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Evaluation of Hematuria

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Objectives

• Describe the evaluation and management of gross hematuria
• Describe the evaluation and management of microscopic hematuria
Case Presentation

• 34 year old female presents with depression and suicidal ideation
  – Recent divorce, not sleeping well
  – Otherwise healthy
  – Normal physical exam
  – CBC, Basic, UDS all normal
Case Presentation

• Urinalysis
  – Normal except
    • 1+ blood
    • Tr protein
    • 2 WBC
    • 12 RBC
    • 2 epi
    • No bacteria
• Is this patient medically cleared for psych admission?

• What further evaluation is necessary
Does this patient have hematuria?

- Hematuria
- >2-3 RBCs per HPF
- Microscopic hematuria
  - Yellow urine
  - Concentration
- Gross hematuria
  - Red/brown urine
  - 1 ml blood
  - Presence of clots = post glomerular disease
Does this patient have hematuria?

Centrifuge Result

- Sediment Red
  - Hematuria

- Supernatant Red
  - Dipstick H=heme
    - Positive
      - Myoglobin
      - Hemoglobin
        - Plasma Color
          - Red
          - Myoglobinuria
          - Hemoglobinuria

- Negative
  - Beeturia
    - Phenazopyridine
    - Porphyria
  - Clear
    - Myoglobinuria
Evaluation of hematuria

- Clues from history and physical
- Glomerular vs. Extraglomerular
- Transient vs. Persistent
History

• Infection symptoms?
  – Cystitis: dysuria, frequency
  – Pyelonephritis: flank pain, fever
  – Recent URI?

• Flank pain, especially unilateral
  – Stone
  – Blood clot
  – Malignancy
History

• Symptoms of prostatic obstruction
  – BPH
  – Malignancy

• Coagulopathy
  – Therapeutic range
  – Culcllaure TF *Arch Intern Med* 1994
    • Rate of hematuria in treated and controls equal
    • 81% with hematuria had identifiable cause
History

• Relationship with menstruation
  – Endometriosis
  – Contamination
    • Collection of urine specimen

• Sickle cell disease/trait

• Hereditary disorders
  – Polycystic kidney disease
  – Hereditary nephritis
Glomerular vs. Extraglomerular

- Urinalysis
  - Red cell casts
  - Proteinuria
    - > 1+
    - Not seen in gross hematuria
  - Red cell morphology
    - Deformed as they pass thru basement membrane
    - Osmotic injury in nephron
  - Urine color
    - Smoky brown = methemoglobin
  - Blood clots
Transient vs. Persistent

• Transient usually benign
  – Infection
  – Stones
  – Exercise

• May be seen in patients with malignancy
Risk-factors for Malignancy

- Age > 40
- Smoking history
- Occupational exposures
  - Printers, painters, chemical plant workers
- Gross hematuria
- Chronic irritative voiding symptoms
- History of pelvic irradiation
- Analgesic abuse
Case 1

- 22 yo female
  - 2 days of dysuria, frequency, urgency
  - Now with hematuria
  - No fever, no flank pain
  - LMP 2 weeks ago, not sexually active
  - Normal VS
  - Suprapubic tenderness on exam
Case 1

- Further evaluation?
Case 1

• Over the counter meds?

• Urinalysis
  – Bloody urine
  – 1+ Leukocyte esterase
  – > 100 WBC
  – > 100 RBC
  – 2+ bacteria
Urinary Tract Infection

• Does this patient need a urine culture?
Urinary Tract Infection

• Urine culture in
  – Relapse
  – Suspicion for pyelonephritis
    • Flank pain
    • Fever

• Treatment
  – Phenazopyridine
  – Antibiotics
    • 3 days
    • 7 days
Case 2

• 43 yo male, previously healthy
• Gross hematuria 2 days ago
• Acute onset of severe right flank pain
  – Radiates to groin
  – Diaphoresis, nausea, emesis X 1
  – Can’t find comfortable position
  – Mild right CVA tenderness
Case 2

• Initial treatment?
Case 2

• Initial treatment
  – IV toradol, anti-emetics, narcotics prn
  – Urinalysis
    • 1+ blood
    • 12 RBC
    • No WBC, bacteria
  – IV fluid bolus?
Renal Colic

• Passage of stone from kidney to bladder
• Localization of pain often related to site of stone
  – Lower ureter/UVJ groin
• Family history
• Recurrence
• Concomitant infection
• Mimics
  – AAA
  – Ectopic pregnancy
Renal Colic

• Non-contrast CT
  – Sensitivity 95%
  – Specificity 99-100%
  – Other diagnosis
  – Use with KUB

• USN
  – Obstruction
  – In ability to give contrast
  – Recurrent stone
Renal Colic

- NSAIDs
- Narcotics
- Calcium channel blocker
- Alpha blocker
- Size and location
Case 3

• 73 yo male
  – Gross hematuria for 2 days
  – Unable to void for past 8 hours
  – Mildly hypertensive
  – Obvious distress
  – Bladder distention on physical exam
  – Foley catheter
    • Bloody urine
    • Blood clots
Case 3

• Next steps?
Case 3

- CBC
- Basic
- Coumadin: INR
- Urinalysis, Urine culture
- Bladder irrigation
Gross Hematuria

• Infection 25%
• Stone 20%
• VS seldom unstable
• Assure urinary drainage
  – History of blood clots
  – Size of clots
  – Ease of passage of urine
Gross Hematuria

• Clot retention
  – Foley catheter
    • 16 F or larger
    • Three-way catheter
    • Discharge with catheter vs. removal

• Followup
Case 4

- 31 yo male
- Completed first marathon
- Blood in urine
- U/A
  - Red urine
  - >150 RBC
  - No WBC, bacteria, protein
Exercise-induced Hematuria

• Contact sports
• Non-contact sports
  – Long-distance running
    • 10-20%
  – Rowing
  – Swimming
  – Cycling
Exercise-induced Hematuria

• Mechanism
  – Increased urinary excretion
  – Long-distance running/cycling
    • Bladder trauma
  – Bicycling
    • Urethra trauma
  – ? Renal ischemia
  – Nutcracker syndrome
Exercise-induced Hematuria

• Rule-out myoglobinuria

• Followup
  – Clears within one week
  – Consider full workup with risk factors for malignancy
Case 5

- 34 yo female with 1 week of progressive swelling in the lower extremities
- No chest pain, dyspnea, orthopnea, abdominal pain or distention
- VS 148/92 88 14 98.3 99%
- Exam normal except for 2+ pre-tibial pitting edema
Case 5

• CBC normal
• Basic normal except BUN 24 Creat 1.42
• U/A
  – 3+ protein
  – 12 RBCs
  – No WBCs, bacteria
Glomerulonephropathy

• ED care is usually supportive
  – Treat hypertension if emergency/urgency
  – Close followup
  – Admission criteria
    • Acute renal failure
    • Hypertensive emergency/urgency
    • Oliguria/anuria
    • Electrolyte abnormalities
    • CHF/volume overload