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Atorvastatin, a double weapon in osteoporosis treatment: An experimental and clinical study

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Objective: The aim of this study was to evaluate the effect of atorvastatin on the bone formation and resorption markers in ovariectomized rats (experimental study), and to study its effect on the bone mineral density (BMD) in postmenopausal osteoporotic women (clinical study).

Materials & Methods: The study involved experimental and clinical aspects. In the experimental aspect, 42 female Wistar rats were divided into five groups: group I - sham-operated, group II - 1 mL of carboxymethyl cellulose [CMC] was administered orally, group III - 20 mg/kg orally of atorvastatin was administered, group IV - Untreated ovariectomized [OVX] rats and served as a model of osteoporosis [OP] and group V - 20 mg/kg orally of atorvastatin was administered to ovariectomized rats. After four weeks, serum acid phosphatase, alkaline phosphatase, osteocalcin, total calcium and inorganic phosphorus were assessed. Then, 3 µm thickness lumbar and femur sections were examined to assess cortical thickness, trabecular area, numbers of osteoblasts and osteoclasts. In the clinical aspect, 85 post-menopausal osteoporotic females with recently detected hyperlipidemia participated in the study. Atorvastatin 40 mg/day, calcium carbonate 500 mg/day and vitamin D 800 IU were given to all patients for a period of 18 months. BMD was measured at the start and at the end of the study by dual-energy X-ray absorptiometry (DEXA).

Results: In the experiment aspect, the biomarkers of bone remodeling were notably elevated in the OVX group. Whereas atorvastatin produced a significant decrease in the level of these bone metabolic markers and significantly ameliorates osteoporotic changes induced by ovariectomy. In the clinical aspect, after 18 months the DEXA showed improvement in the T-score, statistically significant only in the femoral neck area.

Conclusion: Atorvastatin was able to decrease the rate of bone metabolism and increase osteogenic activity. It has dual mode of action both anabolic and antiresorptive effect on bone. This lipophilic statin member may act as a double weapon drug.

Biography

Nisha Zahid has completed her Bachelor degree in Dental Surgery and currently, she is pursuing her MPhil in Pharmacology from a reputed institute Ziauddin University of Karachi, Pakistan. She has done with her course work and presently, she is doing her research which is on statins.

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