1. In hypoglycaemia which is correct
    a. Sudden death in Type I diabetics is usually due to hypoglycaemia induced status epilepticus
    b. Peritoneal dialysis can falsely lower capillary glucose levels measured
    c. Beta blocker medications can cause a lack of typical sympathetic symptoms of hypoglycaemia
    d. Glucose administration should be the only antidote to all hypoglycaemic overdoses of diabetic medications

2. Which lower limb anatomical area is most likely due to diabetic ulcer
    a. Medially and above the malleolus
    b. Sole of the foot
    c. On the shins
    d. On the calves

3. Regarding diagnostic accuracy of the following tests for diabetic foot ulcer, which has the highest likelihood ratio for having an underlying osteomyelitis if present
    a. Positive “probe to bone” test
    b. MRI
    c. Plain xray
    d. Bone scan

4. Which is **incorrect** regarding the management of diabetic complications
    a. ACE I are effective in slowing the progression of diabetic nephropathy regardless of their effect on blood pressure
    b. Central adrenergic antagonists (ie Prazosin) may worsen orthostatic hypertension in the presence of autonomic neuropathy
    c. There is a greater chance of weight gain with Metformin compared to other diabetic anti-hyperglycemic agents
    d. Metformin administration is a separate risk factor for IV contrast induced nephropathy besides diabetes and renal impairment

5. Which is the **least** likely to be a cause of hypoglycaemia
    a. Adrenal insufficiency
    b. Hepatic failure
    c. Valproate overdose
    d. Salbutamol toxicity

6. In DKA which is true
    a. Can cause concurrent high anion gap metabolic acidosis and hyperchloremic acidosis
    b. Total body potassium is usually high
    c. Pregnancy is not a precipitant for DKA
    d. Urine dipstick (nitroprusside) tests for all forms of ketones

7. Regarding cerebral oedema from DKA treatment which is true
    a. Children and Adolescents are usually not at risk
    b. Rarely occurs in the first 24 hours of treatment especially DKA is improving clinically and biochemically
    c. Any change in neurological function during therapy is an indication for IV mannitol
    d. Mortality is low usually around 7%

8. Regarding the treatment of DKA which is **not** correct
    a. Aim to replace approximately 50% of total water deficit over the first 12 hours
    b. Do not transition to 5% dextrose until serum glucose is <8 mmol/L
    c. Do not give supplemental K if serum K levels are > 5 mmol/L
    d. Bicarbonate should be avoided unless pH < 7.0

9. Which is a feature of DKA but **not** a feature of HHS
    a. Blood glucose usually very high > 35 mmol/L
    b. Serum bicarbonate <15
    c. Fluid deficit is > 8 L or > 20% of total body water
    d. pH > 7.3

10. Regarding treatment for HHS which is correct
    a. Heparin is contraindicated as there is greater risk of bleeding
    b. Mortality is usually lower than DKA
    c. After initial resus with N.Saline, the fluid of choice is 0.45% Saline
    d. The risk of cerebral oedema is higher compared to patients with DKA

11. Which is true in a patient with Alcoholic Ketoacidosis (AKA)
    a. Ketoacidosis is predominantly driven by the ketone body Acetoacitate
    b. Serum ethanol levels are not useful in calculating the Osmolar gap
    c. Vigorous fluid resuscitation should be avoided as AKA has a high risk of cerebral oedema
    d. After initial resus, fluid of choice is 5% dextrose

12. In patient presenting with thyroid storm which treatment regime is correct
    a. Amiodarone should be given for RAF
    b. Esmolol is a viable alternative to propranolol in patients with asthma
    c. PTU is contraindicated in pregnancy especially 1st trimester, Methimazole should be used instead
    d. Iodine should be given before PTU but Lithium can be used in iodine induced hyperthyroid or amiodarone induced thyrotoxicosis

13. Which is **not** part of the diagnostic parameters for Burch and Wartofsky's diagnosis for thyroid storm
    a. Hypertension
    b. High temperature
    c. Atrial Fibrillation
    d. GI-hepatic dysfunction

14. In Myxedema coma which is a typical finding or treatment option
    a. Left ventricular hypertrophy on ECG
    b. Severe hypovolemia needing large volume IV fluid replacement
    c. Caries a high mortality up to 60%, so all patients require ICU admission unless palliative
    d. T3 (Liothyronine) has fewer cardiac effects than T4 (Levothyroxine) and is the preferred choice for replacement in patients with cardiac instability

15. Which characteristic is more consistent with Secondary hypothyroidism compared to Primary
    a. Hypothermia more common
    b. Dry and course skin
    c. Cardiomegaly
    d. Poor response to T4 without concurrent steroids

16. Regarding Adrenal insufficiency disease which is correct
    a. Most common worldwide infectious cause of Primary Adrenal Insufficiency (Addison's) is HIV whilst most cause of Secondary Adrenal Insufficiency is chronic steroid use
    b. Freidrich-Waterhouse syndrome is due to autoimmune disease
    c. Addison's disease is typically characterized by hyponatremia and hyperkalemia
    d. IV hydrocortisone is the preferred treatment choice if Adrenocorticotropic hormone stimulation test (ie short synacthen test) is to be performed subsequently

17. Regarding chronic steroid administration and illness which is correct
    a. Doubling the dose of mineralocorticoid is needed in a time of physical stress
    b. Chronic inhaled steroid use can be associated with hypothalamus-pituitary-adrenal axis suppression

c. In most cases the hypothalamus-pituitary-adrenal axis function recovers within 1 week
d. For a minor illness or injury, doubling or tripling the daily dose of steroid is usually needed for 24 to 48 hours

18. Which is more likely a feature of Secondary Adrenal Insufficiency compared to Addison's
    a. Presentation of hypotension resistant to vasopressors without concurrent steroid administration
    b. Cushingoid appearance
    c. Skin pigmentation
    d. Hyponatremia with hyperkalemia

Answers

1. C (Sudden death in Type I diabetes is likely due to hypoglycaemia induced prolonged QTc and arrhythmias from autonomic neuropathy, peritoneal dialysis can falsely elevate capillary glucose levels measured, antidote to sulfonylurea overdose is octreotide. Tintinalli 8th edition. Octreotide, Murray Toxicology Handbook 2nd edition)
2. B (Arterial ulcer on shins and toes, venous ulcer above malleolus usually medial, calves not commonly an area of friction or pressure where diabetic ulcers are often located)
3. A (Ulcer area > 2 cm2, high ESR > 70mm/h, positive probe to bone tests have greater positive LR vs MRI & xray, bone scan can be falsely positive from hyperemia or Charcot arthropathy)
4. C (Risk factors for contrast induced AKI: arterial studies, renal impairment, age >70, DM, nephrotoxic drugs, dehydration, etc. Metformin has no effect on BMI or waist:hip ratio. Intravenous contrast AND Other hypoglycaemic agents. DUNN RJ emergencymedicinemanual.com 2016)
5. D (Valproate OD symptom includes hypoglycaemia. Chapter 3.76 Valproic acid, Murray Toxicology Handbook 2nd edition)
6. A (Total body K is usually depleted by renal losses, pregnancy is a precipitant although in many patients there is no clear precipitant, urine dipstick only detects AcAc but not βHB)
7. C (Risk factors for cerebral oedema in DKA: very young children, adolescents and new onset diabetics. Usually occurs when patient appears to be improving often before 48 h. Mortality is high 70% as per DUNN. Diabetic Ketoacidosis DUNN RJ emergencymedicinemanual.com 2016)
8. B (Begin 5% dextrose when glucose is <15 mmol/L)
9. B (DKA: pH <7.3, bicarb < 15, glucose > 13, anion gap > 10, ketonemia. HHS: severe hyperglycaemia usually BSL > 35, plasma osmolality > 315 mOsm/kg, bicarb > 15, pH > 7.3, serum ketones negative to mildly positive)
10. C (Mortality is higher 15-45%, heparin should be considered for DVT risk, cerebral oedema is uncommon compared to DKA. HHS, DUNN RJ emergencymedicinemanual.com 2016)
11. D (βHB is the primary ketone body in AKA, Calculated osmolality = 2 x [Na] + [glucose] + [urea] + [ethanol] thus if ethanol is entered and gap is still wide then other causes of Osmolar gap should be considered, cerebral oedema has not been reported in those being treated for AKA)
12. B (Amiodarone should be avoided as it is a precipitant of thyroid storm, PTU is safe in 1st trimester but Methimazole is not, iodine should be given at least 1 hour after PTU)

13. A (Parameters: high temperature, CNS effects, GI-hepatic dysfunction, tachycardia, congestive heart failure, Atrial fibrillation)
14. C (Typical ECG findings are bradycardia, low voltage, changes associated with pericardial effusion. Metabolic findings are hypoglycaemia, hypothermia, hypoventilation and hyponatraemia thus glucose replacement and fluid restriction should be the mainstay of fluid management, vasopressors are ineffective without thyroid hormone replacement. T4 is more cardiac stable compared with T3 which can cause arrhythmias or AMI in large doses)
15. D (Other features of Primary hypothyroidism: more obese, hypothermia more common, voice more coarse, pubic hair present, skin dry and coarse, heart size increased, normal menses and lactation, increased serum TSH, serum cortisol not decreased)
16. C (Most common infective cause of Addison's worldwide is TB, Freidrich-Waterhouse syndrome is secondary to overwhelming sepsis, IV dexamethasone does not interfere with Adrenocorticotropic hormone stimulation tests)
17. D (Increasing dose of mineralocorticoids in stress is usually not necessary. Inhaled, topical, intranasal and PR routes are not at risk for axis suppression. Hypothalamus-pituitary-adrenal axis function recovers within 1 month)
18. B (Secondary Adrenal insufficiency: Volume depletion and hypotension not as severe unless crisis is present, hypokalemia, hypernatremia aldosterone functioning OR hyponatremia due to water retention, Cushingoid appearance due to long term steroid use, absent skin pigmentation)