

SPECIFIC CHARACTERISTICS OF DRUGS AFFECTING LIVER FUNCTION

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Abstract: This article explores the pharmacological, clinical, and practical characteristics of medications that affect liver function. It analyzes the hepatotoxic potential of various drugs, the criteria for selecting pharmaceuticals in patients with liver diseases, and approaches to combined therapy using hepatoprotective agents. Scientifically grounded data based on hygienic, clinical, and pharmacological indicators are presented with examples of medications widely used in medical practice in Uzbekistan.

Key words: liver, pharmacokinetics, hepatotoxicity, pharmaceutical agents, hepatoprotectors, metabolism, detoxification.

The liver is the body's main organ for metabolism and detoxification. It is involved in the biochemical transformation of numerous substances, including pharmaceuticals. The liver performs critical functions such as neutralizing toxic compounds, bile production, regulating carbohydrate, fat, and protein metabolism, and synthesizing enzymes that degrade hormones and medications. Among the factors that impair liver function, drugs play a significant role. Therefore, liver status must be carefully considered when prescribing medications.

Pharmacokinetic Properties of Drugs Affecting the Liver. Drugs often enter the liver through the portal system after oral administration. During this "first-pass effect," the liver metabolizes drugs through biotransformation, often significantly reducing or altering their activity. Liver metabolism generally proceeds through two phases: in the first phase, cytochrome P450 enzymes mediate oxidation, hydroxylation, and dealkylation. In the second phase, conjugation reactions like glucuronidation and sulfation convert substances into water-soluble forms for elimination via bile or urine.

Causes of Hepatotoxicity. Drugs can harm the liver through several mechanisms. One such mechanism is idiosyncratic reactions, which are unpredictable and vary individually. Another is dose-dependent toxicity, where excessive doses cause liver damage. Additionally, certain drugs may activate or inhibit hepatic enzymes, leading to interactions that heighten overall toxicity.

Common Hepatotoxic Drugs in Clinical Practice. Numerous drugs used in clinical practice can impair liver function. For instance:

-Paracetamol, in high doses, leads to hepatocellular necrosis and must be dosed strictly under medical supervision.

-Erythromycin can cause cholestatic hepatitis.

-Isoniazid, used for tuberculosis, may result in severe hepatitis.

-Amiodarone, a cardiac antiarrhythmic, may cause liver fibrosis with long-term use.

Regular monitoring of liver enzymes-AST, ALT, ALP, GGT- and bilirubin levels is essential when using such medications.

Hepatoprotective Agents. Hepatoprotective drugs support liver cell repair and protect against further damage:

- Ursodeoxycholic acid improves bile flow and reduces cholestasis.

- Silibinin (Silymarin) acts as an antioxidant, protecting liver cells from free radical damage.

- Ademetionine (SAmE) promotes cell regeneration by donating methyl groups.
 - L-ornithine-L-aspartate detoxifies ammonia, preventing hepatic encephalopathy.
- Special Populations and Precautions:
- Elderly patients: Drug metabolism slows with age, requiring dose reductions and frequent liver monitoring.
 - Pregnant women: Many hepatotoxic drugs are contraindicated due to potential harm to fetal development.
 - Patients with chronic liver disease: Liver function tests must be evaluated before prescribing any medication.

Therapeutic Strategy. When drugs with hepatotoxic potential are identified, discontinuation or substitution with safer alternatives is essential. In some cases, co-administration with hepatoprotectors or initiation of detoxification therapy, hydration, and symptomatic management is required. Healthcare providers must adopt an individualized approach and consider possible drug interactions.

Approach in Uzbekistan's Medical Practice. In Uzbekistan, clinical protocols have been established to guide medication use in patients with liver diseases. Special precautions are required when using medications such as paracetamol, antibiotics, hormonal agents, or anticonvulsants in patients with hepatitis or cirrhosis. Furthermore, pharmaceutical control and laboratory monitoring are firmly integrated into the national healthcare system to ensure medication safety.

CONCLUSION

The selection and administration of drugs affecting liver function require clinical vigilance, deep knowledge, and practical experience. Every drug has specific effects on the body, and the liver is particularly vulnerable to damage. When used alongside hepatoprotective agents and guided by individualized, lab-based monitoring, pharmacotherapy can be optimized to preserve liver health and patient safety.

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