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DEPARTMENT : MLT 2ND SEMESTER

SECTION:B

PAPER: GENERAL PHARMACOLOGY

INSTRUCTOR:MAM NADRA

Q1:

(A) **What does drug interactions mean and enumerate its various types.** **A drug interaction is a reaction between two (or more) drugs or between a drug and a food, beverage, or supplement. Taking a drug while having certain medical conditions can also cause a drug interaction. For example, taking a nasal decongestant if you have high blood pressure may cause an unwanted reaction. A drug interaction is a situation in which a substance affects the activity of a drug when both are administered together. This action can be synergistic or antagonistic (when the drug's effect is decreased) or a new effect can be produced that neither produces on its own.**

Drug interactions may be the result of various processes. These processes may include alterations in the pharmacokinetics of the drug, such as alterations in the absorption, distribution, and excretion of a drug. Alternatively, drug interactions may be the result of the pharmacodynamic properties of the drug,

Types

(drug-drug interaction) interactions between drugs come to mind

(drug-food interactions) interactions may also exist between drugs and foods
(drug-plant interactions) drugs and medicinal plants or herbs
(drug-disease interactions)
But there are essentially two types of drug interactions.
Pharmacokinetics DI
Pharmacodynamics DI

(B) Write down a detail note on pharmacodynamic drug interaction.

Pharmacodynamics interactions:

Are those in which the activity of the object drug at its site of action is altered by the precipitant. Such interactions may be direct or indirect. These are of two types

:Direct pharmacodynamics interactions.
:Indirect pharmacodynamics interactions.

Indirect pharmacodynamic interaction:

In which both the object and the precipitant drugs have unrelated effects. but the latter in Some way alerts the effects but latter in some way alerts the effects of the former.
Example: salicylates decrease the ability of the platelets to aggregate thus impairing the Homeostasis if warfarin induced bleeding occurs.

Direct pharmacodynamic interactions:

In which drugs having similar or opposing pharmacological effects are used concurrently.
The three consequences of direct interactions are
1. Antagonism (Antagonism : 1-1 = 0)
The interacting drugs have opposing actions

Example: Acetylcholine and noradrenaline have opposing effects on heart rate.

2. Addition or summation (Additive effect : 1 + 1 =2)

The interacting drugs have similar actions and the resultant effect is the some of individual drug responses

Example:CNS depressants like sedatives and hypnotics,…

3. Synergism or potentiation Synergistic effect : 1 +1 > 2 and Potentiation effect : 1 + 0 =2 :

It is an enhancement of action of one drug by another

Example: Alcohol enhances the analgesics activity of aspirin.

Q2:

(A) Differentiate between hypoglycemic and hyperglycemic agents with examples.

Hyperglycemic:

=Hyperglycemic refers to an excess of glucose in the bloodstream

=Blood sugar level rigs more than 130 mg/dl.

=Can be caused by non-compliance of anti – glycaemic agents.

= Commonest complication is Hyperosmoler Hyperglycemic Nonketotic syndrome.

Examples: Sulfonylureas – glimepiride, glipizide, glyburide.

:Biguanides – metformin.

:Thiazolidinediones (Tzd) – pioglitazone, Actos generic.

:Alpha-glucosidase inhibitors – Acarbose.

:Meglitinides – nateglinide.

:Combination of sulfonylureas plus metformin – known by generic names of the two drugs.

Hypoglycaemic:

=Hypoglycemic refers to a deficiency of glucose in the blood stream

=Blood sugar level drops less than 70mg/dl.

=Can be caused by excessive intake of anti-glycemic agents beyond the present does.

= Commonest complication is Diabetic ketoacidosis

Examples: Sulfonylureas – glimepiride, glipizide, glyburide.

:Biguanides – metformin.

:Thiazolidinediones – pioglitazone, Actos generic.

:Alpha-glucosidase inhibitors – Acarbose.

:Meglitinides – nateglinide.

:Combination of sulfonylureas plus metformin – known by generic names of the two drugs

(B) What is emesis and antiemetic drugs, give examples:

Antiemetic Drugs: An antiemetic is a drug that is effective against vomiting and nausea. Antiemetics are typically used to treat motion sickness and the side effects of opioid analgesics, general anaesthetics, and chemotherapy directed against cancer.

Examples:

aprepitant (Emend)

:dexamethasone (DexPak)

:dolasetron (Anzemet)

:granisetron (Kytril)

:ondansetron (Zofran)

:palonosetron (Aloxi)

:prochlorperazine (Compazine)

:rolapitant (Varubi)

Emesis Drugs:

Antiemetic drugs are types of chemicals that help ease symptoms of nausea or vomiting. Antiemetic drugs may also be used to treat nausea and vomiting caused by other medications, frequent motion sickness, infections, or stomach flu. Antiemetic drugs help to block specific neurotransmitters in the body

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(C) What kind of drugs are used for cough and sputum, give examples:

Cough: There are 2 types of OTC cough medicines: antitussives and expectorants. A common antitussive is dextromethorphan (some brand names: Triaminic Cold and Cough, Robitussin Cough, Vicks 44 Cough and Cold). The only expectorant available in OTC products is guaifenesin (2 brand names: Mucinex, Robitussin Chest Congestion).

Sputum: Guaifenesin belongs to a class of drugs known as expectorants. It works by thinning and loosening mucus in the airways, clearing congestion, and making breathing easier. Dextromethorphan belongs to a class of drugs known as cough suppressants. It acts on a part of the brain (cough center) to reduce the urge to cough.

Examples:

:Keeping the air moist. ...

:Drinking plenty of fluids. ...

:Applying a warm, wet washcloth to the face. ...

:Keeping the head elevated. ...

:Not suppressing a cough. ...

:Discreetly getting rid of phlegm. ...

:Using a saline nasal spray or rinse. ...

:Gargling with salt water.

Q3:

(A) Enumerate different targets for antibiotics.

, there are three main antibiotic targets in bacteria:

:The cell wall or membranes that surrounds the bacterial cell.

:The machineries that make the nucleic acids DNA and RNA.

:The machinery that produce proteins (the ribosome and associated proteins)

Gram positive " cell wall composed of thick layer of peptidoglycan"

Gram negative "cell wall composed of thin layer of peptidoglycan"

(B) Explain viral replication process in detail

Viral replication is the formation of biological viruses during the infection process in the target host cells. Viruses must first get into the cell before viral replication can occur. Through the generation of abundant copies of its genome and packaging these copies, the virus continues infecting new hosts. Replication between viruses is greatly varied and depends on the type of genes involved in them. Most DNA viruses assemble in the nucleus while most RNA viruses develop solely in cytoplasm

Viral entry is the earliest stage of infection in the viral life cycle, as the virus comes into contact with the host cell and introduces viral material into the cell. The major steps involved in viral entry are shown below. Despite the variation among

viruses, there are several shared generalities concerning viral entry.
Viruses multiply only in living cells. The host cell must provide the energy and synthetic machinery and the low molecular-weight precursors for the synthesis of viral proteins and nucleic acids.
It is the first step of viral replication. The virus attaches to the cell membrane of the host cell. It then injects its DNA or RNA into the host to initiate infection. In animal cells these viruses get into the cell through the process of endocytosis which works through fusing of the virus and fusing of the viral envelope with the cell membrane of the animal cell and in plant cell it enters through the process of pinocytosis which works on pinching of the viruses.

Transcription / mRNA productionEdit

For some RNA viruses, the infecting RNA produces messenger RNA (mRNA). This is translation of the genome into protein products. For others with negative stranded RNA and DNA, viruses are produced by transcription then translation.

The mRNA is used to instruct the host cell to make virus components. The virus takes advantage of the existing cell structures to replicate itself.

There are two processes used by viruses to replicate: the lytic cycle and lysogenic cycle. Some viruses reproduce using both methods, while others only use the lytic cycle. In the lytic cycle, the virus attaches to the host cell and injects its DNA.

Q4:

(A) Classify antihypertensive drugs with example.

Antihypertensive drugs comprise several classes of compound with the therapeutic intention of preventing, controlling, or treating hypertension.

The classes of antihypertensive drug differ both structurally and functionally. They are important in anaesthetic practice because they are commonly prescribed to the general population, with the overall prevalence of hypertension being 31% in the UK [defined by the National Institute for Health and Care Excellence (NICE) as a measurement of 140/90 mm Hg or higher in clinic, with subsequent ambulatory or home measurement of 135/85 mm Hg or higher].1 Antihypertensive drugs are used frequently in other unrelated conditions, for example, β-blockers in thyrotoxicosis and anxiety, or angiotensin-converting enzyme inhibitors (ACEIs) in heart failure. Hence both the drug and its indication are relevant to the conduct of anaesthesia.

Examples:

:Decongestants, such as those that contain pseudoephedrine.

:Pain medicines (NSAIDs), such as ibuprofen and naproxen.

:Cold and flu medicines. ...

:Some antacids and other stomach medicines. ...

:Some herbal remedies and dietary supplements.

(B) What are the causes and drug therapy of various kinds of angina pectoris?

Angina pectoris is the medical term for chest pain or discomfort due to coronary heart disease. It occurs when the heart muscle doesn't get as much blood as it needs. This usually happens because one or more of the heart's arteries is narrowed or blocked, also called ischemia.

There are three types of angina:

:Stable angina is the most common type. It happens when the heart is working harder than usual.

:Unstable angina is the most dangerous. It does not follow a pattern and can happen without physical exertion. ...

:Variant angina is rare. It happens when you are resting.

Angina, which is also known as angina pectoris, occurs when the flow of blood through the coronary arteries to the heart muscle is insufficient to meet the heart's oxygen demands, such as during physical activity. Coronary heart disease is the most common cause of reduced blood flow to the heart in people with angina.

1: STABLE ANGINA:

CAUSES:

Myocardial oxygen demand exceeds oxygen supply , usally brought on by physical exertion.

DRUGE THERAPY OF STABLE ANGINA:

Sublingual /lingul nitroglycocin is typically used at the onset of an acute apisode a beta blocker or a long acting nitrate is often used to prevent attacks.

2:VARIANT ANGINA:

CAUSE:

Myocardial oxygen supply decreases due to corronary vasopasm may occure while patient is at rest.

DRUG THERAPY OF VARIANT ANGINA:

Treated primrily with a calcium channel nlocker.

3:UMSATABLE ANGINA:

CAUSES:

Myocardial oxygen supply decreases at the same time oxygen demand increases can occure at any time secondary to athetosclerotic plaque rupture within the corinary arteryox

DRUG THEROPHY OF UNSTABLE ANGINA:

May require a combination of druge that is a calcium channel blocker. Anticoayulant druges are also helpful in preventing thrombogenesis and coronary occlusion.

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Q5:

(A) Differentiate between general and local anesthetics, explain various stages of general anesthesia .

General anesthesia causes a person to 'fall asleep' while the medical procedure takes place, while local anesthesia is applied to

a specific region in the body where the procedure will be performed.

Local anesthesia numbs just a small area of tissue where a minor procedure is to be done.

General anesthesia affects the entire body and makes the person unconscious. The unconscious person is completely unaware of what is going on and does not feel pain from the surgery or procedure. General anesthesia medicines can be injected into a vein or inhaled.

Stages of general anesthesia:

There are four stages of general anesthesia, namely: analgesia - stage 1, delirium - stage 2, surgical anesthesia - stage 3 and respiratory arrest - stage 4. As the patient is increasingly affected by the anesthetic his anesthesia is said to become 'deeper'.

Stage(1)**(stage of analgesia or disorientation): from beginning of induction of general anesthesia to loss of consciousness. Stage II (stage of excitement or delirium): from loss of consciousness to onset of automatic q.**

Stage(2) also known as the excitement stage, is the period following loss of consciousness and marked by excited and delirious activity. During this stage, the patient's respiration and heart rate may become .

Stage (3) – **Extends from onset of regular respiration to cessation of spontaneous breathing. This has been divided into 4 planes: – Plane 1: Roving eye balls. This plane ends when eyes become fixed. – Plane 2: Loss of corneal and laryngeal reflexe**s.

Stage(4) Commonly used intravenous induction agents include propofol, sodium thiopental, etomidate, methohexital, and ketamine. Inhalational anaesthesia may be chosen when intravenous access is difficult to obtain (e.g., children), when difficulty maintaining the airway is anticipated, or when the patient prefers it.

(B) Write down the mechanism of action of narcotic and non-narcotic analgesics

NACROTIC:

The word opioid refers to derivatives of the opium plant or to synthetic drugs that imitate natural narcotics.
Opioid agonists (also called narcotic agonists) include opium derivatives and synthetic drugs with similar properties.

Narcotic analgesics are a class of medicines that are used to provide relief from moderate-to-severe acute or chronic pain. They may also be called opiates, opioid analgesics,
or narcotics. Analgesic is another name for a medicine that relieves pain 28, 2018

Nonnacrotic:

Non-opioid analgesics can be classified due to their chemical characteristics as acid (NSAIDs = **non**-steroidal anti-inflammatory drugs such as ASA, ibuprofen, diclofenac, naproxen) and **non**-acid (paracetamol, metamizole). The common **mechanism of action** of these substances is their **effect** on prostaglandin synthesis.

Mechanism of action

Opioids exert their major effects by interacting with opioid receptors in the CNS and in other anatomic structures, such as the gastrointestinal tract and the urinary bladder.
Opioids cause hyperpolarization of nerve cells, inhibition of nerve firing, and presynaptic inhibition of transmitter release.

Morphine also appears to inhibit the release of many excitatory
transmitters from nerve terminals carrying nociceptive (painful) stimuli.