Impact of hypercholesterolemia on toxicity of N-nitrosodiethylamine: biochemical and histopathological effects

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Abstract:
N-nitrosodiethylamine (NDEA) is an important carcinogen frequently present in human environment and food chain. Nitrosamines such as NDEA produce oxidative stress due to generation of reactive oxygen species and alter the antioxidant defence system in the tissues. The present investigation was aimed at studying its toxicity under hypercholesterolemic conditions. NDEA administration brought about hepatic degeneration as evidenced by the significant decrease in liver weight index of both normal as well as hypercholesterolemic animals. Hypercholesterolemia did not affect the hemoglobin (Hb) content in experimental animals but resulted in an increase in the osmotic fragility of erythrocytes. The antioxygenic potential of experimental animals decreased in both, the NDEA-fed group as well as in the group that was also supplemented with a hypercholesterolemic diet. This was evident by increased in vitro lipid peroxidation (LPO) of erythrocytes. The antioxygenic potential of experimental animals decreased in both, the NDEA-fed group as well as in the group that was also supplemented with a hypercholesterolemic diet. This was evident by increased in vitro lipid peroxidation (LPO) of erythrocytes. Administration of NDEA resulted in a substantial and significant increase in LPO in all the tissues under normal as well as hypercholesterolemic conditions. Addition of hypercholesterolemic diet in general, increased LPO in all the tissues to varying degrees but its effect was maximal in the liver. Effect of NDEA administration on antioxygenic enzymes under normal as well as hypercholesterolemic conditions was variable in different tissues. Histopathological analysis of different tissues (heart, liver, lungs, spleen and kidneys) showed mild to severe pathological changes among the control and experimental groups.

Key words:
NDEA, lipid peroxidation, hypercholesterolemia, antioxygenic potential