College of Veterinary Medicine
Department of Internal Medicine & Preventive

Different Routes for Administration of drugs

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Routes for Administration of drugs

Often there is a great choice in selecting the route by which a drug should be given to patients. However, the condition of the patient and knowledge of advantages and disadvantages of various routes are of prime importance in making the selection of best suiting routes.

Following are the different ways by which a therapeutic agent could be given to patients:

1-**Enteral(PO.)**

2-Parenteral(Injection)

3-Inhalation

4-Topical or Local

Factors to be considered when choosing certain route

- **1-** must be correlate with the site of drug action

therefore, treatment of skin lesion by topical application at most.

- **2-Drug nature:** Drugs which are water soluble are to be injected intravenously.
- **3-Duration of action:** Drugs intended for longer duration of action are given by route when absorption is slow (e.g. transdermal).
- **4-Patient status:** Whether he is conscious or unconscious.

Routes of drugs administration can be classified as follows:

- **I-Oral Route Or Per OS (P.O.) :** Enteral drug placed directly in the GI tract or It means giving the drug by mouth (by digestive system). It includes:-
- **1-Swallowing:** tablet, capsules by special gun ,Electuary ,paste .
- **2- Drench:** fluid drugs administration ex. Anti helmenticts drugs by drenching gun.
- **3- stomach tube:** fluid drugs incase drugs irritant to mucus membrane of mouth ex. Chloral hydrate, drugs high expensive

drench gun

stomach tube

Advantages: -

- **1-** This is a common route, does not require sterilization or water solubility.
- **2-** It is a safe route since in over dose it can be managed.
- **3-** Oral drugs can be given in different pharmaceutical shapes.

Disadvantages:

- **1-** Some drugs are destroyed by gastro-intestinal juice as Penicillin.
- **2-** Some drugs are not absorbed from GIT as gentamycin.
- **3-** Some drugs cause local irritation to the mucous membrane.
- **4-** Irregularity of absorption by food or anticholinergic drugs.
- **5-** Drugs are carried directly to the liver by portal vein & may be inactivated by first-pass metabolism.

II-Parenteral route(Injection) :It includes: -

- **1-Intravenous route(IV.)**

Injection of the vein should be with the direction of blood but Not against it. The I.V. fluids should be isotonic, site of injection is the vein of Jugular vein in cows ,horse, sheep .goats .cephalic vein in Dogs,Cats

Advantages: -

- **1-**Large volume of preparation can be given, with control the rate of administration.
- **2-**Rapid onset of drug action, so, it is preferred in emergencies.
- **3-**Drugs that are rapidly destroyed can be infused continuously.
- **4-**Administration of drugs that cannot be absorbed by the gut or irritant to be given by other route.

Disadvantages: -

- **1-**I.V fluids are aqueous solutions only, suspension cannot be given to avoid embolism.
- **2-**Thrombus is liable to occur especially with prolonged infusion.
- **3-**It is not safe route thus the drug must be given slowly.

2-Intramuscular route(IM.)

It is a common route, more rapid than subcutaneous route and less affected by peripheral circulatory failure. The irritant solution is not to be given by this route, site of injection is the muscle of femur in sheep, goats dogs, cats and gluteal, neck muscle in cows, horse.

3-Subcutaneous route(SC.)

- The Isotonicity is not essential except for patient comfort. Only aqueous solutions are used because aqueous suspensions & oleaginous suspensions and solutions are Irritant & cause pain. Poor absorption in case of peripheral circulatory failure . incase vaccination, dehydration in animals. site of injection is over of scapula in cow ,horse, in sub axillary in sheep ,goats.

4-Intraperitonial route(IP.)

- A relatively large volume of non-irritant drugs can be given. The rate of absorption is faster than subcutaneous & Intramuscular route. The site of injection is the lower part of the abdomen in small animals and Para lumber regions in cows, the needle should not touch the intestine but only in the peritoneal cavity.

5-Intradermal route(Id.)

- The volume of preparation injected is rarely more than 0.2 ml because the tissue volume is small & compact. The absorption is slow due to poor circulation. The Istonicity is very important because the route is mostly for diagnostic purposes & non-isotonic solutions may cause false signs, which give false positive results.

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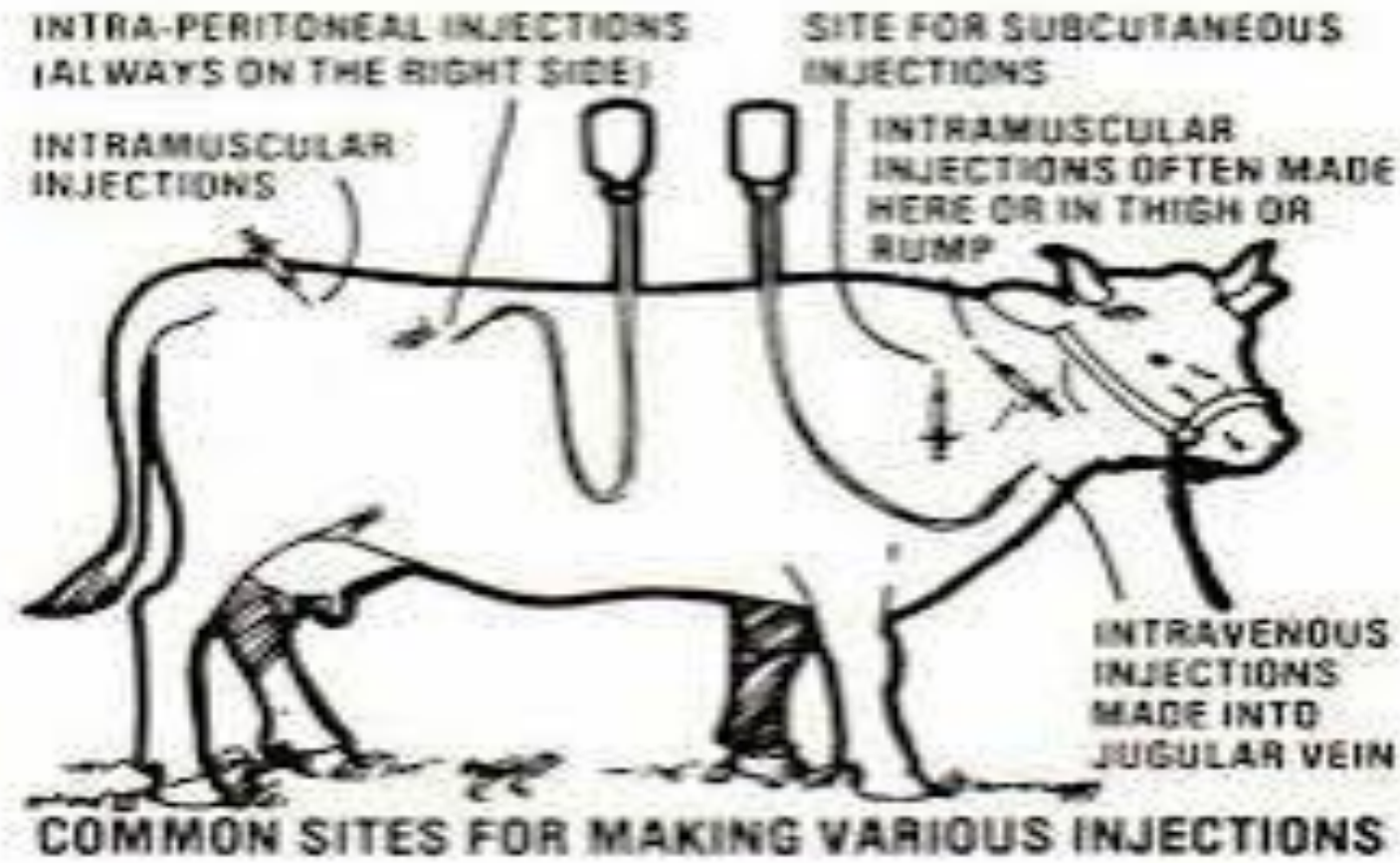

COMMON SITES FOR MAKING VARIOUS INJECTIONS

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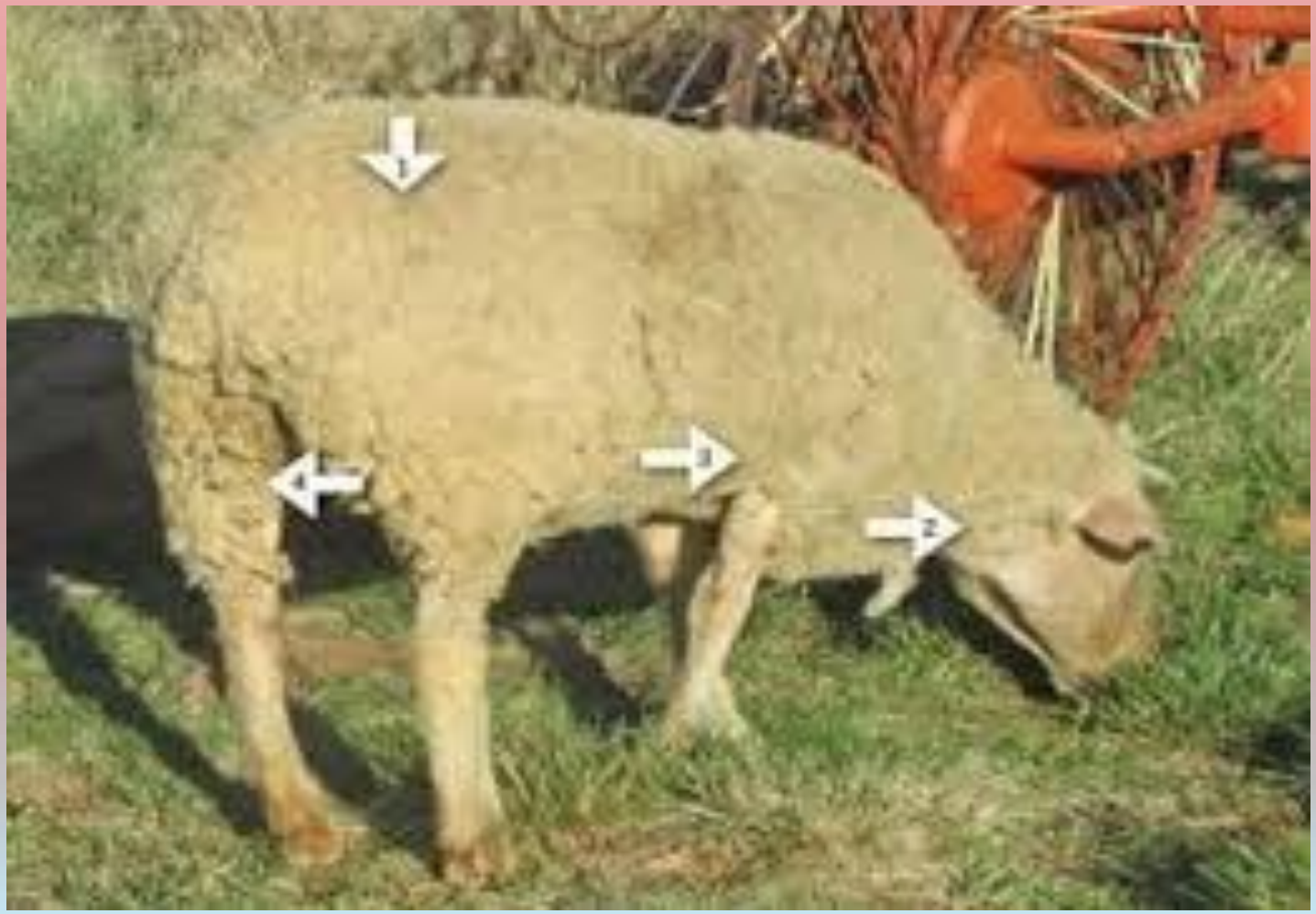

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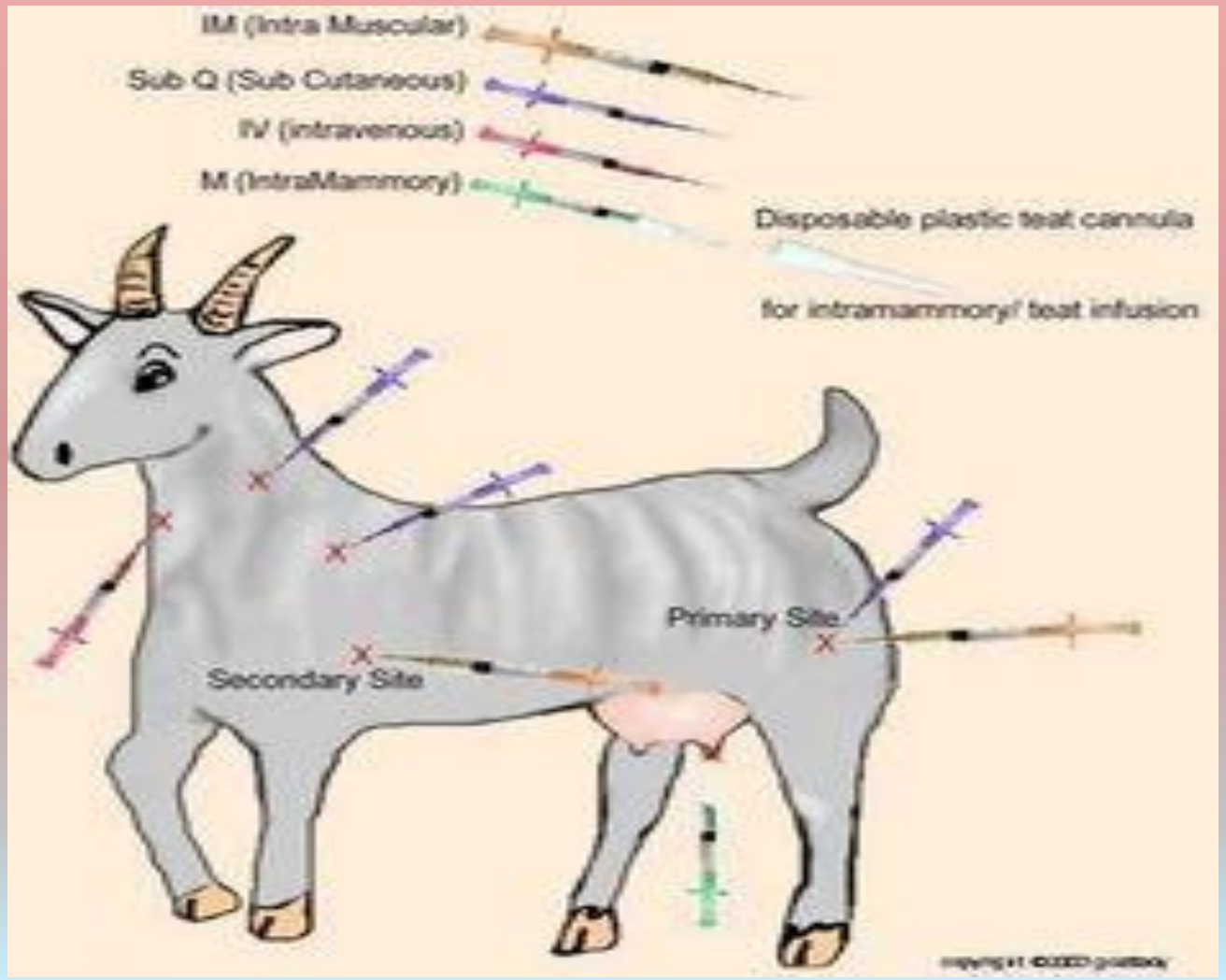

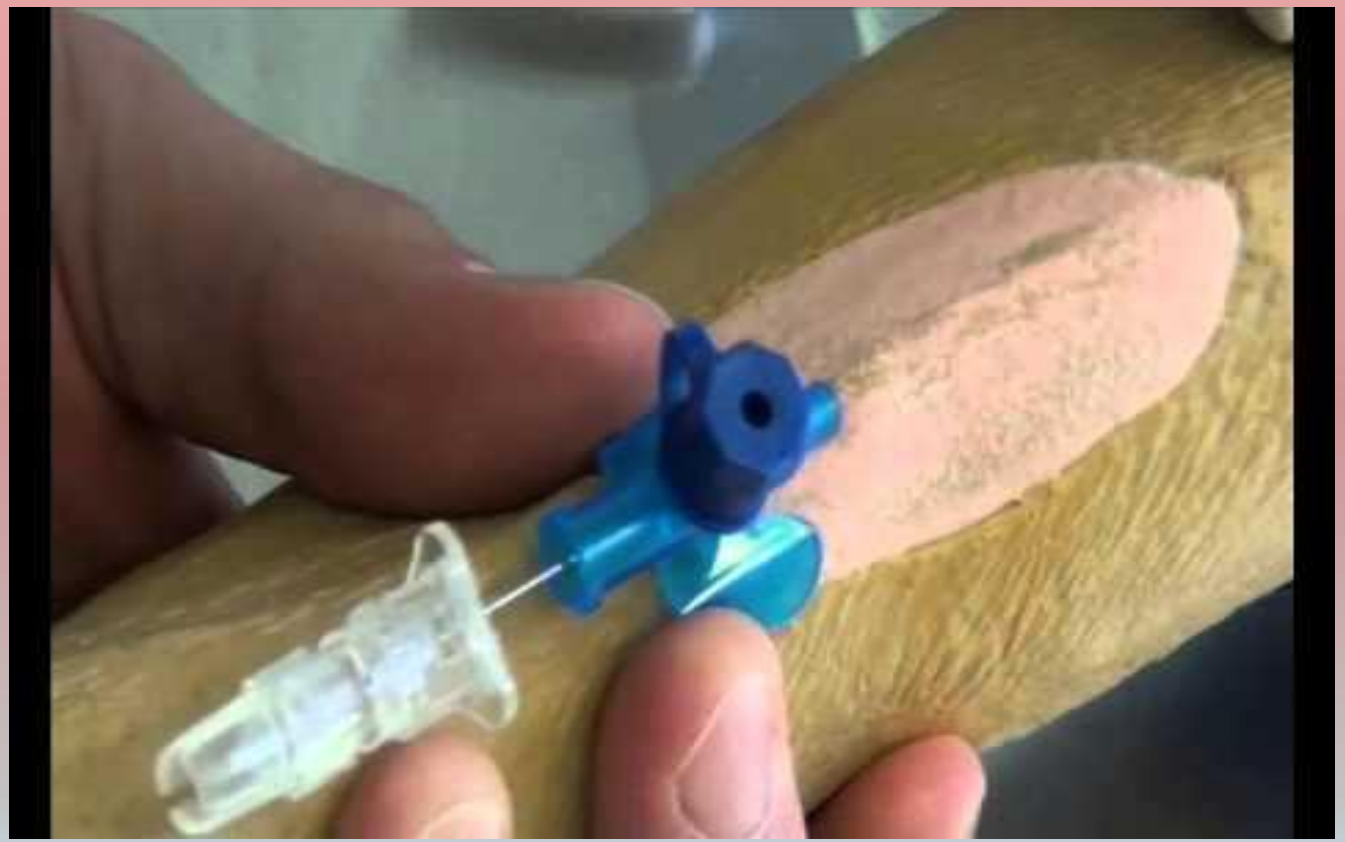

intravenous injection in dogs (cephalic vein)

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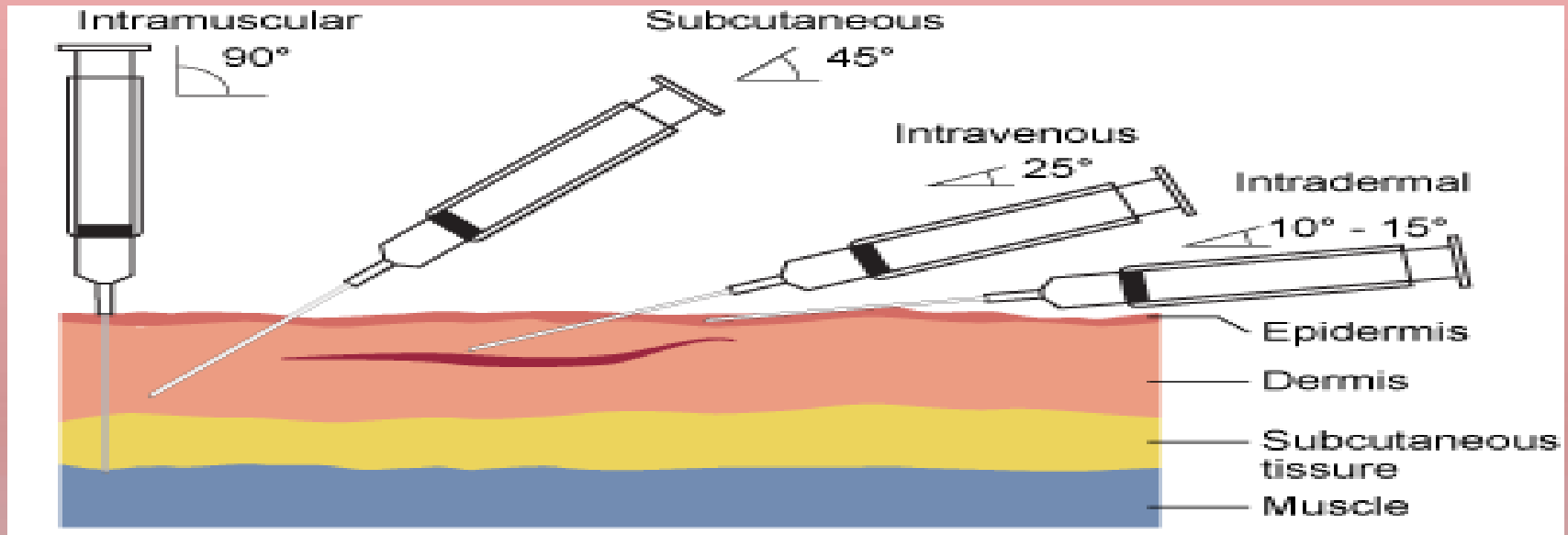

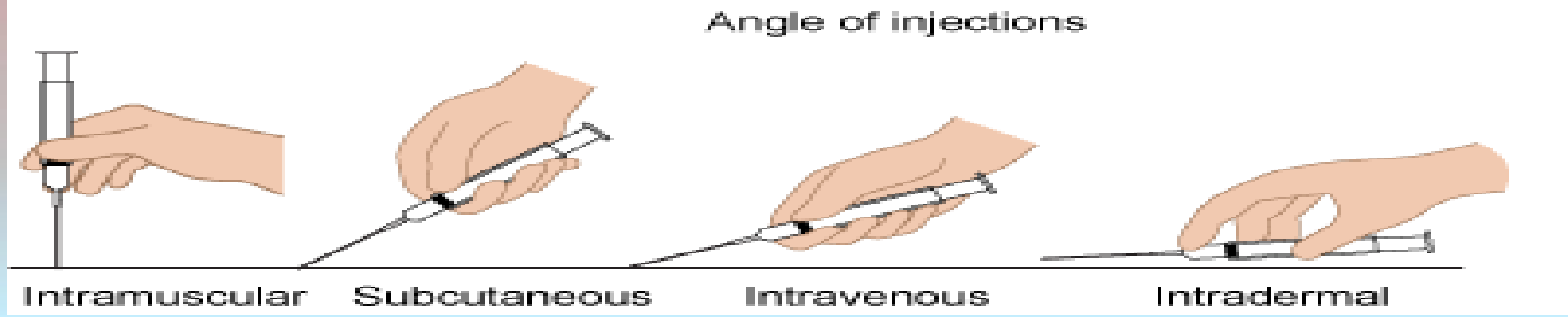

6-Topical or local application:

local use refers to site-specific applications of drugs, The drugs may be applied locally at the site or area to be treated in the skin or mucous membrane. These include eye, ear, nose drops, skin cream, skin ointment & suppositories.

- **Advantages:** This route provides a high local concentration of the drug without affecting the general circulation.
- **The disadvantage of this route is :** Absorption may occur when there is tissue damage.

- **7-Rectal route:(rectal enema)** this route is preferable for:
- 1- When the drug causes irritation by other routes
- 2- or there is motion sickness or vomiting

- **8-Inhalation:**
- The drugs are given through inspired air, as volatile anesthesia (Ether) also
- as inhaler as B2 adrenoceptor stimulants as (Salbutamol).

Advantages:

- **1-**rapid action when used for systemic administration like inhalational anesthesia.
- **2-** direct action (topical) as (Salbutamol) for asthma with less systemic side effect.

The disadvantages:

- **A**-It needs a special apparatus.
- **B**-The substance should be not irritant.
- **C**-The patient must be conscious.

- **9-Intrathecal route:** as in general anesthesia.
- **10-Intraarterial route.**

- **11- Intra articular route:** injection directly into joint space e.g. hydrocortisone injection for rheumatoid arthritis. Strict aseptic precautions should be taken. Repeated administration may cause damage to the articular cartilage.

- **12- Intra-cardiac route:** In cardiac arrest intracardiac injection of adrenaline is made for resuscitation.
- **13-intramamary injection:** incase mastitis.