Effect of sodium levothyroxine on knee articular cartilage tidemark integrity in hypothyroidism: A histomorphometric, histopathologic and biochemical study in animal model

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Abstract: (448 Views)

Background and Objective: Sodium levothyroxine is one of the common medicines used for treatment of hypothyroidism and thyroid cancer. The study was done to determine the effect of sodium levothyroxine on knee articular cartilage tidemark integrity, plateau tibia cartilage thickness (calcified and non-calcified) and liver enzymes in induced hypothyroidism rats.

Methods: In this experimental study, 50 adult female BALB/c mice, weighting 25-30 grams were randomly allocated into one control and four experimental groups. Animals in control did not receive any medicine. Animals in the second group were received different increasing doses of sodium levothyroxine daily for 8 weeks. Animals in the third group were received constantly high dose of levothyroxine daily for 8 weeks. In the fourth group, the animals became hypothyroid with propylthiouracil (PTU). In the fifth group, animals with hypothyroidism were received sodium levothyroxine by gavage same as group 2. After 8 weeks serum samples were taken to determine ALT, AST and ALP. The plateau tibia cartilage stained with hematoxylin-eosin. Histologic changes evaluated by light microscopy. Using a light microscope equipped with camera, the samples were photographed and using a computer equipped with axiovision software. Cartilage (calcified and non-calcified)
thickness measured in micrometer. The integrity of tidemark line on hematoxylin-eosin staining also evaluated.

**Results:** The results of the present study showed separation, disruption and destruction in tidemark line in group 3 (the group with high dosage of sodium levothyroxine from the beginning of the treatment). The total cartilage and non-calcified part thickness in groups 3, 4, 5 were reduced and in group 3 showed significant reduction (P<0.05). Calcified cartilage thickness in all groups were reduced and in group 3 showed significant reduction (P<0.05). ALT level decreased in all groups compared to control group but only in the second and third groups, the decrease of ALT was significant (P<0.05). AST serum level in all groups significantly increased in compared to control group (P<0.05). ALP serum level in all groups increased compared to the control group, but this increase was significant only in the groups 4, 5.

**Conclusion:** Consumption of sodium levothyroxine with constantly high dose can cause severe alteration in knee joint cartilage in hypothyroidism rats.

**Keywords:** Hypothyroidism [MeSH], Sodium levothyroxine [MeSH], Knee Joint [MeSH], Cartilage [MeSH], Liver [MeSH].

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