The Possible Prophylactic Role of Vitamin-E on Methylprednisolone Acetate-Induced Femoral Head Necrosis

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Abstract

Background: Corticosteroid medication is a pivotal risk factor in the development of avascular osteonecrosis. Vitamin E as a biological antioxidant agent could be used to protect the bone against corticosteroid-induced necrosis.

Aim of the work: The present work was designed to study the histopathological changes in rat femoral head following intraperitoneal administration of corticosteroids (namely methylprednisolone acetate-MPSL) and to find out the role of vitamin E either on preventing or reducing these changes.

Materials and methods: Sixty adult male albino rats were devided into four groups: G**roup I** (normal control), Group **II** (Sham control), Group **III** (MPSL-treated): the rats were subdivided into: Subgroup **III-A** (MPSL-treated once daily for 3 days ; short duration) and Subgroup **III-B** (MPSL-treated once weekly for 3 weeks; long duration) and Group **IV** (MPSL and vitamin E-treated): Rats in this group received vitamin E once daily for one week prior to MPSL-treatement then subdivided into: Subgroup **IV-A (**MPSL and vitamin E-treated once daily for 3 days; short duration) and Subgroup **IV-B (** MPSL-treated once weekly and vitamin E-treated once daily for 3 weeks; long duration). Twenty four hours after the end of the experiment, the rats were sacrificed. Both femora were extracted and prepared for light microscopic examination. Image analysis was done to measure the thickness of the articular cartilage and the obtained data were statistically analysed.

Results: Short and long durations of administration of MPSL in group III resulted in many pathological changes in the articular cartilage, bone trabeculae, marrow hemopoietic elements , fat cell population and epiphyseal plate. The severity of changes increased with the long duration of MPSL treatment in subgroup III-B, indicating a duration dependency. Administration of vitamin E before and during MPSL

administration in group IV reduced femoral head osteonecrotic changes. These observations were confirmed by statistical analysis of the measured thickness of femoral head articular cartilage.

Conclusion: The administration of MPSL induced osteonecrotic changes of femoral head architecture which were time dependant. Prior and concomitant administration of vitamin E affords a partial protective effect against MPSL- induced femoral head necrosis.

Key words: femoral head, osteonecrosis, methylprednisolone acetate, vitamin E.

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