Adult Hematuria

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Objectives

1. Review prevalence of hematuria in general population.
2. Etiology and clinical diagnosis.
4. Review algorithmic management.
5. Apply above to your clinical practice.
6. Case review.

Prevalence

Microscopic hematuria (MH) in adults ranges from 0.19 to 21 percent.

Clinically Significant MH

The American Urological Association (AUA) defines this as **three or more** red blood cells per high-power field on microscopic evaluation of urinary sediment from two of three properly collected urinalysis specimens.

? Urine Dipstick ?

- Can be misleading because it lacks the ability to distinguish red blood cells from myoglobin or hemoglobin.

- Requires follow-up examination by microscopic technique to confirm the presence of RBCs

Microscopic vs. Gross Hematuria

MH is often an incidental finding but may be associated with urologic malignancy in up to 10 percent of adults.
Work Up
- History & Physical Examination
- Assess the patient's risk factors for urothelial cancer
- Laboratory Findings
- Studies
- Referral

Risk Factors for Urothelial Cancers
- Smoking
- Occupational Exposures (benzenes, leather dye, rubber)
- Race (Caucasians 2x other populations)
- Age (> 65)
- Male gender (4x)
- Chronic Inflammation
- Personal Bladder CA hx
- Bladder Birth Defects
- Family History
- Chemo-tx or radiation
- Arsenic in drinking water
- Low fluid consumption

Causes of MH
- Glomerular
- Non-glomerular
  - Renal
  - Extrarenal
- Others (exercise, menstrual, intercourse)
Clinical Diagnosis

- Evaluation of the upper urinary tract followed by cystoscopy fails to identify the source of MH in up to 68% of patients.
- The younger the patient, the less likely the source will be identified.

Typical Clinical Scenario

- Usually during investigation of patients with suspected urinary tract infection.
- UA may reveal blood, leukocytes, nitrites and bacteria (c/w patient’s symptoms).
- Treat with antibiotics.
- Resolution of MH is usually demonstrated by follow-up urine studies 6 weeks post-tx.
- If resolved, no further work-up is needed.
Causes of Transient MH

- Vigorous physical exercise
- Sexual intercourse
- Trauma
- Digital rectal prostate examination
- Menstrual contamination

Follow-up urine should demonstrate resolution 48 hours after discontinuing these activities.


Transitory MH

!!! Renal cell carcinoma and urothelial tumors may also present with transient MH !!!


Medication Review

- Aminoglycosides
- Amitriptyline
- Analgesics
- Anticonvulsants
- Aspirin
- Busulfan (Busulfex)
- Chlorpromazine

- Cyclophosphamide
- Diuretics
- Oral Contraceptives
- Penicillins (extended spectrum)
- Quinine (QM-260)
- Vincristine (Oncovin)
- Warfarin (Coumadin)

Signs of glomerular disease

- Proteinuria (>300mg in a 24 hour urine collection).
- Elevated creatinine levels.
- Red cell casts.
- Dysmorphic red blood cells.

*Prompt referral to nephrology is required for further investigation and possible renal biopsy.*


Radiographic Assessment

- Upper Urinary Tract
- Lower Urinary Tract
Radiography of Upper Tract

- Intravenous Urography
- Renal Ultrasonography
- Computed Tomography

Intravenous Urography

- Traditionally, it has been the initial radiographic approach for the evaluation of the upper urinary tract in patients with MH.
- It defines the anatomy of the urologic tract from the kidney to the bladder.
- Low cost
- Readily available

Intravenous Urography (IU)

- Limited sensitivity in detecting small renal masses (< 3 cm).
- Limited application in the evaluation of the bladder and the urethra.
- Exposure to potentially nephrotoxic contrast media.
- The cost savings of ordering IU may be offset by the frequent need for follow-up with a renal UTZ or CT.

Radiography of Upper Tract

- Intravenous Urography
- Renal Ultrasonography
- Computed Tomography

Renal Ultrasonography

- Least expensive and safest choice because there is no exposure to IV contrast media.
- Appropriate choice to evaluate hematuria during pregnancy.
- Masses of 3 cm or greater, cysts and high degree of sensitivity.
Renal Ultrasonography

- More sensitive than IU in detecting renal cell carcinoma.
- Less sensitive than IU in detecting transitional cell carcinoma.

Radiography of Upper Tract

- Intravenous Urography
- Renal Ultrasonography
- Computed Tomography

Computed Tomography

- Best test if MH is associated with renal colic.
- High sensitivity for renal calculi.
- “stone protocol”
Computed Tomography

IN COMPARISON TO UROGRAPHY...
- Higher accuracy
- Decreased radiation dose
- Faster examination time
- Better at sizing and localizing stones (even those < 3 cm)
- Should be used to evaluate renal and perirenal abscesses


Evaluation of the Lower Urinary Tract

- Urine Cytology
- Cystoscopy

Evaluation of the Lower Urinary Tract

- Identifying an abnormality in the upper urinary tract does not preclude evaluation of the lower because comorbid lesions may exist.
Urine Cytology

- AUA recommends that patients with MH have radiologic assessment of the upper urinary tract followed by urine cytology studies.
  - Sensitivity is increased when urine is collected as the first void in the morning on three (3) consecutive days.

- High specificity (95-100% in two studies) for detection of high-grade lesions in the bladder and carcinoma in situ.
  - Vs. Cystoscopy - non-invasive.
  - Limited in detecting low-grade lesions in the bladder as well as renal cell carcinoma.

Cystoscopy

- AUA recommends for all patients older than 40 years (and those who are younger but have risk factors for bladder cancer) that have MH.*
  - Abnormal urine cytology would also necessitate cystoscopy.*
  - The only reliable method of detecting transitional cell carcinoma of the bladder or urethra.**
Follow-up

- Repeat UA and cytology every six (6) months.
- Important for persons older than 40 and those who have risk factors for urothelial cancer.

Risk Factors for Urothelial Cancers

- Smoking
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Follow-up

- Understanding the strengths and weaknesses of each radiographic study with data from the history and physical examination can help providers select the most appropriate starting point for the evaluation of the upper urinary tract.
- You can always page Urology with questions.
Case

- RP – 78 y/o male with h/o afib (on warfarin), HTN and COPD.
- No prior h/o urothelial cancer.
- Ex-smoker (55 pack-years)
- Reported 1 episode of painless gross hematuria 3 days prior to office visit.

**WHAT SHOULD BE DONE NEXT?**

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**Case (continued)**

- UA: 4+ blood, 2+ protein, trace LE, 10-25 WBCs, >25 RBCs, few bacteria.
- UCx: pending at the time (no growth)
- Treated with ciprofloxacin, CT urogram ordered and referred to Urology
- Other labs were normal: PSA, creatinine, CBC, electrolytes, PT/INR, urine cytology
Case (continued)

- KUB - NEGATIVE

- Phone f/u revealed that patient was pain free and had no recurrence of his gross hematuria

- CT Urogram...

CT Urogram - Hydronephrotic changes are not present. At the level of the right kidney no cortical abnormality is observed. In the left kidney an ovoid solid mass lesion is observed, which measures 2.8 x 1.5-cm. The ureters show no evidence of dilatation and the retroperitoneal lymph nodes are not enlarged. The rest of the examination shows diverticulosis of the colon without evidence of associated diverticulitis.

IMPRESSION:

Sharply delineated solid mass lesion measuring slightly over 2-cm in its greatest dimension is observed in the cortex of the left kidney. Small renal cell carcinoma must be considered in the differential diagnosis.

Report sent via e-mail to [PCP]

Case (continued)

- Pre-op by Urology

- Scheduled for Laparoscopic Left Radical Nephrectomy

Pathology - mild interstitial nephritis and cystic renal cell carcinoma
Case (currently)

- 9 months since first encounter (6.5 months post-op).
- RP’s blood pressure is well-controlled.
- He is followed by urology and nephrology.
- Minor intermittent complications (lytes).
- He is in good spirits.

Health Connect

.cvhematuria
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