

The Protective Effects of Melatonin on the Histological Changes of Testis in Busulfan-Treated Adult Mice

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Abstract

Introduction: Antineoplastic chemotherapy is usually accompanied by fertility impairment and the aim of this study was to investigate the possible protective effects of melatonin, a pineal gland hormone with potent antioxidant activity, on busulfan-treated adult male mice.

Materials and Methods: This study was performed on 32, eight-week old adult male mice. The animals were divided into four groups consisting of a control and three experimental groups. The animals in the control group received dimethyl sulfoxide (DMSO), a solvent, the second group a single dose of intraperitoneal busulfan (20 mg/kg), the third group a single dose of intraperitoneal melatonin (10 mg/kg) for five days and the fourth group melatonin (10 mg/kg) for five days upon an initial dose of busulfan (20 mg/kg). Thirty-five days after the treatments, all the animals were sacrificed and dissected. Johnson's score were determined by examining the morphometric characteristics of seminiferous tubules and estimating Leydig cell volumes and germ cell counts.

Results: Busulfan-treated mice showed reductions in Johnson's score and quality of spermatogenesis ($p < 0.001$) in comparison to the controls. The quantitative values of seminiferous tubules ($p < 0.05$) and the nuclear volume of Leydig cells ($p < 0.05$) were significantly lower in the busulfan-treated mice relative to the controls. In the fourth group, melatonin not only caused a remarkable normalization in seminiferous tubule indices ($p < 0.05$), but also increased the nuclear volume of Leydig cells ($p < 0.001$), the relevant Johnson's score ($p < 0.001$) and all germ cells in comparison to the second group ($p < 0.05$).

Conclusion: Melatonin might have a possible protective effect against busulfan-induced testicular damage. Although the protective mechanism of melatonin has not been fully revealed, the protection seems to be through a decrease in oxidative stress.

Keywords: Antineoplastic chemotherapy, Busulfan, Male infertility, Melatonin, Spermatogenesis, Testis.

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