**11. Dysuria/UTI by Danielle Brooks**

**Overview:**

**Urinalysis:** essential to diagnose conditions such as calculi, urinary tract infection, and even malignancy.

* **Dipstick urinalysis:**
	+ Specific gravity: correlates with urine osmolality and concentrating ability of kidneys.
		- Normal: 1.003-1.030
		- <1.010 = relative hydration
		- >1.020 = relative dehydration
	+ pH: normal pH 5.5-6.5. Often correlates with serum pH.
		- Useful in UTI, for example: alkaline urine indicates urea-splitting organism
	+ Hematuria: 3+ RBCs per high-powered field in 2/3 urine samples.
		- Dipstick test detects RBC’s peroxidase activity, so a positive test can also mean myoglobinuria or hemoglobinuria.
		- 20% of patients with gross hematuria have urinary tract malignancy🡪 require further work up with cystoscopy and abdominal imaging.
	+ Proteinuria: urine protein excretion >150 mg/day (microalbuminuria is 30-150 mg/day).
		- U-dip is typically sensitive to albumin and will be positive at concentrations 5-10 mg/dL.
		- 1+ is about 30 mg/dL; 2+ is about 100 mg/dL; 3+ is about 300 mg/dL; 4+ is about 1,000 mg/dL.
	+ Glycosuria: will be positive if glucose is present at 180-200 mg/dL.
	+ Ketonuria: Uncontrolled diabetes, pregnancy, carb-free diets, starvation
	+ Nitrites: Present when certain gram-negative and gram-positive bacteria reduce nitrates.
		- Bacteria load is >10,000/mL if positive.
		- Highly specific but not sensitive so a negative result does **not** rule out UTI!
	+ Leukocyte esterase: Produced by neutrophils. Suggests pyuria.
* **Microscopic urinalysis:** used to detect cells, casts, crystals, and bacteria.
	+ Cells**:** squamous epithelial cells suggest contamination; transitional epithelial cells are normal; renal tubule cells suggest kidney pathology.
	+ Casts: can help localize disease to specific part of GU tract
	+ Crystals: calcium oxalate, uric acid, triple phosphate (often seen in alkaline urine, UTI), cysteine
	+ Bacteria: 5 bacteria per HPF equates to about 100,000 CFU/mL

**Urinary Tract Infections: Outpatient Management**

* The most common form of UTI is **acute uncomplicated cystitis**:
	+ Symptoms: dysuria, urinary frequency or urgency in healthy, non-pregnant female patients
	+ Physical exam: usually normal, but may see suprapubic tenderness in 10-20%.
	+ Diagnosis: defined as symptoms above + positive urine culture (> 103 CFU/mL of bacteria).
		- Note, however, that empiric treatment *without* urine culture results is the mainstay of management in the outpatient setting.

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| **Regimens in Acute Uncomplicated Cystitis:** | **Dosing:** |
| *First Line Therapy:* |  |
| * Trimethoprim-Sulfamethoxazole
 | 160/800 mg BID x 3 days(Avoid if resistance prevalence >20% or if used to treat UTI in last 3 months) |
| * Nitrofurantoin
 | 100 mg BID x 5 days |
| * Fosfomycin
 | 3 g single dose  |
| *Other options:*  |  |
| * Fluoroquinolones
 | Increasing *E. coli* resistance may hinder empiric use. Usually reserved for more invasive infections and non-GU disease.* Ciprofloxacin 250 mg BID x 3 days
* Ciprofloxacin, extended release 500 mg daily x 3 days
* Levofloxacin 250 mg daily x 3 days
* Oflaxacin 200 mg daily x 3 days or 400-mg single dose
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| * β-lactams
 | Increasing *E. coli* resistance.* Amoxicillin-clavulanate 500/125 mg BID x 7 days
* Cefdinir 300 mg BID x 10 days
* Cefpodoxime 100 mg BID x 7 days
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**At IMA:**

* Order: urine-dip and urinalysis for patients with urinary symptoms
	+ If there are WBCs, +nitrite, +leuk esterase🡪 treat empirically
	+ +Nitrite is more useful than +leuk esterase
	+ If both nitrite and leuk esterase are negative, the chance of UTI is reduced by 40-60%
* Order urine culture if history of recurrent UTIs or if no improvement with empiric treatment
* Patient-initiated therapy: women with history of UTI are given a prescription with instructions to initiate treatment at symptom onset

**References:**

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