แบบฝึกทบทวน SIID355 Topic 5 disease of endocrine pancreas and complications

จัดทำโดยวิชาการรุ่น 134 เพื่อทบทวนความรู้รายบท (Optional) ไม่ได้มีความเกี่ยวข้องใดกับข้อสอบจริง
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Diabetes mellitus complications + **Pancreas tumor**

1. Which of the following complications found in a patient, most strongly suggests a definitive diagnosis of diabetes mellitus due to its pathognomonic nature?

A. Gangrene of the lower extremities
B. Diffuse mesangial sclerosis
C. Nodular glomerulosclerosis
D. Necrotizing papillitis
E. Isolated cranial nerve palsy

Answer: **C**

Gangrene = *common macrovascular complication but not unique to DM*
Diffuse mesangial sclerosis = *may also occur with aging and hypertension*
Necrotizing papillitis = *more common and severe in DM, but not exclusive*
Cranial nerve palsy = *seen in diabetic mononeuropathy, but also other causes*

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2. A diabetic patient develops vision changes. Fundoscopy reveals microaneurysms, hard exudates, and retinal edema. Six months later, retinal detachment is observed. Which mechanism most directly drives this progression?

A. AGE-induced degeneration of lens proteins
B. VEGF overexpression in response to retinal ischemia
C. Direct glucose toxicity to retinal photoreceptors
D. Immune-mediated retinal vasculitis
E. Decreased aqueous humor outflow and increased IOP

Answer: **B**
*The progression from **non-proliferative to proliferative retinopathy** involves **VEGF overexpression** due to **hypoxia**, leading to **neovascularization and fibrosis**, increasing the risk of **vitreous hemorrhage and retinal detachment**.*

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3. All of the following are reasons why diabetes mellitus increases the risk of pyelonephritis, EXCEPT:

A. Glucosuria promotes bacterial growth
B. Autonomic neuropathy causes urinary stasis
C. Hyperglycemia impairs phagocyte activity
D. Proteinuria increases renal tubular oncotic pressure
E. Hyaline arteriosclerosis decreases renal perfusion

Answer: **D**

Proteinuria may be marker of nephropathy but doesn't play direct role in increasing the risk of pyelonephritis. For choice E, decrease renal perfusion leads to reduced WBC migration

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4. A patient is found to have a mass in the pancreas, with involvement of regional lymph nodes and duodenum, consistent with Zollinger-Ellison syndrome. Which of the following findings is most likely associated with this condition?

A. Leukocytic infiltration of islets
B. Amyloid deposition in islets
C. Episodic hypoglycemia
D. Decreased proportion of ß-cells
E. Severe peptic ulceration

Answer: **E**

Zollinger-Ellison syndrome is caused by a ***gastrinoma*** *(usually pancreas, duodenum, or peripancreatic soft tissue) → acid secretion,* ***Amyloid deposition*** *→ seen in* ***Type 2 DM***
Leukocytic infiltration *and* ***Decreased β-cell proportion*** *→ seen in* ***Type1 DM***
Increased insulin level *→ hypoglycemia seen in* ***insulinoma****, not gastrinoma*

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5. Which of the following complications of Type II Diabetes Mellitus does NOT primarily result from diffuse thickening of the endothelial basement membrane of small vessels due to collagen type IV deposition?

A. Microaneurysm
B. Glove and stocking pattern of sensory loss
C. Sexual impotence
D. Brainstem stroke
E. Glaucoma

Answer: **D**

Microangiopathy *from* ***collagen type IV deposition*** *in small vessels underlies many diabetic complications:* ***Microaneurysm*** *→ retinal capillaries (non-proliferative retinopathy),* ***Glove and stocking pattern*** *→ peripheral* ***neuropathy****,* ***Sexual impotence*** *→* ***autonomic neuropathy****,* ***Glaucoma*** *→ may be associated with microvascular changes*

Brainstem stroke *results from* ***macrovascular disease*** *(i.e.* ***atherosclerosis****) instead.*

Glucose homeostasis and hyperglycemia

1) Which of the following does NOT increase in the fast state (10–14 hours after meal) compared to the postprandial state (4–8 hours after meal)?

A. Glucagon secretion
B. RBC glucose utilization
C. Serum β-hydroxybutyrate
D. Liver gluconeogenesis
E. Liver glycogenolysis

Answer: E

Glucagon secretion ↑↑ (Counterregulatory hormone), RBC glucose utilization is insulin-independent and remains active, β-hydroxybutyrate ↑ due to enhanced ketogenesis, liver glycogenolysis is active early in fasting but declines as glycogen stores deplete.

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2) Which of the following plasma glucose values meets the ADA 2025 diagnostic criteria for diabetes?

A. FPG 124 mg/dL, with BMI value = 24
B. 2-hr OGTT 165 mg/dL, with serum triglyceride = 180 mg/dL
C. HbA1c 6.2%, with history of hypertension (BP = 140/90)
D. Random glucose 210 mg/dL, with polyuria

Answer: D

Explanation: Random plasma glucose ≥ 200 mg/dL with classic symptoms is diagnostic.

Other diabetes criteria: FPS ≥ 126 mg/dL, 2-hr OGTT ≥ 200 mg/dL, HbA1c ≥ 6.5%

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3) A 28-year-old woman has FPG 110 mg/dL and 2-hr OGTT of 145 mg/dL. What is the correct classification and follow-up?

A. Normal glucose tolerance; repeat in 3 years
B. Normal glucose tolerance; annual monitoring
C. Prediabetes; annual monitoring
D. Prediabetes; repeat in 3 years

Answer: C
FPG 100–125 and OGTT 140–199 = prediabetes; follow-up yearly.

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4) A 52-year-old asymptomatic man undergoes diabetes screening. His fasting plasma glucose (FPG) is 130 mg/dL, but his HbA1c is 6.2%. According to ADA 2025 guidelines, what is the most appropriate next step?

A. Diagnose type 2 diabetes based on FPG alone
B. Ignore the HbA1c result and repeat FPG only

C. Repeat the test that is below the diagnostic threshold
D. Perform a 75g OGTT immediately

Answer: **B**

*If two different tests are discordant, result **above** diagnostic threshold should be **repeated***

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5) Which scenario best fits WHO 2019 "hybrid diabetes"?

A. Autoimmune diabetes with islet antibodies
B. Ketosis-prone T2DM with later insulin independence
C. Diabetes in a normal BMI patient with unclear etiology
D. MODY confirmed by genetic testing

Answer: B
Hybrid diabetes (WHO 2019) includes:
1) Slowly evolving immune-mediated diabetes of adults (previously called LADA)
2) Ketosis-prone type 2 diabetes → patients initially present like type 1 (e.g., DKA)

***A** = classic Type 1 DM, **C** = unclassified diabetes, **D** = clear-cut monogenic diabetes (MODY)*

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6) A 60-year-old T2DM patient has poor glycemic control despite triple oral therapy. What is the most appropriate next step?

A. Add sulfonylurea
B. Initiate insulin
C. Increase metformin dosage
D. Begin chromium supplementation

Answer: B
Indication for insulin: poor control on ≥2–3 oral agents.

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7) What is the earliest detectable stage of Type 1 diabetes based on ADA 2025?

A. Symptomatic hyperglycemia
B. Dysglycemia with autoantibodies
C. Autoimmunity with normoglycemia
D. Diabetic ketoacidosis

Answer: C
Explanation: Stage 1 = autoimmunity + normal glucose levels.

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8) A patient develops diabetes mellitus after having recurrent pancreatitis and is later diagnosed with cystic fibrosis. Which of the following findings is most likely associated with this type of diabetes?

A. Increased serum C-peptide level
B. Diabetic ketoacidosis (DKA)

C. Acanthosis nigricans
D. Unresponsiveness of GLUT4

Answer: B

Loss of both β-cells and α-cells → leading to absolute insulin deficiency, similar to type 1 (Decrease C-peptide without insulin resistance and Acanthosis nigricans, prone to DKA)

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9) Metformin is classified as biguanide. What is its primary mechanism of action?

A. Insulin sensitizer
B. Insulin secretagogue
C. Delayed glucose absorption
D. Incretin mimetic
E. Increased renal glucose excretion

Answer: A

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10) Which of the following is correct regarding the 75-g oral glucose tolerance test (OGTT) performed after fasting for 8 hours during pregnancy?

A. Used for overt diabetes diagnosis of hyperglycemia in pregnancy
B. Requires 50-g GCT (non-fasting) for co-interpretation
C. Done at first antenatal care in the first trimester
D. Used to repeat a previously negative screening result 6-7 months prior

Answer: D

Overt diabetes diagnosis and first ANC (early pregnancy) screening uses ***standard criteria*** *(FPG, HbA1c, random glucose) — not necessarily 75-g OGTT; one-step strategy, while 50-g GCT is part of the two-step strategy with 100-g OGTT*

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11) The ABCDE(F) approach is a comprehensive strategy to reduce diabetes-related complications. Which of the following components is NOT correctly matched with the appropriate preventive measure?

A. Advice on diabetes education
B. Blood pressure control (<130/80 mmHg)
C. Cholesterol control (statin therapy)
D. Daily insulin injection
E. Eye examination (Annual screening)

Answer: D

D *stands for Diabetes control and DN (diabetic nephropathy) screening, not daily insulin.*

Laboratory test in endocrine and pancreatic diseases

1) Which of the following best reflects the average glycemic control over 2–3 months, and is used in both diagnosis and monitoring?
A. Fructosamine
B. Capillary glucose
C. HbA1c
D. Glycated albumin

Answer: C

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2) A patient with diabetic ketoacidosis (DKA) is undergoing treatment and needs ketone body monitoring. Which of the following is the main reason sodium nitroprusside is not recommended for this purpose?
A. It cannot detect acetoacetate
B. It cannot detect β-hydroxybutyrate
C. It gives false positives with vitamin C
D. It overestimates total ketone body concentration

Answer: B
Sodium nitroprusside detects acetoacetate and acetone but not β-hydroxybutyrate (B-OHB), which is the major ketone in DKA. Therefore, it's unreliable for monitoring. Excess Vitamin C gives a false negative result (Not false positive like penicillamine, captopril, acetylcysteine)

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3) A 48-year-old male presents with polyuria and fatigue after his routine fitness training. His random plasma glucose is 215 mg/dL, with body temperature 38.5°C. Urine albumin/creatinine ratio is reported as 145 mg/g. Which of the following is the most appropriate next step for evaluating diabetic kidney disease?

A. Confirm the diagnosis of diabetic kidney disease based on this result
B. Repeat urine albumin/creatinine ratio 1 more time within 2-3 days
C. Repeat urine albumin/creatinine ratio 2 more times within 3–6 months.
D. Start oral antiglycemic drug to prevent further albuminuria

Answer: C

Albumin/creatinine = 145 mg/g (Normal < 30 mg/g)→ Moderately increased albuminuria High fever (≥38°) and exercise can cause transient albuminuria. Diagnosis requires at least 2 out of 3 elevated values within 3–6 months to confirm persistent albuminuria consistent with diabetic kidney disease. ***B:*** *Too soon; transient changes may not normalize in 2–3 days* ***D:*** *DM treatment decisions are based on glycemic control, not a single albumin result*

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4) In a patient with glomerulonephritis without anemia or uremia, which glycemic biomarker becomes invalid?
A. HbA1c
B. Capillary glucose
C. Fructosamine
D. Plasma glucose

Answer: C

Fructosamine reflects glycated serum protein (mainly albumin), invalid in hypoalbuminemia <3 g/dL

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5) The laboratory test in a patient with chronic diabetes mellitus type II shows elevated C-peptide but a normal insulin level. What is the best explanation?
A. Non-frozen sample
B. Diabetic nephropathy
C. Exogenous insulin injection
D. Acute hemolytic crisis

Answer: B
*C-peptide degraded in kidney is accumulated in **nephropathy** despite normal insulin levels*

***Non-frozen sample** would cause C-peptide degradation → low, not elevated*
***Exogenous** insulin suppresses endogenous insulin & C-peptide → both low, not just insulin*
***Hemolytic crisis** may cause falsely low insulin due to IDE from RBCs*

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6) HbA1c is generally superior to plasma glucose for monitoring glycemic control <u>except:</u>

A. It reflects a longer glycemic time frame
B. It is well standardized
C. It is unaffected by recent food intake
D. It allows flexibility in sample type and source

Answer: D

HbA1c requires whole blood, while glucose can be measured in plasma, serum, capillary, venous, or arterial.

7**) From the last question, in reality, however, some of these factors are prone to cause a falsely high interpretation of HbA1c, <u>except:</u>**

A. Splenectomy
B. Iron malabsorption
C. Renal failure without dialysis
D. Negative Glycation phenotype

Answer: D

Splenectomy and Iron malabsorption *= False high*
(decrease RBC turnover rate → prolongs RBC lifespan → more glycation)
Renal failure *→ uremia = False high (carbamylated Hb, interfering with HbA1c assays)*
Negative Glycation phenotype *(biological variation)→ less glycation = False low*

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8) Which of the following statements is incorrect regarding the proper use and interpretation of glucose meter results?

A. Devices should be protected from humidity and heat to ensure accuracy
B. Ensure sufficient blood flow to prevent dilutional effect from finger milking
C. NaF should be mixed with blood from the fingertips for diabetes diagnosis
D. Always consider icodextrin in dialysis patients for its interference with glucose readings

Answer: C

DM diagnosis requires venous plasma*, not capillary blood per ADA guidelines.*
NaF (or citrate buffer) is used to prevent glycolysis, heat/humidity affects accuracy,
milking causes dilution, and icodextrin causes false high readings in some meters

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Hypoglycemia

1. Which of the following is the first physiological defense against hypoglycemia?
A. Increase Glucagon
B. Autonomic symptom
C. Increase cortisol and GH
D. Decrease in insulin

Answer: D

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2) Which symptom is classified as neuroglycopenic, which onsets when the blood sugar drops below 50 mg/dL?
A. Palpitations and anxiety
B. Pupil dilatation and trembling
C. Seizure and drowsiness
D. Sweating and clamminess

Answer: C

A,B,D = just increase sympathetic tone (Autonomic symptoms),
C = symptom from brain glucose deprivation (Neuroglycopenic symptom)

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3) A diabetic patient presents with dizziness and sweating. Blood glucose is 60 mg/dL, and symptoms resolve after oral sugar intake. What is not a diagnostic criterion that this scenario fulfills regarding Whipple's Triad?
A. Hypoglycemic unawareness from diabetes mellitus
B. Neuronal symptoms of glucose deprivation
C. Lower plasma glucose than the cut point
D. Return of plasma glucose to normal range post-treatment

Answer: A

History of diabetes *is* ***not*** *part of Whipple's triad. It helps* ***contextualize*** *the case (increase unawareness), but is* ***not required*** *for the diagnosis of hypoglycemia.*
Low plasma glucose *(cutoff <70 mg/dL in diabetic patients; <55 mg/dL in normal)*

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4) A patient with recent sulfonylurea overdose is found unconscious with a plasma glucose of 40 mg/dL. Which strategy best prevents rebound hypoglycemia in this case?
A. Keep blood glucose above 120 mg/dL at all times
B. Administer IV 10% dextrose drip and frequent glucose monitoring
C. Oral carbohydrate 15–30 g and discharge after recovery
D. Avoid giving carbohydrates to prevent insulin spikes

Answer: B

Unconsciousness with a plasma glucose of 40 mg/dL (<50 mg/dL) = ***severe hypoglycemia****.*
The correct strategy should start with ***IV 50% dextrose (50 ml) bolus****,*
then ***Continuous 10% dextrose infusion*** *to prevent recurrence.*
Finally, ***monitor blood glucose every 2–4 hrs*** *for 24 hrs due to sulfonylurea's long action.*

*Targeting >120 mg/dL isn't recommended—****overshooting can stimulate more insulin*** *release due to sulfonylurea action. The patient is unconscious →* ***cannot take oral glucose.***
Carbohydrate avoidance increases the risk of persistent or recurrent hypoglycemia.

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5) A diabetic patient recently lost weight and began intense exercise. Despite unchanged medication, they develop frequent hypoglycemia. Which mechanism best explains this?
A. Impaired hepatic glucose output
B. Increased insulin clearance
C. Increased insulin sensitivity
D. Decreased renal glucose reabsorption

Answer: C.
Increased insulin sensitivity and glucose utilization from exercise are major factors

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6) Which condition best fits with definition of pseudohypoglycemia?

A. Persistence of neurologic symptoms despite plasma glucose correction
B. Anemic patient corresponding to the limitation of glucose measurement
C. Hypoglycemia in an adrenal insufficiency patient with decreased insulin levels
D. The patient unintentionally ingests an anti-glycemic drug of a relative

Answer: B

*In **anemia**, capillary glucose may be **falsely low** due to reduced red blood cell mass, leading to **pseudohypoglycemia. A: 3 possible causes :** post-hypoglycemic brain injury or concomitant of brain lesion or prolonged hypoglycemia*
***C, D: true hypoglycemia** due to hormonal deficiency and sulfonylurea ingestion*

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7) Which is incorrect regarding management of hypoglycemia?

A. Increased carbohydrate intake is preferred over surgery in patients with insulinoma
Heparinized blood should be collected and tested for hypoglycemic cause identification
B. Monitoring 15 minutes after 15–30 g of oral glucose intake is recommended in mild to moderate hypoglycemia
C. Heparinized blood should be collected and tested for hypoglycemic cause identification
D. Autoimmune hypoglycemia should not be ruled out in hypoglycemic hyperinsulinemia patients

Answer: A

In insulinoma, dietary management (like frequent carbs) is not curative. Surgery is the definitive treatment, despite being invasive to the patient

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8. A healthy adult presents with post-prandial dizziness. Mixed meal test is positive for Whipple's triad. Insulin and C-peptide are normal, and sulfonylurea test is negative. Which diagnosis is most likely?
A. Insulinoma
B. Autoimmune hypoglycemia
C. Reactive hypoglycemia
D. Exogenous insulin injection

Answer: C

***Reactive hypoglycemia** (aka postprandial hypoglycemia) occurs 1–3 hours after a meal in otherwise healthy individuals. The answer is **not insulinoma or autoimmune or exogenous insulin**, because insulin levels or antibodies would be abnormal*
