Adverse drug effects

Undesirable or harmful effects which can occur at therapeutic doses and need a reduction of dose or drug withdrawal .

- **Nausea and vomiting**
- **Deafness with gentamycin**
- **Death with penicillin**

Types of adverse drug reactions

A, B, C, D and E

1) Type A reactions

- Excessive therapeutic effect
- Side effects

I) Type A reactions

- Common
- 75 % of all adverse reaction
- Related to pharmacological actions.
- Dose-dependent
- Predictable
- Can be avoided by adjusting the dosage regimen
- Most of them are reversible upon stopping drug.
- Hypotension (antihypertensives)
- Hypoglycemia (insulin)

Type A reactions

1. Excessive therapeutic effect

Unwanted effects related to the main pharmacological actions of the drug that occur when the drug produce greater therapeutic effect than is necessary.

- **Warfarin → Anticoagulant → Bleeding**
- **Insulin → Normoglycemia → Hypoglycemia**

2. SIDE EFFECTS

Unwanted effects unrelated to the main pharmacological actions of the drug but due to other normal actions of the drug.

e.g. morphine constipation during its use as analgesic.

II) Type B reactions

- are bizarre reactions
- Not related to the normal pharmacological actions of the drug.
- Unpredictable
- Not dose-related.
- Occur only in minority of patients.

Types

- allergic reactions (Hypersensitivity)
- Genetic disorders (Idiosyncrasy)

Type B
1) Hypersensitivity (allergic reactions)

Abnormal response tio the drug due to antigen- antibody reactions e.g. Penicillin

- allergic response to a drug.
- rashes, hypotension and bronchospasm (anaphylactic reaction).

Type B

2) Idiosyncrasy

- is abnormal response to the drug due to genetic disorders.
- Succinylcholine apnea
- Malignant hyperthermia
- Favism
- Porphria

SECONDARY EFFECTS

- Unwanted effects that occur secondary to the wanted actions of the drug.
- Overgrowth of microorganisms following use of broad spectrum antibiotics.

Type C reactions (Continuous reaction)

- Due to long term use e.g. NSAIDs analgesic nephropathy

Type D reactions (Delayed adverse reactions)

Teratogenesis

Is congenital malformations occurring in the fetus due to exposure to drugs during pregnancy

e.g. Thalidomide → phocomelia

Carcinogenesis

Ability of some substances to induce cancer.

Stilbesterol → adenocarcinoma of vagina in female off springs.

Mechanisms

1. DNA alteration

griesofulvin& alkylating cytotoxics

2. Immunosuppression

immunosuppressant increase incidence of cancer

e.g. organ transplantation & rheumatoid arthritis

3. Hormonal

long term use of estrogen replacement in PMW induce endometrial cancer

Type E reactions (Ending of drug)

- Sudden discontinuation (abrupt withdrawal).
- Rebound adrenal insufficiency

e.g. corticosteroids