

A morphologic and morphometric study of adult mouse testis following different doses of busulfan administration

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Abstract

Introduction: Anti-cancer drugs have adverse effects on spermatogenesis. Therefore, information on their role for the prevention of germinal epithelium destruction is necessary. The aim of this study was morphologic and morphometric evaluations of testes, measurement of volume and volume density of testes parameters, measurement of tubular diameters, germ and somatic cell counts following administration of different doses of busulfan in adult mice.

Materials & Methods: In the present study, 42 male NMRI mice aged 6-8 weeks were used. The animals were divided into 5 groups. Case groups received a single dose of busulfan by intraperitoneal injection as 5, 10, 20 and 40 mg/kg in the first, second, third and fourth groups respectively. The control group received only the solvent for busulfan. All the animals were killed 35 days after treatment and their testes were dissected out and processed for light microscope studies. Then morphometric studies were performed on testicular parameters. The data were analyzed using ANOVA and Tukey test and p values less than 0.05 were considered significant.

Results: Busulfan administration in 5, 10, 20 and 40 mg/kg doses significantly reduced most morphometric parameters in testes with a maximum effect in the 40 mg/kg group. Volumes of testes, tubules and germinal epithelia were decreased significantly in the experiment groups ($p < 0.05$) however, the volume of interstitial tissue increased ($p < 0.05$). Tubular diameters and thickness of epithelia were also decreased in the experiment groups. Number of germ cells was reduced, but number of sertoli cells was not affected. The number of leydig cells were not affected in 10 and 20 mg/kg busulfan treated groups, however in the 40 mg/kg treated group they were increased significantly ($p < 0.003$). In 5 mg/kg treated group there were no significant differences in morphologic and morphometric studies.

Conclusion: Busulfan could reduce testicular parameters and disrupt spermatogenesis through affecting both germ and somatic cells in a dose dependent manner. Therefore, the side effects of busulfan on spermatogenesis should be considered during cancer therapies.

Key Words: Spermatogenesis, Busulfan, Morphometry, Mouse, Testis, Germ cells, Chemotherapy.

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