Nuclear magnetic resonance therapy (MBST) in the treatment of osteoporosis. Case report study

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Summary

Despite various pharmacological treatments, the problem of osteoporosis is not yet solved nor decreased. Drug's adverse event and fractures after long termed pharmacotherapy indicate a need for new treatment modalities. Nuclear magnetic resonance therapy could be a supplement to exercise and an alternative or supplement to pharmacotherapy. Number of clinical studies showed increase of BMD after nuclear magnetic resonance therapy and here presented case reports of eleven well-documented cases in which patients experienced severe trauma, having a huge hematoma around the hip but did not suffer any fracture, encourage this expectation. This case report study additionally presents case reports based on the follow-up of the incidence of fractures in a group of 450 patients (males n = 55, females n = 395) with a mean age of 68.4 years. All patients had been treated with MBST – therapeutic nuclear magnetic resonance, standard cycles of 10 days subsequently and followed during a five-year period.
The data indicates that NMRT might reduce a risk of fractures in osteoporotic patients.

KEY WORDS: nuclear magnetic resonance therapy; osteoporosis; fractures; accident falls.

Introduction

Despite various pharmacological treatments the problem of osteoporosis is not yet solved nor decreased (1-3). About the application of bone modifying drugs existing real life data do not support clear relevant anti-fracture effects (4, 5). On the contrary, new problems appeared such as drug's adverse event and fractures after long term of pharmacotherapy. Additionally, there is still an absence of any early prevention and a lack of education about the bone and skeleton in general.

Therefore, new therapeutic possibilities are needed among which a non-invasive, non-pharmacological therapy with ability of provoking positive effects on bone cells, improving function and movement and reducing the pain without adverse effect would be desirable. Nuclear Magnetic Resonance (NMR), well known technology used in diagnostics has been developed for the treatment and patented under the brand MBST. The NMR therapy equipment is using field strengths from 0.4 to 2.35 MilliTesla for 17 to 100 kilo Hertz in the magnetic resonance frequency. The field strength varies depending on the treatment system and regime. Numerous scientific studies on cell culture and animal model confirmed the regeneration of the cartilage and stimulation of bone formation, while clinical studies demonstrate effects of NMR-Therapy (MBST) on pain relief in degenerative rheumatic diseases (6-20).
A big problem related to osteoporosis is also the fact that there is no diagnostic method able to measure the bone strength, on which depends fracture risk. BMD, usually used in clinical practice as a diagnostic "golden standard", is not reliable for assessing the risk of fractures, especially for assessing therapeutic effect. The best evidence of a successful treatment is the resistance of the bone on the strong force which happens in severe trauma, but it is not possible to make a double blind, prospective, placebo controlled clinical study based on purposely exposing patients to accidents with potential fracture trauma. However, well documented case reports could be important evidence despite the fact those aren't prospective double-blind, randomised studies.

Method

450 patients (males n = 55, females n = 395) with a mean age of 68.4 years were evaluated regarding the evidence of fracture, based on the anamnesis and medical documentation. All of them have been treated with therapeutic nuclear magnetic resonance (NMRT) and followed during a 5-year period in the K-Centre (Polyclinic / Centre for Osteoporosis and other bone- and joint disorders, head: Prof.Dr.Sc. Dalibor Krpan, Prim.Dr.Med, Zagreb, Croatia).
All patients suffered from osteoporosis, diagnosed by DEXA measurement (T-score less than -2.5), and were treated with therapeutic NMRT, one MBST cycle (one hour treatment per day on 10 consecutive days; using MBST Osteobed (ODM device), MedTec GmbH., Wetzlar, Germany).
All patients had been taking VitD3 800 I.j, continuously, starting more than a year ago before they did NMR treatment. Patients did not use other drugs for osteoporosis for two years or more before the treatment or did not use at all prior to the treatment.
Among evaluated patients, in 11 of them we found evidences of very severe trauma confirmed with a huge hematoma around the hip, but without fracture which is well documented by the medical source documents from the hospital where

they have been admitted after trauma. These cases are described separately as case reports (Table 1).

Due to the fact that we collected data retrograde we don't have control BMD for all patients but only for patients who have been on regular control. Results are previous published and show significant increase of BMD (16).

Evidence of fracture in the group of 450 patients (male n = 55, female n = 395) with a mean age of 68.4 years were evaluated based on the anamnesis and medical documentation. Regarding to the fact that NMRT has gradual effect, reaching maximum effect after six months, the period of evaluation of fractures is divided as following:

A) less than three months after- treatment;
B) between three months and one year after treatment;
C) between one year and two years;
D) more than two years after treatment.

Table 1 - Cases with NMR osteoporosis treatment and severe trauma without fractures after long time follow-up.

Case	Gender	Age	Time (m) after MBST osteoporosis treatment	Accident cause	Fractures
1	f	82	60	Multiple downfalls. Two times she had a big hematoma around a hip without fracture. (She had previous fracture of forearm)	0
2	m	80	18	Fall/tumble in a bus accident. He suffered a big hematoma but no fracture. (On the control DXA after MBST treatment significant increase of BMD was found)	0
3	f	87	>12	Heavy fall into a hole and had suffered a severe hematoma, but no fracture. (On the control DXA after MBST treatment significant increase of BMD was found)	0
4	f	78	36	Downfall, no fracture. (Control DXA was not done)	0
5	f	75	24	Traffic accident, no fracture. (No significant difference in BMD on control DXA after MBST treatment has been found)	0
6	f	80	>24	Downfall at home. She had a big hematoma around hip but no fracture. (She had previous fracture of forearm)	0
7	m	75	36	Traffic accident with multiple contusions and hematomas. (On the control DXA after MBST treatment significant increase of BMD was found)	0
8	f	78	>36	Downfall (before NMRT multiple fractures!).	0
9	f	85	>12	Heavy fall on the street and had a big hematoma around the hip, but no fracture. (Control DXA was not done)	0
10	f	70	>12	Traffic accident with a big hematoma around the hip. (She had previous fracture of forearm)	0
11	m	71	>24	Fall from a tree. He suffered from many bruises and contusions but no fracture	0

Results

In all eleven cases, presented in Table 1, evidences of very severe trauma such as huge hematoma around hip and contusions have been founded but without fracture. It is well documented by the medical source documents from the hospital where they have been admitted after trauma. All of them had low BMD before NMRT, and four of them had previous fractures.

In the group of 450 patients we found:

A) less than three months after NMR treatment: 2 patients with fractures;
B) between three months and one year after NMR treatment: no patient with fracture;
C) between one year and two years: 2 patients with fractures;
D) more the two years after treatment: 14 with fractures.

In period less than three months after NMR treatment (A) there are two patients with fractures. Both of them suffered fracture of forearm after a severe fall, and both of them had previous fractures and very low BMD.

Within the period between three months and one year after NMR treatment (B) there has been no fractures at all.

Within the period between one year and two years after NMR treatment (C), there were two patients suffering a fracture. One is a lady of 80 years with a new compressive fracture of L5, found on control X-ray. The other is a lady of 83 years with a fracture of forearm, but not hip fracture despite she fell down the stairs and had a big hematoma around left hip, which clearly shows that it was severe trauma.

Within the period of more than two years after NMR treatment (D) there were 14 patients with fractures. All of them were females above 80. In one case a hip fracture occurred after severe trauma, in 4 cases vertebral compressive fracture and in 9 cases fracture of forearms. It is important to add that the lady who had hip fracture has been completely recovered after surgery and implantation of endoprosthesis.

Discussion

Fracture amid minor trauma is the most important complication of osteoporosis which results in serious negative consequences on quality of life and causes permanent disability in significant percentage of patients. Therefore, prevention of fractures is the major goal of the treatment of osteoporosis.

Thus, osteoporosis is characterized by low bone strength. There is no diagnostic tool or method able to measure bone strength. We are only able to measure surrogate parameters such as BMD and bone markers, but they are not measuring bone strength which depends mostly on the quality of collagen (osteoid) which gives a flexibility and microarchitecture, and that cannot be measured. Because of that the most of big clinical studies related to the treatment of osteoporosis took a fracture risk as a parameter of therapeutic effect. But fracture will happen if a force acts on bone, so the fact that someone didn't have a fracture doesn't mean positive effect of the treatment, despite that it could be double blind, randomized, placebo controlled study. The best evidence of a successful treatment is the resistance of the bone on the strong force which happens in severe trauma, but it is not possible to make a double blind, prospective, placebo controlled clinical study based on purposely exposing patients to accidents with potential fracture trauma.

Therefore, we believe that this case report study provides important information, despite the fact that there is rather a small number of the cases. All reported cases are well documented and show that NMRT might be the new non-pharmaceutical method able to reduce risk of fracture. We can see that there were no fractures among patients during the period between three months and one year after NMRT, which is assumed as the period of maximum effect of NMRT, and only two between one year and two years after NMRT. Due to gradual effect of NMRT, two cases of fractures happened within first three months after MBST treatment cannot be taken as an indicator that the treatment failed.

But, because that is not double blind placebo controlled study, there is need for more studies about the MBST treatment of osteoporosis. Still, those cases and particularly eleven cases with confirmed osteoporosis and previous fracture who didn't have fracture after MBST treatment despite severe trauma clearly confirmed by huge hematoma around hip, encourage the expectations on which MBST could be a useful alternative or supplement to medical therapy in patients with osteoporosis. Additionally, important is the fact that MBST has no risk of adverse event which makes it appropriate for a fracture prevention strategy in combination with exercise and vitamin D3.

Conflict of interest

Authors Dalibor Krpan and Werner Kullich declare that they have no conflict of interest.

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