* Therapeutic drug monitoring
* Dr Arif Hashmi
* Objectives
* Review the therapeutic monitoring of drugs with low therapeutic indices.
* Indications of Therapeutic drug monitoring.
* Clinical significance of therapeutic drug monitoring.
* Give example of drugs that needs therapeutic drug monitoring.
* **Definition of TDM**
* Measurement of drug conc. at different intervals in body fluids & tissues
* Maintain relatively constant conc. of medication in bloodstream
* Commonly measurement is in biological matrix of prescribed xenobiotic
* But it may also be of an endogenous compound prescribed as replacement therapy
* **Why TDM ?**
* Major use of measured conc. of drug
* Individualization of dosage
* Maintaining plasma conc. within target range
* **Principle**
* PD factors:-
* Max. effect attained in target tissue
* Sensitivity of tissue to drug
* PK factors:-
* Absorption
* Vd
* Clearance

Factors determining conc. of drug in plasma & biological fluids:

* **Major sources of pharmacokinetic variability**
* Compliance
* Age
* Physiology
* Disease states
* Drug interactions
* Environmental influences on drug metabolism
* Genetic polymorphisms of drug metabolism
* **Aims of TDM**
* Therapeutic response
* Correlation between drug conc. & therapeutic effects
* Dosage regimen to produce therapeutic effects
* Investigation of therapeutic failure
* **Aims of TDM**
* To monitor ADRs
* Prevention of toxicity
* Diagnosis of poisoning
* Individualization of drug therapy in renal/hepatic disease
* **Situations where TDM is useful**
* Drugs with narrow therapeutic index
* Digoxin
* Lithium
* TADs
* Antiepileptics
* Antiarrhythmics
* **Situations where TDM is useful**
* Potentially toxic drugs in the presence of disease
* Aminoglycosides in presence of CRF
* Drugs where therapeutic effect is difficult to measure
* TAD
* Anticonvulsants
* **Situations where TDM is useful**
* Therapeutic failure- to check patient’s compliance
* ATT
* Antibiotics
* Unexpected toxicity with drugs following zero order kinetics
* Phenytoin
* **Situations where TDM is useful**
* Toxicity difficult to distinguish from underlying disease
* Penicillin in pyogenic meningitis
* **Situations where TDM is not useful**
* Drugs whose response easy to measure
* Antihypertensives
* Diuretics
* Anticoagulants
* Drug action due to active metabolite or exists in ‘Prodrug’ form
* **Situations where TDM is not useful**
* Drugs with delayed effects
* BM depression with anticancer drugs
* ‘Hit & Run’ drugs
* Aspirin
* MAO inhibitors
* Reserpine
* Omeprazole
* **Situations where TDM is not useful**
* Drugs with irreversible action
* OPCs
* Anticholinesterases
* Inflammatory states
* Basic drugs bind to acute phase proteins
* **Drugs commonly monitored**
* **Disadvantage of TDM**
* Measures both bound & free drug concentration
* Rise in bound form affect results
* Free drug conc. ideal to measure
* **Conclusion**
* Guide to
* Efficacy
* Avoid toxicity
* Compliance
* Individualization of dosage