Canadian Undergraduate Urology Curriculum (CanUUC): Hematuria

Last reviewed May 2017

Objectives:

blood in the urine

1. Define microscopic and macrosopic (gross) hematuria
2. Outline the investigations required (upper and lower urinary tract) when evaluating hematuria.
3. Describe the common causes of hematuria.
4. List the common risk factors for urothelial malignancy.
5. Outline the evaluation of a renal mass.
6. List how hematuria of nephrologic origin differs from hematuria due to a urologic source

What is hematuria?

- GROSS HEMATURIA
  - Visible blood in the urine
  - This is always significant!
- MICROSCOPIC HEMATURIA
  - Greater than 2-3 RBC/HPF on two microscopic analysis
  - Absence of recent menses, exercise, or instrumentation

simple حتى لو كان بسبب

Cytoscopy لي ما لازم يكون عامل مؤثر

the female should not be in menses.

Hematuria: Why Care?

- Should be regarded as a symptom of urologic malignancy until proven otherwise
- 1-16% prevalence in the population
- Hematuria carries a 5-10 fold risk of urologic malignancy

Outline

① 28 year old male with gross hematuria

② 49 year old female with microscopic hematuria

③ 67 year old male with gross hematuria and clot retention

Case 1

"Something's wrong down there…"

A 28 year old male

- 2 episodes of gross hematuria
  - Self-limiting
- LUTS for 6months
  - Urinary hesistancy
  - Decreased in the force of stream
- Non-Smoker
- No pain, No Trauma

Does this patient need evaluation?

- YES! why?
- **Gross hematuria** carries a fivefold yield of representing significant underlying pathology
- Needs evaluation **regardless of age**

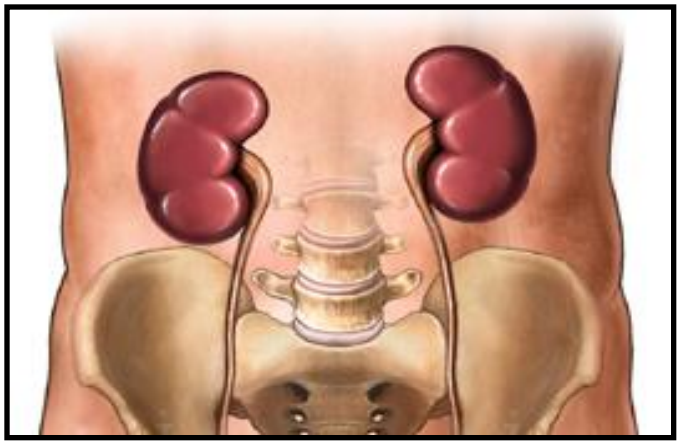
Key Points on History

1. **Pain with hematuria** usually from upper tracts
   - Usually represents a stone or infection
2. **Painless hematuria** usually more worrisome
3. **Presence of clots** [bleeding يعني]
   - **Usually indicates more significant hematuria**

What investigations are required?

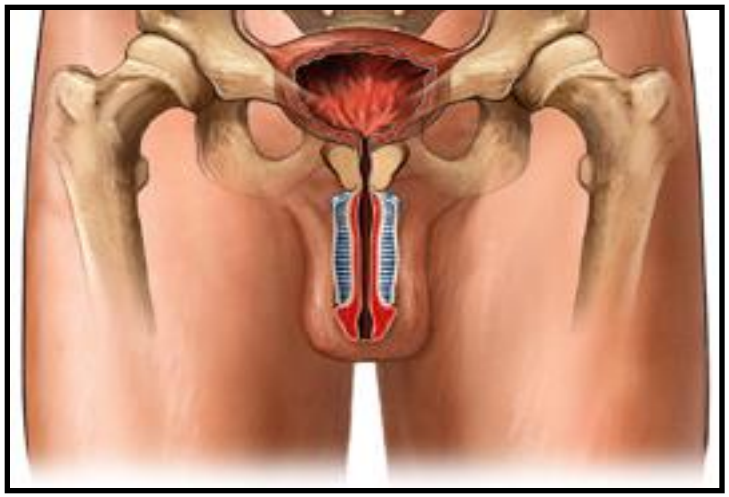
1. Urinalysis, urine C&S, lytes, Cr
   - R/O infection, renal failure
2. Urine cytology
3. **UPPER TRACT STUDY**
   - Imaging
4. **LOWER TRACT STUDY**
   - Cystoscopy

Upper tract investigations



- **Ultrasound**
  - Very useful first line imaging of upper tracts
  - Assess for mass, calculus, hydronephrosis
- **Computerized tomography (CT)**
  - For evaluation of any abnormalities on ultrasound

Lower tract investigations



- Radiographic studies <u>do not rule out</u> lower urinary tract pathology
- **<u>Cystoscopy</u>** is the gold standard for evaluating the lower urinary tract

Other Tests: Urine cytology and markers

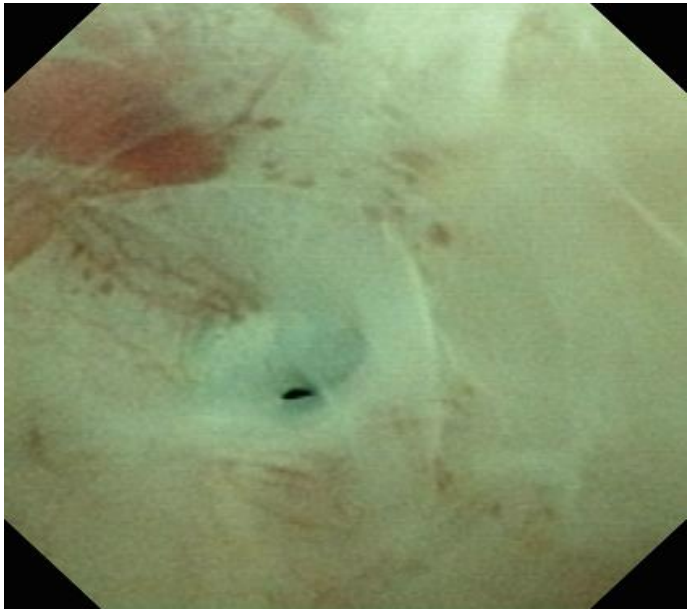
- Urine cytology
  - Sensitivity 34%, specificity 81%
  - Greatest sensitivity in high grade urothelial tumors
- Bladder tumor marker tests
  - More sensitive than cytology but less specific
  - Possibly a role in followup of bladder tumors

Urologic causes of hematuria

- **Upper tract**
  - Renal cell carcinoma
  - Renal calculi
  - Obstruction/Hydronephrosis
- **Lower tract**
  - Bladder cancer
  - BPH
  - UTI
  - Urethral Stricture

Case 1: Results

- Urinalysis, urine culture
  - 1-5 WBC, 5-10 RBC
  - No growth (No bacteria)
  - Neg STI's
- **Renal Ultrasound**
  - Normal upper tracts
- **Cystoscopy**
  - Narrow bulbar urethral stricture
  - Stricture dilated sequentially



Case 1: Continued

- Hematuria and LUTS improved after cystoscopy and dilation → معالجة عن طريق توسيع الـ urethra.
- Symptoms recurred in 6 months
- Urinary retention
- Repeat cystoscopy with urethrogram
  - 5cm bulbar urethral stricture

Urethral Stricture

- Fibrosis of urethra and corpus spongiosum causing:
  - LUTS/retention
  - UTI
  - Hematuria
- Etiology
  1. – Trauma
  2. – Idiopathic
  3. – Infection
  4. – Iatrogenic

Urethral Stricture: Treatment

ما يهمنا في ال pathology كتير...

- Dilations, urethrotomy:
  - Forcibly opening strictured segment
  - Not usually curative
  - Temporary relief
- Urethral reconstruction
  - >90% success
  - Tissue transfer (buccal mucosa)

Case 2

"An incidental finding…"

A 49 year old female

- Routine insurance urinalysis
  - Dipstick: 1+ Hgb
  - Microscopic: 5 RBC/HPF
- Negative urine C&S, N Cr (65)
- No Gross Hematuria
- Non-Smoker
- No LUTS and no pain

Does this patient need investigation?

- Yes!
- Age >40 with microscopic hematuria

Microscopic Hematuria: Who to investigate?

- Patients **over the age of 40** need full urologic evaluation
  - Yield 11%
- Complete investigation NOT needed for **microscopic** hematuria in a nonsmoker (and no other risk factors) less than 40 years of age
- Upper tract imaging reasonable in all patients
- Cystoscopy can be deferred in patients under 40 without risk factors for lower tract pathology

When do people under 40 with microscopic hematuria require full cystoscopy?

- **People with risk factors for lower tract malignancy:**

1. Smokers
2. Occupational exposure to dyes
3. Radiation therapy to pelvis
4. Cyclophosphamide exposure
5. Analgesic abuse with phenacetin

Does a positive dip always indicate hematuria?

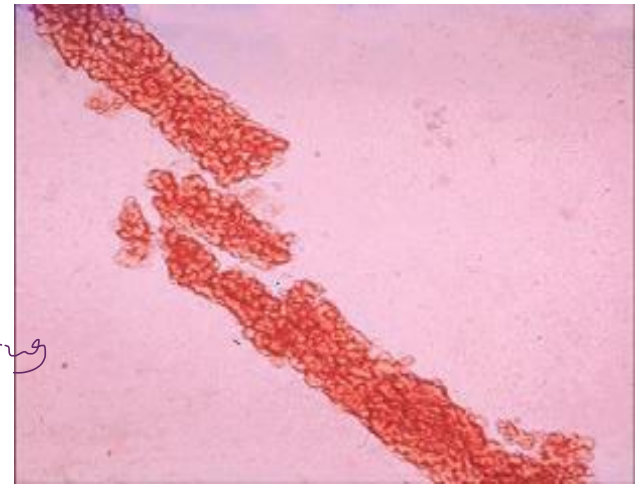
- No
- Causes of a false +ve dipstick
  - Dehydration
  - Myoglobinuria
  - Menstrual blood contamination
  - Oxidizing agents (Vitamin C, etc.)

Hematuria: Is Urine Dipstick Accurate?

- Sensitivity 0.91
- Specificity 0.99
- False positive 16% therefore confirm with microscopic exam of urine sediment
- Good for screening

When to suspect a nephrologic (glomerular) source?

1. RBC casts
2. Proteinuria
3. Dysmorphic red blood cells
4. Elevated creatinine

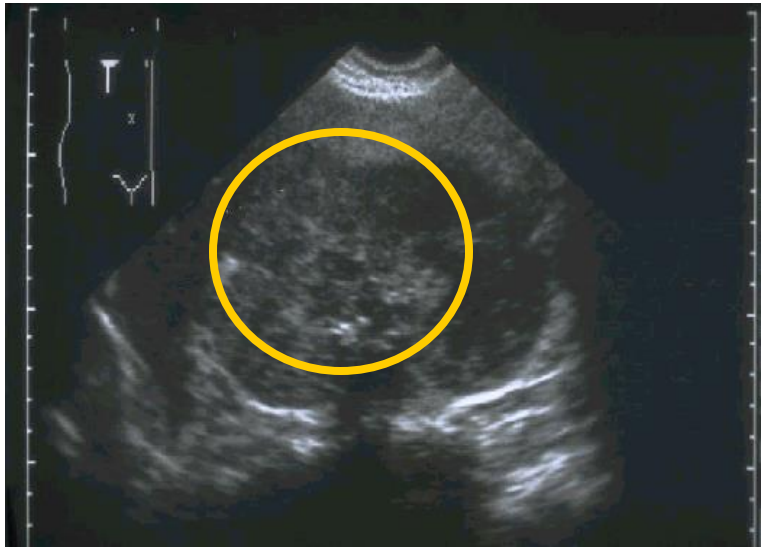


If these are present there may be no need to investigate for urologic source

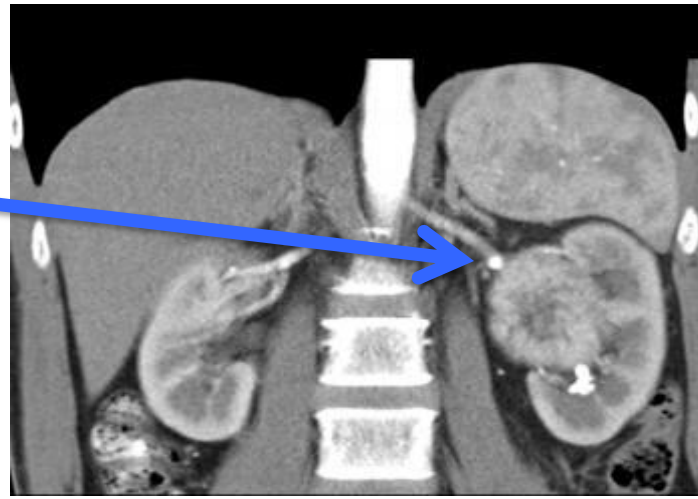
Case 2: Investigations

- **Upper tract**
  - 4cm left renal mass on ultrasound
  - No calculi or hydronephrosis

- **Lower tract**
  - Normal cystoscopy
  - Normal cytology



Further evaluation: CT abdomen



- 4cm central left renal mass
- Differential Diagnosis:
  - RENAL CELL CARCINOMA
  - Oncocytoma
  - Angiomyolipoma
  - Lyphoma
- **A solid renal mass is considered carcinoma unless proven otherwise!**

Renal Cell Carcinoma

- 3% of all adult malignancies
- 90% of malignant renal tumours
- Males:females = 2:1
- Risk factors:
  - Smoking (mild)
  - von Hippel Lindau (VHL) syndrome
  - "Bad luck"

Renal Cell Carcinoma: Presentation

- Age 40-60
- ~60% are incidentally discovered (ultrasound, etc)
- Hematuria
- 15% have “classic triad” of flank pain, abdominal mass, & hematuria
- Paraneoplastic syndromes
  - Hypercalcemia, Cushing’s, etc.

pancreatic cancer

Renal Cell Carcinoma: Diagnosis

- Based on radiographic studies
  - Incidental ultrasound
  - Best imaging modality: Abdominal CT
  - Generally do not do biopsy

Renal Cell Carcinoma: Treatment

- **<u>Localized disease:</u>**
  - Nephrectomy (is the only cure)
  - Radical vs. Partial (small or bilateral tumours)
  - Radiotherapy not beneficial
  - Chemotherapy ineffective
- **<u>Metastases:</u>**
  - Palliative radiotherapy (bony lesions)
  - Tyrosine kinase inhibitors (TKI's)

Case 3

"Those damn cigars…"

A 67 year old male

- Gross hematuria for 2 weeks
- Passing clots per urethra for 2 days
- Unable to void for 8 hours
- Smoker x 30 years
- Urinalysis: 4+ Hgb, >50 RBC/HPF

Does this patient need investigation?

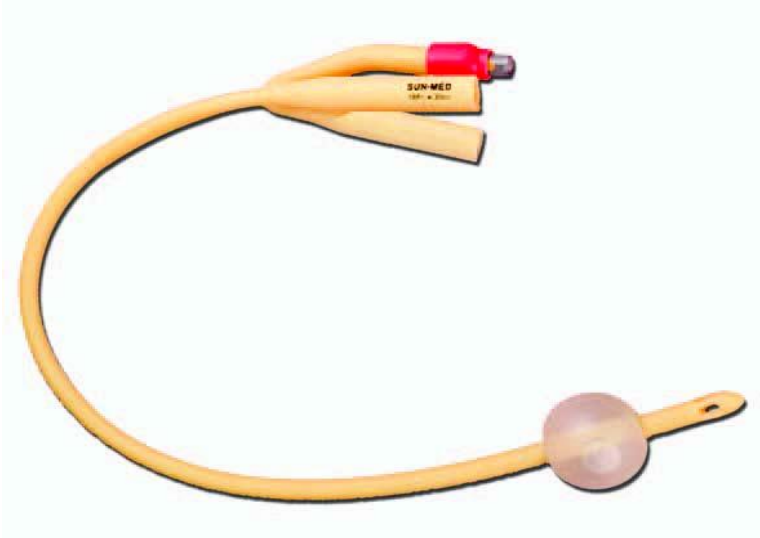
- **Yes! Definitely**
- **Gross hematuria**
- **Smoker**

Treatment plan

- Needs catheter (large)
- **Upper tract imaging**
  - Renal ultrasound
- **Lower tract study**
  - Cystoscopy
- Urine Cytology

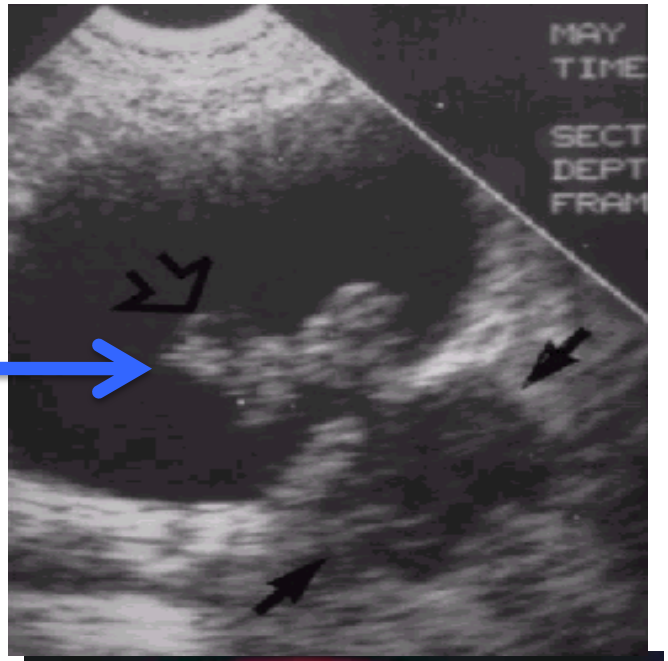
Clot Retention

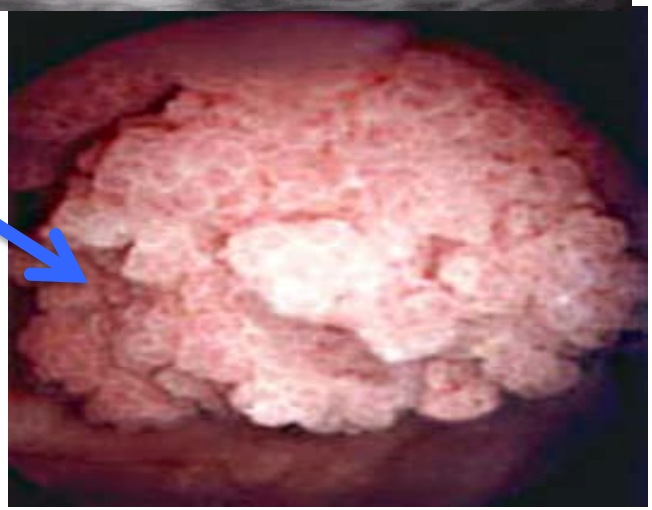
- Bladder hemorrhage and large clots
- Place large bore 3-way catheter
- Manually irrigate clots
- Continuous bladder irrigation (CBI)



Case 3 Investigations

- Renal ultrasound
  - Normal kidneys
  - Possible bladder lesion
- Urine Cytology
  - "Atypical cells"
- Cystoscopy
  - Papillary bladder tumour

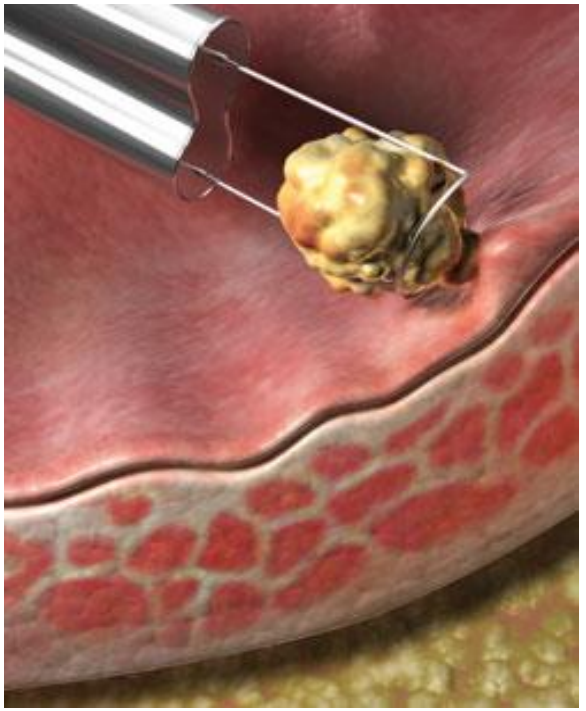




Bladder cancer:
Urothelial Carcinoma (Transitional Cell Carcinoma)

- Most common cause of gross hematuria over age 40
- Male: Female (3:1)
- Most common type of bladder tumour (>85% tumours)
- Radiologic investigations have a high false negative rate
- Cystoscopic ("visual") diagnosis

TCC: Treatment



- TURBT
  - Stages the cancer
  - Treatment for early stage cancers
- Prone to recurrence
  - Cystoscopic surveillence
- Higher stage lesions
  - Intravesical immunotherapy (i.e. BCG)
  - Radical cystectomy
  - Combined chemoradiotherapy

bladder كل ال
تشال ...

Transurethral Resection of Bladder Tumour (TURBT)

Bladder Tumor After TURBT Surgery

When to re-evaluate hematuria

- The likelihood of tumors developing within 2 to 5 years after a negative evaluation is in the 0 to 3% range
- Cytology, urinalysis and blood pressure checks at 6m, 12m, 24m and 36m after negative evaluation
- Re-evaluate if :
  - Gross hematuria
  - Positive or atypical urine cytology
  - New onset of irritative voiding symptoms without infection