Understanding Forensic Pharmacology: What Indian Physicians Need to Know?

Harshad Malve

Pharmacology is a branch of medical science which deals mainly with drug classifications, actions, side effects and therapeutic uses. Standard textbooks like “Goodman & Gilman’s The Pharmacological basis of Therapeutics” describes subject of pharmacology as a broad one that embraces the knowledge of the source, physical and chemical properties, physiological actions, absorption, metabolism, excretion and therapeutic uses of drugs. It also defines drug as any chemical agent that affects living protoplasm. This definition of drugs includes the poisons and toxic chemicals as well. Toxicology is concerned with the deleterious effects of the poisons and chemical agents on all living systems. Toxicology forms a subset of Forensic Medicine for medical syllabus in India. It is defined as the science that involves detection of drugs and toxins in biological samples and its application for medico-legal purposes.

The interpretation of drug effects, use or abuse and its duration of action for the medico-legal process is referred to as Forensic Pharmacology. A fine line differentiates Toxicology and Forensic Pharmacology. Some textbook use terms like “Pharmacological toxicology” for evaluating the toxicity of therapeutic drugs. Parikh’s textbook of Medical jurisprudence, Forensic medicine & Toxicology, mentions Forensic Pharmacology as a part of Forensic medicine. It discusses toxicities from the drugs in therapeutic use, drugs for abuse, drugs having no medicinal value and “street” or “designer drugs”.

Thus Forensic pharmacology forms an interface between pharmacology, toxicology and forensic medicine.

With evolving use of technology and advances in pharmacology it is essential to expand the horizons of pharmacology beyond therapeutics. A subspecialty like “Forensic Pharmacology” can empower the pharmacologists’ and use of their expertise in medico-legal cases. The pharmacokinetics and pharmacodynamics of drugs differ once the person dies, leading to differing interpretation of laboratory reports and has medico-legal implications which forms basis of Forensic Pharmacology. Substance abuse, doping, forensic pharmacokinetics, drug interactions or adverse drug reactions leading to medicolegal issues, use or abuse of drugs, personal injury or death due to drug exposure, environmental exposure to chemicals and forensic pharmacovigilance are the other aspects of Forensic Pharmacology.

Basic principles of Forensic Pharmacology include the use of common drugs/poisons that are encountered by the practicing clinicians and the approach to determine their medico-legal role in establishing the cause of death, injury or a disease. It also includes the postmortem toxicology and key concepts related to the medico-legal consequences of the effects and toxic actions of drugs used in humans.

While learning pharmacology the students learn key concepts that are important to understand the drug actions, including principles of pharmacokinetics as well as the physiological and cellular basis of diverse drug actions. Topics that are explored in forensic pharmacology include pharmacokinetics of the toxic drugs, impairment versus intoxication and how the interpretation of drug actions is effectively used in the criminal court setting. For example, the science of ethanol and drugs of abuse, along with other important agents (doping drugs, therapeutic drugs, etc.). An introduction to the basic experimental methods and laboratory techniques of forensic toxicology is also a part of Forensic Pharmacology which includes; biological samples, analytical plans, and few of the special problems commonly encountered in forensic toxicology.

Forensic pharmacology should enable the students to accurately appraise pharmacological and toxicological data for medico-legal purposes, to explain and justify their scientific opinions and to apply this knowledge to present the scientific opinions in court of law. It will also help to interpret scientific information obtained from multiple sources and compile this information to assess how various biological factors which may alter the drug actions. It
will further help to identify the exact methods for compilation and analysis of toxicological data from different biological sources. It can help in describing the role of biological factors in individual and specific toxicities.

In the era of expanding and changing scientific concepts, the knowledge of Forensic Pharmacology will enable Indian pharmacologists to explore new options for research. It will also add up new tools and entirely new dimensions to investigate the medico-legal cases in India.

References


