Lecture 10 which doctor gave it to us as self-Reading.

every thing in this color means it is my understanding and this Color means it is from internet

Drug routes of Adminstration

- Enteral
- Parenteral
- others

Oral route (PO)

- must be swallowed
- most commonly used
- Safest, most convenient and most economical
- Duodeum is major site of Absorbtion, Jujunum and ileum maybe involved.

Disadvantages

- The patient must be cooperative
- Absorbtion is variable because several factors which affecting the rate and extent of absorbtion
  - * Vomitting
  - * failure of disintegration and dissolution
  - * first-pass effect
  - * Drug maybe distroyed by gastric acid or intestinal flora.
  - * food may delay absorption
  - * Alteration in intestinal motality may affect the absorption
  - * Absorption maybe affected By splanchnic blood flow.

Sublingual route (SL)

- * Drug is placed under the tongue
- Avoids first-pass effect
- Used when rapid onset is required Such as angina pectoris → heart doesn't got enogh blood
- Not commonly used

Rectal route (PR)

- useful in unconscious or vomitting patients.
- Absorption is irregular, incomplete and unpredictable
- Can Be used for local effect
- for drugs poorly absorbed or unstable in the GIT.
- used for rapid effect.
- Aseptic technique is required. (معقمة)
- avoid first-pass effect partially why? because drug can partially Bypass the liver following systemic circulation. So the drug will absorped by two different Vascular system one of them will bypass the liver

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قال رسول الله صلى الله عليه وسلم: العهد الذي بيننا وبينهم الصلاة فمن تركها فقد كفر.

Second routes is * parenteral Routes

intravenous (IV)

- Bolus vs. infusion.
  Bolus is much more faster
- only aqueous solution can Be injected with IV
- Rapid onset of Action
- Oily vehicles or that participate blood Constituents should not be givin IV
  I understand that it is carrier for ingrediants which is lipid soluable.
- No first-pass hepatic motabolism

Disadvantages

- produce high initial Conc. might be toxic
- once injected, the drug is there ?? → مش عارف شو اللغز هذا!

Drug by IV → right side of heart → the lung → left side of the heart → systemic Circulation

intramusclar routes (IM)

- The drug is injected in muscle fibers of deltoid, gluteus maximus or Vastus lataralus
- Absorption is depend on blood supply (slower for g.m ⇒ gluteus maximus)
- Absorption reduced in circulation failure or shock
- the drug must be non-irritating for muscle tissue

And IM can Utilize

- aqueous solutions for fast absorption and rapid action
- Depot prepration and suspensions for slow absorption (oily vehicles or ethyleneglycol)
- can accomodate large volumes

Subcutaneous injection

* Subcutaneous injections (SC or SQ)

- Drug is injected under the skin
- Absorption is affected by blood flow
- Solid pellets can Be implanted under the skin to produce effect over weeks and monthes.
- Drug must Be non-irritating to tissues.
- Absorption is slow & sustained
- accomodate smaller volume than IM

The third routes is Other Routes

Inhalational or pulmonory route

* Used for gasous or volatile drugs Such as general anesthetics
* also for solid drug that can be put in an aerosal, Such as drugs for bronchial asthma
* Drug is absorbed across pulmonary epithelium and mucous membrane of respiratory tract.
* absorption is rapid * avoid first pass-effect.
* The lung acts as a route of elimination also

Transdermal route (TD)

* the drug is applied to skin for systemic effect Such as angina.
* for sustained effect
* Avoid first pass-effect

Topical application

- Systemic absorption also occure from aboraded, burned and inflamed skin.
- for local effect
  - skin (highly lipid Soluble can be absorbed systemiclly
  - mucous membrane → vagina, orpharynx, mouth, Conjuctiva, nose, Urethra, Colon, rectum, Urinary bladder

Enteral Routes			
Buccal or sublingual (SL)	Rapid absorption from lipid-soluble drugs.	No "first-pass" effects. Buccal route may be formulated for local prolonged action. Eg, adhere to the buccal mucosa with some antifungal. Buccal is different from sublingual which is usually placed "under tongue."	Some drugs may be swallowed. Not for most drugs or drugs with high doses.
Oral (PO)	Absorption may vary. Generally, slower absorption rate compared to IV bolus or IM injection.	Safest and easiest route of drug administration. May use immediate-release and modified-release drug products.	Some drugs may have erratic absorption, be unstable in the gastointestinal tract, or be metabolized by liver prior to systemic absorption.
Rectal (PR)	Absorption may vary from suppository. More reliable absorption from enema (solution).	Useful when patient cannot swallow medication. Used for local and systemic effects.	Absorption may be erratic. Suppository may migrate to different position. Some patient discomfort.
Other Routes			
Transdermal	Slow absorption, rate may vary. Increased absorption with occlusive dressing.	Transdermal delivery system (patch) is easy to use. Used for lipid-soluble drugs with low dose and low MW (molecular weight).	Some irritation by patch or drug. Permeability of skin variable with condition, anatomic site, age, and gender. Type of cream or ointment base affects drug release and absorption.
Inhalation and intranasal	Rapid absorption. Total dose absorbed is variable.	May be used for local or systemic effects.	Particle size of drug determines anatomic placement in respiratory tract. May stimulate cough reflex. Some drug may be swallowed.

Route	Bioavailability	Advantages	Disadvantages
Parenteral Routes			
Intravenous bolus (IV)	Complete (100%) systemic drug absorption. Rate of bioavailability considered instantaneous.	Drug is given for immediate effect.	Increased chance for adverse reaction. Possible anaphylaxis.
Intravenous infusion (IV inf)	Complete (100%) systemic drug absorption. Rate of drug absorption controlled by infusion rate.	Plasma drug levels more precisely controlled. May inject large fluid volumes. May use drugs with poor lipid solubility and/or irritating drugs.	Requires skill in insertion of infusion set. Tissue damage at site of injection (infiltration, necrosis, or sterile abscess).
Subcutaneous injection (SC)	Prompt from aqueous solution. Slow absorption from repository formulations.	Generally, used for insulin injection.	Rate of drug absorption depends on blood flow and injection volume. Insulin formulaton can vary from short to intermediate and long acting.
Intradermal injection	Drug injected into surface area (dermal) of skin.	Often used for allergy and other diagnostic tests, such as tuberculosis.	Some discomfort at site of injection.
Intramuscular injection (IM)	Rapid from aqueous solution. Slow absorption from nonaqueous (oil) solutions.	Easier to inject than intravenous injection. Larger volumes may be used compared to subcutaneous solutions.	Irritating drugs may be very painful. Different rates of absorption depending on muscle group injected and blood flow.
Intra-arterial injection	100% of solution is absorbed.	Used in chemotherapy to target drug to organ.	Drug may also distribute to other tissues and organs in the body.
Intrathecal Injection	100% of solution is absorbed.	Drug is directly injected into cerebrospinal fluid (CSF) for uptake into brain.	
Intraperitoneal injection	In laboratory animals, (eg, rat) drug absorption resembles oral absorption.	Used more in small laboratory animals. Less common injection in humans. Used for renally impaired patients on peritoneal dialysis who develop peritonitis.	Drug absorption via mesenteric veins to liver, may have some hepatic clearance prior to systemic absorption.

أتوقع (وركز على كلمة أتوقع) أن المعلومات الإضافية في الجداول هاي مو مطلوبة بس اي بالصفات اي فوت