Abstract
Objective: To examine the pathological findings that occurred in the lens and cornea and biochemical findings in the lens of rats fed with corn syrup and the protective effects of alpha lipoic acid (ALA).
Materials and methods: Twenty-four rats were randomly divided into three groups. Group I served as the control group. Group II was used as the study group; the rats were treated with 30% corn sugar solution for 10 weeks. Group III was the treatment group. Corn syrup was given by the oral route to the rats during the study, and ALA (100 mg/kg) was added to the treatment 4 weeks after the study began. At the end of the experiment, central corneal thickness (CCT) was measured in all rats with an ultrasonic pachymeter. Then the right eyes of the rats were enucleated for histopathological examination of the cornea and lens. The left lenses were homogenized for biochemical analyses.
Results: The lenses of the rats treated with corn syrup revealed severe damage; many lens fibers appeared swollen and ruptured with large vacuoles near the lens epithelium. In addition, malondialdehyde (MDA) levels, a parameter of oxidative stress, increased but not significantly in Group II; however, ALA treatment decreased MDA levels significantly. Antioxidant enzyme and catalase (CAT) activities were significantly decreased in Group II, and ALA treatment increased these activities; however, the increase was not significant. Changes were observed in the cornea such as epithelial alterations, subepithelial vacuolizations, collagen fibers loss in the stromal layer, interruptions in the subepithelial basement membrane and central corneal thickening.
Conclusions: Corn syrup can cause severe damage in rat lenses and corneas. However, ALA ameliorates the effect of corn syrup-related lesions on the cornea and lens.