Faculty of Education
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CYTOGENETICAL AND HISTOLOGICAL STUDIES OF THE EFFECT OF 5-FLUOROURACIL ON BONE MARROW CHROMOSOMES AND TESTIS OF THE MALE ALBINO MICE AND THE PROTECTIVE ROLE OF VITAMIN C.

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ABSTRACT

5-Fluorouracil (5-FU) is an antimetabolite chemotherapy drug and clinically commonly used for the treatment of solid tumours of the breast, ovaries, head, neck, gastrointestinal and colorectal tumours.

Hence, the present study was carried out to evaluate the possible protective role of vitamin C against the possible pathogenic impacts of 5-fluorouracil on bone marrow chromosomes and testes of adult male albino mice from the cytogenetical and histological points of view.

In order to achieve these intended goals, the experimental design was carried out in the following manner: sixty adult mice were used in the present study. They were allocated into six equal groups. The first group served as control group and each animal was injected intraperitoneally (i.p.) with the drug solvent saline solution (0.9 % NaCl) and the second and third groups were injected (i.p.) with 80 mg/kg b.wt. of 5-FU in every other day for two and four weeks, respectively. While, each animal from the fourth and fifth groups was injected (i.p.) with 5-FU in every other day in addition to daily injection (i.p.) with 12 mg/kg b.wt. of vitamin C for two and four weeks,

respectively. The animals of sixth group were injected (i.p.) with 12 mg/kg b.wt. of vitamin C daily for four weeks.

The chromosomal results

Structural chromosomal aberrations were detected in this study. These aberrations were constituted of centromeric attenuation, deletions, fragments and ring chromosomes exhibiting a statistically highly significant increase ($P<0.001$), while end to end association were exhibiting a statistically significant increase ($P<0.05$) and other were insignificant such as chromosomal gap, chromatid gap, centric fusion, beaded chromosomes and sticky chromosomes in comparable with the control group. Such abnormalities were markedly inclined after vitamin C, separately or 5-FU associated mode, recording significant decrease ($P<0.05$). The results of the total structural chromosomal aberrations were significantly time-dependent manner.

The results of this study recorded decrease in the mitotic index of bone marrow cells after administration of 5-FU for two and four weeks, but after administration of 5-FU in addition to vitamin C for two and four weeks there were a noticeable elevation in the mitotic index of bone marrow cells.

The histopathological results

Histological examination of testes of 5-FU treated mice exhibited histopathological changes that increasingly progressed within the time of treatment. These marked changes were represented by degenerated seminiferous tubules ensheathed by irregular basal laminae, disattachment and disorganization of the testicular tissue caused wide spaces between tubules. Necrosis and vacuolization of spermatogonia, primary spermatocytes were also detected. Some seminiferous tubules exhibited exfoliation and maturation arrest. Pyknotic and karyolysed nuclei of spermatogonia and some spermatocytes were also detected. Vasodilatation of the blood vessels engorged with blood congestion was also noted in the interstitial tissue. Some seminiferous tubules partially restored their spermatogenesis after administration of vitamin C in addition to 5-FU for two weeks and after four weeks of administration of vitamin C in addition to 5-FU some seminiferous tubules restored their regular shape and position.

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