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The toxic effect of drug Diclofenac Sodium: A Review Study

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Abstract: *NSAID's are one of the most widely used drugs worldwide. It is estimated that around 22 million people take NSAID's on a daily basis. These drugs are used for a vast array of activities and conditions, and many are sold as over the counter drug without any valid prescription. A vast number of people all over the world use this medicines to get relief from Fever, headache and to reduce swelling. Non-steroidal anti-inflammatory drugs are commonly used as an anti-inflammatory, analgesic, anti-pyretic and anti-platelet agent. NSAID's works by blocking the effect of enzymes COX-1 and COX-2 which play a central role in the production of Prostaglandins leading to less pain and swelling. Drug induced liver injury (DILI) is one of the leading cause of acute liver damage and failure. NSAID's and Antibiotics are the most common drugs causing liver damage.*

Key Words: *NSAID's, Liver injury, Analgesic, Anti-pyretic, Anti-inflammatory.*

1. INTRODUCTION:

"Healthy citizens are the greatest asset any country can have."

– Winston Churchill

Diclofenac Sodium falls under the category of Non-steroidal anti-inflammatory drug commonly abbreviated as NSAID's (1). These classes of drugs are one among the most commonly prescribed drug worldwide. They are used as analgesic, antipyretic and anti-inflammatory agents (1). Diclofenac is very unique among the NSAID's group as it possesses its analgesic activity by blocking the effect of chemicals called Cyclo-oxygenases (COX) enzymes (2). These enzymes help in the synthesis of Prostaglandins. Prostaglandins are produced at the site of damage or injury which results in pain and inflammation. By blocking the effect of COX enzymes fewer Prostaglandins are left which results into less pain and inflammation. Drug induced liver injury (DILI) is one of the leading cause of acute liver damage and failure (3). NSAID's and Antibiotics are the most common drugs causing liver damage. In a case study it was seen that Drug induced liver injury is mostly due to Antibiotics followed by NSAID's (3). NSAID's are responsible for around 10% of Hepatic damage (4). NSAID's induce liver injury by the formation of Reactive oxygen species (ROS), such as O_2, NO, HO and H_2O_2 (5). A latest study on drug metabolism confirms that administration of NSAID's significantly increases the level of Lipid Peroxidation (LPO) by decreasing the level of Glutathione, which results in the generation of free radicals which causes hepatotoxicity (6). A cluster of enzymes found in cytosol is released into the blood due to the disturbance of hepatocytes transport function, which indicates hepatocellular injury (6).The deleterious effect of NSAID's have also been seen in Kidney malfunctioning which may be in the form of reduction of renal blood flow and glomerular filtration rate, nephritis, water and salt retention, renal papillary necrosis and impairment of blood pressure control and even acute Kidney failure (AKF) (7). Treatment with NSAIDs may be accompanied by adverse effects such as, platelet dysfunction, gastrointestinal damage and convulsions when co-administered with quinolone-derivative antibacterial drugs (8). Diclofenac sodium causes a rare but potentially fatal hepatotoxicity, that may be associated with the formation of reactive metabolites and subsequently adverse hepatitis effects which may arise in certain individuals (9). The extensive use of Diclofenac sodium in veterinary medicine has been linked to near extinction of vultures in the Indian subcontinent, and as such the drug has been eliminated from veterinary use in the year 2006. Vulture deaths were reported to be due to severe renal damage causing visceral gout following scavenging on dead livestock treated shortly before death (10-11).

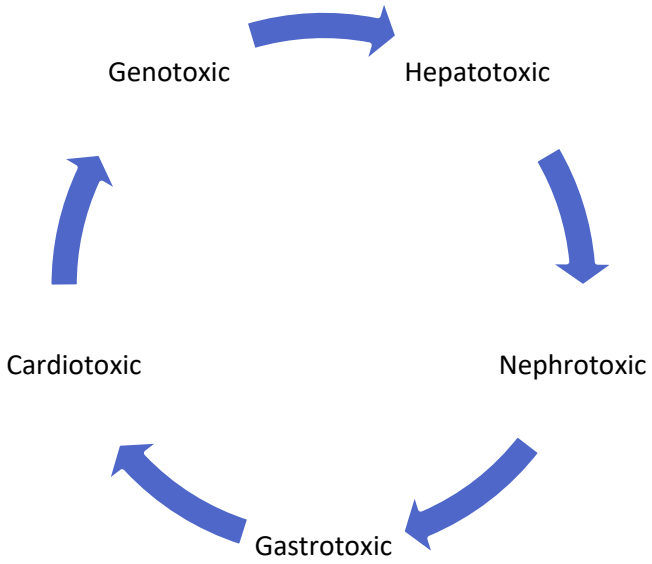

Fig Showing: The toxic effect of drug Diclofenac on various system/organs of the body

2. CONCLUSION:

In the current world very few are the people who haven't used NSAID's in some part of their life, whether be in pain management from headache, dental pain or else in post-operative pain. In spite of knowing the deleterious effect of these drugs we are still using it in masses without proper physician prescription. To protect the vital system of our body we must pay heed and try to minimize the rampant use of such drugs otherwise it will be very late for us to reimburse our lost health. The use of NSAID's (Diclofenac sodium) should only be done by the advice of a qualified Physician and the doses should be strictly adhered as prescribed and if possible try not to use as Over-the-counter drug.

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