Therapeutic Drug Monitoring:
Tailoring doses to increase safety and efficiency of medication

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What is therapeutic Drug monitoring (TDM)?

Therapeutic drug monitoring (TDM) is testing that measures the safety and efficiency of a medication based on plasma or blood concentrations. Dosage is targeted at achieving a particular therapeutic range. Not all medications require therapeutic drug monitoring.
You will see therapeutic drug monitoring used:

- To ensure that prophylactic dosing is effective to maintain the absence of a condition, such as seizures, cardiac arrythmias, depressive or manic episodes, asthma relapses or organ rejection.
- To avoid serious toxicity for medication with a Narrow therapeutic index (NTI-Drugs)

Drugs with narrow therapeutic index (NTI-drugs) are drugs with small differences between therapeutic and toxic doses, meaning that small changes in dosage, or interactions with other drugs could cause adverse effects. Regular monitoring is required for safety.

The following commonly used can be considered NTI-drugs:

- Aminoglycosides (gentamicin, tobramycin, neomycin, streptomycin)
- Ciclosporin
- Carbamazepine
- Digoxin
- Flecainide
- Lithium
- Phenytoin
- Phenobarbital
- Rifampicin
- Theophylline
- Warfarin

Test your knowledge!

Doses that are too high...
can lead to adverse events (e.g. increase in falls, decreased cognition, declines in overall health) and toxicity, which can be fatal.

Doses that are too low...
can result in therapeutic failure (i.e. increase in seizures, persistent infection)

Regular monitoring using blood tests is essential, and the interval (i.e. weekly, fortnightly etc) should be clearly stated in the clinical notes.

Therapeutic drug monitoring (TDM) should be performed when the patient has achieved steady-state concentration, has changed drug therapy, or has had a change in response to treatment (eg, toxicity).

Drugs with a narrow therapeutic index should be closely monitored. Mistakes in dosing or insufficient monitoring of high-risk medications can lead to serious complications and adverse health effects.