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Pharmacology For Nursing

BY

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Dedication

To My Husband, Dr. George his Understanding and cooperation.

To My Lovely children:

Fadi, Sandy, and Suleiman.

Sawsan

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Unit 1
Pharmacology And Nursing

Essential Principles Of Pharmacology

1- Overview

A- Drug classification

Drugs are organized in taxonomies (classification in three ways):

- 1- **Chemical classification:** groups drugs according to structure.
- 2- **Pharmacologic classification:** groups drugs according to physiologic activities and mechanisms of action.
- 3- **Therapeutic classification** : groups drugs according to therapeutic indication.

B- Drug names

- 1- **The chemical name** is the chemical structure of the compound.
- 2- **The generic name**, used worldwide as established through the committee on International Nonproprietary Name of the World Health Organization, is the name selected by the original manufacturer of the drug based on the chemical structure. It is also known as the nonproprietary name because it is not restricted by trademark.
- 3- **The trade name** or brand name is a proprietary name owned by the company that manufactures the drug. It is registered as a trademark.

For example , acetaminophen is the generic name for the drug most commonly referred to by its brand name Tylenol

C- Drug sources

- 1- Drugs are derived from many sources, principally plants, animals, and minerals.(Fig.1-1).
- 2- Most modern drugs are synthetic chemical compounds manufactured in laboratories.
- 3- Some are semisynthetic drugs that are chemically altered (E-g. , levorphanol .

- 4- Other drugs are genetically altered or engineered, this group of drugs is growing in importance as a source of drugs today (E-g., Humulin).



Animals

Minerals

Laboratory

Plants

Fig.1-1: Main sources of drugs

11- Principles of pharmacology

A- Pharmacodynamics /action

- 1- This is the process by which drugs influence the cell physiology that achieve the desired result.
- 2- All but a small number of drugs interact with specific sites called receptors.
- 3- **Receptors** are cellular proteins or nucleic acids that regulate the physiologic and metabolic activities of the cell in either of two ways.(Fig.1-2)

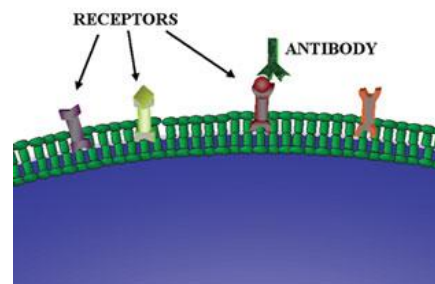


Fig.1-2 :drug receptors

- a- **Agonists** (agonists (activators)) bind to the receptor to produce a pharmacologic effect.
- b- **Antagonists** (blockers) bind to the receptor and prevent the cell from producing an effect. **Antagonists may also block the action of another drug .**

- 4- **Potency** is the drug activity measured in terms of the dose required to produce a particular effect.
- 5- **Efficacy** is the maximal effect produced by a drug . This is important to know when deciding between two drugs that have similar action. For example, two antibiotics may effectively kill the same organism, but one may take more doses than another, making the other more effective—

B- Pharmacotherapeutics

The desired effect is the intended effect or the reason the drug is administered to a particular client at a given time—

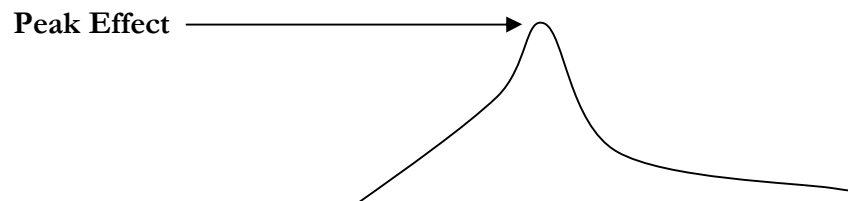
C- Pharmacokinetics

- 1- Pharmacokinetics is the process by which the body absorbs the drug into the bloodstreams, distributes it to its site of action, metabolizes it, and excretes it . The therapeutic action of the drug depends on the pharmacokinetic actions.

Critical thinking exercise:

*Various systems in the body excrete the drug out. List the most important systems and suborgans that play a major role in excreting the drugs outside the body?
Discuss the solution with your instructor*

- 2- **Onset of action** is the time it takes for the drug to reach its minimum effective concentration.
- 3- **Peak effect** occurs when the drug is exerting its maximum effect and is at its highest concentration.(Display1-1).



Display 1-1: Drug concentration

- 4- **Duration of action** is the length of time that the drug remains above its minimum effective concentration.

5- Absorption involves the transfer of the drug across biologic membranes to the target tissue. A biologic membrane may be the skin, mucous membranes of the eyes or ear, vagina or rectum, stomach or intestinal lining, or subcutaneous (SC) or muscle tissue. Biologic membranes also exist inside of body cavities and drugs are sometimes given directly into them (E.g., intraperitoneal or intrathecal administration). (Fig.1-3).

- a- With oral medications, absorption occurs from the digestive tract by diffusion across the mucosal barrier. The quantity and rate of absorption are influenced by a number of factors. (Display 1:2).



Fig.1-3: Absorption of oral drugs through digestive system.

- b- With parenteral medications, the absorption is more rapid and predictable because IV administration places the drug directly in the plasma. With other parenteral sites (intramuscular (IM) and subcutaneous (SC)), the circulatory system has more rapid access to the site of administration. Factors affecting absorption of parenteral medication include solubility of the drug in the interstitial tissue, the area of the absorbing capillary membrane, and muscle mass and circulation in the area. (Fig.1-4)

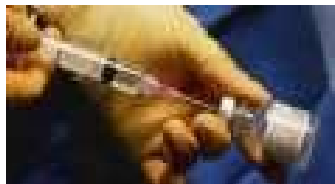


Fig.1-4: Parenteral drug

- 6- **Bioavailability** is the extent to which a drug is absorbed and transported to target tissue.
- 7- **Distribution** is the process by which drugs are transported by blood or other body fluids to the site of action. It depends on protein binding, lipid solubility, and circulation.

DISPLAY 1-2

Factors That Influence absorption of Oral Medications

- Presence or absence of food .
- Solubility of the drug .
- Stability of the drug in gastric .
- Dosage form (e.g., capsule , tablet , extended release)
- Length of time in the stomach
- Presence of other drugs.
- Alteration of gastric pH (E-g., as seen in client's receiving H₂ blockers or proton pump inhibitors)
- Pathology, (E-g., diseases that increase or decrease peristalsis, change gastric emptying , or reduce the surface area (as in surgical removal of part of the stomach or intestine)

- 8- **Excretion, or elimination**, is the process by which a drug is removed from the body along with its metabolite
- a- The routes by which drugs are excreted include the kidneys, lungs, intestines, and in lesser degrees the sweat glands, and mammary glands.

D- Contraindication /cautions

A contraindication is a factor indicating that the use of a particular drug will cause harm. An example of a contraindication is the presence of allergy to a drug.

Critical thinking exercise:

A certain drug is prescribed for a patient .The nurse who cares about this patient knows that this drug is

contraindicated for patient's condition. What actions the nurse may take to deal with such situation? Is it always necessary to not administer contraindicated drug for a particular patient condition?

E- Side /adverse effects

1- Side effects.

a-A side effect is an expected effect that may not cause harm.

b-Sometimes side effects become intended effects, for example; anticoagulation is a side effect of aspirin when aspirin is given for inflammation. Yet at certain times, aspirin is given for its anticoagulant activity. Another example occurs with the tricyclic antidepressant nortriptyline, which has a side effect of sedation. The drug is given at night to take advantage of its ability to aid sleeping.

2- Adverse effects

a- An adverse effect is harmful and unexpected. It can be seen as an effect in any organ.

b- Adverse reactions can assume many forms and are highly dependent on the specific drug .

3- Toxicity

Toxicity means that the drug is acting as a toxin or poison. It can occur in any organ or system.

Drug administration and the nurses' role

I- The nursing process & medication administration

A- Assessment Overview

- 1- In this first phase of the nursing process, obstacles to positive outcomes of drug therapy are identified.
- 2- Assessment data include comprehensive information from the client's history, physical examination, and any other relevant factors that would alter pharmacologic effects. The more information obtained , the more likely the outcome will be successful .
- 3- Before the initiation of medication therapy , the nurse should interview the client or family to obtain the following assessment data :
 - a- The reason the medication is being prescribed and if it is truly indicated.
 - b- A client's goal in taking the medication
 - c- A complete drug history, including:
 - Which drugs (including over-the counter (OTC) medications) the client is currently taking and when.
 - The presence of diseases that might alter the effectiveness of the drug .
 - The client's age and lifestyle and how these factors affect present health problems and the medication prescribed (eg, does the client live alone or are there others available to help with medication therapy ?) .
 - Any history of illegal drug use .
 - Any known allergies .(Display 1-2)
 - Alcohol use .
 - Use of herbal medicines or vitamins.

Display 1-2

Hypersensitivity and allergic reaction to drug therapy are common and unpredictable. An immediate reaction is known as an anaphylactic or anaphylaxis. It occurs at the time of drug administration (usually within 30 minutes) and is characterized by angioedema, urticaria, and profound vasodilation and bronchoconstriction. These symptoms result from sudden tissue release of vasoactive chemicals known as histamine and bradykinins. Anaphylaxis is fatal unless reversed by epinephrine and antihistamines.

A delayed hypersensitivity or allergic reaction occurs after the drug has been in the client's system. It is caused by circulating immune complex and is determined by the development of fever or rash or both.

4- Always assess for:

- A- The possible presence of other drugs that may interact with medications to be given.
 - B- Possible hypersensitivity or allergic reactions; such reactions are absolute contraindications for medication administration.
 - C- Potential for the development of side effects.
 - D- The client's previous experiences and responses with drugs.
 - E- Barriers to understanding and learning (E-g., cultural and language differences between the nurse and client, hearing loss).
 - F- Barriers related to the present illness (E-g., memory deficit, speech deficit, intellectual limitations, ability to understand, and coping strategies).
- 7- In female client, determine the possibility of pregnancy. Be sure to check pregnancy risk category for any drug considered. D- Pregnancy risk categories reflect a drug's potential to cause birth defects. Drugs are best avoided during pregnancy, but when absolutely needed, an assessment should be made as to the risk – benefit ratio. (Fig.1-5)

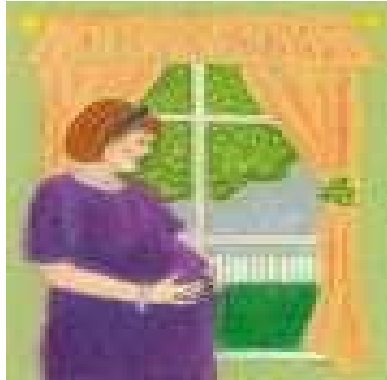


Fig.5-1 : Many drugs are contraindicated in pregnancy and lactation.

Critical thinking exercise:

You are caring for a young adult who has had repeated hospitalization. During assessment, client finds it difficult to hear you clearly. What assumptions do you make about client's repeated hospitalization in term of adherence to prescribed medication?

B- Planning and implementation

- 1- In this phase, the nurse decides how to render care related to medication administration. Included in this phase are:
 - a- Preparation and administration of medications.
 - b- Parameters to be monitored and dietary restrictions or inclusions.
- 2- During administration, the nurse must adhere **to the five rights** : right drug , right dose , right time , right client and the right route. Any variation in the rights can lead to detrimental effects for the client. In addition, the nurse should check the medication label three times during administration.
- 3- The nurse must also consider the client's developmental stage when administering medications .
 - a- **In elderly**, changes in muscle mass and body fluids will alter the distribution and subsequent effects of pharmacologic agents. The elderly may be more sensitive to certain agents because of slower metabolism and circulation and the presence of diseases such as diabetes . These factors make them more prone to experience toxic effects , such as liver or renal failure , and necessitate dosage adjustments .

b- In pediatric clients , differences in age , body weight , or surface area will determine dosages . For example , a 2-year – old has surface area than an 8-year old , but both of these clients require a pediatric dosage .

Critical thinking exercise :

Do you think that monitoring medication in pediatric is difficult? In what ways the drug may be harmful to pediatric client?

What suggestions do you present in the class to decrease the harmful effects in this age groups?

c- Client teaching must identify any lifestyle changes the client must make as a result of the medication regimen. For example, a client taking hypoglycemic medications must be taught how to balance meals with the medications, self-testing of blood sugar, and the importance of regular eye and feet examinations. (Fig.1-6)



Fig.1-6 : self – testing of blood sugar

II- Routes of medication administration

A- Oral

- 1- Pills, tablets, capsules, and liquids are administered through the oral route. These agents also are called **PO** (per os or by mouth) medications. Sublingual (**SL**) and buccal medications are also considered to be PO.
- 2- When drugs are given into GI tract but bypass the mouth , (E-g., by nasogastric , gastrostomy , or duodenostomy tube) , the oral preparations are used .

- 3- The nurse must assess the client's ability to take oral medications. The presence of pathology (E-g., stomatitis, dysphagia) will hinder the client's ability to ingest medications .
- 4- The presence of pathology in the GI tract (eg, ulcers) may hinder the client's ability to absorb medication.

Critical thinking exercise:

In what ways presence or absence of food in the stomach affects the medication?

- 6- When giving oral medications, the nurse should follow these guidelines:
 - a- Wash hands.
 - b- Do not touch the medications by hand.
 - c- Check the five rights of administering medication.(Fig.1-7)



right patient right time right route right dose right drug

Fig.1-7: Five rights of medication administration

B- Parenteral:

- 1- Parenteral medications are administered by injection of any kind , including SC, I-D , IM , and IV .
- 2- Other parenteral routes of medication administration not usually administered by a nurse include, intra-arterial, intracardiac, intraperitoneal, intrapleural.
- 3- When giving parenteral medications , the nurse must follow these guidelines :
 - a-Wash hands .
 - b-Don gloves .
 - c-Assess and identify possible detriments to absorption, such as poor circulation .

d-Select the appropriate site :

- Intradermal : ventral forearm , upper chest , shoulder .
- SC: outer aspects of the arms and thighs , hip and lower abdomen , above the iliac crest .
- IM : ventrogluteal , deltoid , dorsogluteal , vastus lateralis .
- IV : lower arm and hand , upper arm , antecubital .(Fig. 1-8)

Fig. 1-8 : Parenteral routs



I-V injection

I-D injection

I-M injection

- 4- Know your medications. Some medications need to be rubbed (massage) after administration (E-g., insulin); others must never be rubbed (E-g., heparin) . The nurse must be certain to know the unique aspects of each medication before administering .
- 5- Note that parenteral medications are limited in the volume that can be delivered :
 - a- SC medication should never be greater than 1 ml; medications must never be delivered into a muscle in volume greater than 3-4 mL.
 - b- IV medications can be given using bolus method, drip method . The drug must be delivered very slowly and not through the main line . IV medications must never be administered rapidly, so the nurse must identify the appropriate time span to deliver the medication.
- 6- Know which type of delivery system to use and how to prepare the medication in the correct delivery system . For example , if a filter is required , know which is the appropriate filter .
- 7- Use aseptic procedures to all times when preparing and administering IV medications .
- 8- IV and IV continuous drip method must be administered via an infusion pump to ensure adequate dose- (Fig.1-9)



Fig.1-9: Infusion pump

- 9- NEVER mix IV medications without being absolutely sure that the medications can safely be mixed together.

C- Respiratory

- 1- Inhalation : turbo inhaler , metered-dose *nebulizer*, vaporizer , intermittent positive –pressure breathing (IPPB) .(Fig.1-10)
- 2- Instruct the client on how to use and clean the equipment because potentially harmful microorganisms tend accumulate in and around respiratory equipment .



Fig.1-10: Nebulizer

D- Topical

A- Skin topical preparation

- 1- Topical preparations for the skin and mucous membranes may be powders. Lotions, creams, ointments,, pastes , medicated bath preparations , or patches (E-g. , pain medication or nitroglycerin preparations) . Dressings containing medications may be open or closed, wet or dry.
- 2- When administering any topical preparation, wash hands and don gloves.
- 3- Be sure to date a patch when applied. (If the client has excessive hair where the patch is to be applied, the area should be shaved first.)
- 4- Be sure to date and time a dressing when applied.

B- Eye Topical medications. Irrigation, drops, ointment, patch .

- a- When administering medications in the eye , the client's position is very important . Use basic principles of gravity to make sure the medication is applied accurately in the eye , which tends to blink as a defense during medication administration .
- b- Place the client in the supine position, and have the client look upward.
- c- With the lower lid everted, hyperextend the client's neck .
- d- Do not touch the dropper or applicator for the ointment, otherwise clean technique will be interrupted.

C- Ear topical medications .Irrigations , drops .

- a-For adults , pull the pinna up and backward ; for children , pull the pinna back and down . These positions allow for the medication to flow freely into the ear .
- b-Do not touch the dropper
- c-Instruct the client to lie with head turned to the unaffected side .
 - 1- Apply eardrops so that the medication slides down the ear canal.
 - 2- Have the client stay in position for 5 minutes.
- d- Rectal suppository, cream, ointment, gel .
 - a- Often the client will administer this him\herself-
 - b- Offer apply a sanitary pad for comfort
 - c-. Make sure that the client knows how use, clean, and maintain the applicator.

Critical thinking exercise:

Your client has a nasogastric feeding tube in place You will be administering morning medication, including 4 tablets, 1 capsule ,and 10cc of an elixir. Describe how you will safely administer medication through a feeding tube to this client.

Unit 2
*Drug Associated
with Cardiovascular Therapies*

Cardiotonic Agents

I- Overview of Cardiotonic Agents

A- Description

- 1- Drugs that increase the force of myocardial contraction, thereby enhancing stroke volume and cardiac output, are classified as **cardiotonic agents**. These drugs also are known as entropic agents because they increase the force of contraction. Chronotropic agents increase heart rate. Include in this class are digitalis glycosides and amrinonE-(Fig.2-1)

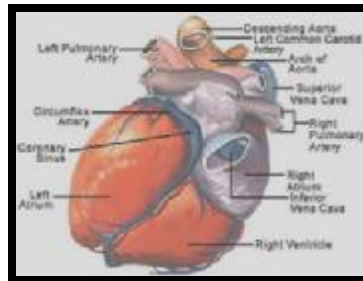


Fig.2-1: Cardiotonic agents affect the heart

B- Action

These drugs improve cardiac output in a failing heart.

- C- Indication:** Treatment of congestive heart failure (CHF) in conjunction with diuretics, vasodilators, and angiotensine converting enzymes (ACE) inhibitors.

II- Digitalis Glycosides

- A- Indication:** Treatment of congestive heart failure(CHF),atrial tacharrhythmias, cardiogenic and thyrotoxic shock state.

B- Nursing management

- 1- Assess the client for symptom of cardiac failure.
- 2- Assess *heart rate ,rhythm and blood pressure*.
- 3- Be aware that toxicity may be treated with digoxin immune fab (antibody fraction specific for digoxin).This bind to the glycosides and the combination is excreted in the urine.

Critical thinking exercises

One of the nursing interventions for a patient who are receiving digoxine therapy is to assess pulse rate before administering the drug. Discuss with your colleagues in the class the rationale of such nursing action in the light of digoxine effect on cardiac contractility.

Your assessment of Mr. Kary reveals despnea ,hypertension respiratory wheezes bilaterally. Urine output has been less than 30 cc /hour and he has gained 12 bound over the last 2 days. You place Mr. Kary in high fowler position and call his physician who ordered digoxine 0.5 mg IV Stat: repeat in 4 hours then give 0.25 mg qid. Do you feel this is the safe dosage of digoxine to give? Why digoxine was given IV in Mr. Kary case?

Antiarrhythmic Agents

Overview of Antiarrhythmic agents

A- Description

- 1-. Drugs that affect myocardial conduction are called antiarrhythmic agents. They are classified by their mechanism of action. Types include class I, class II, class III, and class IV.
- 2- The etiology and the type of arrhythmias present will dictate the choice of drug.

B- Action:

Antiarrhythmic agents act to restore a normal cardiac rhythm. Restoring of rhythm may occur through various drug actions ,as described below.(Fig.2-2).

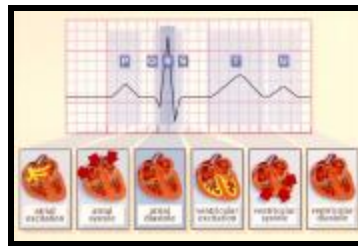


Fig. 2-2: Cardiac rhythm as shown in Electrocardiogram (ECG)

C- Indication:

Treatment of cardiac arrhythmias(Abnormal cardiac rhythm).

D- Overview of Nursing management

- 1- Closely monitor the client's vital signs, ECG, neurological functioning.
- 2- Be aware that fatal dysrhythmia can occur from the pro-arrhythmic effect of most antiarrhythmic agents. More than half of all deaths from myocardial infarction(M.I) that occur within the first hour of MI result from dysrhythmias.
- 3- Evaluate the effectiveness of treatment according to the following criterion: *The patient will have normal cardiac rate and rhythm.*

E. Common Antiarrhythmic agents

- 1-Moricizine (Ethmozine)
- 2-Quinidine
- 3- Procainamide hydrochloride(Procan,Pronestyl).
- 4- Lidocaine (Xylocaine)
- 5- Amiodarone (Cordarone)
- 6- Bretylium tosylate(Bretylol)
- 7- Adenosine(Adenocard)

Critical thinking exercise:

Mr. John ,68 years old has been receiving amiodarone for the last 3 days to treat serious cardiac arrhythmias .Most of the time Mr. John was out of the bed and use his cellular phone frequently. Through out his routine nursing check up, the nurse discovered that the last ECG was done 2 days earlier. Mr. John looks well and laugh frequently on phone- How will you interpret this situation and what, if any, nursing action will you take?

Antihypotensive Agents

I- Overview of Antihypotensive agents

A- Description

- 1- Adrenergic agonists are primarily used to treat hypotension, which may be a manifestation of a shock state.
- 2- These agents are also known as sympathomimetics agents.

B- Action

- 3- Adrenergic agonists may stimulate alpha, beta or combined activity.
- 4- Alpha-stimulating drugs increase peripheral vascular resistance and thus blood pressure.
- 5- Beta-Stimulating drugs increase myocardial contractility and heart rate.
- 6- Beta-stimulating drugs need to be used very cautiously in cardiogenic shock because increased heart rate and contractility may increase oxygen consumption and lead to dysrhythmia or infarct extension.

C- Indications

- 1- Treatment of life-threatening hypotension, shock, or cardiac arrest not caused by hypovolemia.
- 2- When volume depletion is the cause of hypotension or shock, the volume must be replaced to restore blood pressure.

D- Overview of nursing management

- 1- Know that a client receiving antihypotensives is either in an emergency room, a critical care unit, or on the way to a critical care unit.
- 2- Continuously monitor the client's heart rate and rhythm with a cardiac monitor. Be sure to continuously monitor blood pressure through an arterial line.
- 3- Be sure that hemodynamic monitors are in place with cardiac output determination.

- 4- Evaluate effectiveness of interventions using the following criterion: The client experiences improved tissue perfusion as manifested by increased blood pressure.

E- Common Antihypotensives

1-Epinephrine (Adrenalin):

a- General information: Epinephrine is a natural catecholamine with both alpha-and beta-agonist activity.

b- Action.

- 1- Cardiac effects mediated by B1 activity are increased heart rate, contractility, speed of conduction.
- 2- B2 activity includes bronchodilation and gluconeogenesis.

c- Indications:

- 1- Management of profoundly symptomatic bradycardia or cardiac arrest, status asthmaticus, and anaphylaxis.
- 2- (Note: This drug cannot be used as a substitute for fluid volume replacement if hypotension and bradycardia result from hypovolemia-)
- 2- Ephedrine
- 3- Isoproterenol (Isuprel).
- 4- Dopamine (Intropine).
- 5- Dobutamine (Dobutrex).

Critical thinking exercises

Dopamine increase the force of cardiac contraction and increase cardiac output with minimal increase of heart rate, thus produce less myocardial oxygen demand than other drug in this group. How this information may affect patient diagnosed with shock state?



You are working in a clinic when a patient has a sudden severe episode of laryngeal edema and hypotension .The physician shouts an order for adrenaline 0.1 mg I-V stat .Your stock supply provide epinephrine 1 mg / ml. You draw up 1 ml into a syringe and hand it to the physician for I-V administration. What error has the nurse make? Did the nurse hand the physician the required drug?

Calcium Channel Blockers:

I- Overview of Calcium Channel Blockers :

A- Description: Calcium channel blockers are used for several cardiac-related disorders because of their effects on calcium.

B- Action.

- 1- Cardiac and smooth muscle function is maintained by the normal balance of calcium. During depolarization, calcium enters the muscle cells through membrane channels that are selective for calcium. These are known as slow membrane channels.
- 2- Calcium channel blockers block the entry of calcium into these channels *and cause vasodilation, bradycardia ,decrease force of contraction and reduced atrioventricular (AV) node conduction.* These actions reduced myocardial oxygen consumption and energy demands.(Fig.2-3).
- 3- Because these agents have several effects, they are used in several cardiac and cardiovascular conditions.

AV node conduction:

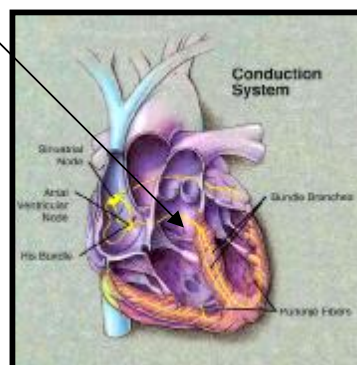


Fig.2-3: Conduction system of the heart

C- Indications.

- 1- Management of all forms of angina pectoris.

- 2- Treatment of mild to moderate hypertension.
- 3- Treatment of several cardiac arrhythmias.
- 4- Improvement of cerebral arterial spasms.

D- Overview of nursing management.

- 1- Carefully monitor blood pressure because the vasodilation may reduce blood pressure. If these agents are given for reasons other than hypertension, reduced blood pressure may not be a desired effect.
- 2- Evaluate cardiac rhythm by ECG.
- 3- If the client is receiving other blockers, such as β blockers, observe for excessive blocking of cardiac function and signs of congestive heart failure (CHF).
- 4- Instruct the client on use of the drug and how to recognize signs and symptoms of side effects.
- 5- Instruct the client on when to seek help.
- 6- Evaluate effectiveness of interventions using the following criteria:
 - a- The client experience a reduction in blood pressure.
 - b- The client is free of chest pain.
 - c- The client has a normal sinus rhythm.

E- Common Calcium Channel Blockers.**1- Nifedipine (Adalat)**

The most potent peripheral smooth muscle dilator of all the calcium channel blockers is the agent commonly used for treatment of severe hypertension and hypertensive crisis.

2- Verapamil (Calan, Isoptin).**3- Diltiazem (Cardizem)****4- Nicardipine (Cardene)****5- Amlodipine (Norvasc)**

F- Contraindication of calcium channel blockers

- 1- Clients with heart failure because of the myocardial depressed effect.
- 2- Severe left ventricular dysfunction, heart block, cardiogenic shock and systolic blood pressure less than 90 mmHg

Critical thinking exercise:

You are working on a telemetry unit. the monitor indicate that your patient Mr.Kary is experiencing supraventricular tachycardia with hypotension (BP 85/50). You have a standing order to treat this arrhythmia with a calcium channel blocker, diltiazem 20 mg I-V push. What nursing action you may take to deal with such situation? What information doctor may need to review his order?

β - Adrenergic Blockers

I- Overview of β - Adrenergic Blockers

A- Description: β -adrenergic blockers are used to improve cardiac function by blocking the action of catecholamines such as adrenaline (epinephrine).

B- Action.

- 1- Stimulation of β -receptors by agonists results in such activities as *increased heart rate* and *contractility*, increased rennin release by the kidneys, bronchial dilation, and potassium entry into cells.
- 2- These agents block the β -receptors, resulting in a decreased chronotropic and inotropic effect as well as bronchial constriction.

C- Indications.

- 1- Management of *hypertension* and reduction of myocardial oxygen need and *reduction of tachyarrhythmias*.(Fig.2-4)
- 2- Prophylaxis of angina pectoris, supraventricular and ventricular arrhythmias, and migraine headaches.
- 3- Reduction of intraocular pressure (topical administration).

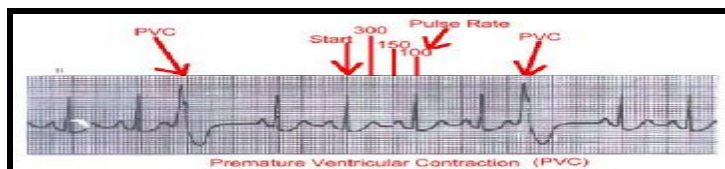


Fig 2-4: Tachyarrhythmias

D- Overview of nursing management.

- 1- Because this category of drugs affects the heart and lungs, nurse must be careful to monitor oxygen intake and demand, cardiac and respiratory rate and rhythm, and overall oxygenation.
- 2- Evaluate the effectiveness of interventions using the following criteria:
 - a- The client's blood pressure is normal.

- b- The client's heart rate and rhythm are normal.
- c- Myocardial oxygen demand does not exceed supply.

E- Contraindication of B adrenergic blockers

- 1- Bradycardia
- 2- Heart block
- 3- Asthma

F- Common b- Adrenergic Blockers.

- 1- Propranolol (Inderal)
- 2- Atenolol (Tenormin)
- 3- Carteolol(Cartrol)
- 4- Nadolol(Corgard)
- 5- Esmolol(Brevibloc)
- 6- Metoprolol(Lopressor)

Critical thinking exercise:

Mrs. Nancy ,36 years of age ,was prescribed propranolol (inderal) to treat a newly diagnosed mitral valve prolapsE- She has been healthy except for multiple allergies and asthmaA-Mrs. Nancy calls the nurse to report that her asthma has deteriorated since she started on the inderal and she wonders if she might be allergic to this new medication .How would you advise her?

Nitrates

I- Overview.

A- Description.

- 1- Nitrates(Nitroglycerin derivatives) improve blood flow to the heart muscle.
- 2- The therapeutic goal in the administration of nitrates is to decrease symptoms and improve hemodynamic.
- 3- Research shows that nitrates administered early to the patient with acute MI reduce the mortality rate, infarct, infarct extension, and related complications.(Fig.2-5)

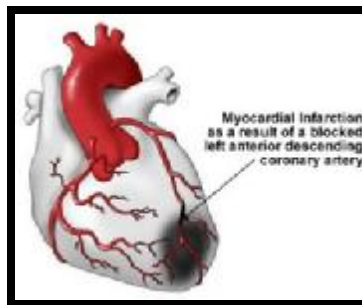


Fig.2-5: Infarcted area of the heart

B- Action: Nitrates work by directly relaxing smooth muscle, thereby causing vasodilatation and allowing more blood to reach the myocardium.

C- Indications: Acute or long-term management of angina pectoris.

D- Overview, of nursing management.

- 1- Be aware that the client who needs these drugs is usually very sick with cardiac disease.
- 2- Note that the IV preparations are used only in critical care units and that sophisticated monitoring techniques (E-g., pulmonary artery catheters, arterial lines) are typically used.
- 3- Note that the PO preparations are used when the client recovers from the acute or crisis phase and is able to be managed on nitrates that can be self-administered.

- 4- Focus nursing management on astute cardiac monitoring and client teaching.
- 5- Obtain a thorough history and physical assessment, including risk factors.
- 6- Assess the locations, durations, intensity, precipitating and alleviating factors and associated symptoms of the client's angina pain.
- 7- Monitor vital signs continuously with IV administration and periodically with PO administration.
- 8- Obtain ECG and cardiac enzymes. Some clients may required echocardiograms, stress tests, radioimmune assay studies, and angiography.

2- Planning and implementation.

- a- Note that nitrates are available in many forms; individualized client considerations determine the nitrate of choice. Acute acting nitrates include the IV, SL, spray, and transmucosal forms. Chronic nitrate therapy includes the sustained released, ointment, transdermal, and transmucosal forms.
- b- When administering IV nitroglycerin, be sure you know how to administer the drug, titrate the dose, wean the drug, and the homodynamic range that the client is to be kept within. Perform blood pressure and pulse check before each change.
- c- Note that IV preparations are diluted in D5W or 0.9% normal saline in a concentration of 25 to 50 μ /mL and administered as infusion.
- d- Instruct the client on safe administration of the drug:
 - 1- Do not crush, break, or chew the sustained-release preparations.
 - 2- Hold SL tablets under the tongue until they dissolve. The client should avoid swallowing, eating, drinking, or smoking until then. Be aware that lingual spray is also administered under the tongue. Advise clients that SL table should be kept in the original dark glass bottle and should be replaced 6 months after opening.
 - 3- Place buccal tablets between the cheek and gum of the upper lip. Drinking hot liquids will increase the onset of action.

- 4- Rotate topical administration sites, and remove medication before the next application. Dose – measuring application paper are provided for measuring proper dose- Avoid contact with hands. Do not rub in ointment. Note that these preparations can cause hypotension; in the event of dizziness, the client must remove the patch and lie down.
 - 5- Apply transdermal patches, which are waterproof, to any non hairy area of the body. Remove patches before cardioversion or defibrillation to prevent burns.
- e- Advise the client to notify the physician if chest pain does not respond to therapy, worsens, is accompanied by diaphoresis or shortness of breath, or if severe headache occurs.
 - f- Be aware that hypotension is a very common side effect. Instruct the client regarding signs of hypotension and actions to take if this occurs (E-g. Lie down, call physician). With IV preparations, the hypotension may be profound, necessitating critical intervention, such as lowering the nitrate dose and adding other medications to the regimen.
 - g- Caution the client to change position slowly to minimize the effects of orthostatic hypotension.
 - i- Be aware that *headaches* is common side effect; instruct the client to take aspirin or acetaminophen as prescribed for headache-

E- Contraindications / cautions.

- 1- Contraindicated in clients with hypersensitivity, head trauma, cerebral hemorrhage, severe anemia, pericardial tamponade, and constrictive pericarditis.
- 2- IV nitroglycerin is contraindicated in clients with severe *hypotension*, and *hypovolemia*-
- 3- Use with caution in clients with glaucoma, hypertrophic cardiomyopathy, renal and liver disease, ventricular outflow obstruction , mitral valve syndrome, uncontrolled hypertension, and carotid disease.

F- Common Side Effect of Nitrates

- 1- Headache ,dizziness ,restlessness,weakness.
- 2- Hypotension,flushing ,tachycardia, syncope.
- 3- Nausea ,vomiting ,dysuria, impotence.

G- Common nitrates:

- 1- Nitroglycerin (Nitrostat)
- 2- Nitroglycerin IV (Tridil, Nitro-Bid IV)
- 3- Nitroglycerin spray (Nitrolingual)
- 4- Nitroglycerin sustained-release (Nitrobid, Nitrong, Nitrospan)
- 5- Nitroglycerin topical (Nitrobid, Nitrol).
- 6- Nitroglycerin transdermal patches (Nitro-Dur, Transderm-Nitro, Nitro-Disc).
- 7- Isosorbide dinitrate (isordil ,sorbitrate)
- 8- Isosorbide mononitrate (Imdur, Ismo, Monoket).

Critical thinking exercise:

Mr Jack a patient with newly diagnosed coronary artery disease (Angina) has been started on a nitroglycerin patch that he is to apply in the morning and remove before going to the bed at night. Sublingual nitroglycerin ,PRN , is ordered for episodes of chest pain. Discuss the appropriate teaching for Mr. Jack.



Mr Ronaldo has Nitropaste (nitroglycerin ointment) ,1 inch ,ordered every 6 hours to decrease blood pressure and control angina .The nurse carefully measures out 1 inch of ointment on the measuring paper and spreads the ointment with her finger. Before she is able to administer the medication, she feels dizzy and unwell. She hands the medication to another nurse and asks her to give it. Interpret the situation and identify the errors made by the nurse and how could be prevented?

Angiotension – Converting Enzyme (ACE) Inhibitors

I- Overview of ACE inhibitors.

A- Description: ACE inhibitors help control blood pressure by preventing the conversion of angiotensin I to angiotensin II.

B- Action.

- 1- ACEs covert angiotnsin I to angiotensin II, *a potent vasoconstrictor*. This stimulates aldosterone release, which promotes sodium and water retention.
- 2- Increased blood pressure results from vasoconstriction, sodium and water retention. This rennin-angiotension-aldosterone system is essential in the maintenance of blood pressure.
- 3- ACE inhibitors block conversion of angiotensin I to angiotensin II.
- 4- This reduces peripheral vascular resistance, prevents vasoconstriction, and lowers blood pressure.

C- Indications : Treatment of hypertension and heart failure.

D- Overview of nursing management.

- 1- Because this dug affects cardiac output, closely monitor the CV effects.
- 2- Ensure that the client understands the medication regimen.
- 3- Asses CV, renal, fluid, and electrolyte status.
- 4- Assess all baseline data: ECG, Blood pressure, heat rate, respiratory rate, body weight, skin color and temperature, renal and GI output, nutritional status, serum chemistries.

E- Contraindication of ACE inhibitors

- 1- Pregnancy and breast feeding mothers
- 2- Used with caution in renal insufficiency.

F- Side effects of ACE inhibitors

- 1- Hypotension
- 2- Hyperkalemia

G - Common ACE inhibitors.

- 1- Captopril (Capoten)
- 2- Benazepril (Lotensin)
- 3- Fosinopril (Monopril)
- 4- Quinapril (Accupril)
- 5- Lisinopril (Prinivil)
- 6- Ramipril (Altace)
- 7- Enalapril (Vasotec).

***Critical thinking exercise***

Your client in an intensive care unit is being received captopril 25 mg P.O biD- During your routine assessment for client's condition ,you discovered that the total urine output during the last 24 hours was 700 ml, and the last blood pressure measurement was 90/60 mmHg. What assumptions you made about the patient's medication? What actions do you take to prevent further deterioration?

Cerebral and Peripheral Vasodilating Agents

I-Overview of Cerebral & Peripheral Vasodilating Agents.

A- Description.

- 1- Vasodilators cause dilation of blood vessels.
- 2- The drugs used differ widely in chemical structure, in specificity of action, and in primary clinical application.
- 3- This chapter focuses only on those drugs used to treat cerebral or peripheral vascular obstructive diseases-(Fig.2-6)



Fig.2-6: Cerebral and peripheral vessels

B- Action

- 1- A basic action of all direct-acting vasodilators is relaxation of smooth muscle.
- 2- Vasodilators differ considerably with respect to their effect in various tissues and also on different segments within the same vascular bed. The difference in their action on arteries versus veins is of particular importance because arteries deliver oxygen and veins remove unoxygenated blood.
- 3- Vasodilators can also differ in their action in various areas. Some increase blood flow primarily in the coronary arteries. Other act mainly in the renal, mesenteric, or skin vessels.
- 4- Another factor affecting vasodilatation is the preexisting state of the vessels.

C- Indication

- 1- Vasoconstriction due to hypertension.
- 2- *Atherosclerotic obstruction of coronary or cerebral arteries*, which can give rise to angina pectoris or impaired cerebral function.
- 3- Excessive vasoconstriction in the peripheral arteries of the extremities, which can cause symptoms ranging from *intermittent claudications* to *severe ischemia*.
- 4- Treatment of *heart failure* refractory to conventional treatment.

D- Overview of nursing management.

- 1- Because the actions and side effects of vasodilators vary widely, closely examine each drug, noting why it is being used and its potential side effects.
- 2- Because all vasodilators used for peripheral and cerebral vascular obstructive disease must be taken long term and are often not effective, direct nursing care at improving circulation in conjunction with drug therapy.
- 3- In the case of vascular disease, there is a danger that organs are not perfused with blood- Symptoms appear based on the area deprived of oxygen. Thus, direct nursing management according to the severity and locations of symptoms (I-E-, a client with transient ischemic attack [TIA] receives different care than one with gangrene of the foot).
- 4- Be aware that the objective of therapy with these agents is to improve circulation to the area as much as possible and to manage the symptoms.
- 5- Evaluate effectiveness of interventions using the following criteria:
 - a- The client experiences relief of symptoms as a result of improved circulation.
 - b- Note: Symptom relief is relative to the reasons for drug administrations, for example, improved pedal pulses will result when the problem is circulation in the foot.

E- Contraindication\caution:

- 1- Contraindicated in *glaucoma*.

2- Used with caution in clients with *bleeding tendencies*, which can be exacerbated by some of these drugs.

F- Side / adverse effects.

- 1- CNS: dizziness, headache,
- 2- CV: flushing, tachycardia, sweating, weakness.

G- Common cerebral and peripheral vasodilating agents.

- 1- Isoxsuprine (Vasodilan, Voxsuprine)
- 2- Papaverine (Pavabid).
- 3- Dipyridamole (Persantine).

Critical thinking exercise

Mr. John was recently diagnosed with intermittent claudication due to severe arterial insufficiency in the lower leg. His physician is discussing treatment options with him. Mr. John is against taking medication that doctor prescribed requesting that he will be allowed to be cured by herbal remedies. Discuss : Mr. John's right to refuse treatment! How to work with Mr. John to resolve this conflict?

Diuretics

I- Overview of Diuretics

A- Description

- 1- Diuretics promote a net loss of body fluid by increasing the amount of fluid lost through the urinary tract.
- 2- They are classified according to chemical structure, pharmacologic activity, mechanism, and primary site of action within the nephron.(Fig.2-6)
- 3- Types include carbonic anhydrase (CAH) inhibitors, osmotic agents, loop diuretics, thiazide and thiazide-like agents, and potassium-sparing agents.
- 4- CAH inhibitors and osmotic diuretics act predominantly in the proximal nephron.
- 5- Loop diuretics act primarily in the ascending loop of Henle.
- 6- Thiazide and thiazide – like diuretics act between the ascending loop of Henle and the early portion of the distal tubule.
- 7- Potassium – sparing diuretics act mainly on the late portion of the distal convoluted tubule and the collecting duct.

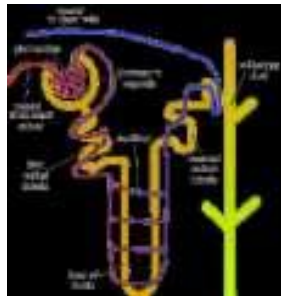


Fig.2-6: Nephron

B- Action

- 1- Diuretics act to alter the balance of sodium and water in the renal tubules.
- 2- Sodium loss is accompanied by excretion of osmotically equivalent amount of water.

- 3- Increased excretion of key electrolytes (E-g., sodium, potassium, magnesium, and calcium) also occurs.

C- Indications.

- 1- Prevention and treatment of *edema* associated with hypertension, congestive heart failure (CHF), cirrhosis, and endocrine disease.
- 2- Increased intracranial or intraocular pressure.
- 3- Management of electrolyte disorders.

D- Overview of Nursing Management

- 1- Monitor vital signs.
- 2- Assess breath and heart sounds to evaluate effectiveness.
- 3- Monitor urine output
- 4- Weigh the client daily to track fluid losses or gains.
- 5- For immobile client, ensure that a urinal or bedpan is within easy reach.
- 6- Inform client about increase urine output and frequency.
- 7- Make sure that diuretics not administered at night.

Critical thinking exercise

The elderly are more sensitive to the effects of diuretics than younger clients. Why ? and What nursing additional attention needed in such situation.

E- Common diuretics

I- Common CAH inhibitors

Acetazolamide (Diamox)

II- Common Osmotics diuretics

Mannitol (Osmitol)

III- Loop diuretics

- 1- Furosemide(LASIX)
- 2- Bumetanide (Bumex)
- 3- Ethacrynic acid (Edecrin)

IV- Common Potassium – Sparing diuretics

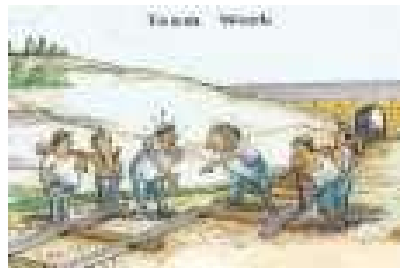
- 1- Spironolactone (Alatone, Aldactone).
- 2- Amiloride (Midamor)

V- Common Thiazide and Thiazide like Diuretics

- 1- Chlorothiazide (Diuril)
- 2- Hydrochlorothiazide (HydroDiuril)
- 3-Chlorothalidone (Hygroton).
- 4-Bendroflumethiazide(Naturetin)

Critical thinking exercise

You are caring for a patient with severe heart disease who is being treated for hypertension and congestive heart failure. Medication include Enalapril(Vasotec) 10 mg qd and lasix 40mg bid. What assessment data are important to collect before administering these medication?

**Critical thinking exercise**

You are working in cardiac unit ,caring for client after bypass surgery. Mr Mike has lasix 40 mg ordered bid to pull off extra fluid that is retained from the surgery.After administering the medication you look through the chart as you document the medication you gavE-You note that the nurse has chrtd the following: B-P 100/60 mmHg , serum potassium 2 Meq /L. Were you wrong to administer the lasix ,and if so ,why?

Lipid-lowering agents

I- Overview of lipid-lowering agents.

A- Description.

- 1- Hyperlipidemia is considered one of the major modifiable risk factors for the development of atherosclerosis and subsequent cardiovascular, cerebrovascular, and peripheral vascular disease.
- 2- Drug used to treat hyperlipidemia are classified as lipid-lowering agents. Types include Bile acid-sequestrants, Hydroxymethylglutaryl coenzyme A (HMG-CoA) reductase inhibitor , Fibrates and Niacin (vitamin B₃).

B- Action

- 1- The desired action of lipid-lowering agents is to change the lipid profile and decrease cardiac risk with minimal side effects.(Fig.2-7).
- 2- More specifically, it is desirable to lower total cholesterol (TC), triglycerides (TG), and low-density lipoproteins (LDL) while maintaining or increasing the high-density-lipoprotein (HDL) level.



Fig.2-7: Lipid in the inner lining of the vessel

C- Indications.

- 1- The decision to initiate lipid-lowering therapy is based on the lipid profile in conjunction with other factors that predispose an individual to developing atherosclerotic vascular diseases.
- 2- The lipid profile typically measures the , TG, LDL, and HDL. The relationship of the lipid levels is important. TC, TG, and LDL are thought to contribute to atherosclerosis when elevated, ***HDL is thought to be cardio protective.***
- 3- An elevated LDL level is the most significant risk factor for the development of atherosclerosis.

- 4- The most recent recommendations from the American Heart Association suggest keeping the LDL level under 100 mg/dl for individuals with a history of atherosclerotic heart disease or for those with two or more risk factors for the development of atherosclerotic heart disease. Individuals without risk factors for atherosclerosis should keep the LDL level under 130 mg/dl.
- 5- Triglycerides should be kept under 200 mg/dl, and HDL should remain greater than 35 mg/dl.

D- Overview of nursing management.

- 1- Note the pharmacologic therapy is initiated in conjunction with diet therapy; therefore, make certain that the client understands all of the components of a low-cholesterol diet and is given all information needed to ensure compliance. (Fig. 2-8).



Fig. 2-8: Food Guide Pyramid

- 2- Be aware that many of the lipid-lowering agents are **hepatotoxic**.
- 3- Monitor serum transaminase levels before and during therapy. Check transaminase level when therapy is initiated, every 6 weeks for the first 3 months, then every 8 weeks for the remainder of the first year. If the transaminase levels remain within normal limits after the first year, check every 6 months. Be aware that if transaminase levels become elevated (especially if they are greater than or equal to three times normal), the medication should be discontinued.
- 4- Evaluate the effectiveness of interventions using the following criteria:
 - A- The client will comply with medication administration.
 - B- The client's cholesterol will be reduced.

E- Common lipid lowering agents

- I- Common Bile Acid-Sequestrants
 - 1- Cholestyramine (Questran)
 - 2- colestipol (colestrid)

II- Common HMG-CoA Reductase Inhibitors

- 1- Atorvastatin (Lipitor)
- 2- Simvastatin(Lopid)

III- Common Fibrates

- 1-Gemfibrozil (Lopid)

IV- Miscellaneous

- 1- Nicotinic Acid (Niacin)

Critical thinking exercise:

John Dewy 56 years of age ,visit his primary health care nurse. His cholesterol level(310 mg/dl) has been elevated for the last tow visits. His physician prescribed lopid to reduce his cholesterol level. Discuss other therapeutic options for Mr. John to reduce his cholesterol.

Anticoagulant and Thrombolytic Agents

I- Overview of anticoagulant & thrombolytic agents.

A- Description.

- 1- Anticoagulants *inhibit* the development and enlargement of *blood clots*.
- 2- Thrombolytics lyse or *dissolve clots*.

B- Action: these agents exert their effect by acting on factors involved in the blood clotting process.

C- Indications.

- 1- All of these drugs are used for *disorders affecting coagulation*.
- 2- Anticoagulants or thrombolytic agents are used when coagulation is excessive and poses a threat to the client, such as in disseminated intravascular coagulation (DIC), coronary artery occlusion, pulmonary embolism, deep vein thrombosis, or pulmonary of fat embolism.
- 3- The drugs are also used in situation in which there is a high risk for clotting disturbance that would jeopardize the well-being of a client, such as myocardial infarction, immobility, fractures, and some orthopedic and cardiac surgeries.

D- Overview of nursing management.

- 1- Be alert for dangers associated with **excessive bleeding** or clotting when caring for a client receiving drugs that affect coagulation.
- 2- Know that *excessive bleeding can cause death* and excessive clotting supplied by the obstructed vessel.
- 3- Evaluate the effectiveness of interventions using the following criteria:
 - A- The client's coagulation profiles reflect the objective of the therapy.
 - B- The client does not experience any deleterious effects from drug administration.
 - C- The client understands the reason for therapy and is able to identify how, when, and why the drug is taken.

- D- The client can identify side effects and understands the dangers in changing the dose or discontinuing the drug.
- E- Tissue perfusion is maintained because no evidence of bleeding or clothing occurs.

Note: Major side effects of anticoagulant and thrombolytics is bleeding, the nurse is always required to assess presence of external or internal bleeding if patient is under such treatment.



Always monitor prothrombin time (PT) for patient under anticoagulant therapy.

E- Common anticoagulants.

1- Heparin (lipo-hepin, liquaemin)

A- **General information:** heparin is a pharmaceutical preparation of a natural anticoagulant found in the liver and lungs.

B- Indications.

- 1) Prevention of extension of *existing clots*.
 - 2) Prevention of thrombus formation in at-risk clients (risk factors include immobility, fractures, heart disease, obesity, varicose veins, deep vein thrombosis, pelvic surgery, and artificial heart valve).
 - 3) It is drug of choice when immediate action is required.
 - 4) Heparin does not dissolve existing clots.
- C- Common side effect: **Spontaneous bleeding**. Common sites of bleeding include gums, Gastrointestinal (GI), Genatourinary (GU) tracts.

2- Warfarin sodum (coumadin, panwarfin, sofarin).

A- General information.

- 1) Warfarin is an oral anticoagulant derived form coumarin.

- 2) Although the drug may prevent new blood clots from forming, it does not dissolve existing clots.

B- Pharmacotherapeutics / indications

- 1) Long-term prevention or treatment of venous thromboembolic disorders such as those related to prosthetic heart valve, venous thrombosis, and atrial fibrillation with embolism.
- 2) Prevention of extension of existing blood clots and complications secondary to thromboembolism.

F- Common thrombolytic agents.

- 1-Streptokinase (Streptase)
- 2- Urokinase (Abbokinase)
- 3-Alteplase(Tissue type plasminogen activator,TPA).
- 4-Anistreplase

Critical thinking exercise

You are caring for a patient who is in traction. He is receiving 5000 units OF subcutaneous Heparin BID. Discuss the reason why this patient is receiving heparin and how you will safely administer the medication.

Critical thinking exercise

You are caring for a patient with acute myocardial infarction. During infusion of streptokinase ,the patient asked the nurse if the drug being administered affect the bleeding peptic ulcer. What actions the nurse may take to prevent complications of streptokinase?



Collaborate with your colleagues

Mrs. Linda is 48 year of age was admitted to intensive care unit (ICU) diagnosed with pulmonary embolism .In the first 24 hours she had been given Alteplase stat ,then she was given Heparin as maintenance dose- Few hours later Mrs. Linda developed hematemesis and hematuria in addition to spot of blood under the skin over the arms. The physician was notified at once and ordered to give protamine sulfate. Discuss with your instructor the reason for giving protamine sulfate ? Were you wrong to give Alteplase?

Unit 3
Drugs Associated
With Respiratory therapies

Antihistamines, Decongestants, Antitussives , and Expectorants

I- Overview of Antihistamines, Decongestants, Antitussives and Expectorants.

A- Description

- 1- These categories of drugs are used alone or in combination to relieve a wide range of *respiratory symptoms*.
- 2- Many of these agents are found in *over - the-counter (OTC)* preparations, and clients often self-medicate for seemingly simple respiratory disorders. (Fig 3-1)

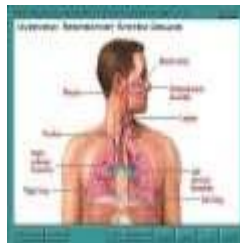


Fig.3-1 : Respiratory system

B- Action: these drugs have multiple actions, including histamine blocking, arteriolar constriction or decreasing respiratory fluid volume, and CNS reflex suppression.

C- Indications.

- 1- Symptomatic relief of cough, colds, influenza.
- 2- Relief of allergies.
- 3- In conjunction with other agents to relieve symptoms associated with more severe respiratory infection such as bronchitis.

D- General nursing management.

- 1- Be sure to provide appropriate information to clients because they will often self-medicate- (*Many think that a drug is mild if it is available OTC*).
- 2- Be aware that many of these preparations have actions that affect the cardiovascular (CV) or gastrointestinal (GI) systems.
- 3- Note that many of these drugs have dangerous interactions with other drugs. Be sure to instruct the client about these interactions and assess for the presence of other medications.

II- Antihistamines.**A- General information.**

- 1- Histamine is a chemical mediator found in all of the body's cells.
- 2- Histamine is released into the bloodstream by the mast cells in response to the presence of several different stimuli such as drugs, trauma, or antigens to which an individual may be allergic.

B- Indications.

- 1- Prevention of treatment of symptoms of allergic disorders that are either seasonal or acute (due to ingestion of food or inhalants or contact with an allergen).
- 2- Treatment of Parkinson's disease.
- 3- Motion sickness.
- 4- Used as hypnotics in the elderly (sedating antihistamines).

C- Common side effects: Drowsiness and dryness of the mouth.

D- Common Antihistamines

- 1- Diphenhydramine (Benadryl).
- 2- Chlorpheniramine (Chlor-Trimeton).
- 3- Clemastine (tivist).
- 4- Loratadine (Claritin).
- 5- Promethazine (Phenergan)



Critical thinking exercise

Mr. John is admitted to the oncology unit for chemotherapy. Before administering a chemotherapeutic agent that is known to cause allergic symptoms in some patients, diphenhydramine (Benadryl) is ordered. Discuss the rationale for this order. If anaphylaxis developed in this client, would administering additional Benadryl help?

II- Decongestants.**A- General information**

- 1- Decongestants may be purchased OTC.
- 2- Because a prescription is not needed, clients often minimize possible adverse effects.

B- Indications.

- 1- Reduction of local blood flow before nasal surgery.
- 2- Reduction of rhinitis and nasal congestion associated with colds.

C- Common nasal decongestants.

- 1- Ephedrine Sulfate (Pretz-D nasal spray)
- 2- Naphazoline (Privine)
- 3- Oxymetazoline (Privine).

III- Antitussive.**A- General information.**

- 1- Antitussives are used to *suppress the cough reflex*, which is a natural defensive mechanism.
- 2- When the cough is so severe that it causes excessive fatigue and interrupts sleep, a cough suppressant is indicated.
- 3- Antitussives may be narcotic or non-narcotic.

B- Indications

- 1- Inhibit frequency of dry, nonproductive cough.
- 2- Note: Antitussive should not be used if the cough is productive because secretions can pool and cause pneumonia.

C- Common Antitussive.

- 1- Narcotic Antitussives.
 - a- Codeine
 - b- Hydrocodone (hycodan)
- 2- Nonnarcotic Antitussive
 - a- Dextromethorphan(Benylin DM)

IV. Expectorants.**A- General information.**

- 1- Expectorants are used to facilitate expectoration.
- 2- Many preparations are OTC, so be sure the client exercises caution when self- medicating.

B- Indications

- 1- Relief of dry, unproductive cough that accompanies respiratory conditions such as colds, influenza, bronchitis, and asthma.
- 2- Facilitation of secretion removal in respiratory conditions associated with increased mucous production such as bronchitis, asthma, chronic obstructive pulmonary disease(COPD).

C- Common expectorants.

- 1- Guaifenesin (Robitussin)
- 2- Potassium Iodide (SSKI)

Critical thinking exercise

Mr. Mike ,a college student ,comes to the health clinic with cold symptoms (productive cough, low grade fever, nasal discharge ,and general malaise).He states he went to the drugstore to buy some cold medicine, but there were so many different preparations that he was confused. Discuss your recommendations for Mr. Mike with their underlying rationale.

Methylxanthine Bronchodilators.

I- Overview of Methylxanthine Bronchodilators.

A- Description.

Drugs that *reverse airway constriction* are classified as bronchodilators. (Fig. 3-2)

B-Indications: relief of reversible bronchospasm associated with acute and chronic bronchial asthma, exercise-induced bronchospasm, bronchitis, emphysema, bronchioectasis, or other obstructive pulmonary diseases.

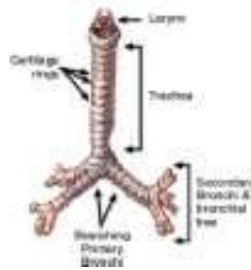


Fig.3-2 Bronchial tree

C- Overview of nursing management.

- 1- Because of the CV side effects, monitor cardiopulmonary status before the start of drug therapy and periodically during therapy, paying particular attention to the presence of persistent respiratory wheezing, respiratory stridor, or continued dyspnea and tachyarrhythmias.
- 2- In accordance with protocol, obtain blood samples for analysis of drug toxicity (E-g., theophylline levels) to assess client's response to medication and to detect stabilization or change despite compliance with drug regimen.
- 3- Assist the client to recognize and report signs of deteriorating respiratory status (E-g., use of hand-held peak flow meters).
- 4- Teach the client and family to recognize signs signifying possible drug toxicity (E-g., nausea, vomiting, severe GI pain, irregular heart rate, restlessness, tremors, convulsions). *Explain that these problems should be identified, reported, and managed as early as possible.*

- 5- Evaluate the effectiveness of interventions using the following criteria:
- a-The client does not experience any deleterious effects from drug administration.
 - b-Tissue perfusion is maintained, as evidenced by improved oxygenation.



Know that rapid IV injection can result in flushing palpitations, dizziness, hyperventilation, hypotension, and angina like pain.

D- Common Methylxanthine Bronchodilators.

- 1- Theophylline (Aminophylline)
- 2- Dyphylline
- 3- Oxtriphylline

Discussion

Discuss with your instructor the other types of bronchodilators other than Xanthines that you have studied throughout this book.

Critical thinking exercises

Mrs. Dora 55 years of age has been admitted to medical ward as known Case of chronic obstructive pulmonary disease (COPD). Aminophylline 250 mg diluted in 250 ml N/S was prescribed to be given Tid. After one hour of administering the drug, Mrs. Dora developed tachycardia and hypotension. The nurse cares for Mrs. Dora noticed that 100 ml of the infusion had been administered. Discuss the rationale of Mrs. Dora response to the drug. What, if any, errors were made by the nurse in administering the drug?



Critical thinking exercise

Mr. Micheal is 51 years of age admitted to ICU after he has developed respiratory arrest . The client is known case of bronchial asthma .CPR was started and during CPR physician ordered Adrenaline 0.1 mg and immediately administered the drug via endotracheal tube. In the light of your knowledge of different types of bronchodilator ,what your explanation of physician's action?

Unit 4
Drugs Associated With
Gastrointestinal Therapies

Antiulcer, Antiemetic, and Emetic Agent

I- Overview of Antiulcer, Antiemetic & Emetic agents.

A- Description.

- 1- These drugs act on gastrointestinal tract. (Fig. 4-1)
- 2- Antiulcer and antiemetic agents are used to restore gastric integrity.
- 3- Emetic agents are used to induce vomiting.

B- Action.

- 1- Antiulcer agents act by preventing or neutralizing gastric secretion in a variety of disease states.
- 2- Antiemetic agents act by decreasing the vomiting reflex.
- 3- Emetic agents act by local GI irritation and central medullary effect.

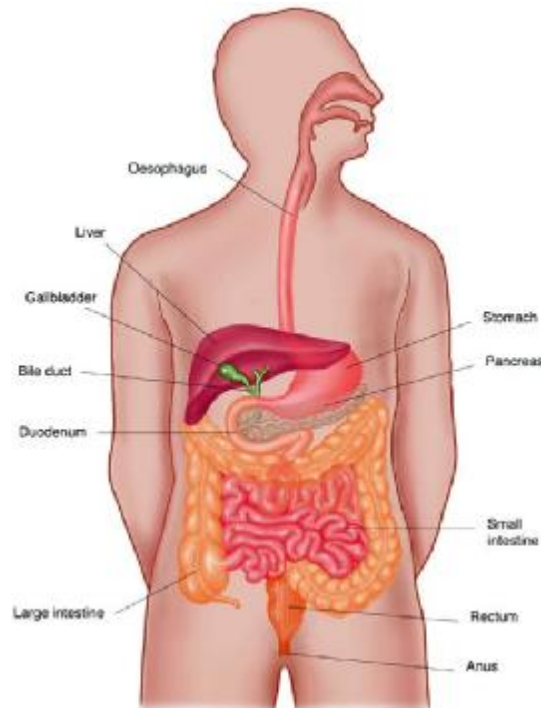


Fig.4-1: Gastrointestinal Tract

C- Indications.

- 1- **Antiulcer** agents: prevention and symptom control of gastroesophageal reflux disease (GERD), gastritis, ulcer disease, and other hyperacid conditions.
- 2- **Antiemetic** agents: relief of nausea and vomiting.
- 3- **Emetic** agents: management of drug overdoses and certain poisonings.

D- Overview of nursing management.

- 1- Know that these agents affect the stomach, which is the first place for food and drug absorption. For this reason, be alert for problems relating to gastric absorption and emptying.
- 2- Perform a detailed assessment, including intake and tolerance of food.
- 3- Be aware that fluid and electrolyte alteration may accompany gastric pathology or treatment. Also note that absorption of other drugs may be altered in the presence of disease of these agents.
- 4- Evaluate effectiveness of intervention using the following criteria:
 - a- The client is free of pain.
 - b- The client is adequately nourished.
 - c- The client is free of any symptoms of gastric bleeding.

II- Antacids.

A- General information: antacids are used to treat gastric hyperacidity as a one-time dose or as part of the treatment of more severe conditions associated with hyperacidity.

B- Indication.

- 1- Treatment of hyperacidity associated with mild condition such as heartburn and acid indigestion.
- 2- Adjunctive treatment for more severe gastric conditions such as ulcers, hiatal hernia, gastritis, GERD, Zollinger-ellison syndrome.
- 3- Prevention of ulcers.
- 4- Used as phosphate binders in clients with renal failure.

C- Common antacids.

- 1- Aluminum carbonate (*Basaljel*)
- 2- Aluminum hydroxide gel (*Amphojel, Aludrox*)
- 3- Calcium carbonate (*Tums*)
- 4- Aluminum/magnesium compounds (*Maalox, Riopan, Mylanta*).

Critical thinking exercise

Mr. Simon is being treated for gastritis . In addition to other drugs Antacids prescribed-The nurse who cares for Mr. Simon prepared the medication including Maalox syrup 15 ml and provided them to the client while he (client) is having his lunch. What error the nurse made in term of drug interaction? What assessment data is needed to administer Antacids drugs?

III- Histamine – 2 Antagonists.

A- General information: this group of drugs revolutionized the prevention and treatment of ulcer disease by providing marked reduction in the production of gastric acids.

B- Indications.

- 1- Prevention and treatment of gastric and duodenal ulcers.
- 2- Treatment of Gastroesophageal reflux disease(GERD) and esophagitis.

C- Common histamine 2 antagonists.

- 1- Proton pump inhibitor
- 2- Misoprostol(synthetic form of prostaglandin)
- 3- Cimetidine (Tagamet)
- 4- Ranitidine (Zantac)
- 5- Famotidine (Pepcid)
- 6- Nizatidine (Axid).
- 7- Sucralfate (Carafate)

Critical thinking exercise

Ranitidine (Zantac) 10 mg ,I-V is orderE-the pharmacy sends up 10mg of Zantac diluted in a 100 ml bag of normal saline-Your tubing has a drop factor of 10 drops/ml.Calculate the I-V drip rate in dropers per minute.

IV. Antiemetic Agents.**A- General information :**

- 1- Antiemetuc agents inhibit the vomiting reflex.
- 2- The antiemetic effects of drugs in many categories (eg, anticholinergics, antihistamines, phenothiazines) may be used.

B- Antiemetic drugs have different therapeutic classification

include:

- 1- Phenothiazines
- 2- Antihistamine
- 3- Corticosteroids(have antiemetic effect)
- 4- Miscellaneous Agents

C- Indications: used in prevention or treatment of nausea and vomiting.

D- Common antiemetic agents (selected from different classifications)

- 1- Chlorpromazine(Thorazine)
- 2- Trimethobenzamide (Tigan)
- 3- Prochlorperazine maleate (Compazine)
- 4- Promethazine (Phenergan)
- 5- Buclizine (Bucladin-S)
- 6- Metoclopramide (Reglan)
- 7- Ondansetron(Zofran)

V. Emetic Agents.

A- General information: emetics are used to *induce vomiting*.

B- Action.

1- Emetics irritate the stomach to force the action of vomiting.

2- They also stimulate the *cerebral vomiting center*, which is located in the medulla.

C- Indications: induction of vomiting when poisons have been ingested or drug overdose has occurred.

D- Common emetic agents: Ipecac syrup.



Critical thinking exercise

Mrs. Sally is being treated in an outpatient chemotherapy unit. She will be receiving Cisplatin, a very emetogenic chemotherapeutic drug. The following drugs have been ordered I-V 30 minutes before her treatment: Zofran and Reglan. Explain the rationale for these orders.

Laxatives and Antidiarrheal Agents

I- Overview of Laxatives & Antidiarrheal agents.

A- Description.

- 1- Laxatives promote bowel evacuation. They are classified by mechanism of action and include bulk-forming agents, lubricants, hyperosmotic agents, stimulants, saline laxatives, and stool softeners.
- 2- Antidiarrheal agents act either systemically or locally to repress or reduced bowel activity.

B- Action: varies depending on the specific agent (see below).

C- Indications.

- 1- *Laxative* is used to **treat or prevent constipation** and evacuate bowel contents in preparation for radio logic or endoscopes procedure. (Fig4-2).
- 2- Laxative also is used to inhibit the absorption of products by bowel (E-g., ammonia) into the blood. Such a regimen is typically prescribed for clients diagnosed with cirrhosis of the liver complicated by hepatic encephalopathy and for whom elevated serum ammonia levels are monitored.
- 3- *Antidiarrheal* is used to symptomatically **control or treat** acute or chronic nonspecific **diarrhea**.



Fig.4-2: Large intestine of humans

D- Overview of nursing management.

- 1- Record intake and output to assess fluid or dietary alternations, specific attention to signs of a fluid deficit are necessary for individuals with diarrhea.

- 2- Observe stool output or odor, or if applicable, obtain stool samples to aid in obtaining a differential diagnosis for diarrhea.
- 3- Institute dietary measure to ease or alleviate diarrhea or constipation.

II- Bulk-Forming Agents.

A- General information. As the name of the category implies, these agents form bulk in the intestine, making elimination easier,

B- Indications.

- 1- Treatment of diarrhea or constipation.
- 2- Bulk-forming agents are particularly useful for atonic or spastic constipation in the elderly population and for individuals with diverticulosis or irritable bowel syndrome-

C- Common bulk-forming laxatives.

- 1- Psyllium (Fiberall, Metamucil).
- 2- Polycarbophil (Equalactin, Fibercon, Mitrolan)
- 3- Methylcellulose (Citrucel)

III- Lubricants.

A- General information: these agents facilitate the passage of stool through lubrication of the stool.

B- Indications: used in treatment of constipation and prevention of straining at stool for cardiac clients or clients after rectal surgery.

C- Common lubricants

- 1- Mineral oil (Agoral Plain)

IV. Hyperosmotic agents.

A- General information: these agents treat constipation by adding water to the colon through osmotic activity.

B- Indications. Treatment or prevention of constipation may be used for clients with intermittent constipation or with bowel retraining needs.

C- Common hyperosmotic agents.

- 1- Lactulose (Cephulac, Chronulac)
- 2- Glycerin (Glycerol, Osmoglyn)

Critical thinking exercise

You are an oncology nurse caring for Mr. Robert 36 years of age with cancer. His disease has progressed to a point where he is taking large amount of Narcotics to control the pain and he spends most the day in a wheel chair Your assessment reveals complaints of feeling full and bloated .For over a week ,Mr. Robert has been incontinent of small amounts of liquid stool two to three times a day. What is your explanation of Mr. Robert complaints? What will you recommend to promote normal bowel function?

V. Stimulants

A- General information: These agents stimulate peristaltic activity causing the passage of stool.

B- Indications.

- 1-Treatment of constipation ,particularly associate with prolonged bed rest.
- 2-Cleansing of bowel for radiologic examination .

C- Common Stimulants

- 1- Bisacodyl (Dulcolax)
- 2-Cascara sagrada(Cascara)

VII- Saline Laxative

A- General information: These agents are soluble inorganic salts that are powerful and rapid acting.

Because these agents manipulate electrolytes levels ,the client may experience increase in intestinal fluid and electrolytes ,thus distending the colon.

B- Indications.

- 1- Elimination of poisons
- 2- Cleansing of bowel for radiologic examination .
- 3- Removal of intestinal parasites (drug of choice)

C- Common Saline laxatives

- 1- Magnesium citrate (Citroma)
- 2- Magnesium hydroxide (Milk of Magnesia)
- 3- Phosphate /Biphosphate (Fleet Phospho-soda)

VIII- Stool softeners

A- General information: stool softeners are not considered to be laxatives in the truest sense of the word.

Either calcium ,sodium, or potassium-based surfactants promote absorption of water into the stool,resulting in softening of fecal mass and a reduced likelihood of constipation.

B- Indications.

Used to prevent constipation or to soften stool for a wide range of condition in which straining of stool is contraindicated.

C- Common stool softeners

- 1- Docusate potassium (Dialose).
- 2- Docusate sodium (Colace).

IX. Antidiarrheal Agents.

A- General information.

- 1- Antidiarrheal agents are locally acting or systemically administered preparations used to decrease the volume or fluidity of bowel contents for both acute and chronic diarrhea-
- 2- Types include opiates, adsorbents, intestinal flora modifiers, and hormonal agents.
- 3- Specific antidiarrheal agents that alter hormone response are used when diarrhea is secondary to a GI carcinoid or vasoactive intestinal peptide (VIP) mass or tumor.

- 4- Antibiotics are sometimes prescribed to treat acute or chronic diarrhea. The use of these agents should be limited to situations in which an acute infectious agent has been identified or is suspected. Choice of antibiotic therapy depends on the causative agent.
- 5- Bulk-forming agents also are used as antidiarrheal.

B- Indication: used in the treatment of acute or chronic diarrhea.

C- Nursing management for antidiarrheal agents.

- 1- Assessment.
 - a- Assess fluid and electrolyte level.
 - b- Assess nutritional status.
 - c- Assess the client's dietary intake.
 - d- Estimate fluid loss.

D- Common antidiarrheal agents.

- 1- Opiates
 - a- Loperamide (Imodium, Kaopectate II)
 - b- Diphenoxylate hydrochloride with atropine sulfate (Lomotil).
- 2- Adsorbents
 - Bismuth subsalicylate (Pepto-Bismol)
- 3- Intestinal flora modifiers
 - Lactobacillus (Bacid)
- 4- Hormonal agents
 - Octreotide acetate



A nurse cares for an elderly client having bowel problems

Critical thinking exercise

Mrs. Sara ,72 years old admitted to surgical ward for investigation after falling down where you work as an assistant nurse. While you were taking her vital signs she states " my bowel have been in a miss for over 3 weeks. First I had terrible constipation and had to use all sorts of laxatives to get me cleaned out. Now I seem to be having just the opposite problem.

What kind of medication can I take for the diarrhea?"

You as a nurse discuss Mrs. Sara concerns.

Unit 5
*Drugs Associated
With Anesthesia
And Pain Therapies*

Anesthetic Agents

I- Overview of Anesthetic Agents.

A- Description.

- 1- General anesthetic agents suppress CNS function so deeply as to reduce consciousness and block sensation of pain so that surgery can be performed. *Types include inhalation and IV anesthetic agents.*
- 2- Local and regional anesthetic agents block sensitivity to pain in one part of the body so that surgical procedures can be performed.
- 3- Other drugs used during anesthesia include skeletal muscle relaxants, narcotics, cholinergic agents, and barbiturates. (Specific information about these drugs can be found elsewhere in this book). These drugs potentiate the effects of anesthesia, making the induction easier, reducing the amount of gas needed, and generally relaxing the client.

a- Skeletal muscle relaxants that paralyze muscles are used to facilitate successful intubation.

b- Narcotics are used for preoperative sedation.

c- Atropine, an anticholinergic agent, is used to dry secretions to prevent respiratory congestion and to help limit fluid loss during surgery.

B- Action: actions are not fully understood and vary with the agent used.

C- Indications: used for induction of anesthesia- Fig (5-1)



Fig. 5-1: Induction of anesthesia in an operation room

D- Overview of nursing management.

- 1- Perform a thorough client history, noting current medications and presence of any allergies.
- 2- Be aware that highly diligent monitoring is required for a client who is anesthetized.
- 3- Provide appropriate preoperative teaching.
- 4- Instruct the client about what to expect postoperatively.
- 5- Evaluate effectiveness of interventions as follows: the client remains pain free during surgical or other procedures with no side effects.

II- General anesthetics: Inhalation Anesthetics.

A- General information: inhalation anesthetics provide rapid suppression on the CNS.

B- Pharmacodynamics / action.

These agents are administered through the respiratory tract as a gas and carried to the brain.

C- Indications: indicated during surgical procedure-

D- Common inhalation anesthetics.

- 1- Volatile liquids.
 - a- Enflurane (Ethrane)
 - b- Halothane (Fluothane)
 - c- Isoflurane (Forane)
 - d- Desflurane (Suprane)
- 2- Gases.
 - a- Nitrous oxide-
 - b- Cyclopropane: may cause rebound hypotension.

III- General anesthetics: IV anesthetics

A .General information :IV anesthetics (E-g., barbiturates) are used during induction of anesthesia or used alone to produce unconsciousness in shorter, simpler procedure in which pain is minimal, such as dilatation and curettage (D and C).

B-Indication: Induction and maintenance general anesthesia

C- Common general intravenous anesthetics

- a- Alfentanil (Alfenta)
- b- Etomidate (Amidate)
- c- Fentanyl and droperidol combination(Innovar)
- d- Ketamine(Ketalar)

IV. Local and Regional Anesthetics.

A- General information.

- 1- By numbing a particular area of the body, local and regional anesthetics allow an individual to endure surgery **without being rendered unconscious and without feeling pain.**
- 2- Routes of administration.
 - a- Skin / mucous membranes.
 - b- Intradermal /SC.
 - c- Spinal (into the subarachnoid space).
 - d- Epidural (into the area surrounding the dura mater.)

B- Indications.

- 1- Local anesthetics are indicated when the surgical procedure does not required unconscious sedation.
- 2- Infiltration of an area by a local anesthetic may be referred to as a block because one area of the body is blocked from the pain of surgery. The bock can be **regional or field.**
- 3- ***Epidural anesthesia***, commonly used during childbirth, is a blocking of spinal nerves by instillation of anesthetic outside of the spinal sheaths.Fig.(5-2) .

Epidural is a type of regional block used for surgery of the upper or lower abdomen and pelvis.

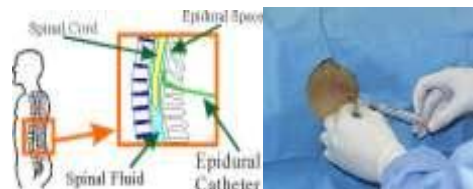


Fig. 5-2 : Epidural anesthesia

- 4- **Spinal anesthesia** produces the largest field of nerve blocking because the anesthetic is injected into the subarachnoid space, which separates the spinal cord from its covering sheaths. (Fig 5-3).

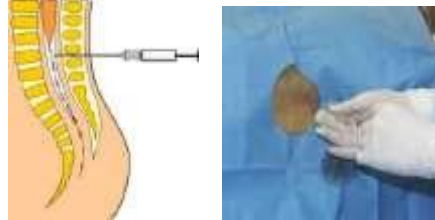


Fig. 5-3: Spinal anesthesia

C . Common local and regional anesthetics.

- 1- Benzocaine (Americaine)
- 2- Lidocaine (xylocaine)
- 3- Bupivacaine (Marcaine)
- 4- Butamben (Butesin)
- 5- Dibucaine (Nupercaine)
- 6- Procaine (Novocain)



Critical Thinking Exercise

You are a nurse working in surgical ward caring for a patient who is undergoing a surgery. The client states that " I will not sleep for a long time under surgery ,my physician assured me that I am going to have oxygen inhalation to induce sleeping" What explanations you provide to this patient? Were the physician wrong or the client misunderstood him?

Narcotic Analgesics

I- Overview of Narcotic Analgesics.

A- Description.

- 1- Narcotic analgesics provide pain relief- Fig.(5-4)
- 2- They are classified according to their source- Opium, the parent compound, is composed of more than 20 distinct alkaloids including morphine, a pure substance of opium.

B- Action: narcotic analgesics reduced pain by stimulating opiate receptors in the CNS. In doing this, they mimic the analgesic effect of naturally occurring brain opiates called *endorphins*.

C- Indications: used for relief of moderate to severe pain.



Fig. 5-4: Narcotics analgesic relief pain

D- Overview of nursing management.

- 1- Assess the client's pain after drug administration.
- 2- Assess the client's respiratory status. *Respiratory depression* can occur with even small doses of narcotics because they reduce the sensitivity of the brain stem (respiratory centers) to increases in carbon dioxide tension.
- 3- Note that drowsiness and sedation are characteristic features of more potent narcotics and they have a role in their analgesic effects, so the nurse must know the client's baseline mental status to evaluate how the drug is affecting the client's state of mind.
- 4- Be aware that *nausea and vomiting may occur* because narcotics stimulate the chemoreceptor trigger zone on the medulla. To minimize nausea and vomiting, administer antiemetic drugs such as the phenothiazine or diphenhydramine as prescribed.

- 5- Narcotics are prescribed to be administered PRN. Analgesia is markedly improved when given around the clock on a regularly scheduled basis
- 6- Note that a narcotic antagonist (Naloxone) (Narcan) must be available when administering narcotics IV in case respiratory depression becomes life-threatening.

E- Contraindications / cautions.

- 1- Narcotics are contraindicated in patients with hypersensitivity to the drug. ***Respiratory insufficiency or depression***, severe CNS depression, heart failure secondary to chronic lung disease; cardiac arrhythmias, increased intracranial or cerebrospinal fluid pressure, head injuries, brain tumors, acute alcoholism and delirium, tremors, convulsive disorders, post biliary tract surgery, suspected acute abdomen, and surgical anastomosis.
- 2- Clients taking monoamine oxidase (MAO) inhibitors should not receive narcotics either together or within 14 days of MAO inhibitor treatment.
- 3- Use with caution in clients with excessive respiratory secretions or decreased ventilation because narcotics depress the respiratory center, decrease ciliary activity, reduce the cough reflex.
- 4- Use with caution and in reduced dosage in clients currently receiving other narcotic analgesics, general anesthetics, phenothiazine, other tranquilizers, sedatives, hypnotics, tricyclic antidepressants, and other CNS depressants (including alcohol).
- 5- Be aware that ***rapid IV injection of narcotic analgesics*** increases the possibility of side effects such as hypotension and respiratory depression.

F- Side / adverse effects.

- 1- **CNS:** depression of CNS seen as dizziness, sedation, confusion, drug dependence,
- 2- **CV:** hypotension and shock.
- 3- **Resp:** respiratory depression is a major side effect. Hypercapnia and hypoventilation, resulting in cerebrovascular dilation and increased intracranial pressure may occur.
- 4- **GI:** constipation, nausea and vomiting, spasm in the sphincter of oddi.
- 5- **GU:** can cause spasms in the urinary bladder.

G. Common narcotics analgesics(natural and synthetic)

- 1- Morphine-(natural occurring opium alkaloid)
- 2- Codeine: (has Antitussive effect)
- 3- Fentanyl ,Alfentanil,Sufentanil:(most often used in anesthesia)
- 4- Meperidine(Demerol) : (frequently prescribed synthetic drug)
- 5-Methadone(Dolophine) : (synthetic)

Critical thinking exercises

You are working at night shift (11-7) on a busy surgical unit. You answer another client's call light while his nurse is on break. The patient says" the dose that the nurse gave me an hour ago has not worked and I am still in terrible pain" When the nurse return you reported what the client said. The nurse seemed unconcerned ,stating" Oh ,that client is always complaining about something" the nurse appear to be lethargic and you notice her speech is somewhat slurred.

Discuss the following:

- What concerns do you have about the nurse and the client in this situation?
- What additional data would you like to collect?
- Identify your legal/ethical responsibilities to the client, the nurse, and the administration.



You are working in a busy postanesthesia recovery unit (PACU), caring for two patients recovering from general anesthesia. You have been asked to extend your shift because someone called in sick. You are preparing intravenous morphine to administer to one patient, but before you administered the morphine, you are interrupted twice. After you finally administered the drug, you realized that you administered it to the wrong patient who developed hypotension (B-P 80/45) and shallow breathing (R.R 6)

- Analyze the situation above together with your instructor and colleague
- What errors the nurse made in the situation?
- What drug (antidote) must be used to save the life of the other client?

Unit 6
*Drugs Associated
With Neurologic and
Psychiatric Therapies*

Cholinergic Agents Adrenergic Agents

I- Overview of cholinergic and adrenergic agents.

A- Description.

1- Cholinergic and adrenergic drugs influence the activity of **autonomic nervous system**, thus affecting many of the body's vital function. These drugs either facilitate or block the effect of neurotransmitters as they act on the body's cells.(Fig.6-1)

B- Action: These drugs work by occupying the adrenergic or cholinergic receptor sites and either bringing about or stopping the action of the involved neurotransmitter.

C- Indications: Vary with the specific agent.

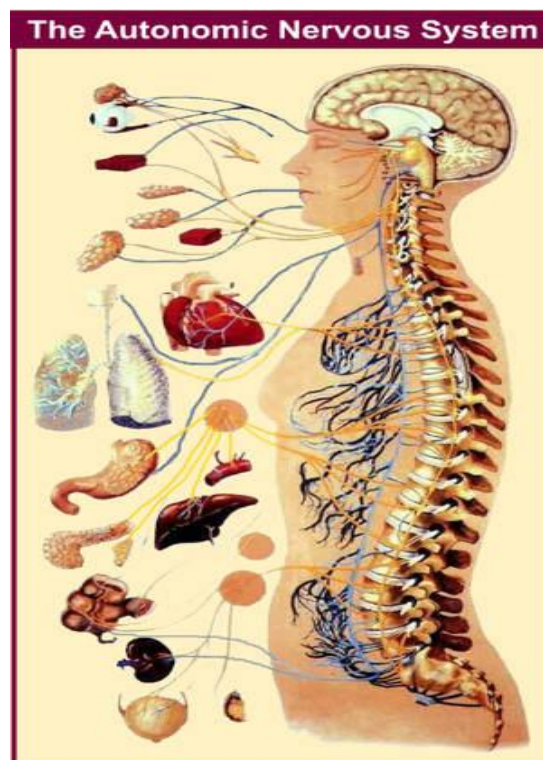


Fig.6-1Organs affected by the function of autonomic nervous system

II- Direct-acting cholinergic agents.

A- General information.

- 1- Drugs that affect nerve impulse transmission in the autonomic nervous system by mimicking the function of the parasympathetic nervous system are classified as cholinergic agents.
- 2- These drugs *imitate the action of acetylcholine* by directly stimulating the muscarinic or the nicotinic receptors.
- 3- These drugs may be referred to as *cholinergic agonists* or *parasympathomimetics*.

B- Indications.

- 1- Reduction of intraocular pressure in glaucoma.
- 2- Production of miosis during ophthalmologic surgery.
- 3- Treatment of postoperative atony(absence of tone) of the GI tract and the urinary bladder.

C- Common direct-acting cholinergic agents.

- 1- Bethanechol (Urecholine).
- 2- Acetylcholine (Miochol)

III- Anticholinesterase agents.

A- General information.

- 1-Acetylcholinesterase destroys acetylcholine at the myoneural junction and at ganglia-
- 2-Anticholinesterase agents *inhibit the action of acetylcholinesterase*, and prolonging the action of acetylcholine.

B- Indications.

- 1- Diagnosis and treatment of myasthenia gravis.
- 2- Treatment of glaucoma.
- 3- Treatment of atony of the urinary bladder.

C- Common Anticholinesterase agents.

- 1- Neostigmine methylsulfate (Prostigmin)

- 2- Edrophonium (Tensilon)
- 3- Donepezil(Aricept)
- 4- Pyridostigmine (Mestinon)

IV. Anticholinergic agents.

A- General information.

- 1- Drugs that *inhibit the action of acetylcholine*, thus blocking the parasympathetic nerve impulses in the CNS and autonomic nervous system, are classified as anticholinergic agent or cholinergic-blocking agents.
- 2- They are also referred to as **parasympatholytic drugs**.
- 3- Anticholinergic drugs are divided into two classes, the *nicotinic-blocking agents* and the *antimuscarinic drugs*.

B- Indications.

- 1- Creation of mydriasis(dilation of pupils) and cycloplegia for ophthalmic examinations.
- 2- ***Preoperative reduction of excess salivation and prevention of bradycardia.***
- 3- Reduction of GI motility and secretions in cases of peptic ulcer, GI spasms, irritable bowel syndrome, or other GI disorders.
- 4- Alleviation of nasopharyngeal and bronchial secretions accompanying upper respiratory and allergic disorders.
- 5- Prevention and relief of motion sickness.
- 6- Treatment of enuresis in children
- 7- ***Treatment of sinus bradycardia and conduction block.***
- 8- Creation of sedation and amnesia in obstetrics.
- 9- Alleviation of dysmenorrhea.
- 10- Antidote to over dose with cholinergic agents.
- 11- ***Alleviation of symptoms of Parkinsonism*** (especially tremor and rigidity) and control of extrapyramidal disorders resulting from antipsychotic treatment.

C- Common Anticholinergic agents.

- 1- Atropine sulfate (Isopto Atropine).
- 2- Belladonna tincture
- 3- Homatropine hydrobromide(Homapin)
- 4- Hyoscyamine (Anaspaz)
- 5- Benztropine (Cogentin).
- 6- Dicyclomine (Bentyl).
- 7- Hyoscyamine (Levsin).
- 8- Scopolamine (Hyoscine).
- 9- Biperiden
- 10- Trihexyphenidyl (Artane)
- 11- Trimethaphan (Arfonad).
- 12- Ipratropium bromide (Atrovent).
- 13- Flavoxate (Urispas)

Critical thinking exercise

Mary and her husband ate mushrooms they picked while hiking. They were admitted to the hospital later that afternoon with acute cholinergic poisoning. Describe the signs and symptoms they likely exhibited .What antidote do you think was given , and why?

V. Adrenergic Agents.**A- General information.**

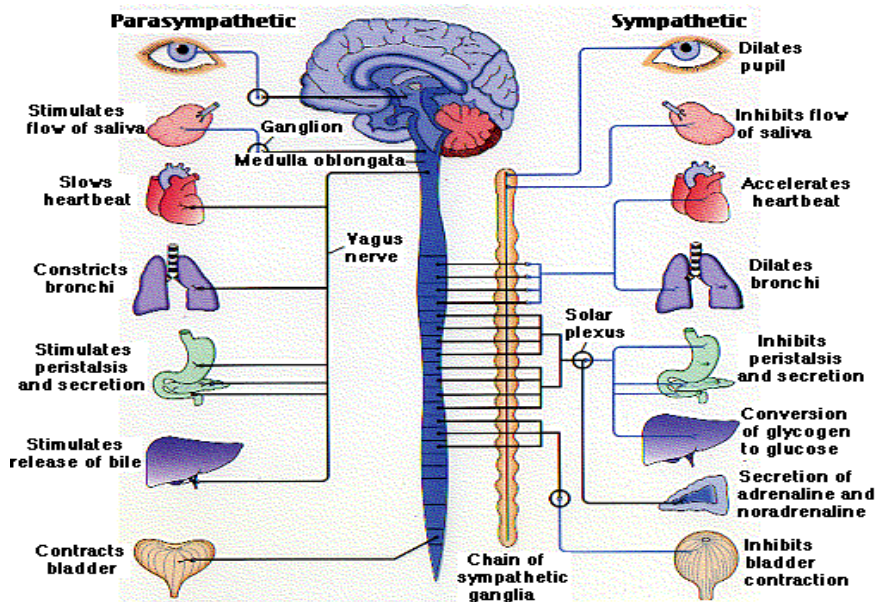
- 1- Adrenergic agents mimic the effects of sympathetic nervous system stimulation.
- 2- Because of the mimic effect of sympathetic nerve stimulation, they are also know as sympathomimetic or sympathetic stimulant drugs.
- 3-They were being divided into two classes: **catecholamine** and **noncatecholamines**.

B- Action

- Catecholamine

- 1- Increase rate and force of cardiac contraction
- 2- Vasoconstriction and bronchodilation
- 3- Decrease gastric motility
- 4- Decrease motility, tone, and contractility of urinary bladder

- **Noncatecholamines:** are synthetic drugs that are adrenergic in their action. (Display 6-1)



Display 6-1: Adrenergic agents mimic sympathetic nervous system stimulation

C- Indications.

- 1- Used to increase blood pressure in severe hypotension.
- 2- May be used to reverse anaphylactic shock.
- 3- Used to reverse symptoms that occur during an asthma attack.
- 4- Used in conjunction with local anesthetics to reduced bleeding at the operative site.
- 5- May be used to treat hypoglycemic episodes because epinephrine antagonizes the effects of insulin, causing blood sugar to rise.

- 6- Noncatecholamine adrenergics may be used as nasal decongestants or mydriatics (phenylephrine and ephedrine).
- 7- Terbutaline sulfate, a noncatecholamine, is used for the treatment of asthma and to suppress premature labor.

D- Nursing management for adrenergic agents.

- 1- Assess and record baseline data: vital signs, ECG, chest x-ray study, weight, skin color, reflexes, bowel sounds, urinary output, renal and liver function, serum electrolytes, and thyroid function.
- 2- When administering the drug I-V, monitor the client's ECG, and evaluate cardiac rate and rhythm.

E- Common adrenergic agents.**1- Catecholamines.**

- a- Epinephrine (Adrenalin)
- b- Ephedrine

2- Synthetic catecholamines.

- a- Isoproterenol (Isuprel).
- b- Phynylephrine (Neo-synephrine)
- c- Pseudoephedrine (Sudafed)
- d- Albuterol (Proventil, Ventolin).

VI- Antiadrenergic Agents.**A- General information.**

- 1- Antiadrenergic drugs block the catecholamine responses by interacting with the receptor site.
- 2- There are two types of adrenergic blockers.
 - a- α -Adrenergic blockers - block α receptors.
 - b- β Adrenergic blocker - block β receptor.

B- Action: α -Adrenergic blockers block the receptor of cells that usually receive adrenergic stimulation. They then block or inhibit the effect of epinephrine and norepinephrine on these cells.

C- Indications.

- 1- α adrenergic blocker are used to improve cerebral circulation. They also may be used in the treatment of pheochromocytoma and in select cases of hypertension, especially when hypertension is associated with increased sympathetic nerve activity.
- 2- β adrenergic blockers are used in CV disorders such as hypertension myocardial infarction, and angina pectoris. (Note: These drugs are contraindicated in Prinzmetal's [variant] angina). They are also used in glaucoma and migraine headaches.

D- Common antiadrenergic agents.

- 1- α Adrenergic blockers.
 - a- Dexazosin (Cardural)
 - b- Prazosin (Minipress).
 - c- Terazosin (Hytrin).
 - d- Ergotamine tartrate (Cafergot).
 - e- Phentolamine mesylate (Regitine).
 - f- Tolazoline (Priscoline).
- 2- β Adrenergic blockers.
 - a- Carteolol(Cartrol,Ocupress)
 - b- Penbutolol(Levatol)
 - c-Acebutolol (Sactal)
 - d-Atenolol (Tenormin).
 - e-Propranolol (Inderal).
 - f-Metorolol tartrate (Lopressor).
 - g.Nadolol (Corgard).

Critical thinking exercise

Mr. Tom is scheduled for a bronchoscopy. Before this procedure, you have been ordered to him valium and atropine. Explain the rationale of giving an anticholinergic agent as a preoperative medication.



Mr. Newton , healthy 46 years of age develop s seasonal allergies. He self-medicate his allergy symptoms with over-the-counter ephedrine(Bronkaid) for approximately 4 weeks before going to his physician. When nurse takes his vital sings ,he is surprised that his blood pressure is 160/92 and his pulse is 102. How does ephedrine and adrenergic agent relieve allergy symptoms? What side effects are common?

Central Nervous System(CNS) Stimulants

I- Overview of CNS stimulants.

A- Description.

- 1- CNS stimulation is an effect that may be noted with used of many drugs.
- 2- The actual indications for using CNS stimulation are limited.
- 3- Types of CNS stimulants include **amphetamines** and **amphetamine-like agents**. Amphetamines are a group of drugs belonging to the sympathomimetic amines.

B- Action.

- 1- CNS stimulants enhance neurotransmitter activity in the CNS, particularly the cerebral cortex. (Fig.6-2)
- 2- This stimulation produces peripheral effects on blood pressure, GI motility, vasoconstriction, and papillary dilation similar to those of ephedrine and other sympathomimetic drugs.
- 3- CNS stimulants tend to produce an effect that increases energy or reduces fatigue and associated symptoms.

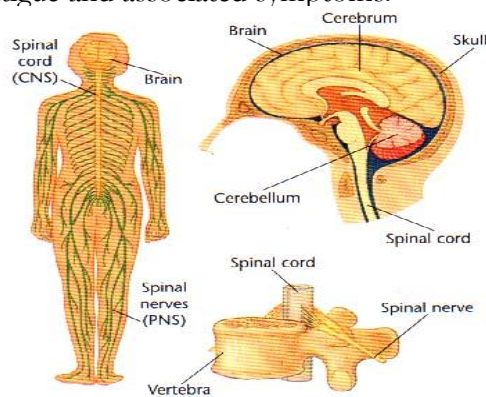


Fig.6-2: Central Nervous system

C- Indication.

- 1- Treatment of narcolepsy.
- 2- Treatment of attention deficit disorder with hyperactivity in children.
- 3- Exogenous obesity.

D- Nursing management for CNS stimulants.

- 1- Assess client for history of drug abuse before beginning therapy.
- 2- Review the complete history and physical examination, noting drug interactions and medications to avoid during amphetamine therapy and medical conditions in which amphetamines are contraindicated.
- 3- Monitor height and weight in children .Suppression of growth in children has been associated with long-term use.
- 4- Avoid prolong use because habituation or psychic dependence can occur.

E- Common CNS stimulants.

- 1- Amphetamine .
- 2- Dextroamphetamine(Dexedrine)
- 3- Methamphetamine (Desoxyn)
- 4- Analeptic agent (Doxapram or Dopram)
- 5- Xanthines (Caffeine)

Display 6-1

Know that amphetamine is subjected to abuse because of their ability to produce wakefulness and euphoria and enhance performance. Abuse leads to compulsive behavior, paranoia, hallucinations, and suicidal tendencies.



Tips on sleep

Critical thinking exercise

Mr. Kary 50 years old has been receiving recently amphetamine tablet 10mg Bid for treatment of Narcolepsy. Mr. Kary states "I experience difficulty to fall sleep in the last few days". What recommendations the nurse may provide to client and his physician.

Antiepileptic Agents

I- Overview of Antiepileptic agents.

A- Description.

- 1- Antiepileptic agents fall into two distinct pharmacologic categories:
 - a- Agents that affect generalized tonic-clonic seizures and partial seizures.
 - b- Agents that affect other generalized seizures including absence, myoclonic, and atonic seizures.
- 2- These agents also are known as *anticonvulsants*.

B- Action.

- 1- Antiepileptic agents affect the conduction of ions across neuronal membranes, particularly sodium and calcium channels.
- 2- By altering these channels, antiepileptics suppress the epileptogenic focus and inhibit repetitive neuronal firing(Fig.6-3)

C- Indications: Used for management of *seizure disorders*.

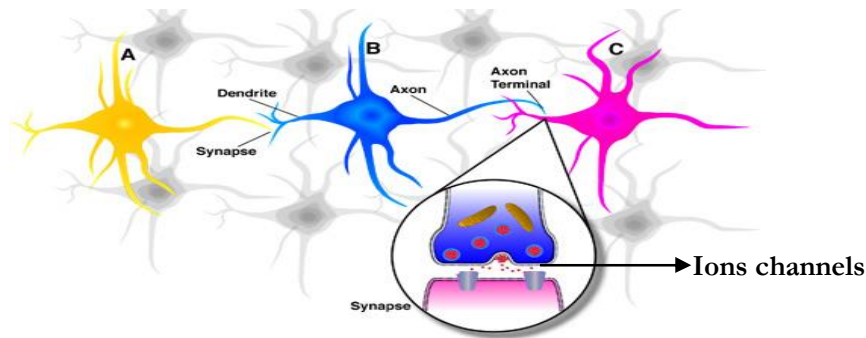


Fig. 6-3: Communication of neurons through channels

D- Overview of nursing management.

- 1- Be aware that because seizures may be associated with a variety of other conditions, optimal treatment requires investigation and management of the reversible causes of seizures (eg, infection or fever), rather than reliance on pharmacologic intervention alone.

- 2- Pay careful attention not only to the drugs being administered and their possible adverse reactions, but also ensure the client's safety secondary to the seizure disorder itself.
- 3- Note all concomitant diseases and medications before the initiation of therapy.
- 4- Protect the client from seizures until pharmacologic effect has been achieved (E-g. pad side rails, maintain air way during seizures).
- 5- Evaluate the effectiveness of interventions using the following criteria:
 - The client will remain free of seizures or have as few seizures as possible.

E . Common Antiepileptic Agents.

- 1- Phenytoin (Dilantin).
- 2- Fosphenytoin (Cerebyx)
- 3- Carbamazepine (Tegretol)

Critical thinking exercise

You are a nurse working in a clinic .Mr. Sam an epileptic for the last 10 years. Came into the clinic complaining of problems with poor coordination and fatigue. He is on Phynotoin 300mg daily. While the nurse has been taking vital signs, patient showed activity of tonic - clonic convulsions. What medication you may give in this situation? What advise do you give to patient after recovery from convulsion regarding the frequency of medication?

II- Barbiturates.

- A- General information:** The only limitation to using barbiturates in seizure management is their sedative effects,which increases as dosage increases-
- B- Action:** Barhiturates inhibit the development of electrical activity and its spread in the CNS.
- C- Indications:** Management of partial and generalized tonic-clinic seizures; also used in Jacksonian seizures.

D- Common barbiturates.

- Phenobarbital (Luminal)

IV. Benzodiazepines.

A-General information: Benzodiazepines are usually classified as sedative hypnotic agents, but some of them have clinical antiepileptic activity.

B- Actions: Benzodiazepines inhibit the origination and spread of electrical activity within the brain.

C- Indications.

- 1- Management of status epilepticus.
- 2- Treatment of seizures caused by alcohol withdrawal and by local anesthetics.
- 3- Management of infantile spasms and myoclonic seizures.

D- Common Benzodiazepines.

- Diazepam (Valium)



stop and think

Critical thinking exercise

Mr. William has a friend who has known to have epilepsy since 3 years Mr. William has known that Valium is given to his friend when he experiences seizures attack. Mr. William who is heavy smoker and over weight admitted to ER complaining of chest pain. Physician ordered to give him valium 5 mg tab ABT. Mr. William doubt of physician's orders and asked the nurse "My friend was given the same drug before ,am I having epilepsy?" What explanations the nurse provide to Mr. William regarding his concerns?

Antiparkinson Agents

I- Overview of Antiparkinson agents.

A- Description.

- 1- Drugs used to treat Parkinson's disease may be classified as either ***dopaminergic agents or centrally acting anticholinergic agents.***
- 2- Other agents that can be used for the treatment of early parkinsonian symptoms or for situations in which other drugs are ineffective include the antihistamines diphenhydramine and orphenadrine and the phenothiazine ethopropazine.

B- Action.

- 1- Dopaminergic agents enhance the effect of dopamine by promoting dopamine synthesis or by activating dopamine receptors.
- 2- Centrally acting anticholinergic agents block receptors for acetylcholine in the CNS.
- 3- Certain antihistamines and phenothiazines block cholinergic receptors in the basal ganglia.

C- Indications: idiopathic or drug-induced parkinsonism.

D- Overview of nursing management.

- 1- Remember that the client with Parkinson's disease loses the ability to coordinate motor movement, so you must provide assistance with medication administration.
- 2- Remember that swallowing is a motor movement and may be impaired as a result of the disease.
- 3- Note that intellect is not impaired in Parkinson's disease so instructions should still be given.
- 4- Be aware that drug treatment for this disease ***is not curative but palliative.***

II- Dopaminergic Agents.

A- General information: Dopaminergic agents enhance the function of the motor system, improving symptoms.

B- Action: Dopaminergic agents either increase dopamine level in the CNS, stimulate dopamine receptors in brain, or inhibit dopamine breakdown in neurons.(Fig.6-4).

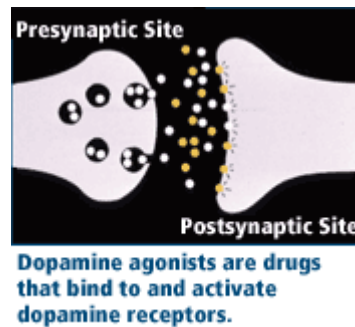


Fig.6-4 : Dopamine receptors in neuron

C- Indications: Used for all form of parkinsonims, whether idiopathic or drug – induced.

D- Common dopaminergic agents.

- 1- Levodopa (Dopar, Larodopa, Sinemet)
- 2- Carbidopa(Lodosyn)
- 3- Amantadine (Symadine, Symmetrel).

III- Centrally Acting Anticholinergic Agents.

A- General information: Centrally acting anticholinergic agents are also referred to as antimuscarinics because the receptors that are blocked from the action of acetylcholine are muscarinic receptors. (Note: Muscarine is a plant substance much like acetylcholine.

B- Action: Inhibit acetylcholine by blocking access to cholinergic receptors.

C- Indication:

- 1- Initial treatment of mild parkinsonism especially in younger clients.
- 2- Adjunctive therapy to dopaminergic agents especially levodopa to control symptoms effectively.

D- Nursing management for centrally acting anticholinergics.

- 1- Teach the client to withhold the next dose and notify the physician immediately if the skin becomes hot and dry with a rise in body temperature. This should be monitored during hot weather.
- 2- Teach the client to avoid alcohol when taking anticholinergics.
- 3- Relieve dry mouth caused by anticholinergics with sips of water, ice chips, chewing gum or hard candy.

E- Common centrally acting anticholinergics.

- 1- Trihexyphenidyl (Artane).
- 2- Benztropine (Cogentin).
- 3- Biperiden (Akineton)
- 4- Diphenhydramine (Benadryl)
- 5- Procyclidine (Kemadrin)

Critical thinking exercises

Mr. Simon has had Parkinson disease for 3 years and despite treatment with sinemet his functional abilities continue to decline. His physician prescribed Artane in addition to sinemet. He comes to clinic 3 weeks later complaining of dry mouth. Mr. Simon said " When do I stop taking antiparkinson drug?" What are the best responses of the nurse toward Mr. Simon side effects and his concern regarding discontinuation of the drug.



Mr. Evans , a patient with Parkinson disease has carbidopa /levodopa 25/100 ordered Tid. Your pharmacy supplies you with sinemet 25/250. You administer one tablet to Mr. Evan for morning dose. What error do you make in this dose?

Antianxiety , Sedatives, and Hypnotics

I- Overview of antianxiety, sedatives, & hypnotics agents

A- Description.

- 1- Antianxiety (anxiolytic), sedative, and hypnotic agents produce specific physiologic and psychological effect such as: ***reduced anxiety, sedation, and sleep induction***. Because all of these agents have some degree of CNS depression, they are **controlled substances**.
- 2- These agents are categorized by chemical structure as either benzodi- azepines or nonbenzodiazepines and include several classes.
- 3- The benzodiazepines are among the most widely prescribed drugs in the world. Their effectiveness and margin of safety have contributed to their popularity and, over the last 20 years, they have essentially replaced the barbiturates in the treatment of anxiety and sleep disorders.

B- Action: These agents act on the CNS to produce varying degrees of depressions.

C- Indications.

- 1- Treatment of anxiety disorders and short-term management of anxiety related to a crisis event.
- 2- Treatment of insomnia.
- 3- Preoperative medications to enhance anesthetic induction.

D- Overview of nursing management.

- 1- Because these drugs produced some degree of CNS depressions, be sure to address the side effects.
- 2- Instruct the client regarding safety measures to follow while taking these drugs.
- 3- Note that some of these agents are ***habit-forming***; be alert for possible psychological and physical dependence.

Wait to think

Discuss the concept of habit forming with colleagues and instructor and can you suggest other drugs that have the same effect.

II- Benzodiazepine Antianxiety Agents (also called Anxiolytics).

A- General information: Benzodiazepines are commonly used as anti- anxiety agents.

B- Indications.

- 1) Treatment of chronic anxiety, anxiety related to a crisis event (time limited) and panic disorder.
- 2) To decrease anxiety accompanying surgical and diagnostic procedures.
- 3) Treatment of alcohol and drug withdrawal, seizure disorders, and sleep disorders.
- 4) Induction of anesthesia.
 - a- Note that respiratory distress, apnea, and cardiac arrest have been reported with IV use.
 - b- Careful monitoring is required in clients with hepatic or renal impairment because the sedating nature of the drugs will be prolonged.

C- Common benzodiazepine antianxiety agents.

- 1- Diazepam (valium).
- 2- Lorazepam (Ativan).
- 3- Alprazolam (Xanax).
- 4- Chloridiazepoxide(Librium)

III- Nonbenzodiazepine Antianxiety Agents.

A- General information: Nonbenzodiazepine antianxiety agents are structurally and pharmacologically unrelated to the benzodiazepines, barbiturates, or other CNS depressants.

B- Action: Nonbenzodiazepine antianxiety agents do not produced CNS depressant activity or any significant sedative actions; however, they do lower or alleviate many symptoms of generalized anxiety.

C- Indications.

- 1- Treatment and alleviation of anxiety disorders.
- 2- Treatment of alcohol or substance abuse because there is no physical or psychological dependency.

D- Common nonbenzodiazepine antianxiety agents.

- 1-Buspirone (Buspar).
- 2-Clomipramine (Anafranil)

IV. Barbiturate Sedatives.

A-General information: The barbiturates have been used as sedative hypnotic drugs for a long time: however, except for a few specific used, they have largely replaced by the safer benzodiazepines.

B- Action.

- 1- Barhiturates act throughout the CNS by suppressing polysynaptic responses. As results, neurotransmission of impulses from the thalamus to the cortex of the brain are diminished and inhibitions are enhanced. (Fig.6-5)
- 2- The amount of CNS sedation produced depends on the dose.

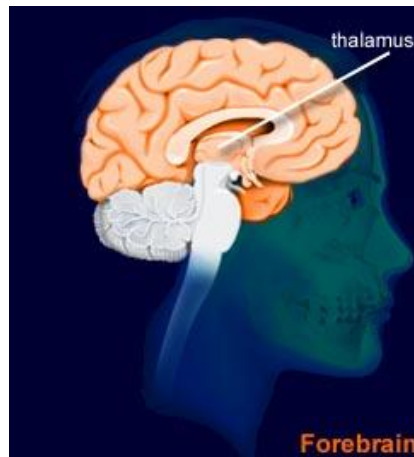


Fig. 6-5: Brain Thalamus

C- Indications.

- 1- Treatment of epilepsy and insomnia.
- 2- Sedation before surgery.

D- Common barbiturate sedatives.

- 1- Pentobarbital Sodium (Nembutal).
- 2- Mephobarbital (Mebaral)
- 3- Phenobarbital (Luminal)
- 4- Secobarbital (Seconal).
- 5- Amobarbital sodium (Amytal)

V. Hypnotic Agents.

A- General information: These agents may be classified as benzodiazepines or nonbenzodiazepines.

B- Action; these drugs are thought to act on the limbic system and thalamus of the CNS by binding to specific benzodiazepine receptors.

C- Indications.

- 1- Treatment of insomnia associated with difficulty falling asleep, frequent nocturnal awakening with difficulty returning to sleep, or early morning awakening characterized by inability to return to sleep.
- 2- Acute and chronic medical conditions where restful sleep is indicated.

D- Nursing management for hypnotic agents.

- 1- Assess type, extent, and duration of sleep disorder.
- 2- Determine what, if any, other measures have been taken to induced sleep.
- 3- Assess the client's expectation of these drugs.
- 4- Assess the client's ability to understand proper use of these drugs.

E- Common hypnotic agents.

- 1- Triazolam (Halcion).
- 2- Temazepam (Restoril).

- 3- Flurazepam (Dalmane).
- 4- Zolpidem (Ambien).
- 5- Amobarbital sodium (Amytal)
- 6- Estazolam (Prosom)

Critical thinking exercise

Mrs. Sommer is admitted to your unit for elective surgery. During your admission assessment, she states she has been taking alprazolam (Xanax) 1 mg tid for the last 3 years. During the interview she appears nervous and asks you at least five times whether the doctor will order her Xanax while she is in the hospital. Discuss your interpretation for these assessment data and how it will affect your plan of care for Mrs. Sommer.

Antidepressant Agents

I- Overview of Antidepressant Agents.

A- Description.

- 1- Depression is treated using three modalities: drugs, electroconvulsive therapy, and psychotherapy.
- 2- The primary treatment for major depressions in pharmacologic therapy is antidepressants.

B- Action.

- 1- Antidepressant agents relieve or cure mental depression by exerting influence on the CNS. These drugs either *alter the availability of selected neurotransmitters* (chemical substances that transmit impulses from one neuron to another) or *alter availability of a specific enzyme*.
- 2- This is accomplished by blocking the reuptake on the selected neurotransmitter in the synapse or blocking certain postsynaptic receptors.
- 3- Generally, antidepressants are discussed within four categories: tricyclic antidepressants. (**TCAs**), selective serotonin reuptake inhibitors (**SSRIs**) , Monoamine oxidase (**MAO**) inhibitors and **miscellaneous** antidepressants.

C- Indications.

- 1- Treatment of major depression.(Fig.6-6)
- 2- Treatment of other neurotic disorders such as anxiety, panic, obsessive-compulsive disorder.



Fig.6-6: Depression

D- Overview of nursing management.

- 1- Review the completed nursing admission history and medical admission documentation, note any preexisting medical conditions, current medications, medication history, allergies, and presenting signs and symptoms of the current illness.
- 2- Note manifestations of the client's experience of depression and the presence of *suicidal thoughts or plans* on each shift or as need. (Fig.6-7).
- 3- Perform assessments related to the common side effects of these drugs.
- 4- Check results of appropriate laboratory test.
- 5- Monitor for effectiveness of drug (i.e., alleviation of symptoms).
- 6- Assess client compliance.
- 7- Observe for the warning signs of hypertensive crisis: frequent headaches increasing blood pressure, palpitations.

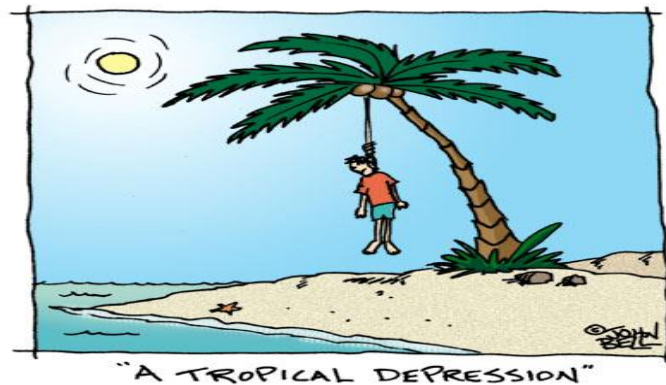


Fig.6-7 : Major depression may lead to suicide

II- Tricyclic antidepressants (TCAs).**A- General information.**

- 1- TCAs act on the enzyme monoamine oxidase (MAO).
- 2- These are the largest groups of antidepressants.
- 3- The agent of choice is based on the individual's need history, particular presenting symptoms, and the propensity of the agent for side / adverse effects.

B- Indications.

- 1- Treatment of major depression; anxiety – based problems such as panic disorder, obsessive compulsive disorder.
- 2- Preadolescent attention deficit – hyperactivity disorder, enuresis, disorders, anxiety disorders, eating disorders.

C- Common TCAs.

- 1- Amoxapine (Asendin)
- 2- Amitriptyline (Elavil).
- 3- Disipramine (Nopramin)
- 4- Imipramine (Tofranil)

III- Selective Serotonin Reuptake Inhibitors (SSRLs).**A- General information.**

- 1- SSRLs selectively block the reuptake of the monoamine neurotransmitter serotonin, thereby making serotonin available at the synapse or receptor sites.
- 2- This is a newer category of antidepressants that is chemically different from other antidepressants.

B- Indications: Used in treatment of major depressive disorder, obsessive-compulsive disorder, obesity, bulimia, diabetic neuropathy, myoclonus.

C- Common SSRIs

- 1- Citalopram(Celexa)
- 2- Fluoxetine (Prozac)
- 3- Sertraline Hydrochloride (Zoloft).
- 4- Paroxetine (Paxil).

IV. Monoamine Oxidase (MAO) Inhibitors.**A- General information.**

- 1- MAO inhibitors block or diminish the actions of MAO, a cytochrome enzyme that is widely distributed throughout the body with the highest concentrations in the brain, liver, and kidneys.
- 2- There are two types of MAO: MAO-A, and MAO-B. The different types appear to favor different monoamine neurotransmitters.

- 3- Although some knowledge of the action of the MAO inhibitors is understood, the full processes and events responsible for the therapeutic responses are not fully understood.

B- Indications.

- 1- Treatment of atypical depression characterized by symptoms of increased appetite, increased sleep, or anxious depression.
- 2- Treatment of major depression unrelieved by TCAs, SSRIs, or miscellaneous agents. (Although MAO inhibitors are considered to be as effective as other antidepressants, they are not the drug of first choice for major depression due to their potential adverse and hazardous effects).
- 3- Treatment of panic attacks, bulimia, obsessive – compulsive disorder.
- 4- Used as antineoplastic agents.

D- Common MAO inhibitors.

- 1- Phenelzine (Nardil).
- 2- Tranylcypromine (Parnate).
- 3- Isocarboxazid (Marplan)

V. Antimanic Agents.

A- General information.

- 1- Antimanic agents are used to control the wide mood swings that occur in bipolar disorder and manic depressions by reducing the mania. (Fig.6-8)
- 2- **Lithium** is commonly the drug of choice for treating the manic phase of manic depressions.



Fig. 6-8: Bipolar Disorder(manic-depressive)

B- Indications: used for treatment and maintenance of manic phase in manic depressive disorder.

C- Nursing management for antimanic agents.

- a- Assess baseline vital signs; weight, all parameters of neurologic function, serial chemistries, CBC, urinalysis, urine electrolytes, renal function, CV function, skin integrity, color and temperature.
- b- Review the client history for possible presence of allergies, any other drugs in the regimen that may cause interactions, or any conditions that require extreme caution.
- c- Evaluate the client's ability to learn all aspects of drug therapy because the client in a manic condition is unable to retain information.
- d- Assess nutritional status.

D- Common Antimanic agent.

-Lithium carbonate (Lithane, Lithonate, Eskalith).



With cooperation, we can create our information

Critical thinking exercise

Mr. River stated taking fluoxetine (Prozac) for depression 1 week ago. When she returns to the clinic, she states she is still depressed and requests that the dosage of prozac be increased .she also complains that she is having trouble sleeping. what teaching is appropriate for Mr. River.

Antipsychotic Agents

I- Overview of antipsychotic agents.

A- Description.

- 1- Antipsychotic agents are included in a broad class of drugs affecting the CNS called *psychotherapeutic drugs*. Because of their influence on the CNS and the resulting side effects, they also are known as *neuroleptic drugs*.
- 2- These agents are classed as either traditional or nontraditional antipsychotics.
- 3- *Traditional* antipsychotic (Phenothiazines and non-phenothiazines) are categorized according to their potency (high, medium, or low potency) or their structure.
- 4 *Nontraditional or atypical* agents include clozapine and risperidone. The term atypical is used for newer drugs that differ from older ones by producing few, if any, movement disorders (extra pyramidal symptoms).
- 5- Antipsychotic agents do not provide a cure for psychosis; they suppress or minimize the symptoms of psychosis.
- 6- Individual responses to the various antipsychotic agents may be different. No one agent is better than the other, rather, the agent of choice would be one that maximizes the therapeutic effect for the client and minimizes the side / adverse effects experienced.

B- Indication.

- 1- Treatment of schizophrenia and psychotic disorders, such as psychotic depression, psychotic behavior during mania, and relief of psychosis in organic brain syndrome.
- 2- Adjunct in the treatment of tetanus.
- 3- Adjunct in pain management in select cases.
- 4- Prevention and treatment of nausea and vomiting.
- 5- Treatment of intractable hiccups.

C- Overview of nursing management.

- 1- Perform a baseline nursing history, including a history of the illness, current symptoms, and past and current medication history, and allergies.
- 2- Obtain blood pressure, pulse, respirations, and temperature each shift, with blood pressures before each dose of antipsychotic.
- 3- Observe for changes in targeted symptoms.
- 4- Monitor for signs of increasing anxiety, agitation, and psychotic behavior. For episodes of increased agitation or other psychotic symptoms, administer PRN doses.
- 5- When administering antipsychotics, check for cheeking.
- 6- Instruct the client to increase fluid intake and include dietary sources of fiber.
- 7- Instruct the client to perform oral hygiene five times daily.

D- Contraindication to use

- 1- Liver damage
- 2- Coronary artery disease
- 3- Cerebrovascular disease
- 4- Parkinsonism
- 5- Bone marrow depression
- 6- Severe hypotension or hypertension
- 7- Coma or severely depressed states

E- Common traditional antipsychotics.

- 1- Acetophenazine (Tindal)
- 2- Chlorpromazine (Thorazine)
- 3- Haloperidol (Haldol)
- 4- Fluphenazine hydrochloride (prolixin, Permitil)
- 5- Promazine (Sparine)

F- Common nontraditional (atypical) antipsychotic agents.

1. Clozapine (Clozaril).

- 2- Olanzapine (Zeprexa)
- 3- Quetiapine(Seroquel)
- 4- Risperidone(Risperdal)

Critical thinking exercise

Mr. William 37 year of age and homeless, has been diagnosed and treated for schizophrenia and alcohol abuse for the last 15 years .He is admitted to the hospital for pneumonia .When you enter his room to administer his prescribed antipsychotic medication and his antibiotic ,he swears at you and tells you to leave the room because he has no plans to take that poison.

Discuss the following:

- Does Mr.William have the right to refuse to take his medication?
- Does his psychiatric history alter his rights?
- Role play how you would respond to Mr. William if you were the nurse in this situation.

Skeletal Muscle Relaxants

I- Overview of skeletal muscle relaxants.

A- Description: Skeletal muscle is drugs that decrease muscle tone and movements by reducing skeletal muscle activity.(Fig.6-9).

B- Action.

- 1- **Centrally acting** skeletal muscle relaxants depress the CNS or block the transmission of nerve impulses from the spinal cord to the skeletal muscles, causing skeletal muscle relaxation.
- 2- **Peripherally acting** muscle relaxants interfere with nerve impulse transmission between the motor end plate and the skeletal muscle receptors. These drugs block depolarization - repolarization activity in the skeletal muscles, causing skeletal muscle paralysis.

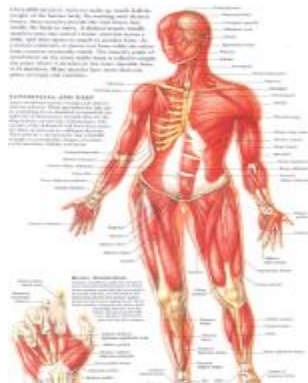


Fig.6-9: Skeletal muscles in humans

C- Indication.

- 1- Centrally acting skeletal muscle relaxants are most effective in relieving muscle spasms locally form trauma or inflammation. They also are used to treat muscle spasms that occur in multiple sclerosis.
- 2- Peripherally acting agents are used in the operating room before induction with general anesthesia.
- 3- Relaxation of skeletal muscles during surgery, endotracheal intubation, mechanical ventilation and facilitation of orthopedic manipulation.

D- Overview of nursing management

- 1- Note any history of seizures (some drugs in this category may cause loss of seizures control)
- 2- Supervise any ambulation and transfers to ensure client safety while the client is under the influence of these medication.
- 3- Monitor B-P every 4 hours when therapy is initiated.
- 4- Question the client on any changes or difficulty in chewing, swallowing , moving fingers, or vision; document findings.

E- Common centrally acting skeletal muscle relaxants.

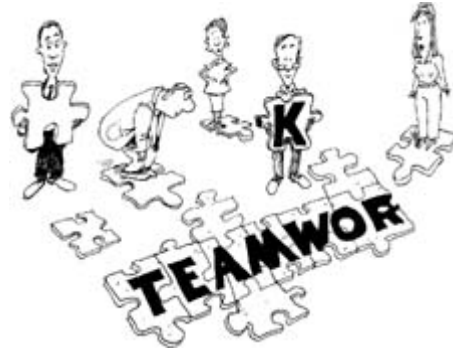
- 1- Baclofen (Lioresal).
- 2- Carisoprodol (soma,Rela).
- 3- Chlophenesin carbamate (Maolate).
- 4- Chlorzoxazone (paraflex, Parafon Forte DSC)
- 5- Cyclobenzaprine (Flexeril)
- 6- Diazepam (Valium)
- 7- Metaxalone (Skelaxin)

F- Common peripherally acting skeletal muscle relaxants.

- 1- Atracurium besylate (Tracrium) .
- 2- Pancuronium bromide (Pavulon).
- 3- Recuronium bromide (Zemuron).
- 4- Vecuronium bromide (Norcuron).
- 5- Tubocurarine chloride.
- 6- Succinylcholine chloride (Anectine, Quelicn, Sucostrin).

Critical thinking exercise

Sara Johnson is experiencing sever muscle spasm. Her physician orders valium 50 mg to be given I-V stat. Discuss how you will safely administer this medication.



Mr. Sam is 55 years of age has been admitted to intensive care unit(ICU) with congestive heart failure and newly developed pulmonary edema-Mr. sam was unable to breath spontaneously ,so he was set on controlled mechanical ventilation. Two hours later, Mr. Sam opened his eyes and started to fight the ventilator that result in the ventilator to be alarmed. Dr. asked to give him pavulon 2 mg I-V stat. Discuss the Dr order and the rationale behind giving this medication.

Unit 7
*Drugs Associated With
Hormonal Therapies & Reproduction*

Pituitary, Thyroid, and Parathyroid Agent

I- Overview of pituitary, thyroid, & parathyroid agents

A- Description

- 1- The Pituitary, thyroid, and parathyroid glands regulate and control all of the body's processes, including metabolism, growth, reproduction, and fluid and electrolyte balance.
- 2- The pituitary, known as the master gland, controls secretion from all other glands.(Fig.7-1).
- 3- The thyroid gland synthesizes, stores and secretes the iodinated chemicals L-triiodothyronine (T3) and L-thyroxine (T4).
- 4- The parathyroid gland regulates calcium and phosphorus.

B- Action: Pituitary, thyroid, and parathyroid agents act either to replace deficient supply of hormones or to block an overabundant supply.

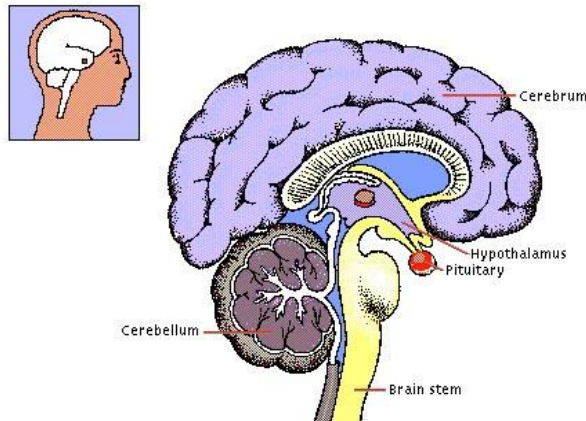


Fig. 7-1: Pituitary gland in brain

C- Indications: These agents are indicated to restore normal homeostatic balance in multiple conditions.

D- Overview of nursing management

- 1- Be aware that nursing management is highly specific to the agent being used.

- 2- Know that fluid, electrolyte, cardiac, and many metabolic functions are altered if one of these drugs is needed or used.
- 3- Carefully monitor physiologic parameters, such as hemodynamics and electrolytes.
- 4- Provide instructions to the client regarding self-monitoring.

II- Pituitary Hormones:

1- Growth Hormone

- A- General information: This hormone is secreted by the anterior pituitary during the growth period.
- B- Indications
- 1- Enhances tissue growth in immature persons; used in **dwarfism**.
 - 2- Inhibits tissue breakdown during times of stress.
- C- Common growth hormones
- 1- Somatropin (Humatrope, Nutroprin).
 - 2- Somatrem

2- Antidiuretic Hormone (ADH)

- A- General information:** Antidiuretic hormone is one of two hormones secreted by the posterior pituitary gland- (The second hormone, **Oxytocin**)
- B- Indications**
- 1- Used as a hormone replacement in clients with diabetes insipidus.(Long-term treatment is requires when diabetes insipidus is idiopathic; short-term treatment is required when it is from head trauma.)
 - 2- Used in diagnostic procedures to determine the ability of the kidneys to concentrate urinE-
 - 3- Used to control GI hemorrhage (usually in the esophagus) by vasoconstriction and to elevate blood pressure in vasogenic hypotensive episodes (*vasopressin*).
 - 4- Used in the treatment of postoperative abdominal distention.
 - 5- Used in the treatment of nocturnal enuresis.

- 6- Antidiuretic hormone is available in water- and oil- based preparations; the indications for the base solution vary with the illness being treated.

C- Common Atidiuretic hormones

- 1- Vasopressin (Pitressin)
- 2- Desmopressin acetate (DDAVP, Stimate)
- 3- Lypressin

3- Adrenocorticotropin Hormone (ACTH)

A- General information

- 1- This pituitary hormone is responsible for the stimulation of the adrenal glands, which, in turn, secrete steroid hormones.
- 2- Because this hormone is so closely related to the adrenal secretion, excesses and deficiencies of it are the same as excesses and deficiencies of the steroid group.

B- Indication

- 1- Used diagnostically to test adrenal ability to release ACTH.
- 2- May be given in certain diseases that have exacerbations and remissions, where exogenous steroid administration is detrimental; diseases include myasthenia gravis, multiple sclerosis and rheumatic disease.
- 3- Used to relieve hypocalcaemia in cancer clients.

C- Common adrenocorticotropin hormones

- 1- Corticotropin injection (Acthar, ACTH)
- 2- Repository corticotropin injection (ACTH, Acthar)
- 3- Corticotropin zinc injection (Corticotropin Zinc)

Critical thinking exercise

After surgery for a brain tumor ,you note that Mr. Willis has excessive, dilute urine output (8000 ml/24hrs). The physician diagnoses deficient antidiuretic hormone production and prescribed lypressin(Diapid),a synthetic vasopressin. What assessment data will indicate that this medication is effective?

III- Thyroid Replacement Hormones

A- Description: These drugs replace the thyroid hormones that are deficient in supply when an individual suffers from *hypothyroidism*.

B- Action: Products provide replacement of T₃, T₄, or both. Their pharmacologic actions are identical and differ only in actual content of T₃, and T₄.

These agents increase metabolic rate, cardiac output, protein synthesis, and glycogen utilization in the same manner as the thyroid hormones.

C- Indications:

Used for replacement of thyroid hormones in clients with mild to severe hypothyroidism.

Used diagnostically in suppression test to differentiate suspected hyperthyroidism from euthyroidism.

D- Common thyroid replacement hormones

- 1- Desiccated thyroid tablets (Thyrar)
- 2- Levothyroxine (Synthroid, Levothyroid)
- 3- Liothyronine (T₃) (Cytomel)

IV. Antithyroid Agents

a- General information: drugs used for hyperthyroidism are designed to block or antagonize the effects of hormones secreted from the thyroid gland.

b- Action

- 1- Antithyroid agents inhibit the formation of thyroid hormones by interfering with the incorporation of iodine into tyrosine.
- 2- They also interfere with the oxidation of iodide ion.
- 3- These actions inhibit the formation of T₃ and T₄ and inhibit the conversion of T₄ to T₃.

c- Indications

- 1- Graves' disease
- 2- Thyrotoxicosis.

d- Common Antithyroid Agents

- 1- Propylthiouracil (PTU) (Propacil)
- 2- Methimazole (Tapazole)

Critical thinking exercise

Mrs. Mary has been taking Synthroid for approximately 2 years. She switched to a generic brand of levothyroxine 2 months ago. When she returns to the clinic, she is complaining of fatigue, weight gain, dry skin, and cold intolerance. What do you suggest?



By team work , we can reach solutions

V. Parathyroid Agents

A-General information

- 1- Parathormone is released by the parathyroid gland in response to low calcium levels. It serves to increase calcium levels by pulling calcium from the bone, absorbing calcium from the renal tubules, and calcium and phosphorus from the stomach.(Fig.7-2)
- 2- When calcium levels are high, parathormone secretion is inhibited.

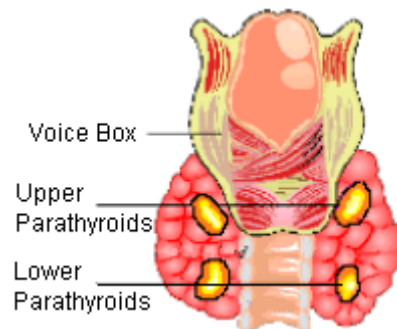


Fig. 7-2: Parathyroid glands

B- Action

- 1- Normalization of calcium levels is essential because calcium is critical to neurologic, cardiac, and musculoskeletal function.
- 2- Some agents may decrease serum calcium levels by inhibiting osteo-clastic bone resorption.
- 3- These drugs may also increase excretion of calcium or phosphorus.

C- Indications: Treatment of disorders in which calcium levels or calcium and phosphorus levels need to be balanced (E-g., Paget's disease, renal disease, parathyroid / thyroid disease).

D- Common Parathyroid agents

- 1- Calcitonin, salmon (Calcimar)
- 2- Alendronate (Fosamax)
- 3- Etidronate (Didronel)

Critical thinking exercise

Mr. Salmon had a subtotal thyroidectomy 2 days ago. When you perform your assessment he complains of tingling in his fingers. What additional data should be collected at this time?

Antidiabetic Agents

I- Overview of Antidiabetic Agents

A- Description

- 1- Antidiabetic agents control glucose levels.
- 2- Types include insulin and oral preparations, known as *hypoglycemic agents*.
- 3- Insulin is the primary hormone that regulates the body's metabolism of carbohydrates, proteins, and lipids.

B- Action

- 1- Insulin is given exogenously to replace deficient hormone levels that occur in diabetes.
- 2- PO hypoglycemic agents work in several ways:
 - a- The sulfonylurea stimulates the pancreas to secrete insulin.
 - b- Biguanides decrease hepatic glucose production and intestinal glucose absorption and increase peripheral glucose uptake and utilization.
 - c- α Glycosidase inhibitors delay the digestion of carbohydrates and absorption of glucose

C- Indications: management of type I (insulin-dependent diabetes mellitus; IDDM) or type II (non-insulin-dependent diabetes mellitus; NIDDM)

D- Overview of nursing management

- 1- Instruct the client on how and when to administer medication.
- 2- Instruct the client on how and when to monitor glucose levels.
- 3- Instruct the client on the importance of following the prescribed diet and to establish a regular meal schedule.
- 4- Evaluate the effectiveness of interventions as follows: the client maintains blood glucose levels within the accepted range.

II- Insulin

A- General information

- 1- Insulin can be isolated from animal sources (beef or pork) or produced synthetically (human).
- 2- Different insulin preparations are available that vary in onset, peak, and duration, allowing for individualized control. Types include:
 - a- Rapid acting.
 - b- Intermediate acting.
 - c- Long acting.

B- Indication

- 1- Treatment of IDDM and NIDDM unresponsive to diet and PO hypoglycemic agents.
- 2- *Treatment of hyperkalemia (insulin promotes cellular uptake of potassium).*

C- Nursing management for insulin

- 1- Assessment.
 - a- Assess the client for signs and symptoms of hypoglycemia.
 - b- Assess client's present knowledge of diabetes and treatment.
 - c- Assess insulin injection sites for allergic reaction or side effects and for presence of lipoatrophy and lipohypertrophy. (Fig. 7-3)
- 2- Planning and implementation.
 - a- Use only insulin syringes to draw up proper dose; if mixing insulin, draw up regular insulin first to avoid contamination of the regular *insulin*. (*Note: To easily tell the difference between regular and long-acting insulin, remember that regular is clear and long-acting is cloudy.*)
 - b- Note that all insulin must be injected SC to *avoid enzymatic destruction in the intestine*. Only regular insulin can be administered IV in emergency situations.

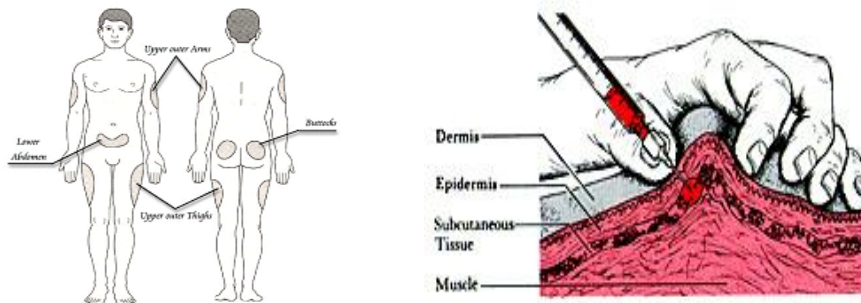


Fig. 7-3: : Insulin injection sites

D- Common Insulins

a- Short acting insulin

- 1- Humulin R
- 2- Novolin R

b- Intermediate – acting insulins

- 1- Isophane insulin suspension (NPH, Humulin N, Novolin N)
- 2- Insulin Zink suspension(Lent L ,Humulin L ,Novolin L)

c- Long – acting insulin

- Extended insulin zinc suspension (Humulin U Ultralente)

d- Insulin Mixtures

- NPH 70 % + Regular 30%(Humulin70/30 ,Novolin 70/30)
- NPH 50 % + Regular 50%(Humulin 50/50)

III- Oral hypoglycemic Agents

A- General information

- 1- There are first-and second-generation *sulfonylureas*; both have similar mechanisms of action.
- 2- The second-generation agents have a higher potency and fewer side effects.

B- Indications

- Treatment of NIDDM that is unresponsive to diet and exercise .

-Used with insulin therapy in the client who requires large amount of insulin, such as an obese client, as a method of increasing insulin receptor sites.

C- Guidelines for use of PO hypoglycemic agents in NIDDM clients may include:

- a- Onset of diabetes at or above 40 year old.
- b- Obese or normal body weight.
- c- Duration of diabetes less than 5 years.
- d- Absence of ketoacidosis.
- e- Fasting serum glucose less than 200 mg / dL.
- f- Absence of renal or hepatic dysfunction.

D- Common oral hypoglycemic agents

- 1- Tolbutamide (Orinase)
- 2- Acetohexamide (Dymelor)
- 3- Tolzamide (Tolinase)
- 4- Chlopropamide (Diabinese)
- 5- Glyburide (nonmicronized) (DiaBeta, Micronase)
- 6- Glyburide (micronized) (Glynase Pres T abs)
- 7- Glipizide (Glucotrol)
- 8- Glipizide XL
- 9- Metformin (Glucophage)
- 10- Glimepirde(Amaryl)
- 11- Rosiglitazone (Avandia) and others.

Critical thinking exercise

Your patient is managing his diabetes with insulin NPH 70/30 .The physician changed this regimen to NPH 50/50 .The patient felt confused of these types of insulin as it contains figures. What explanation do you provide to your patient regarding these types ?



Mr. Jack has been admitted to medical ward as a case of DKA , his blood sugar level upon admission was 350 mg/dl, doctor prescribed insulin q6h as following:

If blood sugar 200 – 250 mg/dl give insulin 5 units SC.

If blood sugar 250 -300 mg /dl give insulin 10 units SC.

If blood sugar is more than 300 mg/dl give 15 units SC.

Discuss the following:

- Type of insulin that given for DKA patient.
- What assessment data do you need before giving insulin?

Reproductive Hormones

I- Overview of Reproductive Hormones

A- Description

1- Gonadal hormones include agents that affect the female and male re-productive cycle (Fig.7-4)

2- Female reproductive hormones include *estrogens, progestins*, and other ovarian hormones.

3- Male reproductive hormones include *androgens, anabolic steroids*, and *antiandrogens*.

B- Action: Reproductive hormones interfere with the normal cycle of hormone balance.

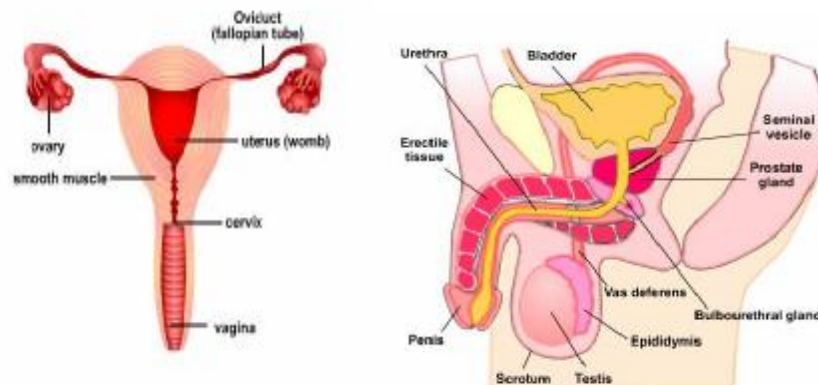


Fig.7-4: Male and Female reproductive systems

C- Indications

- 1- Female gonadal hormones are used for replacement therapy, oral contraception, treatment of infertility, and management of specific estrogen-related tumors.
- 2- Male gonadal hormones are administered for replacement therapy, as metabolic stimulators and to treat certain cancer and virilizing syndromes.

II- Estrogens

A- General information: Estrogens are necessary for normal reproductive maturation of the female client.

B- Action:

- 1- Estrogens stimulate the changes associated with puberty, including primary uterine development and secondary sex characteristics.
- 2- They also contribute to development of the endometrium.
- 3- Additional actions include:
 - a- Bone stabilization.
 - b- Maintenance of skin and vessels.

C- Indications

- 1- Treatment of primary and secondary hypogonadism.
- 2- Suppression of ovulation (by interrupting the normal menstrual cycle).
- 3- Counteract effects of hyperandrogen secretion states.
- 4- Management of dysmenorrhea or dysfunctional uterine bleeding.
- 5- Relief of menopausal symptoms.
- 6- Relief of atrophic vaginitis.
- 7- Palliation of select cancers.
- 8- In combinations with progestins for contraception.

D- Common estrogens

- 1- Estrogen, conjugated (**Premarin, Cenestin**)
- 2- Estradiol (Estrace)
- 3- Dienestrol
- 4- Estropipate (Ogen)

III- Progestins

A- General information: Progestins are synthetic hormones that have the same effect as the hormone *progesterone*.

B- Action

- 1- Certain progestins function as precursors to estrogen, androgen, and adrenocortical steroid synthesis.
- 2- Their primary function is maintenance of the menstrual cycle.
- 3- Other actions include:
 - a- Fat deposition.
 - b- Altered carbohydrate metabolism.
 - c- Competition with aldosterone to discourage sodium reabsorption.

C- Indications

- a- Treatment of amenorrhea.
- b- Treatment of endometriosis.
- c- Treatment of endometrial carcinoma.
- d- Prevention of pregnancy.

D- Common progestins

- 1- Medroxyprogesterone acetate (**Provera**)
- 2- Hydroxyprogesterone acetate (Hylutin)
- 3- Megestrol acetate (Megace)

IV. Oral contraceptives

A- General information: Two types of oral contraceptives are available:

- 1- Combinations of estrogen and progestin
- 2- Progestin only

B- Action

- 1- Inhibition of ovulation by altering the hypothalamic-gonadotropin axis.
- 2- Alteration in cervical mucus to prevent sperm entry and uterine endometrium to prevent implantation. The net result is prevention of pregnancy.
- 3- Suppression of ovarian function.

C- Indications

- 1- Suppression of ovulation for prevention of pregnancy.
- 2- Regulation of menstrual cycles and management of dysfunctional bleeding.
- 3- Treatment of endometriosis.

D- Common oral contraceptives

a- Monophasic preparations:

- 1- Brevicon (Ethinyl estradiol 35 Micgm, Northindrone 0.5 mg)
- 2- Demulen 1/35 (Ethinyl estradiol 35 , Ethynodiol diacetate 1)
- 3- Desogen (Ethinyl estradiol 30, Desogestrel 0.15) and many others.

b- Biphasic preparations:

- 1- Jenest-28 (Ethinyl estradiol 35 Micgm, Northindrone 0.5 mg)
- 2- Nelova

c- Triphasic preparation:

- 1- Ortho Tri-Cyclen.
- 2- Ortho Novum
- 3- Tri-Norinyl.

d- Progestin – only products

- 1- Depo-provera
- 2- Micronor



Critical thinking exercise

Mrs. Smile, a married women, calls the clinic because she forgot to take her birth control pill yesterday. What effect will this have on the therapeutic effects of the birth control pills? How should you advise her? What teaching can you provide that will help her remember to take her birth control pills regularly?

V. Androgens/anabolic steroids

A- General information

- 1- Androgens are also known as anabolic steroids because they are steroid compounds that have the ability to exhibit the tissue building and masculinization characteristics of the male hormone *testosterone*.
- 2- Testosterone is the most important androgen produced by the Leydig cells and adrenal gland responsible for the development of secondary sex characteristics in the male.

B- Indications

- 1- Androgen replacement in hypogonadal men.
- 2- Treatment of certain gynecologic disorders.
- 3- As a protein anabolic agent in clients suffering from severe injury or debilitating illness.
- 4- Refractory anemia
- 5- Prevention of osteoporosis.
- 6- As a metabolic stimulator in prepubertal boys to encourage long bone growth.
- 7- Treatment for low sperm count.
- 8- May be used in some forms of inoperable breast cancer.

C . Common androgens / anabolic steroids

- 1- Testosterone aqueous (Histerone ,others)
- 2- Testosterone cypionate(Depo- testosterone)
- 3-Testosterone enanthate(Delatestyl)
- 4-Danazol (Danocrine) and many others

Agents Used in Labor, Delivery, and Postpartum

I-Overview of agents used during labor , delivery and postpartum

A- Description

- 1- Oxytocin is one of two hormones secreted by the posterior lobe of the pituitary gland.(Fig. 7-5)
- 2- Tocolytic agents that halt the progress of labor.

B- Action

- 1- Oxytocin stimulates the uterus and brings on uterine contractions.
- 2- Tocolytic agents act on uterine muscle to stop the progression of labor.

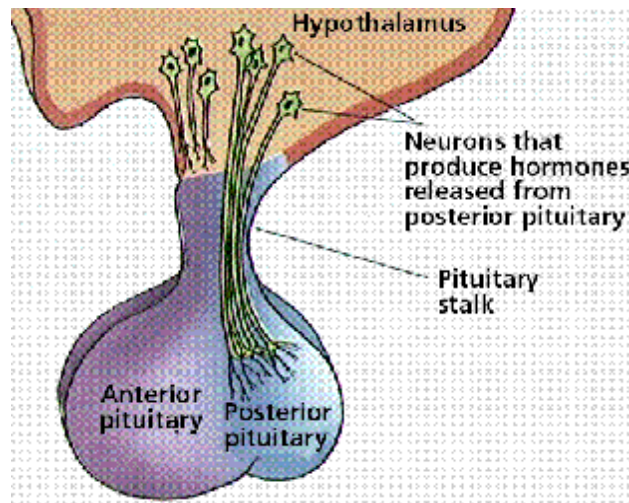


Fig. 7-5: Anterior and posterior lobe of pituitary

C- Indications

- 1- Oxytocic agents are indicated to increase the progression of labor.
- 2- Tocolytic agents are used to halt the progression of labor.

II- Oxytocic Agents

A-General information: Oxytocic agents function the same as natural hormone oxytocin.

B- Aaction

1- *Oxytocin* causes the muscle cell of the uterus to be more permeable to sodium, causing contraction.

It has the same effect on the muscles in the breast that surrounds the milk ducts, causing excretion of milk from the mammary gland-

C- Indications

- 1- Stimulation of uterine contractions and cervical ripening.
- 2- Acceleration of parturition.
- 3- Prevention of postpartum hemorrhage.
- 4- Enhancement of lactation or relief of breast engorgement postpartum in situations in which the milk is not ejected in sufficient amounts.
- 5- Management of missed, incomplete, or inevitable abortion.

D. Common oxytocic agents

- 1- Oxytocin (Pitocin, Syntocinon)
- 2- Prostaglandins.
- 3- Ergot derivatives (Ergonovine maleate)

Critical thinking exercise

Mrs. Sally 31 years of age just have delivered a baby. Postpartum bleeding has occurred as a result of complicated vaginal delivery. Her physician prescribed Syntocinon 20 units in 1000 ml G.W 5% to be run 125 ml/hr. Discuss why Mrs. Sally is receiving Syntocinon. What action may induce on uterus?

III- Tocolytic agents

A- General information

- 1- Tocolytic agents arrest uterine contractions but have not been proven to prevent preterm labor.
- 2- Controversy regarding the use of tocolytics concerns whether the benefits of administering these medications to prolong pregnancy for 48 to 72 hours outweighs the risks to the mother. Two benefits include allowing enough time for the client to be transferred to an institution equipped to care for prematurity and allowing time for administration of glucocorticoid to enhance fetal lung maturity.
- 3- Ritodrine is the only drug approved for tocolysis in the United States. It is specifically developed for the treatment of preterm labor.

B-Action: These drugs activate the B₂-receptor sites in the uterus and inhibit contractions.

C- Indications: Prevention of preterm labor in the presence of:

- 1- Gestational age between 20 and 34 weeks.
- 2- Fetal weight less than 2500 g.

D- Common tocolytic agents

- 1- Ritodrine (Yutopar)
- 2- Magnesium sulfate
- 3- Terbutaline (Brethine)



Collaborate with your colleagues to reach a viable solution for the following situation.

Critical thinking exercise (Ethical /legal Dilemma)

As a nursing student, you are assigned to a unit where abortion is performed. Your religious and family upbringing has taught you that abortion is an immoral act. Do you have a right to refuse to participate in an experience involving abortions as a student? If so, how might you approach your instructor about this issue? Would this situation be different if you were a regular employee on a unit that performs abortions?

Unit 8
*Drugs Associated With
Anti-inflammatory Therapies*

Corticosteroids

I- Overview of Corticosteroids

A- Description

- 1- Corticosteroids are normally released by the **adrenal glands**. (Fig 8-1).
- 2- They are parts of the endocrine system that provides balance to all of the body's metabolic processes.
- 3- **Mineralocorticoid** hormones possess aldosterone-like actions and serve to balance electrolytes through sodium and water reabsorption.
- 4- **Glucocorticoids** are hormones that regulate protein, carbohydrate, and fat metabolism and effect other body processes such as inflammation.
- 5- Most of the drugs available have mineralocorticoid and glucocorticoid properties.
- 6- These drugs are essentially the same as the internal hormones, and their administration will exaggerate the normal physiologic effects as well as turn off the body's normal adrenal-hypophyseal negative-feedback mechanism.

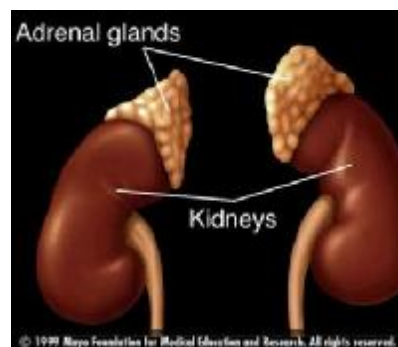


Fig.8-1 : Adrenal Glands

B. Indications

- 1- Long-term management of a number of chronic **inflammatory** diseases such as rheumatoid arthritis, systemic lupus erythematosus, and asthma .

- 2- Short-term management of acute exacerbations of dermatitis, bronchitis, and inflammation associated with infectious diseases.
- 3- Management of traumatic injuries such as head trauma and spinal cord injuries.
- 4- Because steroids affect the body's metabolic functions (E-g., protein, Carbohydrate, and fat metabolism; fluid and electrolyte balance), they are given only when the benefits outweigh the risks.

C. Overview of nursing management

- 1- Be aware that care of the client taking corticosteroids varies greatly depending on disease entity necessitating treatment.
- 2- Because there are many diseases and disorders affecting different body systems, direct nursing care to the disorder being treated.
- 3- Evaluate effectiveness of interventions using the following criteria:
 - a- The client experiences relief of symptoms relative to their presence.
 - b- The client self-administers steroids.
- 4- Note that administration of exogenous steroids will turn off the normal negative-feedback loop that exists between the adrenal and pituitary glands. This essentially ***turns off the adrenal gland***. If the steroids are suddenly discontinued, the client's circulating levels of steroids will fall dramatically because the adrenal is unable to secrete. This places him in ***the life-threatening Addisonian*** (hypo adrenal state). It is for this reason that steroids cannot be suddenly discontinued.
- 5- Be alert for symptoms of steroid withdrawal syndrome, including lassitude, fever, and diffuse musculoskeletal pain. These significant adverse reactions may be life-threatening. In addition, the lowest effective dose for the shortest period of time should be considered.

D- Common corticosteroids

A- Glucocorticoids

- 1- Beclomethasone (Beclovent,Vanceril)
- 2- Betamethasone (Celestone)
- 3- Cortisone (Cortone)
- 4- Dexamethasone (Decadron)
- 5-Hydrocortisone (Hydrocortone,Cortef)
- 6-Mythylprednisolone sodium succinate (Solu-medrol)
- 7- And many others

B- Mineralocorticoid

- 1- Fludrocortisone (Florinef)

Critical thinking exercises

Kim Wilson, 62 years of age ,was admitted for elective abdominal surgery. His medication history reveals daily use of prednisolone. What special attention should be given to Mr. Willson before and after surgery?

You are a nurse caring for a client who receives hydrocortisone 40 mg biD-You came in the next day to care for the same client ,and you didn't see hydrocortisone in the medication regimen. What is your best response to this situation ?

Non-Steroidal Anti-Inflammatory Drugs

I- Overview of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

A- Description

- 1- NSAIDs are the most widely used non- narcotic analgesics.
- 2- They are available over-the-counter (OTC).

B- Action

- 1- NSAIDs act primarily on the peripheral nervous system to relieve pain.
- 2- They also possess some central analgesic effects and were originally used to treat inflammatory conditions such as rheumatoid arthritis.

C- Indications

- 1- Management of mild to moderate pain.
- 2- Reduction of fever.
- 3- Reduction of inflammation.

D- Common NSAIDs

1- Aspirin (acetylsalicylic acid)

A- Indications.

- (1) Management of acute rheumatic fever, rheumatoid arthritis, osteoarthritis and other polyarthritic or inflammatory conditions.
- (2) Prevention of thrombosis, mucocutaneous lymph node syndrome, and reduction of risk of heart attack in clients with a history of a previous myocardial infarction or unstable angina (due to its anticoagulant effect).
- (3) Management of mild to moderate pain in headaches, musculoskeletal problems, and other conditions causing minor pain.
- (4) Reduction of fever.

B- Contraindications / cautions.

- Contraindicated in hypersensitivity to salicylates or NSAIDs (Aspirin hypersensitivity is more prevalent in clients with asthma, nasal polyps, and chronic urticaria-) Also contraindicated in hemophilia, *bleeding ulcers*, and *hemorrhagic states*

2- Ibuprofen (Advil, Motrin, Nuprin)

3- Naproxen (Naprosyn)

4-Diflunisal (Dolobid)

5- Diclofenac(Voltaren)

6- Indomethacin(Indocin)

Critical thinking exercise

You are a nurse cares for a client diagnosed with recent Myocardial Infarction .Aspirin tab daily is prescribed in addition to other drugs. While you are assessing vital signs to the client, he said " What I should be given to treat my peptic ulcer". What action you may take in response to your client? Why do think Doctor prescribed Aspirin to client with Myocardial infarction?

Unit 9
Drugs Associated With
Anti-Infective Therapies

Antibacterial Agents

I- Overview of antibacterial agents

A- Description

- 1- Antibacterial agents are administered in the treatment of bacterial infection.(Fig.9-1)
- 2- Because these drugs destroy bacteria, they may also destroy bacteria that are part of the body's normal flora
- 3- Classes of antibacterial agents include penicillins, cephalosporins, aminoglycosides, macrolides, tetracyclines, quinolones, B lactams, and sulfonamides.

B- Action: Antibacterial agents act to destroy or suppress the growth of bacteria



Fig.9-1 : Different types of bacteria

C- Indications

- 1- Treatment of infections caused by bacteria.
- 2- Prevention of bacterial infection in many situations (i.e., postoperative client, exposure to pathogens, insertion of artificial prostheses).

D- Overview of nursing management

- 1- Before beginning antibiotic therapy, it is important for the nurse to obtain specimen for culture and sensitivity. However, therapy can begin before these results are known.
- 2- When using IV or IM administration, inject slowly to minimize local irritation and phlebitis .Change the IV site at least every 48 hours.
- 3- Explain the importance to complete full course of treatment even though the client may feel better.

- 4- Emphasize to the client that medication must not be saved or given to others.
- 5- Determine if client's GI tract is sensitive to the drug ,and if so ,administer on a full stomach.
- 6- If culture and sensitivity report come back resistant ,notify the physician.
- 7- Instruct client about possibility of major side effects to report to primary health care provider.
- 8- Instruct client to space doses of antibiotic around the clock to maintain adequate blood levels.
- 9- Maintain sterile technique when applying eye drops and ear drops.

II-Penicillins

A- General information

- 1- The penicillin's are derived from cultures of molds or manufactured semi synthetically.
- 2- First-generation penicillin's are natural extracts from several strains of the penicillium mold.
- 3- The natural penicillins are potent gram-positive killers; they have little to no coverage against gram-negative organisms.

B- Indications

- 1- Treatment of infections caused by gram-positive cocci (e.g., streptococcus pneumonia)
- 2- Treatment of infections caused by gram-negative cocci (e.g., N. gonorrhoeae, Neisseria meningitides).
- 3- Treatment of infection caused by gram-negative bacilli (e.g., Fusobacterium)
- 4- Prophylaxis against subacute bacterial endocarditis, and in client with rheumatic or congenital heart disease undergoing surgery, child birth or dental procedures.
- 5- Penicillin should not be used as initial therapy in severe infections.

C- Nursing management for Penicillins

1- Assessment

- a- Assess the client thoroughly for a prior history of hypersensitivity to the penicillins.
- b- Assess for penicillin allergies in mother of infants younger than months old.
- c- Be aware that cephalosprins should also be avoided in client with penicillin allergies because of possible cross-sensitization.

2- Planning and implementation.

- a- Do not give penicillins with acidic fruit juices because the acidity contributes to the decomposition of the drug additionally, ***PO penicillins should be given on an empty stomach*** to minimize binding with food.
- b- Use caution when administering the penicillins to the **elderly, they are more sensitive** to the effects of penicillin than are younger clients.
- c- Observe clients for signs of **electrolyte imbalance** because most penicillins are sodium or potassium salts.

D- Common penicillins

- 1- Penicillin G and V.
- 2- Ampicillin (Omnipen, Polycillin)
- 3- Amoxicillin (Amoxil, Polymox)
- 4- Augmentin
- 5- Cloxacillin(Tegopen)
- 6- Oxacillin (Prostaphilin)
- 7-Bacampicillin(Spectrobid)
- 8- and many others.

Critical thinking exercise

You are a nurse working in busy surgical unit, cares for a patient with diabetic foot. Doctor prescribed Ampicillin 1 gm IV q6h for a patient. Because you are busy, you asked your colleague to prepare the medication who in turn prepared it and administered to your patient. What, if any, errors made in this situation? Discuss with your instructor the concept of anaphylaxis hypersensitivity reactions to penicillins.

III- Cephalosporins

A- General information

- 1- Cephalosporins are a semi synthetic broad-spectrum antibiotic, structurally related to penicillin.
- 2- ***First-generation*** cephalosporins generally have poor activity against enterococci, H. influenzae, and methicillin-resistant staphylococci organisms.
- 3- ***Second-generation*** cephalosporins extend the antimicrobial spectrum of activity of the first-generation cephalosporins by inactivating many resistant gram-negative bacteria.
- 4- ***Third-generation*** cephalosporins further extend the spectrum of action to include additional gram-negative organisms.
- 5- **Fourth generation** cephalosporins have a greater spectrum of antimicrobial activity and greater stability against breaking down by beta-lactamase enzyme compared with third generation drugs.

B- Indication

- 1- Respiratory tract infection
- 2- Otitis media
- 3- Skin infection
- 4- Bone infection
- 5- Genitourinary tract infection
- 6- Septicemia
- 7- Meningitis
- 8- Gonorrhea
- 9- Joint infection

C- Common cephalosporins

1- First-generation cephalosporins:

- a- Cephadrine (Velosef)
- b- Cefadroxil (Duricef).
- c- Cephalexin (Keflex).

d-Cefazolin (Kefzol ,Ancef)

2- Second-generation cephalosporins

- a- Cefaclor (Ceclor)
- b- Cefuroxime (Ceftin)
- c- Cefmetazole (Cefazone)
- d- Cefotetan (Cefotan)
- e- Cefoxitin (Mefoxin)
- f- Cefuroxime(Zinacef ,Kefurox)

3- Third-generation cephalosporins

- a- Cefdinir (Omnicef)
- b- Cefixime (Suprax)
- c- Cefoperazone (Cefobid)
- d- Cefotaxime (Claforan)
- e- Ceftizoxime (Cefizox)
- f. Ceftriaxone (Rocephin)

4- Fourth-generation cephalosporins

- a- Cefepime (Maxipime)

Critical thinking exercise

Mrs. Ellen is admitted to the emergency department with cellulites in her left leg. Cefotetan (s second generation cephalosporins) 1 g is given IV over 30 minutes .Before administering this medication, you note that she is allergic to penicillins, sulfa, and fish but she denies any allergies to other antibiotics. Ten minutes after after the IV cefotetan starts to infuse, Mrs. Ellen complains that she feels odd. She appears flushed and her throat feels tight and itchy . Her respiratory rate is slightly elevated at 24 breaths per minute, but you do not see any rash. How should you proceed?

IV. Aminoglycosides

A. General information

- 1- Aminoglycosides are particularly useful against gram-negative pathogens and are used to treat severe infections such as sepsis, endocarditis, and bacteremia.
- 2- They are also used in gram-positive infections because of their synergy with other antibiotics.
- 3- Serum drug levels should be monitored to prevent renal impairment and to ensure that dose is providing therapeutic levels.

B . Indication

- 1- Treatment of predominately gram negative enteric bacilli.
- 2- Treatment of tuberculosis (TB)
- 3- Management of sepsis or bacteremia
- 4- often given in combination with penicillin to encourage facilitation of the aminoglycoside into the cell.

C . Common aminoglycosides

- 1- Streptomycin
- 2- Amikacin(Amikin)
- 3- Gentamicin (Garamycin)
- 4- Kanamycin (Kantrex)
- 5- Neomycin
- 6- Tobramycin(Nebcin)

V. Macrolides

A. General information: These drugs are bacteriostatic; They inhibit the growth of microorganisms without causing a complete kill. In this situation, the host will need an immune system that is able to mount some of its own defenses to eradicate the organism.

B. Indications

- 1- Treatment of infections caused by gram-positive bacteria (primarily) and some gramnegative bacteria

- 2- Erythromycin is considered the drug of choice for mycoplasma pneumonia.
- 3- It is indicated for Diphtheria
- 4- In penicillin – sensitive or allergic clients it is indicated for prophylaxis of bacterial endocarditis, rheumatic fever, pelvic inflammatory disease caused by N.gonorrhoea and syphilis.
- 5- When used concomitantly with sulfonamide, it can be used to treat H. influenza.

C. Common macrolides

- 1- Erythromycin

Erythromycin is one of the safest antibiotics; hypersensitivity reactions are rare. The most common side effects are related to **GI** disturbances.

- 2- Azithromycin (Zithromax)
- 3- Clarithromycin (Biaxin)
- 4- Dirithromycin (Dynabac)

VI- Sulfonamides

A-General information: Sulfonamides are active against a broad spectrum gram-positive and gram-negative organisms.

B- Indications

- 1- Treatment of uncomplicated UTIs, *pneumocystis Carinii* pneumonia (PCP), otitis media and chronic bronchitis, toxoplasmosis, ulcerative colitis.
- 2- Combined with other antimicrobials for infections requiring poly therapy.

C- Common sulfonamides

- 1- Sulfacytine (Renoquid)
- 2- Sulfadiazine
- 3- Sulfamethizole (Thiosulfil Forte)
- 4- Sulfamethoxazole (Gantanol).
- 5- Sulfasalazine (Azulfidine)
- 6- Trimethoprim-sulfamethoxazole (Bactrim) (*combination agent*).

Critical thinking exercise

You are working in a nursing home ,caring for an elderly, incontinent client who has an indwelling urinary catheterization .You notice his urine is cloudy with lots of sediment and it has a strong foul odor. The client is afebrile and is not complaining of any pain. Analyze these data and discuss how would you will proceed.

VII- B Lactams

A- General Information: These synthetic antibiotic are structurally similar to the penicillins and cephalosporins.They are classified as B lactams because all contain the same chemically structured B lactam ring.

Drugs from B lactam families are inactivated by resistant organism producing B lactam enzymes.

They covers most gram negative organism including those organism resistant to penicillins ,aminoglycosides ,and cephalosporines.

B-Indication

1- Treatment of septicemia and skin infection ,lower respiratory tract infection and abdominal infection.

C- Common B lactams

- 1- Aztreonam(Azactam)
- 2-Imipenaem /Cilastin (primaxin)

**Discuss and reflect on:**

The increase in antibiotic-resistant bacteria is raising concerns about our ability to fight back.

Antitubercular Agents

I- Overview of Antitubercular Agents

A- Description. Antitubercular agents are used to treat tuberculosis (TB) caused by *Mycobacterium tuberculosis* a necrotizing infection most commonly affecting the lungs.

(Fig. 9-2).

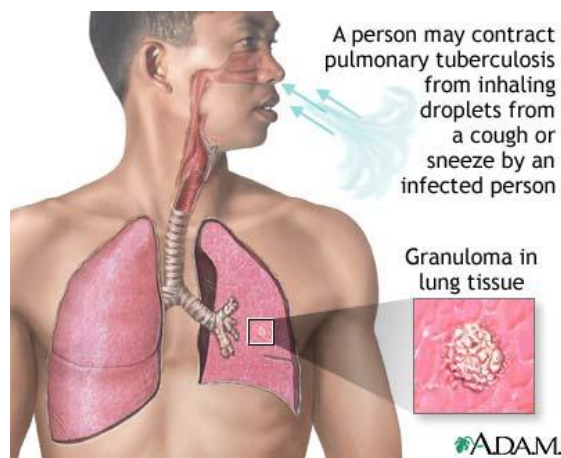


Fig. 9-2: Tuberculosis affect body organs mainly Lungs.

B-Action: Antitubercular agents kill or inhibit the growth of mycobacterial organisms .

C-Indications: Used in prevention or treatment of TB.

D- Overview of Nursing management

- 1- Know that treatment is long and complex; extended treatment is necessary because of prolong generation time of the mycobacterium.
- 2- Emphaize the importance of continued drug therapy, even after symptoms have resolved.
- 3- Identify liver toxicity as the most common adverse reaction.
- 4- Discuss the avoidance of alcohol
- 5- Educate the client to cover nose and mouth when coughing and sneezing. Emphasize the importance of hand washing.

E- Common Antitubercular Agents

- 1- Isoniazid (INH) (Laniazid, Nydrazid)
- 2- Rifampin (Ritadin, Rimactane).
- 3- Ethambutol

Critical thinking exercise

During chemotherapy for breast cancer, Mrs. Christin experience symptoms of tuberculosis (TB) and had an abdominal chest X ray. Sputum results are not yet available but treatment with Isoniazide and Rifampicin is started. Mrs. Christin voices anxiety about taking medication that are toxic and have so many side effects. How can you individualize your teaching for Mr. Christin?



Mrs. Christin is worry about side effects of Isoniazid and Rifampicin

Antifungal Agents

I- Overview of Antifungal agents

A- Description: Antifungal drugs are used to treat infections caused by fungi, whether systemic or local. (Fig. 9-3)

- 1- Systemic antifungal drugs vary in effectiveness and toxicities.
- 2- Systemic fungal (mycotic) infections are difficult to treat because systemic antifungals sometimes are needed in high doses to reach the site to be effective.
- 3- Local antifungal drugs are used for fungal infections that are not life threatening. Infections may involve the integumentary system and mucous membranes.

B- Action: most antifungal drugs bind to components of the fungal cell membrane, leading to death of the fungal cell.



Fig. 9-3 : Different types of Fungi

C- Indications

- 1- Treatment of candidiasis (oral and pharyngeal).
- 2- Treatment of cryptococcal meningitis.
- 3- Opportunistic candida or cryptococcal infections in clients infected with human immunodeficiency virus.
- 4- Treatment of candida (candidiasis may occur in the mouth, vagina, skin, hair, nails)

D- Common antifungal agents

- 1- Amphotericin B deoxycholate (Fungizone)

- 2- Ketoconazole (Nizoral)
- 3- Griseofulvin (Fulvicin)
- 4- Nystatin (Mycostatin)
- 5- Butoconazole (Femstat)
- 6- Ciclopirox (Loprox) and many others.

Critical thinking exercise

Harold Jonson has oral candidiasis and is being treated with nystatin 5 cc after meals and at bed time. What nursing considerations are important to ensure therapeutic effect.

Antiviral Agents

I- Overview of antiviral agents

A- Description

- 1- Antiviral agents are used to treat the infections that occur from viruses. (Fig 9-4)
- 2- Antiviral agents are not as effective as antibacterial *because the viruses are not totally destroyed and continue to live within the host cells.*

B- Action

- 1- Most antiviral agents enter the virus and prevent further replication of the virus.
- 2- Because of this action, the earlier in the disease the drug is given (preferable before symptoms are widely present), the better the out-come.



Fig.9-4: some forms of viruses

C- Indications: Antivirals are indicated when an infectious process is due to a **virus** rather than bacteria.

D- Overview of nursing management

- 1- know that these drugs are used to treat a wide range of viral infections that range from simple rhinovirus to human immunodeficiency virus (HIV).
- 2- Direct nursing interventions according to the severity of the virus under treatment.

- 3- Be aware that antiviral agents are not as effective at causing cell death as antibacterial agents.
- 4- When administering IV, always be careful to use a large vein and observe the infusion site often because extravasation and phlebitis are common.
- 5- Instruct the client to report side effects to health care provider .
- 6- Look up compatibility when giving these drugs IV. ***Do not mix in same solution with other drugs*** unless chemical compatibility has been established.

E- Common Antiviral Drugs

a- Herpes virus infection

- 1-Acyclovir (Zovirax)
- 2-Cidofovir (Vistide)
- 3-Famciclovir (Famvir)

b- Influenza virus infection

- 1- Amantadine (Symmetrel)
- 2-Oseltamvir (Tamiflu)

c- Respiratory Syncytial virus infection

- 1- Ribavirin (Virazole)

d- Drugs for human immunodeficiency virus infection and Acquired Immunodeficiency Syndrome(AIDs).

- 1- Zidovudine (AZT,ZVD,Retrovir)
- 2- Abacavir(Ziagen)
- 3- Didanosine(Videx)
- 4- Lamivudine(Epivir)
- 5-Delavirdine (Rescriptor)
- 6-Efavirnz(Sustiva)
- 7-Amprenavir (Agenerase)
- 8-Ininavir (Crixivan) and many others.

Critical thinking exercise

Nick, a 19 years old college student ,is diagnosed with genital herpes at the student health center .Acyclovir 200 mg qid is prescribed for 10 days .In addition ,acyclovir 400 mg is ordered bid to control recurrence of symptoms when lesions appear. Why Nick is given Acyclovir? What client teaching will Nick need at this time?

Critical thinking exercise (Ethical /Legal Dilemma)

John was diagnosed with acquired immunodeficiency syndrome 2 years ago and has been aggressively treated with many drug protocols. Despite aggressive therapy ,his condition continue to deteriorate and his physician start to talk about end of life issues. John's last hope seems to be a new investigational drug that is being studied at the university.

Discuss with your instructor and colleagues:

- Should we wait approval process for drug when drug being developed to treat terminal condition?
- When a client feels his or her chance for survival without the drug is very limited ,is informed consent for study participation really possible?

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