Robbins Review File

{ ومن لم يذق مرّ التعلُّمِ ساعةً.. تجرع ذلَّ الجهل طوال حياتهِ }

1. **A 2-year-old child has failure to thrive since infancy. Physical examination shows that the child is short and has coarse facial features, a protruding tongue, and an umbilical hernia. As the child matures, profound intellectual disability becomes apparent. A deficiency of which of the following hormones is most likely to explain these findings?**
   A. Cortisol
   B. Insulin
   C. Norepinephrine
   D. Somatostatin
   E. Thyroxine (T_4)

2. **A 37-year-old woman has had difficulty swallowing and a feeling of fullness in the anterior neck for the past week. She is recovering from a mild upper respiratory tract infection 1 month ago. On physical examination, her temperature is 37.4° C, pulse is 74/min, respirations are 16/min, and blood pressure is 122/80 mm Hg. Palpation of her diffusely enlarged thyroid elicits pain. Laboratory studies show an increased serum T4 level and a decreased TSH level. Two months later, she no longer has these complaints. The T4 level is now normal. Which of the following conditions is most likely to have produced these findings?**
   A. Hashimoto thyroiditis
   B. Medullary thyroid carcinoma
   C. Subacute granulomatous thyroiditis
   D. Toxic follicular adenoma
   E. Toxic multinodular goiter

3. **A 70-year-old man has had greater difficulty swallowing for the past 2 years. Over the past 6 months, he has lost 3 kg. On physical examination, his temperature is 37.3° C, and pulse is 102/min. There is fullness to the anterior neck, with a 5 × 10 cm irregular mass on palpation. Laboratory studies show serum TSH of 0.2 mU/L. A thyroid scintigraphic scan shows a 1.5-cm nodule with increased uptake in the right thyroid lobe, and decreased uptake into the remaining enlarged thyroid. What is the most likely diagnosis?**
   A. Follicular adenoma
   B. Graves disease
   C. Hashimoto thyroiditis
   D. Papillary carcinoma
   E. Toxic multinodular goiter

4. **A 27-year-old man has controlled his diabetes mellitus for the past 10 years with insulin injections. This morning, his roommate is unable to awaken him. The man is unconscious when brought to the emergency department. On physical examination, his temperature is 37° C, pulse is 91/min, respirations are 30/min, and blood pressure is 90/65 mm Hg. Laboratory findings include a high plasma level of insulin and a lack of detectable C peptide. Urinalysis shows no blood, protein, or glucose, but 4+ ketonuria. Which of the following conditions is most likely to be present?**
   A. Acute myocardial infarction
   B. Bacteremia
   C. Hepatic failure
   D. Hyperosmolar syndrome
   E. Hypoglycemic coma
   F. Ketoacidosis

5. **Blood relatives of individuals diagnosed with type 1 or type 2 diabetes mellitus are studied for 10 years. Laboratory testing for glucose and insulin levels and autoantibody formation is performed on a periodic basis. The HLA types of the subjects are determined. A cohort of the subjects who are 8 to 22 years old has no overt clinical illnesses and no hyperglycemia; however, autoantibodies to glutamic acid decarboxylase are present. Many subjects in this cohort have the HLA-DR3 and HLA-DR4 alleles. Which of the following pancreatic abnormalities is most likely to be found in this cohort of study subjects?**
   A. Acinar acute inflammation and necrosis
   B. Acinar fibrosis and fatty replacement
   C. Islet amyloid deposition
   D. Islet hyperplasia
   E. Insulitis
   F. Normal islets in a fibrous stroma

6. **A 74-year-old woman is admitted to the hospital in an obtunded condition. Her temperature is 37° C, pulse is 95/min, respirations are 22/min, and blood pressure is 90/60 mm Hg. She appears dehydrated and has poor skin turgor. Her serum glucose level is 872 mg/dL. Urinalysis shows 4+ glucosuria, but no ketones, protein, or blood. Which of the following factors is most important in the pathogenesis of this patient's condition?**
   A. Autoimmune insulitis
   B. Glucokinase gene mutation
   C. HLA-DR3/HLA-DR4 genotype
   D. Peripheral insulin resistance
   E. Virus-induced injury to beta cells in islets

7. **A 5-year-boy has developed features that suggest puberty over the past 6 months. On physical examination, the boy has secondary sex characteristics, including pubic hair and enlargement of the penis. Which of the following morphologic features is most likely to be seen in his adrenal glands?**
   A. Cortical atrophy
   B. Cortical hyperplasia
   C. Cortical nodule
   D. Medullary atrophy
   E. Medullary hyperplasia
   F. Medullary nodule

8. **A 19-year-old, previously healthy woman collapsed after complaining of a mild sore throat the previous day. On examination she is hypotensive and febrile with purpuric skin lesions. Her peripheral blood smear shows schistocytes. Imaging studies show her adrenal glands are enlarged, and there are extensive bilateral cortical hemorrhages. Infection with which of the following organisms best accounts for these findings?**
   A. Cytomegalovirus
   B. *Histoplasma capsulatum*
   C. *Mycobacterium tuberculosis*
   D. *Neisseria meningitidis*
   E. *Streptococcus pneumoniae*

9. **A 29-year-old woman with systemic lupus erythematosus has been treated with corticosteroid therapy for several years because of recurrent lupus nephritis. She undergoes an emergency appendectomy for acute appendicitis. On postoperative day 2, she becomes somnolent and develops severe nausea and vomiting. She then becomes hypotensive. Blood cultures are negative, and laboratory studies now show Na+ of 128 mmol/L, K+ of 4.9 mmol/L, Cl– of 89 mmol/L, CO2 of 19 mmol/L, glucose of 52 mg/dL, and creatinine of 1.3 mg/dL. Which of the following morphologic findings in the adrenal gland cortex is most likely to be present in this patient?**
   A. Adenoma
   B. Atrophy
   C. Carcinoma
   D. Caseating granulomas
   E. Hemorrhagic necrosis
   F. Nodular hyperplasia

10. **A 55-year-old man has experienced increasing lethargy for the past 7 months. Physical examination shows hyperpigmentation of the skin. Vital signs include temperature of 36.9° C, pulse of 70/min, respirations of 14/min, and blood pressure of 95/65 mm Hg. Laboratory studies include a serum cortisol level of 3 μg/mL at 8:00 am with a serum corticotropin level of 65 pg/mL. Which of the following diseases most often occurs in patients with this disorder?**
   A. Type 2 diabetes mellitus
   B. Classic polyarteritis nodosa
   C. Hashimoto thyroiditis
   D. Systemic lupus erythematosus
   E. Ulcerative colitis

Answer Key:

1. **E**. Cretinism is a condition that is uncommon whenever routine newborn screening is available for testing and treatment at birth for hypothyroidism. Hypothyroidism that develops in older children and adults is known as *myxedema*. A lack of cortisol from primary adrenal failure leads to Addison disease, or a 21-hydroxylase deficiency could produce congenital adrenal hyperplasia. An absolute deficiency of insulin leads to type 1 diabetes mellitus, but this is more likely to develop in childhood or later, and there would be weight loss. There is no deficiency state caused by a lack of norepinephrine or somatostatin.

2. **C.** Subacute granulomatous thyroiditis (de Quervain thyroiditis) is a self-limited condition that can be of viral origin because many cases are preceded by an upper respiratory infection. The transient hyperthyroidism results from inflammatory destruction of the thyroid follicles and release of thyroid hormone. The released colloid acts as a foreign body, producing florid granulomatous inflammation in the thyroid. Hashimoto thyroiditis can enlarge the thyroid transiently, but there is usually no pain or hyperthyroidism. Thyroid neoplasms are not typically associated with signs and symptoms of inflammation and are rarely functional. A toxic multinodular goiter likewise produces no signs of inflammation, and does not reverse functionality.

3. **E.** A long-standing diffuse goiter can evolve into a multinodular goiter, and one of the nodules can begin hyperfunctioning to cause so-called Plummer disease. This "toxic" nodule has acquired growth and functional characteristics similar to a benign neoplasm, such as a follicular adenoma, but one that is functional. Rare toxic follicular adenomas can function and produce "hot" nodules, but the remaining gland is often atrophic, not enlarged. In Graves disease, the thyroid is enlarged, but usually diffusely, without pronounced nodularity, so that there is increased uptake into the entire gland. In addition, clinical features such as dermopathy and ophthalmopathy that are lacking with Plummer disease are associated with Graves disease. There may be initial diffuse thyroid enlargement with Hashimoto thyroiditis and transient hyperfunction, but over time the thyroid atrophies, and hypothyroidism ensues. It is extremely rare for a papillary carcinoma to function, and although this would be a hot nodule, the remaining thyroid would not be enlarged.

4. **E.** An insulin overdose produces hypoglycemic coma. He does not have detectable C peptide, which indicates that there is no endogenous insulin production, typical for type 1 diabetes. The high insulin level is the result of the patient's use of exogenous insulin to treat his diabetes mellitus. Because he has not eaten enough to maintain glucose at an adequate level, he has developed hypoglycemia. The ketosis in this case results from decreased food intake, and anyone not consuming enough calories will develop ketosis. Ketoacidosis in type 1 diabetes mellitus would be accompanied by hyperglycemia. Acute myocardial infarction is a complication that generally occurs later in the course of diabetes when more atherosclerosis has developed. The patient has no obvious source of sepsis. Insulin is not injected into the bloodstream, and the injections are almost never complicated by infection. Hepatic failure is not a typical complication of diabetes mellitus. Hyperosmolar coma can complicate type 2 diabetes mellitus.

5. **E.** The presence of HLA-DR3 and HLA-DR4 alleles of the MHC class II region has the strongest linkage to type 1 diabetes mellitus. Autoantibodies to islet cell antigens such as glutamic acid decarboxylase are present years before overt clinical diabetes develops. An insulitis caused by T cell infiltration occurs before the onset of symptoms or very early in the course of type 1 diabetes mellitus. The insulitis in type 1 diabetes mellitus is associated with increased expression of class I MHC molecules and aberrant expression of class II MHC molecules on the beta cells of the islets. These changes are mediated by cytokines such as interferon-γ elaborated by CD4+ cells (along with CD8+ cells). Acute neutrophilic infiltration with necrosis and hemorrhage are characteristic of acute pancreatitis. Extensive fibrosis and fatty replacement of the pancreas is seen in patients with cystic fibrosis surviving for decades. Islet hyperplasia occurs in infants of diabetic mothers. Amyloid deposition in islets may be seen in some cases of type 2 diabetes mellitus. A fibrous stroma with minimal chronic inflammation and scattered normal islets is seen with chronic pancreatitis.

6. **D.** A complication of type 2 diabetes mellitus is hyperosmolar, nonketotic coma. In type 2 diabetes mellitus, the fundamental defect is insulin resistance, leading to an eventual decrease in plasma insulin or a relative lack of insulin, but there is still enough insulin to prevent ketosis. The resulting hyperglycemia tends to produce polyuria, leading to dehydration, which increases the serum glucose level further. If not enough fluids are ingested, dehydration drives the serum glucose to very high levels. Glucokinase gene mutations can be present with maturity-onset diabetes of the young (MODY). The HLA-DR3/HLA-DR4 genotype is a predisposing factor for type 1 diabetes mellitus. Severe loss of beta cells with insulitis, which may be triggered by viral infection, is a feature of autoimmune, or type 1, diabetes mellitus.

7. **B.** Adrenogenital syndrome can lead to precocious puberty, which is most commonly associated with a deficiency of 21-hydroxylase. The lack of this enzyme reduces cortisol production, driving corticotropin production, which leads to adrenal hyperplasia and production of sex steroid hormones. Bilateral adrenal cortical atrophy is typically seen in cases of Addison disease or after long-term exogenous glucocorticoid therapy. A nodule in the adrenal cortex that has zona glomerulosa cells produces primary hyperaldosteronism; if it has zona fasciculata cells, it produces Cushing syndrome. Most adrenal nodules are nonfunctional and incidental findings. A nodule in the adrenal medulla, if functional, produces catecholamines, and older patients with such nodules have hypertension. Medullary atrophy is rare but might result from infections or toxins. Medullary hyperplasia is uncommon but could also produce catecholamines.

8. **D.** This is the typical adrenal finding in Waterhouse-Friderichsen syndrome, and meningococcemia is the most likely cause of such a rapid course. Chronic adrenocortical insufficiency can result from disseminated tuberculosis and from fungal infections, such as histoplasmosis, that involve the adrenal glands. Cytomegalovirus infections of the adrenals can be seen in immunocompromised states and can be severe enough to produce diminished adrenal function, although not acute failure. *Streptococcus pneumoniae* can produce septicemia, but it is unlikely to involve the adrenal glands specifically.

9. B. This woman has findings of acute adrenocortical insufficiency (acute addisonian crisis). Long-term corticosteroid therapy shuts off corticotropin stimulation to the adrenal glands, leading to adrenal atrophy. When this history is not elicited, and the patient is not continued on the corticosteroid therapy, a crisis ensues, in this case made worse by the stress of surgery. When tuberculosis is more prevalent and more severe without drug therapy, dissemination to adrenals occurs more frequently. An adrenal cortical adenoma without atrophy of the contralateral adrenal cortex could be a nonfunctioning adenoma or an aldosterone-secreting adenoma. If the contralateral cortex is grossly atrophic, the adenoma on the opposite side is probably secreting excess glucocorticoids. A carcinoma is most likely to destroy one adrenal, be nonfunctioning, and leave the remaining adrenal intact. Addison disease from granulomatous destruction of the adrenals was more common, but this is a chronic process. Hemorrhagic necrosis suggests Waterhouse-Friderichsen syndrome, which can complicate septicemia with organisms such as *Neisseria meningitidis.* Cortical nodular hyperplasia can be driven by an ACTH-secreting pituitary adenoma, or it can be idiopathic; in either case, hypercortisolism ensues, not Addison disease.

10. C. Addison disease (primary chronic adrenocortical insufficiency) most often results from an idiopathic autoimmune condition (in areas of the world where the incidence of active tuberculosis is low). Autoimmune adrenalitis is associated with the appearance of other autoimmune diseases in about half of all cases. Such autoimmune phenomena are frequently seen in other endocrine organs, such as the thyroid gland. Other presumed autoimmune diseases, such as systemic lupus erythematosus, ulcerative colitis, and the vasculitides, are usually not forerunners to adrenal failure, although treatment of these conditions with corticosteroids can lead to iatrogenic adrenal atrophy. Type 2 diabetes mellitus, unlike type 1, does not have an autoimmune basis.

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قال صلى الله عليه وسلم: {من سلك طريقًا يلتمس فيه علمًا سهَّل الله له بهِ طريقًا إلى الجنة}

دعواتنا لكم بالتوفيق
