

## **PROBLEM SET V: CASE #13**

**History Of Present Illness:** R.G. is a 28-year-old female who presents to the Emergency Room with complaints of recent fevers, dysuria, and left flank pain. She reports a history of multiple bladder infections since childhood. Six months ago, she presented to the Emergency Room with complaints of left flank pain and was treated for left pyelonephritis. She has also noted generalized malaise and fatigue over the past week.

**Past Medical History:** No significant illnesses

**Gynecologic History:** G-3, P-3, all normal spontaneous vaginal deliveries

**Past Surgical History:** Tonsillectomy as a child

**Medications:** none

**Allergies:** No known drug allergies.

**Social History:** Single mom, living in Rio Linda with three children. Currently, She is not sexually active. She works full time performing billing in a doctor's office.

**Review of Systems:** Non-contributory

**Physical Examination:**

VS: Temp 38.0 C    Blood Pressure 120/70    Pulse 86    Resp Rate 16

General – no acute distress

Lungs – clear

Abdomen - Soft, mild deep palpation tenderness left upper quadrant. Left costovertebral angle tenderness.

**Laboratory Data:**

CBC: WBC 13.8, Hematocrit 39

Serum Creatinine 1.0.

Urinalysis: pH 8.0, Leukocyte esterase and nitrite positive

Urine microscopy: > 100 WBCs/HPF, 5-10 RBCs/HPF, 2+ bacteria, coffin lid crystals

1. What additional laboratory studies are indicated?

**Urine culture – > 100 thousand colonies proteus mirabilis**

2. What imaging studies are indicated?

**Given the patient's history of multiple infections, prior pyelonephritis, and proteus on urine culture, she needs radiographic evaluation of her upper urinary tract. She is likely to have either an anatomic abnormality or infection related kidney stone given her history.**

**Choice of imaging studies  
Intravenous Pyelogram  
Renal ultrasound  
Abdominal CT**

**\*\*\*Imaging reveals a large staghorn left renal calculus**

3. What are the four main types of urinary stones? What type of stone does this patient most likely have?

- **Calcium Oxalate Stones – 75% (most common)**
- **Struvite Stones – 10-15% (infection related)**
- **Uric Acid Stones – 5-10% (radiolucent)**
- **Cystine Stones – 1% (cystinuria – autosomal recessive genetic disorder)**

**This patient most likely has a struvite stone. Clues: history of multiple UTI's, proteus urine culture, staghorn stone configuration, coffin lid crystals on microscopy.**

4. What bacteria are involved in the pathogenesis of this patient's stones?

**Urease producing organisms. Organisms which produce urease hydrolyze urea into hydroxyl, ammonium, and carbonate ions. The alkaline environment (pH > 8.0) promotes the precipitation of magnesium ammonium phosphate and carbonate apatite (also known as struvite)**

**Proteus is the most common organism associated with stones**

5. What are her treatment options?

- **Observation, spontaneous passage – Stones < 5 mm**
- **Medical dissolution – Uric acid stones only**
- **ESWL (extracorporeal shockwave lithotripsy) – small stones < 2 cm**
- **Endoscopic fragmentation and removal – Ureteroscopy and Percutaneous**
- **Open surgical removal – rarely required, reserved largest complex stones**

**\*\*\*\*\* This patient underwent percutaneous endoscopic removal of her stone (PCNL) and was rendered stone free.**

6. What potential complications would there be to leaving this kidney stone untreated?

**Pain, urinary tract infection, hypertension, renal loss**

**Example of left nephrectomy specimen removed from a patient with history of multiple urinary tract infections and long standing untreated stone.**

**Pathologic description - A 405 gram kidney measures 14 x 10 X 8 cm. The external surface has multiple areas of hemorrhage. The cut surface shows a thin pale cortex measuring 2-3 mm with multiple 1 cm yellow areas in the renal papillae. The pelvis is dilated and contains multiple 0.9-1.4 cm stones. The attached ureter is dilated measuring 1.2 cm in diameter.**

**Microscopic description - Diffuse scarring of the glomeruli and tubules with fibrosis and scattered lymphocytes. Focal areas of necrosis and hemorrhage. Focal areas of neutrophilic abscess.**

## **PROBLEM SET V: CASE #14**

History of Present Illness: T.M. is a 42-year-old woman who was referred by her primary care physician for a history of a left renal mass. The mass was found on a CT scan ordered to evaluate the patient's symptoms of gross hematuria.

Review of Systems: She has no prior history of urinary tract infections nor stones. She denies shortness of breath, bony pain or weight loss.

Past Medical History: Non-contributory

Past Surgical History: Bilateral carpal tunnel release.

Medications: Oral contraceptives and vitamins

Allergies: none

Social History: Married, living with husband and three children. Works full time as a restaurant manager.

Tobacco use – Never smoked

Alcohol use – Occasional

Drug use – None

Family History: No history of kidney disease. No history of von Hippel Lindau or Tuberous Sclerosis.

Physical Examination:

VS: Temp 98.4      Blood Pressure 160/80      Pulse 82      Resp Rate 16

Lungs – clear to auscultation

Abdomen - soft, deep palpation tenderness and fullness in left upper quadrant. no hepatosplenomegaly.

Lymphatic – no palpable adenopathy

Extremities – without edema

Laboratory Data:

CBC: WBC 6.1, HCT 41.1

Serum Creatinine 1.0.

Urinalysis: large amount of occult blood, 1-3 WBC/hpf, >50 RBC/hpf

Chem 7 (serum electrolytes) within normal limits (Creatinine is 0.7)

1. What is the differential diagnosis of the left renal mass?

- **Primary malignant tumors (in descending order of frequency) – Renal cell carcinoma, transitional cell carcinoma, lymphoma, sarcoma. Wilm’s tumor in children**
- **Benign tumors (in descending order of frequency) – Adenoma, oncocytoma, angiomyolipoma**
- **Metastatic tumors – Lung, breast, stomach, kidney**
- **Infection/abscess**
- **Cysts**

2. What are the presenting signs and symptoms of patients with renal cell carcinoma?

- **Hematuria most common – 60%**
- **Classic triad (Hematuria, flank pain, palpable mass) – only 10-15%**
- **Metastatic disease (dyspnea, cough, headache, bone pain) – 30%**
- **“Internists tumor” – associated with many paraneoplastic syndromes--erythrocytosis, hypercalcemia, hypertension, hepatic dysfunction**

3. What additional studies are indicated and why?

**Chest X ray to rule out metastases**

**Liver function tests (SGOT, SGPT, GGTP). Alkaline Phosphatase.**

**Abnormal liver function tests may suggest metastatic involvement of the liver. An elevated alkaline phosphatase may indicate bony metastases.**

**“Stauffer’s syndrome” – reversible hepatic dysfunction in the absence of metastases. Abnormalities may include elevated alkaline phosphatase and bilirubin, prolonged prothombin time. Presence portends worse prognosis, even in the absence of hepatic metastases.**

**Bone scan in any patient with bony pain or elevated alkaline phosphatase**

4. What treatment is available for patients with renal cell carcinoma?

**Surgery remains the only potential curative therapy for patients with renal cell carcinoma. Prognosis for those patients having surgery for localized disease is good. Patients with metastatic disease have a poor prognosis.**

**Renal cell carcinoma is generally chemo and radiation resistant. Radiation has a palliative role in treating metastatic disease. Biologic response modifiers such as interferon and interleuken 2 can have response rates up to 30%.**

5. A left radical nephrectomy is performed. Describe the gross and microscopic findings.

**Gross:** A yellow-red, variegated tumor measures 4 cm in the upper pole. The tumor compresses but does not appear to invade the renal capsule. The hilum is uninvolved.

**Microscopic:** Cords and sheets of large cell cells have mildly pleomorphic nuclei. The tumor is well vascularized and areas of necrosis are present. Hilar lymph nodes are negative.

**Diagnosis:** T1N0M0 Renal Cell Carcinoma, Clear Cell Type. Grade 1.

## **PROBLEM SET V: CASE #15**

History of Present Illness: M.B. is a 60-year-old man who presents for a physical examination. He has no particular complaints and says it has been 10 years since his last “check up.” (His wife made this appointment)

Past Medical History: Hypertension for 10 years

Past Surgical History: No surgeries

Medications: Prescribed antihypertensive in past, stopped 3 years ago

Allergies: none

Family History: Father died of lung cancer, age 70. Mother died of breast cancer, age 80. Two siblings are alive and well.

Social History: Retired civil engineer with CalTrans. Lives with wife in Sacramento. Three grown living children and five grandchildren.

Tobacco use – 1 pack/year x 45 years

Alcohol use – 1-2 “cocktails”/week

Drug use – None.

Review of System: Pertinent for occasional nocturia and hesitancy. Denies hematuria, dysuria.

Physical Examination:

VS: Temp 37.5      Blood Pressure 160/95      Pulse 70      Resp Rate 18

Lungs – clear to auscultation

Abdomen - soft, non-tender, no mass or organomegaly

Rectal – Symmetrically enlarged prostate with no focal nodules.

Lymphatic – no adenopathy

Extremities – good pulses no edema

Laboratory Data:

CBC: Chem 20 within normal limits (Creatinine 1.1)

UA: 3+ occult blood, no protein

Urine microscopy: 25-50 RBCs/HPF, no WBCs, no casts, no bacteria

1. What are the steps in evaluating patients with hematuria?

- **History and Physical examination**
- **UA, microscopy, and culture**
- **Serum creatinine**
- **Upper tract imaging**
- **Cystoscopy**

M.B. returns after having an intravenous pyelogram, which is normal. He undergoes cystoscopy in the clinic, whereby a urothelial tumor is noted.

**Endoscopic Image: Papillary tumor identified on the posterior wall. He is scheduled for surgery. The tumor is endoscopically resected (TURBT – transurethral resection of bladder tumor) and submitted for pathologic examination.**

2. What are the different types of bladder cancer, and which is most common?

**Transitional cell carcinoma – most common**  
**Squamous cell carcinoma**  
**Adenocarcinoma**  
**Sarcoma**

3. What are common risk factors for developing bladder cancer?

- **Smoking 30-50%**
- **Occupational exposure:**
- **Industries: chemical, dye, rubber, petroleum, leather, printing**
- **Carcinogens: benzidine, beta-naphthylamine, 4-aminobiphenyl**
- **Chronic irritation: schistosomiasis, recurrent UTI's, indwelling catheters**

4. What is the natural history of bladder cancer?

**The natural history of bladder cancer is defined by tumor recurrences and tumor progression.**

**Progression, including metastases, represents the greater biologic risk. The risk of progression is related primarily to the stage and grade of the primary tumor**

5. What are the treatment options for patients with muscle invasive bladder cancer?

- **Surgery – Radical cystoprostatectomy**
- **Combination Chemotherapy**
- **Radiotherapy**