Histological and Biochemical Investigation of the Effects of Apocynin on the Testes in Methotrexate-Induced Rats

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INTRODUCTION & OBJECTIVES: Methotrexate, widely used drug in cancer or many diseases therapy, has many adverse effects on tissues. Apocynin, NADPH oxidase inhibitor, has many antioxidant properties. We aim to demonstrate the adverse effects of Methotrexate on testicular tissue and evaluate the protective effects of apocynin on methotrexate-induced testis injury and male fertility.

MATERIALS & METHODS: A total of 50 male Wistar albino rats (eight weeks old) were divided into five groups: Control (n=10), DMSO (n=10), Methotrexate (n=10), Apocynin(20mg)+ Methotrexate (n=10), and Apocynin(50mg)+ Methotrexate (n=10) groups. Control group received 1.25 ml, %0.9NaCl. DMSO group received 0.2 ml DMSO(Apocynin solvent) everyday. The experimental groups; Methotrexate, Apocynin(20mg/kg) and Apocynin(50mg/kg), received 20 mg/kg Methotrexate as a single dose on day 24, while Apocynin (20mg/kg) and Apocynin (50mg/kg) received Apocynin everyday. All injections were performed intraperitoneally. At the end of day 28, all rats were sacrificed under anesthesia. Testes were evaluated histologically and blood samples were analysed biochemically.

RESULTS: Testicular tissue and biochemical parameters of rats were normal in control groups. Methotrexate group displayed vacuolization in seminiferous tubules, immature germ cells in lumens, basal lamina ondulation and congestion in interstitial tissue (Figure 1). Apoptotic cells were significantly higher in methotrexate group compared with the other groups (Figure 2). Tissue and blood MDA and MPO levels were increased while the GSH and testosterone levels were decreased in methotrexate group. Apoptotic index were significantly decreased in apocynin treatment groups compared with the methotrexate group (Table 1). Apocynin treatment groups exhibited more better testis morphology against methotrexate induced damage and biochemical abnormalities.

CONCLUSIONS: Our results suggest that methotrexate induces structural defects on testis morphology via oxidative stress and apocynin ameliorates these effects with its antioxidant properties.

Keywords: Testis, Methotrexate, Apocynin, Apoptosis, Testosterone