Case 1: Renal Failure

This patient is a 41 year-old male who has a longstanding history of hypertension and diabetes and presents with a complaint of pruritis, lethargy, lower extremity edema, nausea and emesis. He denies any other medical illnesses.

On physical exam the patient is a well-developed, well-nourished male in moderate distress. Blood pressure 180/110, pulse 80, respirations 24 and he was afebrile. Body weight 76.5 kg. HEENT was remarkable for fundoscopic findings of A-V nicking and copper wire changes consistent with hypertensive injury. Cardiac exam had an S1, S2 and S4. The remainder of the exam was remarkable for 2+ lower extremity edema and superficial excoriations of his skin from scratching.

Laboratory Investigations

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>Results</th>
<th>Normal Values</th>
<th>Urinalysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>133</td>
<td>136-146 mmol/L</td>
<td>pH 6.0</td>
</tr>
<tr>
<td>Potassium</td>
<td>6.2</td>
<td>3.5-5.3 mmol/L</td>
<td>Specific gravity 1.010</td>
</tr>
<tr>
<td>Chloride</td>
<td>100</td>
<td>98-108 mmol/L</td>
<td>Protein +1</td>
</tr>
<tr>
<td>Total CO₂</td>
<td>15</td>
<td>23-27 mmol/L</td>
<td>Glucose negative</td>
</tr>
<tr>
<td>BUN</td>
<td>170</td>
<td>7-22 mg/dl</td>
<td>Acetone negative</td>
</tr>
<tr>
<td>Creatinine</td>
<td>16.0</td>
<td>0.7-1.5 mg/dl</td>
<td>Occult blood negative</td>
</tr>
<tr>
<td>Glucose</td>
<td>108</td>
<td>70-110 mg/dl</td>
<td>Bile negative</td>
</tr>
<tr>
<td>Calcium</td>
<td>7.2</td>
<td>8.9-10.3 mg/dl</td>
<td>Waxy casts</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>10.5</td>
<td>2.6-6.4 mg/dl</td>
<td></td>
</tr>
<tr>
<td>Alkaline Phosphatase</td>
<td>306</td>
<td>30-110 IU/L</td>
<td></td>
</tr>
<tr>
<td>Parathyroid Hormone</td>
<td>895</td>
<td>10-65 pg/ml</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>8.6</td>
<td>14-17 gm/dl</td>
<td></td>
</tr>
<tr>
<td>Hematocrit</td>
<td>27.4</td>
<td>40-54 %</td>
<td></td>
</tr>
<tr>
<td>Mean cell volume</td>
<td>88</td>
<td>85-95 FL</td>
<td></td>
</tr>
</tbody>
</table>
24-hour urine protein and creatinine - volume 850 ml, protein 600 mg/dl and creatinine 180 mg/dl
Renal ultrasound- Right kidney 9 x 6.0 cm, Left kidney 9.2 x 5.8 cm
Both kidneys illustrate hyperechogenicity and no hydronephrosis.

**Objectives**

The aim of this case is to understand the pathophysiology of chronic renal failure and to understand the investigations of chronic renal failure.

**Questions**

1. What does the symptoms of pruritis, lethargy, lower extremity edema, nausea and emesis suggest to you?

2. What are the fundus changes of a diabetic?

3. What does S4 signify? What cardiac findings will you expect to find in a hypertensive?

4. What are the possibilities for his 2+ lower extremity edema?

5. What is the significance of the finding “superficial excoriations of his skin from scratching.”?

6. Why was a renal ultrasound ordered? What information can you gather from renal ultrasound studies?

7. How does the results of the renal ultrasound influence your thinking on the diagnosis? What is the normal size of the kidney? Is his kidney size normal? What does small or large kidney signify?

8. What evidence in renal ultrasound, will suggest obstruction?

9. Is the cause of this patients renal failure acute or chronic? How did you arrive at that conclusion?

10. Is this 24 hour urine collection adequate? How did you arrive at that conclusion?

11. How is a 24 hour urine to be collected and when is it appropriate to order this test?
12. Why is the parathyroid hormone elevated?

13. What is the most likely cause of this patient’s anemia?

14. Should this patient be started on dialysis? What are the indications for dialysis?

15. What is the most likely diagnosis for his renal disease? How did you arrive at that conclusion?

16. What are the most likely histological findings on renal biopsy in this patient?
CLINICAL CASE 2

A 56-year-old man presented to surgery with new-onset urinary tract symptoms over the preceding week. These consisted of urgency and frequency associated with suprapubic pain. There was no frank haematuria. He had no significant past medical history and no history of STIs.

Clinically he was afebrile and his abdomen was soft with no palpable bladder. A provisional diagnosis of UTI was made and the patient was prescribed a seven-day course of ciprofloxacin 500mg daily.

His symptoms improved over the week and the urine microscopy report revealed no growth but large quantities of white and red blood cells.

Three weeks later he presented with frank haematuria and incontinence with lower abdominal and left-sided loin pain. He had a palpable bladder and a large stone trapped at the urethral entrance. He was admitted as a surgical emergency and underwent a meatotomy and stone removal under anaesthetic. A cystoscopy was normal and there was no evidence of further calculi in the renal tract.

He has been well since.

Objectives
The student should understand the cause of hematuria and its differential diagnosis.

Questions
1. Who has more prevalence of kidney stones, males or females?
   What is the age incidence of renal stones?
2. What is the common site for renal stones?
3. What is the composition of renal stones?
4. What other diseases kidney stones can cause?
5. What is the clinical features of kidney stones?
6. What is the differential diagnosis of kidney stones?
7. What is the management of kidney stones?