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Postgraduate Corner

1. A 38-year-old man was admitted with sudden onset severe headache. On examination, a dilated right pupil is found along with right sided ptosis. CT scan of the brain shows sub arachnoid hemorrhage. What is the most likely underlying etiology for this condition?
   a. Trauma
   b. PCA aneurysm
   c. Diabetes
   d. Internal carotid artery aneurysm
2. A 25-year-old woman presented with chronic weakness. A blood test is shown here: pH: 7.52, Na: 135, K: 2.8, HCO3: 31, pO2: 99 (room air), pCO2: 47. Her urinary potassium excretion is 8 mmol/L (daily urine volume: 1.7 L). What is the most likely cause of her symptoms?
   a. Current surreptitious diuretic use
   b. Diarrhea
   c. Remote diuretic use
   d. Liddle syndrome
3. A 39-year-old man, a known alcoholic, was admitted for investigations. His blood pressure is found to be 100/60 mm of Hg. The following reports are found. pH: 7.62, Na:143, K: 2.9, HCO3: 32. Urinary K+ is 29 mmol/day. Urinary chloride is 8 mmol/L. What is the most likely diagnosis?
   a. Repeated vomiting
   b. Diuretic abuse
   c. Profuse sweating
   d. Gitelman syndrome
4. A 72-year-old HIV positive woman is being treated for fungal pneumonia. She is also on ART, which she tolerates poorly with frequent nausea. Also, she had had a recent attack of cryptosporidium diarrhea. She presents with weakness and lethargy and the following reports are found: pH: 7.21, Na: 130, K: 2.8, pO2: 101, HCO3: 17. Urinary K+: 30 mmol/day. What is the most likely cause of her hypokalemia?
   a. Diarrhea
   b. Vomiting
   c. Liddle syndrome
   d. Amphotericin B
5. A 23-year-old man, who is a known hypertensive from the age of 14, presented with gradually progressive weakness. His reports are shown here: pH: 7.59, Na: 149, K: 2.3, pO2: 102. Urinary K+: 40 mmol/day. Serum aldosterone: 3 ng/dl (normal salt diet, supine). Urinary cortisol/cortisone: normal. What is the next most appropriate treatment?
   a. Amiloride
   b. Spironolactone
   c. Frusemide
   d. Surgery
6. A 24-year-old woman presented with hypertension from the age of 11. She had also been diagnosed with hypokalemia repeatedly. Her father and elder brother also have the same complaints. Her urinary sodium is 10 mmol/L. What is the most likely diagnosis?
   a. Gitelman syndrome
   b. Syndrome of apparent mineralocorticoid excess
   c. Liddle syndrome
   d. Cushing's syndrome
7. What is the gene whose mutation causes Menkes disease?
   a. ATP7B
   b. SCN5A
   c. ATP7A
   d. CFTR
8. Insulin degludec is the new long-acting insulin in use. Which of the following best describes the chemical nature of degludec insulin?
   a. Hexadecanoic acid at B29
   b. Asparagine replaced with glycine at A21
   c. Myristic acid at B29
   d. Asparagine replaced with lysine at B3

Answers

1. **(B)** Posterior communicating artery aneurysms are common causes of pupil-involving 3rd cranial nerve palsy due to proximity of the artery to the nerve. Around one-third of PCA aneurysms cause significant 3rd cranial nerve compression. Aneurysmal rupture may cause sub-arachnoid hemorrhage. Generally, the 3rd nerve palsy may be reversed, at least partially, by timely clipping of the aneurysm or other neurosurgical interventions.
2. **(C)** This woman shows hypokalemia with metabolic alkalosis. However, 24 hour urinary K excretion is low (<15 mmol in 24 hours). Hence, this is not current diuretic use. Metabolic alkalosis rules out lower GI loss. In Liddle syndrome, there is excess renal loss of potassium. Thus, the logical choice is remote diuretic use.
3. **(A)** This is another case with hypokalemia. But here, the urinary excretion of K+ is high, proving this is a renal loss. Thus, sweating (option C) is not an appropriate choice. Also, diuretic use and Gitelman syndrome cause high urinary loss of chloride (>20 mmol/L). Although vomiting causes GI loss of fluids,

the hypokalemia is mainly due to renal loss due to volume contraction and paradoxical aciduria.

4. **(D)** This woman has a lot of clinical features, which make interpretation of her ABG challenging. In diarrhea, there is metabolic acidosis but urinary potassium excretion is low. In vomiting, there is usually metabolic alkalosis. In Liddle's syndrome, there is urinary K+ loss. Also, it is associated with alkalosis.
5. **(A)** This man has metabolic alkalosis with early onset hypertension. There are a lot of possibilities. Low normal aldosterone rules out primary hyperaldosteronism. Hence, surgery (option D) is not needed. The two main differential diagnoses are Liddle syndrome and syndrome of apparent mineralocorticoid excess (SAME). These two syndromes are very close and the only way to differentiate them is by urinary free cortisol/cortisone ratio (increased in SAME). So, this is Liddle syndrome. Thus, amiloride is the best choice.
6. **(C)** This patient has Liddle syndrome because: hypertension at young age, low urinary sodium and history suggestive of autosomal dominant inheritance
7. **(C)** Menkes disease is an X-linked recessive disorder causing copper deficiency. ATP7B gene mutation causes Wilson's disease. SCN5A mutation causes Brugada syndrome. CFTR is the gene for cystic fibrosis
8. **(A)** Option B is glargine insulin, option C is insulin Detemir and option D is insulin glulisine.

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