

PRACTICAL 3

ROUTES OF ADMINISTRATION

There are many ways that the drug can be administered to the body for treatment of diseases.

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.
- 5-Desire of the patient.

Routes of drug administration can be classified as follows:

I-Oral route:

It means giving the drug by mouth (by digestive system). It includes:-

1-Swallowing:

Advantages: -

- 1- This is a common route, dose 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 gentamycine.
- 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.

2-Sublingually:

Advantages: -

- 1-To avoid first-pass metabolism as Glycerol trinitrate.
- 2-To avoid delay in the rate of absorption.

Disadvantages: -

- 1-Irritation to the mucous membrane of the mouth.
- 2-Excessive salivation promotes swallowing.

II-Parenteral route:

Means giving the drug by any route other than digestive tract (Parenteral in Latin means intestine). It includes: -

1-Intravenous route:

Injection of the vein should be with the direction of blood but Not against it. The I.V. fluids should be isotonic.

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 can not be absorbed by the gut or irritant to be given by other route as : Anti cancer drugs.

Disadvantages: -

- 1-I.V fluids are aqueous solutions only, suspension can not 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:

It is a common route, more rapid than subcutaneous route and less affected by peripheral circulatory failure. Preparation is about 2 ml & isotonicity is not essential except for the comfort of the patient & slightly hypertonic formulation is used to increase absorption due to local effusion of body fluid. The irritant solution is not to be given by this route, site of injection is the muscle of arm, thigh, gluteal region.

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3-Subcutaneous route:

The volume of injected fluid is usually 1 ml or less. 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.

4-Intraperitoneal route:

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, the needle should not touch the intestine but only in the peritoneal cavity.

5-Intradermal route:

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 isotonicity is very important because the route is mostly for diagnostic purposes & non-isotonic solutions may cause false signs, which give false positive results.

6-Topical or local application:

The drug 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: 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.

Procedure: -

1-15 mice are divided into 5 groups.

**2-Each group will be administrated Diazepam 5mg/kg body weight
I.V., I.m, S.C., I.P., &oral.**

3-The time of onset of drug & duration of action will be determined.

4-The comparison between the results should be made in a table as follow:

Route of administration	Time of onset	Duration
ORAL		
INTRAVENOUS		
INTRAMUSCULAR		
INTRAPERITONEAL		
SUBCUTANEOUS		