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FACULTY — Km. UMA

DEPARTMENT — PHARMACY

SUBJECT — PHARMACEUTICS-II

COURSE — D. PHARM

COURSE DURATION — 2 YEAR

SUBTOPIC — POSOLOGY

CONTENT TYPE — TEXT

KEY WORD — POSOLOGY, YOUNG'S FORMULA

UNIT-I

Posology

The word posology is derived from the Greek words "posos", meaning how much and "logos", meaning science. That means it is a branch of medical science which deals with doses or quantity of drugs which can be administered to produce the required pharmacological actions.

* Formula for Calculating dose of child :-

1. **Young's formula :-** child below 12 years

$$\text{Child's dose} = \frac{\text{age in year}}{\text{age in year} + 12} \times \text{adult dose}$$

2. **Fried's rule :-** Infant max up to 2 years)

$$\text{Child dose} = \frac{\text{Age in months}}{150} \times \text{Adult dose}$$

3. **Dilling's rule :-** 4-20 years

$$\text{Child dose} = \frac{\text{Age in years}}{20} \times \text{Adult dose}$$

4. **Clark's Formula (according to body weight) :-**

$$\text{Child dose} = \frac{\text{child's weight (kg)}}{70} \times \text{Adult dose}$$

* Factors Affecting Dose and Action of drugs :-

1. Age
2. Sex
3. Body weight
4. Route of administration
5. Time of Administration
6. Presence of Disease
7. Environmental factors
8. Emotional factors
9. Accumulation
10. Additive effect
11. Synergism
12. Antagonism
13. Idiosyncrasy
14. Tolerance
15. Hypersensitivity

1. **Age**:- Children and old people need lesser amount of drug than the normal adult dose, because they are unstable to excrete drugs to the extent as adults. But at the same time children can tolerate relatively large doses of digitalis and belladonna on the basis of their body weight as compared with adults.

2. **Sex**:- Generally females requir lesser dose than males because of their lesser weight and drugs should be given very carefully during menstruation, pregnancy and lactation. Drugs like alcohol, anaesthetic gases, barbiturates, narcotic and non-narcotic analgesic, etc., which are readily transported from mother to the foetal circulation should be avoided.

3. **Body weight**:- Generally recommended adult doses are based on a "normal" body weight of 70 kg. But such as dose will be too less for a muscular person weighing 100 kg. and too large for a weak person weighing about 50kg

4. **Route of administration**:- the dose of a given drug may vary according to the dosage from and route of administration used. Drugs administered intravenously enter the blood stream directly hence require lesser dose than the subcutaneous dose which in turn is smaller than the oral dose.

5. **Time of administration**:- Time of administration of drugs is very important. Drugs are rapidly absorbed from the empty stomach, hence an amount of drug that is effective when taken before a meal may be ineffective if administered during or after meals.
   eg:- iron, arsenic, cod-liver oil, etc should Always be given on a full stomach.

6. **Presence of disease**:- Drugs are more effective in diseased conditions than normal body condition. During fever one can tolerated high doses of antipyretics than in a nonfebrile condition.

7. Environmental factors :- Alcohol is better tolerated in cold environ-ments than in summer. Dose of a sedative required to produce sleep during day time is much more than the dose required to produce sleep during night.

8. Emotional factors :- Females are more emotional and responsive to drugs therefore require less dose of drugs. Nervous patients require smaller doses of drugs as compared to normal patients.

9. Accumulation :- when a drug is repeatedly administered for a long time, depending on its nature, it may unexpectedly accumulate in the body to produce sudden toxic symptoms. The cumulative effects are usually produced by slow excretion, defective degradation or unexpectedly rapid absorption of drugs.

10. Additive effect :- when the total effect of two drugs is just equal to the sum of their individual effects, it is known as additive effect.

11. Synergism :- when two or more drugs are used in the combined from their action is either increased or decreased depending on the drugs used in combination.

12. Antagonism :- when the action of one drug is opposed by the other drug, the phenomenon is known as antagonism. eg- milk of magnesia is given in acid poisoning. Here one drug is acidic and another is alkaline.

13. Idiosyncrasy :- All persons do not respond alike to the same drug due to varied individual susceptibility, some may produce abnormal reaction to a drug. when an abnormal or unusual reaction is produced by a drug it is known as idiosyncrasy. eg. small doses of quinine may produce ringing in the ear.

14. **Tolerance** :- when a drug administered in an ordinary dose fails to produce the normal therapeutic effect & requires large dose of the drug to produce the normal effect. The unusual resistance thus produced is known as tolerance. eg- alcoholics can tolerate large doses of alcohol.

15. **Hypersensitivity** :- Hypersensitivity is an allergic reaction to a drug and is different from either the expected pharmacological response or toxic reaction to the drug.

Factors Affecting Dose of a Drug in Animal :-

1. Age
2. Body weight and size
3. Sex
4. Time of Administration
5. Route of Administration
6. Climatic conditions
7. Surroundings and work
8. Habit
9. Species
10. Synergistic or Antagonistic Effect
11. character of the drug
12. Object of medication
13. Rate of Elimination.

6. **Climatic condition** :- The temperature and atmospheric moisture have a great influence on the tissue of the animals.

In humid and hot climate less dose is required than in a dry and cold climate.

7. **Surrounding and work** :- Hypnotics may not produce sleep in noisy surroundings unless a heavier dose is administered.

8. **Habit** :- An animal which is constantly under the influence of a drug may develop tolerance for that drug. The normal dose may fail to produce the desired effect and may require much bigger doses to get appreciable effect.

9. Species :- The dose of a drug varies from species to species. The dose of a drug for a horse will be different from cow, from sheep, from goat, from pig, from dog, from cat etc.

10. Synergistic or Antagonistic effect :- when two drugs having similar effect are given in the combined from the action is potentiated and a more powerful effect is produced than either of the individual drug even when given in equivalent dose.

Sometimes when two or more drugs are combined together, they oppose the effect of each other and ultimate therapeutic effect is lost.

11. Character of the drug :- A crude drug has to be given in larger doses than its active principals or extract. eg- nux-vomica powder will have to be given in larger doses than its alkaloid strychnine.

12. Object of medication :- The dose of a drug varies with the purpose for which it is used, eg- magnesium sulphate act as purgative in large doses while in smaller doses it acts as laxative and antacid.

13. Rate of elimination :- The drugs which are excreted at a faster rate require larger doses than those drugs which are excreted at a slow rate.

Dose And Dosage of Drug :-

Dose :- A dose refers to a specified amount of medication taken at one time.

Dosage :- The dosage is the prescribed administration of a specific amount, number, and frequency of dosage over a specific period of time.

How to Calculate doses of drug

(A) According to Age

Example:- 1. The adult dose is 60 mg & the age of the child is 4 year, the dose for the child will be.

$$\text{Child's dose} = \frac{\text{age in year}}{\text{age in year} + 12} \times \text{adult dose}$$

$$= \frac{4}{4+12} \times 60$$

$$= \frac{\cancel{4}}{\cancel{16}_{4}} \times 60 \Rightarrow \frac{1}{\cancel{4}} \times \cancel{60}^{15} \Rightarrow 15\text{mg}$$ ~~Ans.~~

(B.) According to Body Surface Area (BSA)

2. If the adult dose of a drug is 100mg, calculate the approximate dose for a child with a BSA of 0.83 m^2 using.

$$\text{Child's dose} = \frac{\text{Patient's BSA } (m^2)}{1.73\, m^2} \times \text{Drug dose (mg)}$$

$$= \frac{0.83\, m^2}{1.73\, m^2} \times 100 \Rightarrow 47.97$$

$$\Rightarrow 48\text{ mg.}$$ ~~Ans.~~

* Reference:- 1. A. K. GUPTA | S. S. BAJAJ Introduction to pharmaceutics -II, 4th edition, CBS Publishers & Distributors Pvt. Ltd.
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