Read the case summary and answer the questions. There may be multiple answers for each question. Questions are numbered 1- 7.

A nine-year-old male child presented in the OPD with the history of not growing well. Since last few weeks he is complaining of headache and giddiness.
He was born by normal vaginal delivery with the birth weight of 2.7 kg. His neonatal period was uneventful. He was fully immunized with the primary immunization. His development was normal. He had three episodes of urinary tract infections in the past. He still wets bed and complains of recurrent abdominal pain. At the age of three years he was operated for difficulty in passing urine.
He is studying in class three and average in class. At present he is taking dextroamphetamine for attention deficit disorder. He has one sister aged 12 years and well. Both parents are well and runs school.

1.What is the most possible working diagnosis?

a. Meningitis.
b. Migraine
c. Urinary tract infection
d. Acute benign giddiness

Examination:
Weight: 20 kg; height: 117.5 cms.
Blood pressure: 120/95 mm of Hg. Pulse: 104/min all peripheral pulses are equally palpable, R/R: 24/min Temperature: 98.4 F orally.
Pallor +. Pedal oedema present. No other abnormality was noted.

2. What further steps are necessary?

a. Blood pressure recording should be done frequently.
b. Lower extremity blood should be taken.
c. Should be referred to the specialist unit.
d. Nutrition history should be obtained in detail

3. What further investigations are necessary at this stage?

a. Total and differential blood count.
b. Urine analysis
c. Urea nitrogen; serum creatinine and serum electrolyte
d. Serum protein.

Investigations revealed following results:

TLC: 4,500/cmm; P: 60%, P: 38%, E: 2%; Hb: 9G%;
ESR: 12mm/Hr.
Urine: R/E: Pus cells: 10/HPF; Albumin: Trace
Blood: Urea nitrogen: 10 mmol/L; Creatinine: 150 micromol/L
Sodium: 145 mEq/L; Potassium: 5 mEq/L

4. What further investigations are necessary?

a. Urine culture and sensitivity.
b. Electrocardiography.
c. DMSA renal scan.
d. Ultrasonogram of the abdomen.

The result of the above investigations were as follows:

Urine culture was sterile.
ECG: Depression of the ST segment and inversion of the T wave in the left precordial leads.
DMSA renal scan showed bilateral photopenic areas.
Ultrasonogram reported as normal.

5. What is the most possible diagnosis?
   a. Hydronephrosis.
   b. Nephrotic syndrome.
   c. Bilateral renal scarring
   d. Renal artery stenosis.

6. What further investigations are necessary?
   a. Renal angiogram.
   b. Plasma renin activity.
   c. Doppler ultrasound.
   d. IVP

7. Which treatment is most appropriate?
   a. Salt free good protein enriched diet.
   b. Salt free protein restricted diet.
   c. Captopril
   d. Lanoxin.

Answeres:

1. Urinary tract infection.

The presenting complaint is headache and giddiness. This boy is not growing well and has past history of recurrent urinary tract infections. These information leads to the possibilities of renal pathology, Moreover the operative procedure done at the age of three years could be of posterior urethral valve. The persistent of bed wetting further supports the urinary pathology. Hypertension is a common cause of headache and giddiness. Secondary hypertension is more common than essential hypertension in children. Approximately 75-80% of children with secondary hypertension has a renal pathology. Urinary tract infection is present in 25-50% of these patients and is often related to an obstructed lesion.The drug used in this case may cause hypertension.

2. Blood pressure recording should be done frequently.
   Lower extremity blood pressure should be taken.

Accurate measurement of blood pressure requires attention to the comfort and is dependent on the quality of the equipment and the skill of the observer. Pressure that is consistently above the 95^{th} percentile for age is abnormal. Blood pressure should be obtained in all four limbs to evaluate the presence of coarctation of aorta.

3. Urine analysis.
   Urea nitrogen and serum creatinine.
   Serum protein.

There is no evidence of fever on history and on examination. It is unlikely to have leucocytosis in a child who does not have fever due to the UTI. The blood count may not be helpful to find out the pathophysiology in comparison to the kidney function. A child with recurrent urinary tract infection may have feeding problem and the serum protein may be low.

4. Urine culture and sensitivity.
   Electroardiography.
   DMSA renal scan
   Ultrasonogram of the abdomen.

The presence of pus cell > 10/hpf suggest UTI, therefore the urine culture is mandatory. Echocardiography is helpful in assessing the cardiac response to the elevated blood pressure, When the diagnosis of recurrent UTI is made and there is presence of hypertension it is essential to rule out whether there is renal scarring. Renal scanning with DMSA is helpful to find out the renal scarring. Reflux will be found in 25% of all children under the age of 10 year who have had asymptotic or symptomatic bacteruria. Renal ultrasound will provide comparison of kidney size and view of the anatomy of the collecting system.

5. Bilateral renal scarring.

Photopenic areas is indicative of renal scarring. The ECG changes support the left ventricular strain due to hypertension. It is a complication of hypertension secondary to the involvement of the bilateral renal scarring. The most common cause of the bilateral involvement of the kidney is secondary to the obstruction due to the posterior urethral valve.

6. IVP

If vesicoureteric reflux is suspected as in this child, IVP with nephrotomography will evaluate kidney size and to detect calyceal blunting, ureteral dilatation and even scarring. Peripheral plasma renin activity is a useful screening test for both renovascular and parenchymal disease but this study is not available and the value varies between laboratories.

7. Salt free protein restricted diet.
   Captopril

The presence of oedema and the abnormal renal function is an indication to reduce the protein load and restrict sodium. In selecting a drug for hypertension it is essential to see the pathophysiology. In this case the presence of renal scarring suggest renin-angiotensin-aldosterone system to be affected therefore ACE inhibitor, captopril is the drug of choice.