

ABSTRACT

The Effect of Hypervitaminosis A in Femoral Growth of Male Young Mice (*Mus musculus*)

Riami

Vitamin A is important for ocular health, growth, reproduction, and immune system. However, if the concentration is excessive, it may induce negative effects, such as the inhibition of bone growth and increasing the risk of fracture, which results from the inhibition of chondrocyte proliferation and reduced RNA and protein synthesis. Retinoic acid, one of vitamin A metabolites, is not stored in the body although it is less toxic than retinol and retinal. However, it is not without serious effects on bone if it is consumed excessively in a longer period. Retinoic acid inhibits bone growth by three mechanisms. First, it restrains chondrocyte proliferation and chondrocyte hypertrophy, and, finally, it inhibits bone matrix synthesis. The objective of this study was to prove that hypervitaminosis A resulted in femoral growth disorder. This study observed femoral length and chondrocyte counts in proliferation zone and hypertrophy/maturation zone.

This study used posttest only control group design involving 40 male mice (*Mus musculus* BALB/C strain), aged 3-4 weeks. Excessive vitamin A was given per oral in emulsion with the doses of (1) 1/8LD50 (160.62 IU)/grBW/day, (2) 1/6LD50 (214.16 IU)/grBW/day, and (3) 1/4LD50 (321.25 IU)/grBW/day, for 9 days. Two days after the final administration, the animals were sacrificed to remove femoral bones. The length of the bones was measured, and histological preparations were made using HE staining. Data on femoral length and chondrocyte count in proliferation and hypertrophy/maturation zones were analyzed using Anova with confidence level of 95%, followed with Least Significant Difference (LSD) test.

Results of observation and data processing using quantitative analysis revealed that the administration of vitamin A in excessive dose of 1/8 LD50, 1/6 LD50, 1/4 and LD50 in young male mice for 9 consecutive days resulted in inhibited increase of femoral length and reduction of chondrocyte count in proliferation as well as hypertrophy/maturation zones.

Keywords: *hypervitaminosis A, bone length, chondrocyte cells*