



Impact of Hepatotoxicity Degradation and their Chronic Complications in Liver

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DESCRIPTION

Hepatoprotective agents are substances that can protect the liver from damage caused by various factors, such as toxins, drugs, infections, or diseases. The liver is a vital organ that performs many functions, such as metabolism, detoxification, synthesis, and secretion. However, the liver is also vulnerable to injury due to its exposure to various harmful agents. Hepatotoxicity is a condition where the liver cells are damaged or destroyed, leading to impaired liver function and various complications. Hepatotoxicity can be acute or chronic, depending on the duration and severity of the damage. Some of the common causes of hepatotoxicity are:

- Many drugs can cause liver injury, either directly or indirectly, by inducing inflammation, oxidative stress, immune-mediated reactions, or metabolic disorders. Some examples of hepatotoxic drugs are acetaminophen, antibiotics, anti-tubercular drugs, anticonvulsants, statins, and anti-inflammatory drugs.
- Excessive alcohol consumption can cause fatty liver, alcoholic hepatitis, and cirrhosis. Alcohol can also interact with other drugs and increase their hepatotoxicity.
- Hepatitis viruses (A, B, C, D, and E) can infect the liver cells and cause inflammation, necrosis, fibrosis, and cancer. Other viruses that can affect the liver are cytomegalovirus, Epstein-Barr virus, herpes simplex virus, and yellow fever virus.
- Bacteria can cause liver abscesses, cholangitis, or septicemia. Some examples of hepatotoxic bacteria are *S. aureus*, *S. pneumoniae*, and *C. difficile*. Parasitic infections: Parasites can cause liver damage by invading the bile ducts, causing cholestasis, or forming cysts. Some examples of hepatotoxic parasites are *Toxoplasma gondii*, *Clonorchis sinensis*, and *Schistosoma*.
- Various environmental toxins can cause liver injury by generating free radicals, depleting glutathione, or altering gene expression. Some examples of hepatotoxic toxins are aflatoxins, carbon tetrachloride, arsenic, and mushroom toxins.

Hepatoprotective agents are substances that can prevent or reduce the liver damage caused by these factors. It can be derived from natural or synthetic sources. Natural sources include

plants, animals, fungi, or microorganisms that produce bioactive compounds with hepatoprotective properties. Some examples of natural sources of hepatoprotective agents are milk thistle (*Silybum marianum*), turmeric (*Curcuma longa*), licorice (*Glycyrrhiza glabra*), garlic (*Allium sativum*), ginseng (*Panax ginseng*), and honeybee venom. Synthetic sources include chemical compounds that are designed or modified to have hepatoprotective effects. Some examples of synthetic sources of hepatoprotective agents are L-carnitine, ursodeoxycholic acid, pirfenidone, and N-acetylcysteine. Some hepatoprotective agents may cause allergic reactions in some individuals who are hypersensitive to them. These reactions may include skin rashes, itching, swelling, or anaphylaxis.

It can also be used as prophylactics or preventive measures to reduce the risk or incidence of liver injury due to various factors. Hepatoprotective agents can thus improve the quality of life and survival of patients with liver diseases. Some hepatoprotective agents may have hormonal effects and alter the levels of certain hormones in the body. This may cause various symptoms, such as menstrual irregularities, breast enlargement, infertility, or sexual dysfunction. Some examples of hepatoprotective agents that may have hormonal effects are glycyrrhizin, ursodeoxycholic acid, and silymarin. Hepatoprotective agents are substances that can protect the liver from damage caused by various factors, such as toxins, drugs, infections, or diseases. However, like any other drugs, they may also have some side effects, depending on the type, dose, duration, and individual sensitivity of the hepatoprotective agents.

CONCLUSION

Hepatoprotective agents have been studied extensively in animal models and *in vitro* systems to evaluate their efficacy and safety. However, the clinical evidence for their use in human liver diseases is still limited and inconclusive. Therefore, more research is needed to overcome these challenges and to establish the clinical utility and safety of hepatoprotective agents in the prevention and treatment of various liver diseases. Hepatoprotective agents have the potential to offer a novel and effective therapeutic option for liver diseases, especially those

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that have no specific or satisfactory treatment available. Hepatoprotective agents can also be used as adjuvants or

supplements to enhance the efficacy or reduce the toxicity of conventional drugs or therapies for liver diseases.