Modulatory effect of Gallic acid on Aberrant Crypt Foci, inflammation, apoptosis and oxidative stress against 1,2 DMH induced colon carcinogenesis in Wistar rats

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Abstract

Colon cancer is the second most common cause of morbidity and mortality in developed and developing countries. Thus, there is a need for the investigation of other potentially useful options. The present study was carried out to investigate the chemopreventive effect of gallic acid against 1,2-dimethylhydrazine (DMH) induced colon carcinogenesis. DMH is a potent environmental toxicant that specifically targets to the colon. Gallic acid (GA) is a polyphenol, strong antioxidant widely present in tea, berries, and other plants used in the traditional medicine of China. Gallic acid was pretreated at two different doses (25 and 50 mg/kg b.w.) once a day and DMH was administered at the dose of 20 mg/kg body weight (b.w.) subcutaneously (s.c.) once a week upto 15th week in Wistar rats. Animals were sacrificed after 30th week and chemopreventive effect of Gallic acid was assessed by Tumor marker(ACF), Tumor burden, toxicity marker(LPO), antioxidant armory, and level of inflammatory (COX-2, NF-kB,) and apoptotic markers(caspase-3,bcl-2). We observed that pretreatment with Gallic acid significantly ameliorates oxidative damage by diminishing tissue lipid peroxidation (LPO) accompanied by the increase in antioxidant enzymatic activity in the colon of Wistar rats. Further, histopathological finding also revealed that pretreatment with Gallic acid reduced intense filtration of inflammatory cells and significantly restored the architecture of colonic tissue.

Our finding shows that gallic acid significantly suppressed colonic ACF formation, tumor burden and inhibits DMH induced toxicity by ameliorating oxidative stress, inflammation, apoptotic markers, strengthens the hypothesis that GA could exert a significant chemopreventive effect on DMH induced colon carcinogenesis.

Keywords: Chemoprevention , carcinogenesis, Gallic acid, 1,2-Dimethylhydrazine

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