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Chapter 3

SUMMARY

The present study has been performed to investigate the possible protective and treatment role of ß- carotene in minimizing the radiation induced changes in certain biochemical and histological parameters in the liver and kidney of Albino rats.

120 male albino rats weight from 100 to 120 gm were used in this experiment. The animals were housed in plastic cages, under controlled living conditions and provided with standard diet and water.

The nimaals were divided into 6 equal groups:

Group1: control rats

The animals of this group were not supplemented with ß-carotene nor subjected to radiation.

Group 2: ß- carotene treated rats

The animals of this group were orally supplemented with ß-carotene in a concentration of 8 mg / kg day for a period of time 14 consecutive days.

Group 3: Irradiated rats

The animals of this group received whole body gamma irradiation 6.5 Gy as a single dose.

Group 4: ß- carotene treated rats pre-irradiation

The animals of this group were supplemented with ß carotene 8 mg / kg for 14 consecutive days and then exposed to Gamma ray 6.5 Gy single dose.

Group 5: ß- carotene treated rats post-irradiation

The animals of this group were supplemented with ß-carotene 8 mg / kg after exposure by gamma ray 6.5 Gy single dose.

Group 6: ß- carotene treated rats pre and post-irradiation

The animals of this group were supplemented with ß- carotene 8 mg / kg before and after exposed to gamma ray (6.5 Gy) single dose .

Five rats were sacrificed from each group at 1, 7, 14 and 21 day after irradiation. Blood was immediately collected and centrifuged to obtain serum for biochemical analysis. The activities of alanine transaminases (ALT), aspartate transaminases (AST), Albumin, Triglycerides, Cholesterol, HDL, LDL, Uric acid, Urea and Creatinine were determined. Also, Lipid peroxides (MDA), Glutathione (GSH) and Superoxid dismutase (SOD) enzymes was determined. Samples of liver and kidney were excised from the animals and kept in the Bouin fixation for the histopathological study.

Samples from the kidneys of different groups were collected and specially prepared for ultrastructure ivestegation by electron microscope.

A- Biochemical observations:

The mean values of all biochemical parameters for group treated with β-carotene (8 mg/kg/day) shows no significant difference when compared with the control group. The mean values of serum Albumin, Glutathione (GSH) and Superoxide dismutase (SOD) for irradiated group 6.5 Gy single dose shows highly significant decrease when compared with the control group, but the other biochemical parameter alanine transaminases (ALT), aspartate transaminases (AST), Lipid peroxides , Triglycerides, Cholesterol, HDL, LDL, Uric acid, Urea and Creatinine shows significant increase when compared with the control group. The mean values of all biochemical parameter levels for group treated with β-carotene (8 mg/kg/day) before irradiation with gamma ray 6.5Gy shows significant enhancement when compared with the irradiated group. The mean values of all biochemical parametes for group treated with β-carotene (8 mg/kg/day) after irradiation with gamma ray 6.5Gy shows significant difference when compared with the irradiated group by slightly reduction in the effect of radiation damage.

The mean values of all biochemical parameters for group treated with β-carotene (8mg/kg/day) before and after irradiation with gamma ray 6.5 Gy shows significant difference when compared with the irradiated group by highly reduction in the effect of radiation damage.

B-Histological observations:

1-liver:

The treated group supplemented with ß-carotene (8mg /Kg/day) shows no histological changes at first and 21 day like control group, but rats exposed to single dose gamma irradiation 6.5 Gy shows a remarked histological changes in liver tissue such as, degeneration of hepatocytes, vacuolated cytoplasm, and fibrosis in portal tract region. The rats exposed to single dose gamma irradiation 6.5 Gy after supplemention with ß-carotene shows inflammatory cells infiltration with congested portal vein, few disintegration of endothelial hepatic cells and slightly dilution in blood sinusoid. On the other hand, the liver of rats exposed to single dose gamma irradiation at 6.5 Gy before supplemention with ß-carotene shows hepatic changes in tissue at 7, 14 and 21 day when compared with control in the form of degradation in most hepatocytes with more vacuolated cytoplasm, increase in Kupffer cell and necrotic area of hepatocytes, but there was a few improvement observed when compared with the irradiated group in the form of absence fibrosis.

The rats supplemention with ß-carotene before and after exposure with single dose gamma irradiation 6.5 Gy showed a remarked improvement when compared with the previous results.

2- Kidney :

The treated group supplemented with ß-carotene (8mg /Kg/day) shows no histological changes of kidney tissue at first and 21 day like control group. Rats exposed to single dose of gamma irradiation 6.5 Gy shows a remarkable histological changes in the kidney tissue such as, fibrosis and degeneration in some renal tubules. Also the renal corpuscles with ruptured Bowman's capsule associated with hypertrophy of glomerular tuft. The kidney of rats exposed to single dose gamma irradiation 6.5 Gy after supplemention with ß-carotene shows rupture of epithelial lining between renal tubules, few focal tubular necrosis replaced by mononuclear cell infiltration and congested blood vessels. The kidney of rats exposed to a single dose gamma irradiation 6.5 Gy before supplemention with ß-carotene shows different changes in renal tissue at 7,14 and 21day when compared with control in the form of focal tubular necrosis replaced by mononuclear cell infiltration and degradation in some renal tubule. but there was few improvement observed when compared with irradiated group in the form of absence fibrosis.

The rat supplemented with ß-carotene before and after exposure to gamma ray 6.5 Gy single dose, shows remarked improvement in renal tissue when compared with the previous results. Through examination by electron microscope, results shows different changes of renal cell organelles after exposure by gamma ray single dose 6.5 Gy, but improvement of cell organelles was observed when treated with β-carotene (8mg/kg/day) specially, in groups treated pre and post irradiation with β-carotene.

Accordingly it was concluded that β-carotene could exert a beneficial protective and treatment role against radiation induced biochemical , histological and ultra structure changes produced by gamma irradiation 6.5 Gy as a single dose.