

Importance of Therapeutic Drug Monitoring For Safe and Effective Drug Intake

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DESCRIPTION

The therapeutic drug monitoring is a study of drug concentrations in body fluids, typically plasma, which can be employed during therapy as well as for diagnostic purposes. The selection of medications for therapeutic drug monitoring is important because many drugs concentrations are not clearly related to their effects. Therapeutic drug monitoring is used for specific medications attempts to improve drug efficacy, reduce toxicity or aid in diagnosis. Time, way of drug delivery, and dose of drug given, time of blood sampling, handling and storage conditions, precision and accuracy of the analytical method, validity of pharmacokinetic models and assumptions, co-medications, and clinical status of the patient (i.e. disease, renal/hepatic status, biologic tolerance to drug therapy, etc.) all influence the interpretation of drug concentration data. Despite its obvious benefits, it has fundamental limits as well. Some large hospitals have facilities that assist with drug monitoring and result interpretation.

Drug concentrations in plasma, serum, or blood are measured during therapeutic drug monitoring. This knowledge is used to modify dosing such that medication concentrations stay within a specific measurement of particular drugs and their breakdown products (metabolites) at regular intervals in order to keep the medication concentration in the blood constant. Some of the medications being evaluated have a limited "therapeutic index," which is a ratio of the toxic and therapeutic (effective) doses of medication. Most common methods used for drug monitoring are Fluorescence Polarization Immunoassay (FPIA), Enzyme Immunoassay and Enzyme-Linked Immunosorbant Assay (ELISA). These are the most often utilized techniques. These assays are specific; however, metabolites or other drug-like compounds are occasionally detected by the experimental antibody. Blood analysis provides a very brief feature since drugs are quickly metabolized and removed from the body. Drugs in blood are often detectable between minutes to hours, depending on the substance and dose, whereas urine can take one to several days. Therapeutic drug monitoring helps in the establishment of patient-specific dosage regimens; it aids in the enhancement of therapeutic efficacy, the reduction of drug toxicity, and for diagnostic purposes by personalizing drug therapy.

The concentration of the drug at the site of action cannot be determined frequently, however the unwanted effects may correspond better with plasma or blood concentrations than with dose. Concentration measurements are a good replacement of drug exposure for a few medicines, especially when there is no simple or sensitive measure of effect. Therapeutic drug monitoring includes not only measuring medication concentrations but also interpreting the results clinically. Carbamazepine, valproate, and digoxin are likely the most commonly researched medicines. There is, however, limited evidence that monitoring anticonvulsant concentrations improves clinical results when the medications are used to treat mood disorders. This requires knowledge of pharmacokinetics, sample time, drug history, and the clinical condition of the patient. When a drug's effect, such as changes in blood pressure, pain, or serum cholesterol, can be easily detected, the dose should be adjusted accordingly. When medications are used to prevent an adverse reaction, such as graft rejection, or to avoid toxicity, such as with aminoglycosides, monitoring drug concentration is more effective. As drug assays are expensive, the requirement for monitoring, as well as any new information received, should be carefully examined. Therapeutic drug monitoring can help boost efficacy (vancomycin), minimise toxicity (paracetamol), and aid in diagnosis for some medications (salicylates). Most medicines are not recommended for routine monitoring. Only clinically relevant testing should be carried out. Blood analysis provides a very brief feature since drugs are quickly metabolized and removed from the body. Therapeutic drug monitoring or clinical toxicology may need the use of drug tests very much. The information necessary to interpret the results for therapeutic drug monitoring should include the time of sample collection, drug concentrations should be evaluated in clinically relevant time frames in laboratories staffed with properly trained personnel and subjected to quality control procedures the time of the last dose, the dosage regimen, and the indication for drug monitoring. Therapeutic drug monitoring is the measurement of specific medications and their breakdown products (metabolites) at regular intervals in order to keep the medication concentration in the blood reasonably constant.

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CONCLUSION

The aim of employing drugs is to relieve symptoms, treat infections, lower the risk of future sickness, and destroy specific cells, such as in cancer chemotherapy. Monitoring for adverse outcomes is part of monitoring drug efficacy and should be customized to the drug and any reported toxicities within the

species. Therapeutic drug monitoring helps in the establishment of patient-specific dosage regimens; it aids in the enhancement of therapeutic efficacy, the reduction of drug toxicity, and for diagnostic purposes by personalizing drug therapy. Therapeutic drug monitoring, clinical response monitoring, imaging, and diagnostics such as complete blood count, biochemistry, and urinalysis are all elements of monitoring in clinical laboratories.