

Evaluation of changes in bone density before and after one-year administration of denosumab in patients referred to Imam Reza Hospital

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Background:

Osteoporotic fractures are a major public health problem worldwide. The prevalence of osteoporotic fractures increases with age and is associated with decreased quality of life as well as higher mortality rate. Studies have shown that menopause, family history of bone fractures, low bone density (BMD) and advanced age are the main risk factors associated with osteoporotic fractures(1). Although numerous medications are approved for treatment and prevention of osteoporosis, many patients at high risk for fracture are not being treated. Denosumab is a new agent that reduces bone resorption, improves mineral density. Therefore, the aim of this study was to evaluate the changes in bone mineral density before and after administration of denosumab for at least one year in patients referred to Imam Reza Hospital (501 Army) in Tehran.

Methods:

The present study is a clinical trial study that was performed on 202 patients with osteoporosis referred to Imam Reza Hospital and a private clinic in Tehran during 1397 and 1398. Denosumab 60 mg was injected subcutaneously in two doses 6 months apart for all patients. Then, for monitoring 6 months after the second dose injection, densitometry was performed for the patient by DXA method and FRAX and T-score were obtained and the complications were recorded in the mentioned form.

Results:

The difference in bone density of patients before and after treatment with denosumab was significant ($p < 0.05$) and also the risk of major fracture and the risk of hip fracture before and after treatment with denosumab were significantly reduced ($p < 0.05$).

Table1: Demographics characteristics of the patients

Variable	mean±SD
Age, y	68.95±7.9
Height, cm	157.02±5.4
Weight,	68.7±8.2
BMI, kg/m	27.9±3.1

Table2: Effect of denosumab

Variable	Before treatment with Denosumab	After treatment with Denosumab	p Value
Lumbar spine T score (g/cm ²)	-2.55±0.06	-2.00±0.07	0.00
Femoral T score (g/cm ²)	-2.10±0.10	-1.88±0.06	0.02
FRAX Major	23±1.9	18.9±1.5	0.00
FRAX Femor	8.5±1.3	5.7±0.09	0.00

FRAX: Fracture Risk Assessment Tool

Discussion and conclusion:

In this study, subcutaneous administration of 60 mg denosumab at baseline and 6 months later significantly reduced the risk of vertebral and hip fractures. Many studies have suggested that denosumab is a human monoclonal antibody and prevents the interaction of the receptor activator of nuclear factor κ B ligand (RANKL) with the receptor activator of nuclear factor κ B (RANK), its receptor, on osteoclasts and their precursors, thereby blocking the formation, function, and survival of osteoclasts(2-3). Conclusion: Denosumab reduces the risk of bone fractures in postmenopausal women and increases their bone density. It seems that Denosumab can be used as an effective drug to increase the bone density of postmenopausal women and prevent them from increasing the risk of fractures.

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Key words: Bone density, Denosumab, Osteoporosis.

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