Evaluation of Asymptomatic Microscopic Hematuria in Adults
Learning Objectives

• Definition
• Classification
• Differential Diagnosis
• History, Physical
• Investigations
• Follow-up
Case Study

- 49 year old Female, otherwise healthy
- Urinalysis: 5 rbc/hpf
- C&S: Negative
- No hx of gross hematuria
- No LUTS
Classification

- Gross hematuria
- Microscopic hematuria
- Pseudohematuria:
  - menses
  - dyes (beets, juices)
  - drugs (ie rifampin)
  - hemolysis
Definition

Greater than 3 RBCs/hpf on two microscopic urinalysis without recent exercise, menses, sexual activity or instrumentation.
2 or 3 urine analyses should be conducted to reduce rate of false positive.

Uh... when you say “MICROScopic Hematuria”...does that mean it is just a Little problem?
History

• Age
• Duration: acute vs chronic
• Onset: transient, progressive, sudden, recurrent
• Characteristic: painless vs painful, gross vs microscopic, constant vs intermittent
Associated Symptoms

- Fever, back pain, urinary urgency/frequency, dysuria (UTI)
- Renal colic (renal calculi)
- Constitutional symptoms (bladder ca)
- Lower urinary tract symptoms (BPH)
- Recent infection history, edema or hypertension (glomerulonephritis)
- Recent back or abdominal injury, vigorous exercise (trauma)
- Recent bleeding from other sites, family history of bleeding disorders (systemic coagulopathy)
- Cyclic hematuria in women (endometriosis)
- Sterile pyuria with hematuria (renal tuberculosis, analgesic nephropathy, interstitial disease)
Pattern

• What colour is the urine?
• Diet?
• Blood at the beginning, middle or end of stream?
• Recent surgery?
Family history

- Sickle cell disease
- Deafness or ocular abnormalities
- Autoimmune disorders
- Malignancy history
- Birt Hogg Dube
- Von Hippel Lindau syndrome
Medications

- Anticoagulants
- Cyclophosphamide
- Antibiotic: rifampin
- Analgesics
Physical Exam

• Vitals: temperature (UTI), BP (large RCC)
• Genital exam:
  – signs of bleeding at urethral meatus (both sexes)
  – DRE for males
  – Gyne/OB presentations with vaginal bleeding
Physical Exam

• Inspection
  – Rash, ecchymoses, or petechiae (coagulopathy)
  – Hearing loss, lens abnormality (Alports Syndrome)
  – Edema, sore throat

• Palpation
  - Renal colic pain radiating flank to groin (stone)
  - Abdominal tenderness and mass (RCC)
  - CVA tenderness (pyelonephritis)
Risk Factors for Malignancy

- Male gender
- Age (> 40 years)
- Past or current smoking
- Occupational or other exposure to chemicals or dyes (benzenes or aromatic amines)
- Analgesic abuse
- History of gross hematuria
- History of urologic disorder or disease
- History of irritative voiding symptoms
- History of pelvic irradiation
- History of chronic urinary tract infection
- History of exposure to known carcinogenic agents or chemotherapy such as alkylating agents
- History of chronic indwelling foreign body
Investigations

• Urine dip: nitrites, WBC, protein
• Urine microscopy: red cell casts, RBC count, WBC count

• If red cell casts, protein or increased creatinine
Classification

Glomerular – Red cell casts, proteinuria and dysmorphic red blood cells

Renal
- IgA nephropathy
- Alport syndrome
- Thin glomerular BM disease
- Post infectious
- MPGN

Multi-system
- SLE nephritis
- Wegener syndrome
- Goodpasture syndrome
- Sickle cell disease
Classification

Nonglomerular
• Upper tract
  nephroliathiasis, RCC, TCC, polycystic kidney, pyelonephritis
• Lower tract
  cystitis, bladder ca, prostate ca, prostatitis
PROSTATITIS

Normal prostate

Prostate
Urine
Urethra

Prostatitis

Urine
Enlarged prostate
UTI

Yes! A UTI! Let's call this U/A positive!
CANCER
Causes

Blood dyscrasias
- Purpura
- Sickle cell trait
- Anti-coagulants

Renal tumours
- Transitional cell carcinoma
- Wilms' tumour

Infarct
Injury
Tuberculosis
Stone

Focal and glomerular nephritis

Stone in ureter

Hypernephroma

Neoplasm of ureter

Bladder
- Tuberculosis
- Cystitis
- Tumours
- Bilharzia
- Stone

Prostate
- Benign
- Malignant

Jogger's haematuria

Urethral neoplasm
Upper tract investigations

What is the best way to evaluate upper tract cause of microscopic hematuria
a) Ultrasound
b) IVU
c) CT scan
d) IVU followed by CT
Answer

a) Ultrasound
Investigations - UPPER

• U/S: some limitations in diagnosing transitional cell carcinoma
  - can miss very small tumours less than 0.5cm

• IVU (intravenous urography):
  – exposure to contrast
  – less sensitive and specific to U/S
  – at times hard to differentiate solid vs cystic
Investigations - UPPER

AUA guidelines:
• CT scan: enhanced multiphasic as gold standard

CUA:
• Ultrasound: as gold standard
Figure 1. Images of the ureter obtained during the excretory phase. (A) Urogram shows a radiolucent filling defect (arrow) in the distal left ureter. (B) Transaxial computed tomography (CT) scan shows a soft-tissue-filling defect (arrow) in the left ureter. (C) Curved reformatted image from the CT shows a stalk (black arrowhead) in the filling defect; an additional small filling defect (white arrow) proximal to the lesion; and a defect (black arrow) near the ureteric insertion into the bladder.

A: IVP
B: (CT)
C: CT urography
Investigations - LOWER

• Cystoscopy – To be done in all patients above the age of 35.
  - In patients younger than 35, cystoscopy should be done at the discretion of a physician

  **Level C Recommendation**

• Cytology
  – Sensitivity (34%); Specificity (81%)
Cystoscopic removal of urolith using a stone basket.
Approach

**Diasick testing positive for blood**

- Microscopic urinalysis
  - Less than three red blood cells per high-power field
    - Repeat urinalysis three times at six-week intervals
      - Negative: No additional workup
      - Positive: Three or more red blood cells per high-power field
        - Assess for urinary tract infection and other benign causes (e.g., vigorous exercise, menstruation, recent urologic procedure)
        - Repeat urinalysis six weeks after treatment or discontinuation of contributing factor
          - Negative: No additional workup
          - Positive: Renal function testing to assess for medical renal disease (e.g., dysmorphic red blood cells, cellular casts, proteinuria)
            - Negative: Go to Concurrent nephrologic referral
            - Positive: Release from care

  - High risk of malignancy and/or renal insufficiency
    - Less optimal imaging option (e.g., magnetic resonance urography, renal ultrasonography, noncontrast computed tomography, magnetic resonance imaging, retrograde pyelography) and urologic referral
      - Cystoscopy
        - Negative: Annual urinalysis for two years
        - Positive: Treat
          - Negative: Annual repeat urinalysis positive; repeat anatomic evaluation within three to five years
          - Positive: Concurrent nephrologic referral
### Common Etiologies of Microscopic Hematuria

<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>FREQUENCY (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>43 to 68</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>4 to 22</td>
</tr>
<tr>
<td>Benign prostatic hyperplasia</td>
<td>10 to 13</td>
</tr>
<tr>
<td>Urinary calculi</td>
<td>4 to 5</td>
</tr>
<tr>
<td>Bladder cancer</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Renal cystic disease</td>
<td>2 to 3</td>
</tr>
<tr>
<td>Renal disease</td>
<td>2 to 3</td>
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<tr>
<td>Kidney cancer</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Urethral stricture disease</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>
Follow up

What is the appropriate follow up for reoccurrence of microscopic hematuria in the setting of previous negative full work up?

a) Referral to urology
b) Cytology and then refer to urology
c) Repeat cytology 3 times then refer to urology
d) Conduct serial urinalysis
Answer

d) serial urinalysis
Follow up

Urinalysis, cytology and BP check 6, 12, 24 and 36 months following initial presentation

- If negative, risk of future malignancy is less than 1%
- If positive and persistent then, repeat full evaluation in 3-5 years. Or if gross hematuria, positive cytology, and new irritative symptoms in the setting of normal C&S then earlier
Revisit Case

- 49 year old female, otherwise healthy
- Urinalysis: 5 rbc/hpf
- C&S: negative
- No hx of gross hematuria
- No LUTS
Does this Patient need Investigation?

Age: >40, yes!

- Yield is 11% in patients over the age of 40
- Under the age of 40, nonsmoker, complete investigation is not needed
- Upper tract imaging regardless of age
What is the appropriate approach?

a) Urinalysis, cytology, cystoscopy and ultrasound
b) Urinalysis cytology, cystoscopy and CT scan
c) Urinalysis, cytology and ultrasound
d) Urinalysis, cytology and CT scan
Answer

a) Urinalysis, cytology, cystoscopy and ultrasound
Upper tract

Ultrasound findings:
4cm mass on left kidney
CT Scan for better characterization
Lower Tract

Normal cystoscopy
Negative cytology
Case 2

- 28 y.o M with 2 episodes of gross hematuria
- Non-smoker
- 6 months of ongoing LUTS
  - Decreased stream
  - Hesitancy of stream
  - No dysuria
Does this warrant evaluation?

• 5 fold increased risk of significant underlying pathology in gross hematuria
• Age is not a factor in gross hematuria

YES!
What evaluations are needed?

• Urinalysis, C&S, lytes, creatinine
• Cystoscopy
• Imaging
• Cytology
Results

• Urinalysis: 1-5 WBC, 5-10 RBC
• C&S: no growth
• Ultrasound: unremarkable
PLEASE DO NOT FEED THE QUESTIONS

THE QUESTION IS DANGEROUS
References


