DIFFICULT TO TREAT PATIENTS WITH VERTEBRAL FRACTURES

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Abstract: Patients with vertebral fractures, in addition to physical pain, have a reduced quality of life.Teriparatide is the only osteoanabolic preparation for the treatment of osteoporosis, especially valuable in patients with vertebral fractures, as well as in those who have not responded to therapy with it.
We studied 2 groups of patients with vertebral fractures - those in which teriparatide was the first drug of choice and a second group with prior bisphosphonate therapy and worsened BMD indicators and subsequent treatment with teriparatide. The studied patients were 21 aged 65-83 years, of which 12 patients with 2-4 vertebral fractures - primary initiation of therapy with teriparatide (group 1) and 10 patients with severe osteoporosis with insufficient response to current treatment - worse indicators - secondary initiation of treatment with teriparatide - (group 2). Mean baseline BMD T-score in group 1 BMD T-score - 3.8 SD, and in group 2 - BMD T-score - 3.90 SD. The evaluation intervals are 0-12-24 months. Control group of 20 patients without vertebral fractures (group 3) - homogeneous in terms of demographics but heterogeneous in terms of therapy - BMD T-score - 2.98 SD.
The observed improvement in BMD was already at 12 months in both groups of patients with vertebral fractures, with a better result in the group with primary initiation of Teriparatide and this continued until the 24th month. BMD at month 12 improved by an average of 0.42 SD / $p<0.005$ /.
Keywords: PTH, parathormone, BMD, bone mineral density

1. INTRODUCTION

In a global aspect, osteoporosis is a socially significant disease and is the most common disease in elderly women[1]. Its consequences are associated with a high risk of premature death, disability and a high social cost [4] It is therefore important to treat it early and effectively to reverse these effects. The only osteonabolic drug at this stage is teriparatide. It represents 1-34 parathyroid hormone, applied daily pulsatingly induces the differentiation of preosteoblasts into osteoblasts, inhibits osteoblast apoptosis, while simultaneously activating subsequent formation of new bone.[5] . It affects the mineralization of the bone substance by changing the metabolism of the bone, unlike bisphosphonates. It is indicated for therapy in women and men with postmenopausal osteoporosis with vertebral fractures, failure of previous treatment with other preparations and deterioration of BMD, as well as for GCS (glucocorticoid) -induced osteoporosis. Multiple studies have been conducted on the effect on BMD and fracture risk between teriparatide and bisphosphonates [6,7, 8, 9]. We conducted a small study of our own in a Bulgarian population to compare the effects of teriparatide-primary patients and those after bisphosphonate treatment.

2. PURPOSE

To evaluate the therapeutic response and fracture risk in patients with osteoporosis and vertebral fractures treated primarily with teriparatide compared to patients previously treated with bisphosphonates.
Methodology : The studied patients were 21 aged 65-83 years with 2-4 vertebral fractures, of which 12 patients - primary initiation of therapy with teriparatide (group 1) and 10 patients with severe osteoporosis with insufficient response to current bisphosphonate treatment and subsequent initiation on teriparatide therapy - (group 2), due to deterioration of BMD. Group 3 (N 20) were patients without vertebral fractures but with osteoporosis and receiving bisphosphonate treatment.
All patients from the three groups underwent a BMD examination of the two standard areas - femoral neck and lumbar region on a HOLOGIC device, and the measurement was taken before the start of treatment with teriparatide, at the 12th and 24th months, corrected for vitamin D deficiency and normal serum levels of parathormone . The first and second groups have documented two to four severe vertebral fractures through ro-graphs of the lumbar and thoracic spine. Treatment with Teriparatide was conducted for 18 months, as required by the National Health Service of Bulgaria, administered daily at 20 mcg subcutaneously ((20 μg/ day). Prior treatment with bisphosphonates was for 3 years for the second and third groups.

The eligibility criteria are:

A diagnosis of postmenopausal osteoporosis was made For groups 1 and 2 - presence of 2-4 vertebral fractures Adequate calcium and vitamin D intake and corrected vitamin D deficiency Bisphosphonate intake for no more than 3 years for the second group and deterioration of BMD Exclusion criteria - malignant disease, intake of glucocorticoids and medications related to BMD, impaired parathyroid hormone metabolism - hyper and / or hypoparathyroidism, hysterectomy.

3.RESULTS :

Baseline mean BMD T-score in group 1 BMD T-score - 3.8 SD and in group 2 BMD T-score - 3.90 SD. Substantial improvement in CMP was observed in the Teriparatide group during patient follow-up. There are no new vertebral fractures. The change in CMP and the risk of vertebral fractures is shown in a table1.

Table. 1 Change in BMD at 12 and 24 months treated with Teriparatide

Subgroup	**Risk ratio (95% CI)**	**P value**	BMD T-score SD
Total			
Teriparatide 20 μg/d			
Start terapy	0. 32(0.32,0.58)	0.001	-3,8
Folow – up BMD			
≤12 months	0.42(0.42, 0,51)	<0.005	>37%
> 24 months	0.44(0.42, 0.54)	0.011	>44%
New vertebral fracture			
≤12 months	missing		
> 24 months	mssing		

The bisphosphonate treatment group mainly included patients with worsening BMS and vertebral fractures, with two patients having one new fracture during their treatment after 18 months. Despite the slight improvement in BMD, an increased risk of new vertebral fractures was observed in the group of patients with prior bisphosphonate therapy. The results on the change in BMS and fracture risk are shown in Table 2.

Table 2. Change in BMD in group 2 treated with bisphosphonates and subsequently with teriparatide

Subgroup	**Risk ratio (95% CI)**	**P value**	BMD T-score SD
Total			
Biphosphonattes			
Start terapy	0. 52(0.42,0.58)	< 0.005	-3,9
Folow – up BMD			
≤12 months	0.54(0.52, 0.67)	0.023	>17%
> 24 months	0.68(0.62, 0.72)	< 0.005	>27%
New vertebral fracture			
≤12 months	missing		

> 24 months	2 patients

In the control group without vertebral fractures, an improvement in BMD and absence of new fractures was observed Table. 3

Table 3 BMD change in group 3, treated only with bisphosphonates

Subgroup	**Risk ratio (95%CI)**	**P value**	BMD T-score SD
Total			
Biphosphonattes			
Start terapy	0. 32(0.30,0.48)	< 0.005	-2,89
Folow – up BMD			
≤12 months	0.33(0.28, 0.47)	0.019	>28%
> 24 months	0.32(0.29, 0.39)	< 0.005	>29%
New vertebral fracture			
≤12 months	missing		

4. CONCLUSIONS

Results showed an increased fracture risk in patients with prior bisphosphonate treatment, despite an improvement in BMD, compared to patients initially treated with teriparatide. [10]. In addition, new fractures were observed during follow-up treatment and there was a slower progression of improvement in BMD in this group. These processes are likely to be underpinned by osteoblasts, the effect of bisphosphonates on their metabolism and the slowing of bone metabolism [2,3, 9,11].

RECOMMENDATIONS

Teriparatide is at this stage the only authorised osteonabolic agent for the treatment of severe osteoporosis in patients with and without vertebral fractures with post-menopausal and glucocorticoid-induced osteoporosis. The results of our little study show that if there is an indication and no contraindication, it is much better to start the primary than to go through another drug and then switch to a secondary parathyroid hormone analogue.

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