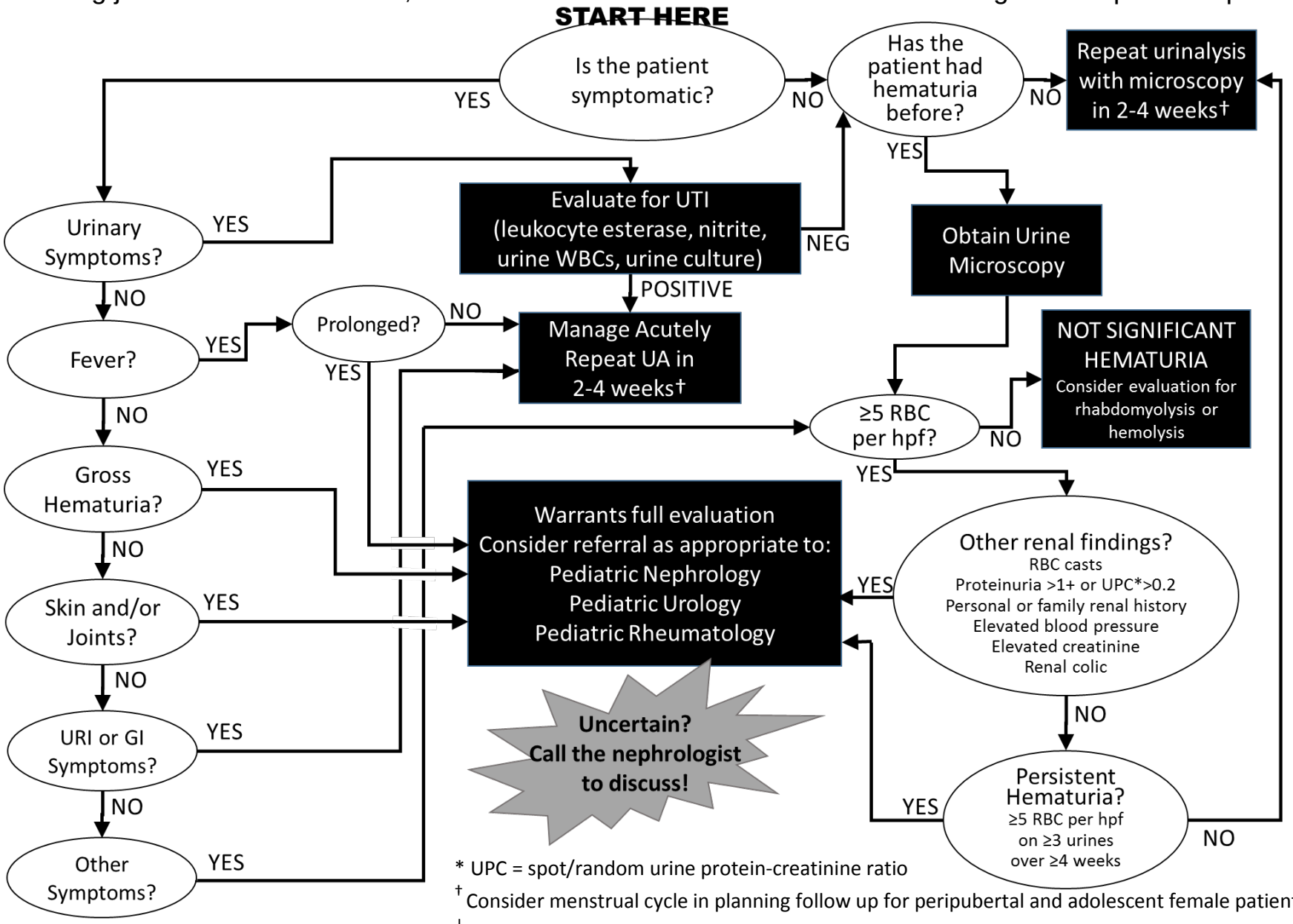
Key Questions on Patient History:

- HPI/ROS: Pain, trauma, joints, skin/rashes, weight loss, fever, hearing loss, edema, urinary symptoms, unusual bleeding or bruising, medications, last menstrual period.
- Family history: kidney disease (chronic kidney disease, dialysis, kidney transplant, polycystic kidney disease), hearing loss (esp. in children/young adults), kidney stones, bleeding diathesis.
- Other considerations: reason the test was done, level of parental/caregiver anxiety.

Recommended initial evaluation for heme-positive dipstick

(Following judicious use of the test, which is not recommended for routine screening in most pediatric patients‡)



* UPC = spot/random urine protein-creatinine ratio

† Consider menstrual cycle in planning follow up for peripubertal and adolescent female patients

‡ See: Kaplan et al. (1997) Screening dipstick urinalysis: a time to change. Pediatrics 100(6):919; Sekhar et al. (2010) A cost-effectiveness analysis of screening urine dipsticks in well-child. Pediatrics 125(4):660; and the AAP Publications *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*, 3rd Edition; and *Recommendations for Preventive Pediatric Health Care - Periodicity Schedule*.