**DT 4th**

**Course Title: GeneralPharmacology II**

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**Note:**

**Attempt all questions**

**Each question carry equal marks**

**Pay attention to every point of question**

**Give to the point answers**

**Extra detail may leads to marks deduction**

(a) Differentiate between type I and type II diabetes mellitus

(b) As per your opinion which of the insulin delivery device is more effective and why?

1. Explain the role of vitamin K in blood clotting and treatment of bleeding disorders
2. What does thrombolytic agents mean? Explain with example
3. Explain the effects and adverse effects of organic nitrates in angina pectoris.
4. Write down the treatment algorithm for improving symptoms of stable angina.
5. Differentiate between primary and secondary hypertension
6. Explain the effect of renin on hypertension
7. What is the importance of pharmacological treatment of hypertension
8. Differentiate between right heart failure and left heart failure
9. Summarize the pharmacotherapy of heart failure

**Ans 4 Primary hypertension**:

it is also calledEssential hypertension is the form of hypertension that by definition, has no identifiable cause. It is the most common type of hypertension, affecting 95% of hypertensive patients

**Secondry hypertension.**

it is a type of hypertension which is caused by an identifiable underlying secondary cause. It is much less affecting only 5% of hypertensive patients

**b) effect of renin on hypertension**:

Baroreceptors in the kidney respond to reduced arterial pressure by releasing the enzyme renin and Low sodium intake and greater sodium loss also increase renin release. renin converts angiotensinogen to angiotensin I, which is converted in turn to angiotensin II in the presence of angiotensin-converting enzyme (ACE). Angiotensin II is the body's most potent circulating vasoconstrictor, constricting both arterioles and veins, causing an increase in blood pressure. Angiotensin II exerts a preferential vasoconstrictor action on the efferent arterioles of the renal glomerulus, increasing glomerular filtration. angiotensin II also stimulates aldosterone secretion, leading to increased renal sodium reabsorption and increased blood volume, which contribute to a further increase in blood pressure.

**c) importance of pharmacological treatement of hypertension:**

Increases the risk for Heart diseases and Strokes

* If Left uncontrolled blood pressure can also cause:
* Heart attack
* Heart FailureKidney disease
* Blindness

**Ans 1**

**type I diabetes mellitus**:

it is a chronic type of diabetes most commonly occure in children caused by autoimmune disese which can leads to the destructon of pancreatic beta cells.

**type II diabetes mellitus:**

it is a chronic type of dibetesoccure due to insulin resistance and can leads to insulin deficiency.

**b) more effective device for insulin delivery:**

insulin pump is more effective method for insulin delivery. This method of administration may be more convenient for some patients, eliminating the multiple daily injections of insulin. The pump is programmed to deliver a basal rate of insulin secretion, and it also allows the patient to control delivery of a bolus of insulin to compensate for high blood glucose or in anticipation of postprandial needs.

**Ans 2) role of vitamin K in blood clotting and treatment of bleeding disorders:**

Vitamin K catalyzes the reaction important for the formation of clotting factor , but it is oxidized in the process to vitamin K epoxide. Regeneration of vitamin K occurs via vitamin K epoxide reductase.

Oral anticoagulants such as warfarin (Coumadin) block the regeneration of the vitamin K, thus halting the further synthesis of the vitamin K–dependent factor.

**b) What does thrombolytic agents mean? Explain with example**

the agent which degrade the clot by splitting fibrin into fragments is called thrombolytic agent. The thrombolytic enzymes catalyze the conversion of the inactive precursor, plasminogen to plasmin.

**Examples:**

1. ***Streptokinase:***

sstreptokinase forms a complex with endogenous plasminogen; the plasminogen in this complex undergoes a conformational change that allows it to rapidly convert free plasminogen into plasmin.

1. ***Tissue plasminogen activator***

t-PA is an enzyme that directly converts plasminogen to plasmin. It has little activity unless it is bound to fibrin, which, in theory, should make it selective for the plasminogen that has already bound tofibrin (ie, in a clot) and should result in less danger of widespread production of plasmin and spontaneous bleeding.

**Ans 3**

1. **Explain the effects and adverse effects of organic nitrates in angina pectoris.**

Nitrates decrease coronary vasoconstriction or spasm and increase perfusion of the myocardium by relaxing coronary arteries. In addition, they relax veins, decreasing preload and myocardial oxygen consumption. Organic nitrates, such as nitroglycerin which is also known as glyceryl trinitrate, are thought to relax vascular smooth muscle by their intracellular conversion to nitrite ions, and then to nitric oxide, which in turn activates guanylate cyclase and increases the cells' cyclic guanosine monophosphate (GMP). Elevated cGMP ultimately leads to dephosphorylation of the myosin light chain, resulting in vascular smooth muscle relaxation .

Adverse effects of organic nitrates: The most common adverse effect of nitroglycerin, as well as of the other nitrates, is headache. High doses of organic nitrates can also cause postural hypotension, facial flushing, and tachycardia.

**B Write down the treatment algorithm for improving symptoms of stable angina.**

rest or nitroglycerin (a vasodilator) is promptly relived the symptoms of stable angina.

**Ans 5) Differentiate between right heart failure and left heart failure**

**Right heart failure:**

Reduction of right ventricular output for an increased atrial pressure is called right sided heart failure.In acute right ventricular failure occurs in massive pulmonary embolism. It,s occure when massive pulmonary embolus become impacted in and obstruct the outflow tract of the right ventricale and main pulmonary artery. This result in arrest of the circulation and sudden death.

**Left heart failure:**

Left sided heart failure is characterized by reduction in effective left ventricular output for a given pulmonary venous or left atrial pressure.An acute increase in left atrial pressure may cause pulmonary congestion or pulmonary edema. In chronic left ventricualar failure decreased cardiac output results in decreased tissue perfusion. Decrese renal blood flow stimulates renin angiotensin system and aldosterone formation which causes sodium and water retension from kidney. This sodium and water retension increase blood volume, therefore increasing venous return to already weak heart resulting in congenstion of lungs.

b**) Summarize the pharmacotherapy of heart failure :**

**1.inotropic drugs:**

Positive inotropic agents enhance cardiac contractility and, thus, increase cardiac output.

1. **digilitalis glycosides**:

The cardiac glycosides are often called digitalis or digitalis glycosides, because most of the drugs come from the digitalis (foxglove) plant. They are a group of chemically similar compounds that can increase the contractility of the heart muscle and, therefore, are used in treating HF.

**3.β-Adrenergic agonists**,

such as *dobutamine* and *dopamine improve cardiac performance by* causing positive inotropic effects and vasodilation. *Dobutamine is the* most commonly used inotropic agent other than *digoxin.*

*4.Milrinone is a phosphodiesterase inhibitor that* increases the intracellular concentration of cAMP.

**Order of theraphy:**

* Experts have classified HF into four stages, from least severe to most severe.
* shows a treatment strategy using this classification and the drugs described in this chapter. Note that as the disease progresses, polytherapy is initiated.
* In patients with overt HF, loop diuretics are often introduced first for relief of signs or symptoms of volume overload, such as dyspnea and peripheral edema.

ACE inhibitors or ARBs are added after the optimization of diuretic therapy. The dosage is gradually titrated to that which is maximally tolerated and/or produces optimal cardiac output. Historically, β-blockers were added after optimization of ACE inhibitor or ARB therapy; however, most patients newly diagnosed with HFrEF are initiated on both low doses of an ACE inhibitor and β-blocker after initial stabilization.

* These agents are slowly titrated to optimal levels to increase tolerability. *Digoxin, aldosterone antagonists, and fixed-dose hydralazine and isosorbide dinitrate are initiated in patients who continue to have HF symptoms* despite optimal doses of an ACE inhibitor and β-blocker.