

Drugs Prescribing in Infants, Children and Elderly

Neonates (under 1 month) → Infant (1 → 12 months) → children (1 - 12 years)

children should not be regarded as small adults

Absorption :-

- Adults absorption is constant; while in infants is variable

* diazepam + digoxin [Lipid soluble drugs] → normal A

* diazepam note :-

* sedative effect for surgery + relaxation of nerve + brain

* paracetamol → ↓ Absorption

* paracetamol note :-

common in therapy of fever + in high dose → liver damage

* Antibiotics like ampicillin, flucloxacillin and amoxicillin

↑ Absorption ; ↓ gastric acidity in children

percutaneous injection → rapid

Intramuscular injection → slow

creams : ~~Topical~~ ophthalmic

Drugs For Adults : $\frac{1}{10}$ / for Children : $\frac{1}{100}$

Distribution :-

* 70% of body weight is water in children \rightarrow

Vd water soluble drugs \uparrow

* Fat content in children $\downarrow \rightarrow \downarrow$ Vd Lipid soluble drugs

* Albumin in children $\downarrow \rightarrow \uparrow$ [free active drug] \rightarrow

\downarrow dose to prevent accumulation + toxicity

* phenytoin highly bound drug \rightarrow low dose for children

additional note : phenytoin is anti epileptic drug

* BBB after birth still immature $\rightarrow \uparrow$ permeability of lipid soluble drugs $\rightarrow \downarrow$ dose to prevent accumulation + toxicity

Metabolism

Cytochrom P 450 enzyme activity in children $\downarrow\downarrow\downarrow \rightarrow$

$\uparrow t_{1/2}$

باجبة لوقت أكثر عن ان سقاي من نفس العمر من الدولة $(t_{1/2})$

* lipid soluble drug deliver kidney $\xrightarrow{\text{convert}}$ water

soluble to elimination

▲ one of the following drugs is eliminated by metabolism in liver of children: **phenobarbitone**

Excretion

renal clearance is less efficient

* Adult glomerular filtration rate is attained after 3-5 months

aminoglycosides, and diuretics are cleared from the body very slowly in the first weeks of life

$t_{1/2}$ in metabolism/excretion in older children $<$ $t_{1/2}$ in Adults

pharmacodynamic

depend on type of receptor \rightarrow mechanism of action

num of receptors

sensitivity of receptors

* Heart tolerance is sign of cardiovascular health* **tolerant α health**

Dose calculation:- **compare with healthy adult**

Clark's rule (العزن)

Child dose = adult dose \times child BW (kg) / 70kg

Young's rule (Age)

Child dose = adult dose \times child age (years) / (age + 12)

Surface Area (more accurate)

Child dose = adult dose \times SA child (M²) / 1.8

* Children's prescription writing:

Age is legal requirement لا نزم تال عن العو

② - route of administration liquid \checkmark tables \times

- bad tests to avoid

- avoid sugars \rightarrow ~~dental decay~~

- avoid prolonged treatment (steroids)

* Elderly a e > 65

body composition: \uparrow fat, \downarrow water

Absorption \downarrow gastric acid, \downarrow motility of gut, \downarrow Blood flow

duodenal diverticulae + bacterial growth \rightarrow Malabsorption

Absorption \downarrow : iron, calcium, ^{*}thiamine, xylose, and galactose (all need active transport mechanisms)

*thiamine vitamine B-1

Metabolism

— reduction in liver activity + ↓ capacity of Microsomal enzyme

— prolonged time of these drugs:

diazepam, quinidine, theophylline, propranolol, nortriptyline

Distribution

↑fat → ↑Vd of lipid soluble drugs

benzodiazepines, lignocaine, gentamycin, morphine, tolbutamide

↓water → ↓Vd of water soluble drugs → low doses

lithium, and digoxin.

Decreased albumin (increases the unbound fraction of highly protein binding drugs like lidocaine, and propranolol)

and increased gamma globulins (for acidic drugs; e.g. warfarin, phenytoin and digoxin).

Excretion $t_{1/2} \uparrow$ of

aminoglycosides, digoxin, lithium, methotrexate, procainamide, tetracycline, penicillins, cephalosporins

Pharmacodynamics

Pharmacodynamics

Impaired homeostatic reflex

more sensitive to drugs affect brain + Blood pressure (β_1) + digoxin

General principles when using drugs in elderly :-

- Full drug history

- regime simple (choose more specific + selective drugs)

- low effective dose

- ↓ duration

- Follow up the pt

- route of administration elixirs easier than tablets