HEMATURIA

(Last updated 07/22/2019; Reviewed by: Sidhant Singh, MD)

PRESENTING COMPLAINTS: Fever, pain, urinary frequency, discolored urine

FINDINGS

- **A**: Check airway
- **B**: ↑/N RR
- **C**: ↓/↑/N BP, ↑/N HR, weak/N pulse
- **D**: Variable altered (V,P,U,D)*
- **E**: Ascites, edema, flank fullness, fever, purpura/petechial
- **Lpc**: Urine dipstick and analysis, CBC, BT/INR/aPTT/PT, ↓/N pH
- **U<sub>pc</sub>**: Bright echogenic foci with acoustic shadowing (calculi), FAST**

*V* (verbal), *P* (pain), *U* (unconsciousness), *D* (delirious)

U<sub>pc</sub> (point of care ultrasound)  L<sub>pc</sub> (point of care labs)

**FAST**: Focused Assessment with Sonography in Trauma

DEFINITION (based on urine microscopy)

- **Hematuria**: 3+ RBCs per high-power field (HPF) in sediment
  - Gross hematuria: grossly red urine
  - Microscopic hematuria: RBCs on microscopy but not visible to the naked eye

- **Pseudohematuria**: Grossly red urine but <3 RBCs/HPF
  - Pigmenturia: caused by many drugs/foods, such as phenytoin, rifampin, beets, carrots
  - Hemoglobinuria: hemolysis (low haptoglobin)
  - Myoglobinuria: rhabdomyolysis (high CK, normal haptoglobin)

OTHER HISTORY

- **History**: Renal or ureteric stones, recent abdominal trauma, recent sore throat, smoking, secondary malignancy, family or personal history of bleeding disorders, visit to developing countries (dengue)

- **Symptoms**: Fever, frequency, urgency, dysuria, hesitancy, abdominal pain, nausea, vomiting, dizziness, palpitations, weight loss, anorexia

- **Signs**: Flank or suprapubic tenderness, palpable abdominal mass, bony tenderness (in case of secondary spread), prostate enlargement, prostatic tenderness on per rectal examination

DIFFERENTIAL DIAGNOSIS

- **Glomerular**
  - Proteinuria, dysmorphic RBCs, RBC casts, reduced GFR, edema, hypertension
Transient: Postinfectious glomerulonephritis (GN), exercise-induced hematuria, interstitial nephritis (medications)

Persistent: IgA nephropathy, thin basement membrane nephropathy (usually urinary protein excretion, blood pressure, and renal function are normal), other GN

Extra-glomerular

- Non-dysmorphic RBCs and blood clots
- Transient: Urinary tract infection (dysuria, frequency, urgency, flank pain, fever), stones (costovertebral angle tenderness), trauma (Foley insertion), sickle cell disease, bleeding diathesis (thrombocytopenia, not warfarin)
- Persistent: Malignancy (cigarette smoking, age ≥ 50, past cyclophosphamide), recurrent infections, indwelling catheter, BPH (hesitancy, nocturia), endometriosis (cyclical), schistosoma haematobium, tuberculosis, hemorrhagic cystitis (pelvic irradiation, cyclophosphamide, mitotane)

OTHER INVESTIGATIONS

- Differentiate glomerular vs extra-glomerular etiology (see above)
- Monitor: Vital signs, including: blood pressure, heart rate, temperature
- Labs: Complete urinalysis (including number of RBC/HPF and WBCs, bacteria, nitrites, protein, casts, crystals), CBC, renal function test, urine culture, blood culture (If significant bleeding, get coagulation studies and blood typing/cross match)
- Imaging: Ultrasound (stones and structural defects), CT urography and cystoscopy (to screen for lesions, unless clear glomerular or infective etiology)

THERAPEUTIC INTERVENTIONS

- General: Treatment varies depending on etiology and degree of hematuria
- Specific for key etiologies
  - UTI/Pyelonephritis: Antimicrobial treatment
  - BPH: Tamsulosin, Consider long-term finasteride/dutasteride
  - Gross hematuria/ hemorrhage: Fluid replacement, RBC transfusion for acute anemia (Hgb threshold 7-8 g/dL for hemodynamically stable medical and surgical patients; Symptomatic anemia (e.g. ongoing bleeding, acute coronary syndrome, new symptoms suggestive of acute stroke) should be treated with transfusion in all patients with Hgb <10 g/dL)); Episodic gross hematuria in IgA nephropathy generally does not require further evaluation or treatment
  - Severe bleeding diathesis: Consider vitamin K or platelet-transfusion, correct thrombocytopenia (platelets < 50 G/L), reverse effects of anticoagulant drugs, correct coagulopathy (INR > 1.5, PTT > 50 sec)
- **Consult:** Urology (all causes) and nephrology (For proteinuria, RBC casts, decreased renal function, dysmorphic RBCs)
- **Medication:** Steroids for glomerulonephritis, Prophylactic antibiotics for recurrent infection
- **Urological intervention:** Lithotripsy for stone
- **Surgical intervention:** Patient with history of trauma and hemodynamic instability with continuous bleeding

**ONGOING TREATMENT**

- **Follow-up management if negative work-up:** If persistent or recurrent hematuria: consider cytology, perform yearly urinalysis, consider repeat work-up in 3-5 years
- **Monitoring:** Hemodynamic and respiratory status, urine output, resolution of hemodynamic instability
- **Further Labs/imaging:** Repeat blood count and coagulation testing, consider urine culture in suspected infection, CT scan for suspected tumor, cystoscopy for suspected bladder source of bleeding; If recurrent bleeding: consider cytology, yearly urine analysis, repeat work in 3-5 years

**CAUTIONS**

- **Urine Dipstick:** Sensitive, but not specific for hematuria (If positive, do microscopy); Can be false-negative in presence of Vitamin C; the presence of many epithelial cells indicates vaginal or skin contamination
- **Warfarin:** Warfarin-related nephropathy is a type of acute kidney injury (AKI) that is caused by excessive anticoagulation with warfarin or sometimes other anticoagulants; Microscopic and, less commonly, gross hematuria may be present

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- [http://www.firstconsult.com/das/pdxmd/body/0/0?type=med&eid=9-u1.0-1_mt_2001327](http://www.firstconsult.com/das/pdxmd/body/0/0?type=med&eid=9-u1.0-1_mt_2001327)