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Hepatoprotective Action of Emblica officinalis Linn. against Radiation and Lead Induced Changes in Swiss Albino Mice

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Abstract : Ionizing radiation induces cellular damage through direct ionization of DNA and other cellular targets and indirectly via reactive oxygen species which may include effects from epigenetic changes. So there is a need of hour is to search for an ideal radioprotector which could minimize the deleterious and damaging effects caused by ionizing radiation. Radioprotectors are agents which reduce the radiation effects on cell when applied prior to exposure of radiation. The aim of this study was to access the efficacy of Emblica officinalis in reducing radiation and lead induced changes in mice liver. For the present experiment, healthy male Swiss albino mice (6-8 weeks) were selected and maintained under standard conditions of temperature and light. Fruit extract of Emblica was fed orally at the dose of 0.01 ml/animal/day. The animal were divided into seven groups according to the treatment i.e. lead acetate solution as drinking water (group-II) or exposed to 3.5 or 7.0 Gy gamma radiation (group-III) or combined treatment of radiation and lead acetate (group-IV). The animals of experimental groups were administered Emblica extract seven days prior to radiation or lead acetate treatment (group V, VI and VII) respectively. The animals from all the groups were sacrificed by cervical dislocation at each post-treatment intervals of 1, 2, 4, 7, 14 and 28 days. After sacrificing the animals pieces of liver were taken out and some of them were kept at -20°C for different biochemical parameters. The histopathological changes included cytoplasmic degranulation, vacuolation, hyperaemia, pycnotic and crenated nuclei. The changes observed in the control groups were compared with the respective experimental groups. An increase in the value of total proteins, glycogen, acid phosphtase, alkaline phosphatase activity and RNA was observed up to day-14 in the non drug treated group and day 7 in the Emblica treated groups, thereafter value declined up to day-28 without reaching to normal. The value of cholesterol and DNA showed a decreasing trend up to day -14 in non drug treated groups and day-7 in drug treated groups, thereafter value elevated up to day-28. The biochemical parameters were observed in the form of increase or decrease in the values. The changes were found dose dependent. After combined treatment of radiation and lead acetate synergistic effect were observed. The liver of Emblica treated animals exhibited less severe damage as compared to non-drug treated animals at all the corresponding intervals. An early and fast recovery was also noticed in Emblica pretreated animals. Thus, it appears that Emblica is potent enough to check lead and radiation induced heptic lesion in Swiss albino mice.

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