

Pediatric Nephrology
Medical Student
Problem Set 2009-2010

Instructions: Over the next three to five weeks, please spend some time answering the following set of questions on the topics indicated. Please make arrangements to review orally the problem set with Dr. Rozansky. The problem set is not graded but is meant as a way to round out your experience in pediatric nephrology from the perspective of a general pediatrician or urgent care physician who may encounter some of these scenarios. Your comments on the clarity of the questions and helpfulness of the exercise will be appreciated.

1. Hypertension

JB, a 15 year old African-American male, was seen by his primary physician for a routine school athletic physical where he was noted to be hypertensive. He arrived at the nephrology office for a consultation and his BP's were noted to be 160/100 and repeated 15 minutes later at 155/95. JB denied any current symptoms, intercurrent illness, or past hospitalizations. His PMH is significant for asthma during his first ten years of life but he is currently on no medication and has no known drug allergy. He lives with his parents and two younger siblings and denies smoking tobacco or use of illicit drugs. His father accompanied him to the visit. Neither JB nor his father know of any kidney disorders in the family. A maternal aunt has been on antihypertensive therapy since her mid-thirties for unclear reasons.

On physical exam : JB presented modestly obese but otherwise healthy and cooperative. Vitals Wt 90 kg (>95%), Ht 180 cm (75%) No significant physical findings were noted on the exam.

What pertinent signs or symptoms in the HPI should be reviewed with JB?

The above history forgets dietary history? What information should be gleaned from the dietary history?

What areas of the exam need special attention for a patient presenting with hypertension?

For JB's age group, what are the likely causes of his hypertension?

What physical and laboratory studies should be performed with this visit?

What should be the goal blood pressure measurements for JB?

If JB is treated medically for essential hypertension, what medications might you choose? Which ones would you specifically not choose?

If JB develops signs and symptoms consistent with a hypertensive crisis, how should he be treated?

2. Proteinuria

A 14 year old male MM presents to the nephrology clinic with a history of borderline hypertension and 2+ proteinuria. The primary physician has seen MM three times without significant variability in the urine dipsticks or BP. MM has no current complaints and his PMH is without hospitalizations or significant illness. He takes no medications and denies illicit drug use. MM presents for his exam as a well appearing, articulate teenage boy in the 50th % for height and weight, vitals BP 140/85 HR 64 RR 18 with no significant findings on exam. Preliminary labs obtained the week before the visit include normal CBC, normal electrolytes, BUN 12, Cr 0.7, albumin 3.4, cholesterol 185, UA without blood but U Pr/ U Cr of 0.82.

What is in your differential diagnosis?

It is possible that both the proteinuria and elevated BP represent benign etiologies. How might proteinuria or blood pressure be evaluated separately to determine if this presentation is benign?

What other tests would you order to help in evaluating your differential diagnoses?

When would a biopsy be indicated?

3. Urinary tract infections and Imaging

Review each of the imaging studies below for their purpose in renal or urological disease. Write a brief summary of each and then apply them to the scenarios below.

Imaging studies

Renal ultrasound

DMSA scan (Nuclear medicine study)

Lasix Renogram (Nuclear medicine study MAG3 study)

Voiding cystourethrogram (VCUG) and Radionuclear cystogram (RCA)
Include in your discussion when you would use each for patients with UTIs

IVP

Spiral CT scan

Scenarios:

Name the study you would order next for each of the following based on these ultrasound results:

Right multicystic dysplastic kidney?

Significant right hydroureteronephrosis?

Significant left hydronephrosis?

A small echogenic right kidney?

A "stone" shadow in the right renal pelvis for someone who presents with flank pain?

Discuss how you would work-up and treat the following patients with UTIs

A 4 month old girl comes to your office with a history of an E Coli UTI at 10 weeks of age. The UTI was diagnosed by a catheter specimen and there was no bacteremia. She appears healthy but is on no medication and had no further work-up since receiving a 14 day course of oral antibiotics.

A 15 year old girl presents with a 6 month history of intermittent left flank pain, which has worsened over the past two months. One week ago she developed high fevers. Labs showed an elevated ESR to 38, Cr 0.8, WBC 16.2 with leftward shift in differential. A CT scan showed multiple enhancements and a mass effect to left kidney with some associated perinephric edema. No hydronephrosis noted. The PMH is consistent with UTI's during the first year of life with no significant follow-up.

A 4 year old uncircumcised but potty trained boy presents with fever, dysuria, and a clean catch UTI that grows E. Coli. He has had no previous history of UTI but had many courses of treatment for otitis media during his first two years of life.

4. Acute renal failure

A 7 year old male is transferred from an outside hospital to the PICU with oliguric acute renal failure due to diarrhea associated hemolytic uremic syndrome. He presents alert, fatigued but hypertensive (150/90) with the following labs: CBC WBC 5.6 Hct 23% Plts 22 Chem: Na 135 K 7.2 (no hemolysis reported), Cl 105, CO2 14, BUN 86 Cr 4.1 Ca 9.1 PO4 5.8 Mg 1.6 Alb 3.1. Besides calling the nephrologist and the PICU attending, what will you need to do immediately?

5. Nephrotic Syndrome

GB a 12 year old male, is seen in the Nephrology clinic with a presentation consistent with nephrotic syndrome: periorbital and pretibial edema with a 8 pound weight gain over the previous

week, urine dipstick 4+ proteinuria, trace blood. He denies any dysuria, gross hematuria, or fevers. His vital signs include Afebrile 130/85, hr 110, rr 20, 54 kg. He has mild abdominal pain, which is minimally tender on exam, and no upper respiratory symptoms, confirmed on exam. Laboratories show Na 133, K 4.2 Cl 105 CO2 18 BUN 28 Cr 0.6 Alb 1.2 Cholesterol 289 iCa 1.01 with U Pr/ U Cr ratio pending. CXR clear. Ultrasound shows slightly enlarged kidneys bilaterally, extra abdominal fluid, and renal parenchymal echogenicity consistent medical renal disease

It is determined that initial therapy can begin as an outpatient with Prednisone, Lasix, and Zantac. What doses and intervals would you choose for these medications?

What sort of follow-up management plan would you organize over the next four weeks?

How would you counsel the patient about potential side effects of these medicines and of nephrotic syndrome in general?

What other labs would you order that may be important in determining etiology?

What criteria would you use to biopsy this patient given his age group?

6. Hematuria

A 5 year old girl arrives at the primary clinic with a chief complaint of painless brownish colored urine for the past two days. The mother reports that she has had no previous hospitalizations. Over the past week though she has had some cough and congestion and vague complaints of headache and fatigue. There have been no GI complaints as she has been eating well. She also denied dysuria and frequency. FH is significant for her mother having history of UTIs as a child in which she was treated with antibiotics and did not receive any formal radiologic work-up. Her exam is significant for normal height and weight, afebrile, 114/60, hr 104, rr18 Pertinent findings-- Tacky mucous membranes but otherwise normal naso-oropharynx; Lungs—upper airway coarseness; Heart Flow murmur Abdomen—soft and no organomegaly GU—Tanner I and no CVAT; Ext – no edema some muscle tenderness elicited in lower extremities. Clean catch UA dark brown, 1.025/ 3+ blood/ tr protein/ neg glucose/ neg ketones/ TNTC RBCs/hpf, < 5 WBCs/hpf, neg leuk esterase/neg nitrites/ no bacteria/ several granular casts/ 1 RBC cast/ few hyaline casts/ few squamous epithelial cells.

What is your differential diagnosis based on this story? Place in order of likely to least likely?

What additional tests would you order to help determine the diagnosis?

If all the tests come back negative, how would you counsel the family?