Tejaswi Chavan et al., Toxicol Open Access 2019, Volume 5
DOI: 10.4172/2476-2067-C1-008

Hepatoprotective effects of omega-3 fatty acids through the modulation of genes involved in lipid metabolism and inflammatory pathway in alcohol induced hepatotoxicity

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Omega-3 fatty acids offer several health benefits. In present investigation, hepatoprotective potential of omega-3 fatty acids in the form of flax oil and fish oil was assessed against repeated alcohol dosing in male albino Wistar rats. Hepatic injury was induced by administering 30 % alcohol (1ml/100g b.w./day, p.o). Flax oil and fish oil (500mg/kg b.w./day, p.o) were administered to hepatotoxicity induced rats. Biochemical parameters were analyzed from serum and liver tissue. The expressions of fatty acid binding protein 1 (FABP1), peroxisome proliferator activated receptor gamma (PPARγ), sterol regulatory element binding protein 1 (SREBP1), nuclear factor kappa β (NF-kβ) and tumor necrosis factor alpha (TNF-α) genes from liver were assayed by semi-quantitative polymerase chain reaction. Administration of flax oil or fish oil prevented hepatic damage with marked improvement in hepatic function and normalization of lipid profiles in serum and liver. These interventions normalized oxidative stress through improvements in levels of anti-oxidant enzymes and oxidative stress markers. Expression of genes such as FABP1, PPARγ were downregulated and SREBP1, NF-kβ and TNF-α were upregulated in alcohol induced hepatotoxic rats while treatment with flax oil and fish oil showed improvement in these gene expression. Histological analysis showed normal hepatic architecture in flax oil and fish oil treated animals. The flax oil was found could protect the liver against alcohol-induced liver toxicity and oxidative stress. However, further clinical studies are required to assess the safety and benefits of flax oil in human beings.

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