Common Causes of Hematuria

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Definition of hematuria (auanet.org)

- 1. Asymptomatic microhematuria: ≥3 RBC/hpf
- 2. Positive dipstick does not define hematuria
- 3. Must be clean catch
- 4. Hx (rule out menstruation, trauma, procedure, etc)
- 5. Obtain renal function (rule out disease)
- 6. Risk factors: smoking, chemicals
- 7. Protocol: CT wo/w contrast, cysto, cytology
Causes of Hematuria

- UTIs
- Stones
- Renal Cancer
- Bladder Cancer
- BPH/CAP
- Exercising (‘jogger’s hematuria, having period, etc”)
- Hematuria W/UP: CT scan, cytology, cystoscopy
Most common cause of microhematuria

- NOT DOING A CLEAN CATCH!

- Clean area with alcohol, first few drops of urine in the toilet

- Void rest of urine into urine cup
Definition of UTI

- Infection in any part of your urinary system: kidneys, ureters, bladder, and urethra. Most involve lower tract.

- Not everyone with a UTI has symptoms

- Symptoms: urgency, frequency, pain, burning

- Greater than 100,000 colonies

- Rule out a contaminant
Causes of UTI:

- Microbes get past the body’s defense systems
- Vast majority caused by E. coli found in GI system
- Women more prone due to shorter urethra
- Infection can ascend up to kidneys
Other Causes:

- Changes in normal bacterial flora (antibiotics, steroids)
- Sexual activity
- Poor hygiene
- Retained urine (increased post void residual)
- Renal/bladder stones
- Fistula formation (hx of surgery, radiation therapy)
Epidemiology of UTIs

- The old notion
  - Uropathogens come and go from the GI tract
  - Some reach the genitals and adhere
  - Enter the urethra and bladder (perhaps via sex)

- Who gets a UTI?
  - Personal susceptibility (e.g., blood type, secretor status)
  - From the bacterial end, the process is direct contact or spread
Urethral Stricture Disease: RUG
Removal of foreign bodies
Retained urine is much worse if infected

- Person can withstand hydronephrosis of kidney up to three weeks with minimal damage to renal function.

- If that hydronephrosis is infected urine, renal function can be lost in 48 hours, and sepsis leading to death can occur.
Questions to ask for recurrent UTIs:

- Hygiene
- Renal/bladder stone history
- Occur after sexual activity
- Incomplete emptying of bladder (nocturia, frequency)
The reality is more complex

- Bacteria enter bladder and adhere to the mucosa
  - They invade the superficial mucosa
  - Protected from host defenses
  - Multiply in mucosal cells
  - Spread from cell to cell
  - Almost like a virus!
Resistance is here

- The 2000s was a decade in which resistant bacteria became very common in outpatient UTI
- Resistance growing in Europe, Asia and North America

Drug-resistant 'superbugs' hit 35 states, spread worldwide

Bacteria that are able to survive every modern antibiotic are cropping up in many U.S. hospitals and are spreading outside the USA, public health officials say.

The bugs, reported by hospitals in more than 35 states, typically strike the critically ill and are fatal in 30% to 60% of cases. Israeli doctors are battling an outbreak in Tel Aviv that has been traced to a patient from northern New Jersey, says Neil Fishman, director of infection control and epidemiology at the University of Pennsylvania and president of the Society of Healthcare Epidemiologists.

The bacteria are equipped with a gene that enables them to produce an enzyme that disables antibiotics. The enzyme is called Klebsiella pneumoniae carbapenemase, or KPC. It disables carbapenem antibiotics, last-ditch treatments for infections that don't respond to other drugs.

"We've lost our drug of last resort," Fishman says.

Carbapenem-resistant germs are diagnosed mostly in hospital patients and are not spreading in the community. They're far more common nationwide than bacteria carrying a gene called NDM-1 that made headlines this week, Fishman says.
Peri-coital antibiotics

- Woman can void right before and right after sex
- Can take one pill right before or right after sex
- Has been shown to reduce UTIs
Infections other than UTIs

- Herpes (HSV-2): 1 in 5 Americans (16.5%), F 2x M
- Gonorrhea: 110 cases / 100,000, increasing 10% in 5 yrs
- Chlamydia: 456 cases / 100,000, increasing 0.7% in 5 yrs
- Syphilis: 6.3 cases / 100,000, increasing 40% in 5 yrs
Inflammatory Causes

- Prostatitis
- Interstitial Cystitis
- Pelvic Inflammatory Disease
Clinical presentation of stones

- **Symptomatic** 70%
  - Colicky pain
    - Upper ureter: back, flank
    - Mid/distal: lower abdomen, testis, labia
  - Nausea/vomiting
  - Hematuria
  - Voiding sx with distal stone

- **Asymptomatic** 30%
Evaluation of stone disease

- Urinalysis, urine culture
- BUN, creatinine, electrolytes

Imaging
- Non contrast helical CT plus KUB (radiodense vs radiolucent)
- IVP: caution with glucophagae, renal failure
- (Renal ultrasound)
Non contrast CT:
Left kidney hydronephrosis from ureteral stone.
Uric Acid Stone (pH<5.5). Rx with bicarbonate or K-citrate
Renal Stone Treatments
Chances that a stone will pass

- > 5mm < 25%; less in proximal or mid ureter
- 5mm 20-45%
- <5mm prox/mid ureter 40-50
  distal 75%
Outpatient management of stones

- Analgesia: narcotics, Toradol

- Followup
  - Obstruction: KUB 1 week
  - Not obstructed: KUB > 1 week

- Strain urine

- Back to ER for pain, fever, nausea/vomiting
Indications for admission for stone disease

- Obstruction with UTI/fever or renal failure
- Pain not controlled by oral analgesics
- Nausea/vomiting that precludes oral intake
Refer to Urologist

- Stone with obstruction/fever
- Stone > 5 mm
- Small ureteral stone that has not passed in 4 weeks
- Tremendous difference in the way stones have been treated in the last 30 years.
Renal Cancer: Incidence

- 38,000 new cases annually in US
- 12,800 cancer related deaths
- Incidence has risen in past 20 years (imaging)
- About 30% of pts present with metastases
Case #2
Risk Factors

- Tobacco (two fold)
- Hypertension and obesity
- Industrial exposure NOT a risk factor
- Acquired renal cystic disease (dialysis 4-9%)
W/U of RCC

- Hematuria
- Radiological diagnosis
- Sometimes incidental
- Biopsy controversial
- WW, open, lap, partial robotic, cryo, RFA,
Biopsy of renal masses?

- Usually was done to rule out lymphoma
- Sampling error?
- Can be done to rule out metastatic disease
- Do not bypass urology service.
- Can cause hematuria (micro or gross)
Conservative F/U renal masses

- 3 cm masses or less in older patients
- F/U with CT scan for change in size/shape
- Unlikely to harbor RCC or metastasize
- Still able to do treatment if localized
Open Surgery
Laparoscopic Surgery
Partial Nephrectomy
Cryosurgery
Follow up of RCC

- BUN/Cr
- CT/CXR to rule out increase in size (if > 3 cm if ww) recurrence or mets
- Longest recurrence on record: 33 years
- Monitor diabetes, blood pressure, urinalysis
Bladder Cancer

- Transitional cell carcinoma (TCC) most common
- Adenocarcinoma more rare (urachal, GI invasion)
- Squamous cell carcinoma: stone disease & schistosomiasis
- Risk Factors: smoking, hair dye, hx of XRT,
- Most common signs hematuria, bladder symptoms
Urine Cytology
IVP (filling defect)
Cystoscopy/TUR

Transurethral Resection

Histology
Treatment: Medical-Surgical

- Intravesical chemotherapy (BCG, mitomycin)
- For non-invasive or CIS
- Part immune/part local tx
- If recurs, bad prognostic sign
Radical Cystectomy
Diversions
Indiana Pouch
Neobladder
Neobladder
Follow up of Bladder Cancer

- Urinalysis, urine cytology, FISH
- BUN/CR
- Imaging
- Curb at risk behaviors: smoking has 20 yr lag
Enlarged prostates, CAP
In conclusion, many causes of hematuria

- Do your clean catch
- Rule out a UTI or inflammatory process
- Repeat if patient menstruating, jogging, etc
- Smoking hx (bladder cancer)
- AV malformations (renal biopsies)
- BPH/CAP
Thank you

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