Clinical effect of alendronate in combination with functional exercise on degenerative Osteoarthrifis

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Abstract: Objective: to observe and analyze the clinical effect of alendronate combined with functional exercise on degenerative Osteoarthrifis(OA), so as to provide an effective scheme for its clinical treatment. Methods: A total of 60 cases of degenerative OA patients in our hospital were selected as the research object, and they were randomly divided into the group A and the group B, with 30 cases in each group. Patients in the group A were orally administrated with alendronate, while those in the group B were given functional exercise therapy in combination with alendronate as the group A. Results: After treatment, VAS score of group B was obviously superior to that of group A, and the differences were statistically meaningful ($t=2.41$, $P < 0.05$). After intervention, the levels of serum P1NP and CTX in the two groups were meaningfully lower than those before intervention ($P < 0.05$), and the levels of BGP and 25(OH)D were meaningfully higher than those before intervention ($P < 0.05$). After the treatment within the same period of time, the effective rate of patients in the group B in comprehensive treatment was 93.8%, meaningfully higher than 79.7% in the group A ($P < 0.05$). Conclusion: For degenerative OA, alendronate combined with functional exercise has a more meaningful effect, which can further improve the stiffness of the affected parts of the limbs, reduce the degree of pain, and improve the quality of life of patients.

1. Introduction

Osteoarthrifis(OA) is related to age and is a common disease in the elderly. With the continuous aging of the population [1], the incidence of OA in the elderly is increasing, which has seriously affected the quality of life of elderly patients [2-3]. The study found that lack of exercise was the main reason for the accelerated occurrence of OA, and exercise was one of the measures for the prevention and treatment of OA [4]. At present, OA is mainly treated with drugs, and the role of exercise in the prevention and treatment of OA has fascinated more and more follow [5]. In this research, the elderly patients with OA were treated with alendronate combined with functional exercise, to observe the therapeutic effect.

2. Objects and methods

2.1. Objects

The total is 60 patients with degenerative OA were selected and included in the criteria: they met the diagnostic criteria of the American College of Rheumatology [6]. Unilateral lesions; Informed consent signed by patients and their families.

Exclusion: patients combined with other knee joint diseases; Patients with severe trauma; Patients with systemic infection or skin disease; Patients with diabetes and other endocrine system diseases; Patients with psychiatric disorders; Patients with important organ dysfunction; Patients with incomplete clinical data.

This research was recognized by the Hospital Ethics Committee. There were 28 males and 32 females. Patients were aged from 45 to 79 years old, and had disease courses of 4 to 12 months. On the basis of the different treatment methods, the enrolled patients were separate into an group B and a group A, 30 cases in every group. There was no meaningful diversity in commonly information between the two groups ($P > 0.05$).

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2.2. Therapeutic method

Medication: patients in two groups were routinely oral calcium carbonate D3 tablets twice a day, 1 tablet each time; Patients in the group A were orally administrated with alendronate sodium, one tablet each time, once a day. According to the group A, the group B was combined with functional exercise therapy.

Functional exercise method:

(1)Lower back muscle training. Squat seat method, standing, feet apart with shoulder width, put the chair behind, keep the upper body upright, hip to push back, knees bent, the body to the direction of the chair face down, pause for a moment, your feet press the ground, back to the original position.

(2)Limb muscle training. For instrument-aided training, dumbbells, rubber bands, and springs can be used for both upper limbs, and weight-bearing walking can be used for both lower limbs, such as walking with sandbags tied.

(3)Chest and hip muscle training. Push-up against the wall method, standing about 60 cm away from the wall (the shorter the distance with the wall, the easier the action), hands on the wall, with the shoulder high, at the same time, both hands apart with the shoulder width, keep the body is in a straight line, elbows to bend on both sides of the body, lower chest to the direction of the wall, feet heel lift off the ground, pause for a moment, and then slowly unbend elbows, back to the initial position. The above trainings for each part lasted for 10 ~20 min each time, 3–4 times a week, and lasted for three months continuously.

2.3. Observation index and curative effect evaluation

Visual Analogue Scale for Pain (VAS): VAS was performed according to the degree of pain before and after the intervention. The score was 0 for no pain and 10 for intolerable ache. The higher the score was, the more grim the pain became.

Determination of serum markers of bone metabolism: Before and after intervention, 5 ml of peripheral venous blood was collected from patients and the serum was collected by centrifugation. The levels of serum type 1 collagen N-telopeptide (P1NP), osteocalcin (BGP), type 1 collagen C-telopeptide β special sequence (CTX), and 25- hydroxyvitamin D[25(OH)D] were measured by electrochemical luminescence method and immunofluorescence analyzer (Roche Cobas e601, Japan).

2.4. Statistical method

SPSS 20.00 software was put to use for data analysis. The measurement data were showed as mean ± SD by t test; The counting data were expressed as (%) and were analyzed by the method of statistical analysis χ 2 inspection. The discrepancy was statistically meaningful ($P < 0.05$).

3. Result

3.1. VAS scores of two groups before and after treatment

The VAS scores of the two groups before and after treatment are shown in Table 1.

Table 1 VAS scores of two groups before and after treatment

Group	n	VAS score	
		Before treatment	After treatment
group B	30	5.77±1.53	1.91±0.41**
group A	30	5.83±1.61	3.22±0.83*

Note: *: Compared with before treatment, $P < 0.05$; **: Compared with the group A, $P < 0.05$.

As shown in Table 1, VAS scores of patients in the group B and the group A after treatment were markedly better than those before treatment, and the differences were statistically meaningful. The difference in VAS score between the group B and the group A before treatment was not statistically meaningful, but the VAS score of the group B after treatment was meaningfully better

than that of the group A, and the differences were statistically meaningful (t=2.41, P < 0.05).

3.2. Comparison of bone metabolism index before and after intervention between that two group

There was no meaningful difference in serum levels of P1NP, BGP, CTX and 25(OH)D between the two groups before intervention (P>0.05). After the intervention, the serum levels of P1NP and CTX in the two groups were meaningfully lower than those before the intervention (P<0. 05). The levels of BGP and 25(OH)D were meaningfully higher than those before the intervention (P <0. 05). The serum levels of P1NP and CTX in the group B were meaningfully lower than those in the group A (P < 0.05). The levels of BGP and 25(OH) D were meaningfully higher than those in the group A (P < 0.05). See table 2.

Table 2 Comparison of bone metabolism index before and after intervention between that two group

Group	P1NP(ng/ ml)		BGP(μg/ L)		CTX(ng/ ml)		25(OH)D(ng/ ml)	
	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
group B	55.13±7.14	45.33±7.36	1.75±0.22	2.88±0.26	0.53±0.06	0.44±0.07	11.33±2.41	14.84±2.17
group A	54.71±7.55	38.40±7.61	1.79±0.21	5.57±0.35	0.52±0.05	0.34±0.09	11.39±2.34	17.41±2.172.51
T value	0.42	7.12	1.33	70.25	0.87	11.25	0.47	8.93
P value	0.661	<0.001	0.153	<0.001	0.358	<0.001	0.668	<0.001

3.3. Clinical treatment efficiency of patients between the two groups

There was no meaningful difference in general information between the two groups (P>0.05). After treatment with different doses at the same time, the effective rate of patients in the group B in comprehensive treatment was 93.3%, meaningfully higher than 83.3% in the group A. The difference was statistically meaningful (P < 0.05), as shown in Table 3.

Table 3 Comparative analysis of clinical treatment efficiency between two groups of patients

Group	n	Remarkable effect	Effective	Invalid	Effective rate of treatment
group B	30	21(70.0)	7(23.3)	2(6.7)	28(93.3)
group A	30	15(50.0)	10(33.3)	5(16.7)	(83.3)
χ 2 value					5.51
P value					<0.05

Changes in pain status, stiffness, daily activity difficulty and quality of life of patients in the group B: The pain severity in the two groups was lower than that before treatment. The grade I, II and III pain severity in the group B were 10, 5 and 4 cases respectively, which were meaningfully better than those in the group A (12, 16 and 14 cases, respectively). The difference was statistically meaningful (P < 0.05).

4. Discussion

The pathogenesis of degenerative OA is still not very clear, and its pathogenesis is varied. Studies have shown that the risk factors for degenerative OA are age, history of knee injury, imaging history, hypertension, and family history of degenerative arthritis [7]. The protective factor is educational background. In addition, advanced age is recognized as a risk factor for the disease, and the incidence of arthritis in the whole body increases meaningfully with age. As you get older, the molecular quality and quantity of collagen and PGs in the cartilage matrix will be changed, affecting the biological stability of cartilage and its adaptability to biomechanics. In addition, the dysfunction of chondrocyte reconstruction mechanism leads to progressive cartilage degeneration. Imaging examination is an effective method to find joint lesions. However, conventional joint X-rays cannot find and diagnose early cartilage lesions.

At present, the principle of treatment for degenerative OA is to relieve pain and swelling symptoms, improve joint mobility and muscle strength, so as to delay the progression of the disease and protect the joint function [8]. In recent years, reports have shown that vibration stimulation can effectively activate the muscle spindle, improve the excitability of primary afferent fibers, and enhance the function of α -motor neurons to activate muscle fibers [9]. However, simple application of this kind of functional exercise can only partially improve the related symptoms and signs, and has poor effect in improving the joint range of motion. Moreover, there is the problem of decreased efficacy after long-term application, which cannot meet the clinical needs.

Muscle visual feedback intervention can directly improve the excitability of muscles around the knee joint, promote the normal and autonomic movement recovery of muscles, and avoid the occurrence of disuse atrophy, thereby promoting the improvement of the joint muscles and muscle groups. At the same time, it can also maintain the normal function of the connective tissues of muscles and ligaments, delay the reduction process of the elasticity and toughness of the connective tissues, and help to reduce the degree of muscle contracture [10]. Reports have shown that muscle visual feedback intervention is superior to conventional functional exercise in enhancing the muscle strength of knee muscles, in that it can simultaneously increase the isometric contraction force and shorten the time required for muscle strength recovery. The results of this study showed that the VAS scores of patients in the group B were meaningfully better than those in the group A after treatment and before treatment ($P < 0.05$). Besides, the active and passive knee motion after treatment were also meaningfully higher than those in the group A and before treatment ($P < 0.05$), confirming that alendronate combined with functional exercise was helpful to reduce pain sensation, improve knee function and joint motion in patients with degenerative OA.

Bone metabolism indicators include bone turnover markers such as P1NP, BGP, and CTX, and bone metabolism regulatory hormones such as 25 (OH) D and fibroblast growth factor 23. P1NP is a marker of bone formation and CTX is a marker of bone resorption. BGP is a non-collagen acidic glycoprotein synthesize mainly by odontoclasts and osteoblast, and by proliferating chondrocytes. BGP plays an important regulatory role in bone calcium metabolism and is a biochemical marker of bone metabolism. The results of this study showed that the two groups of methods can reduce the level of bone turnover in patients, delay bone loss, increase the level of 25(OH)D to promote calcium absorption, thereby playing a role in the prevention and treatment of OA. Compared with patients treated with alendronate alone, patients treated with alendronate combined with functional exercise had better therapeutic effects.

In this study, by way of small group comparison, the effects of alendronate combined with functional exercise therapy specifically for OA and single administration of lorxicam were compared and observed in detail. After patients in the group B were treated with the combined drugs, the effective rate of comprehensive treatment in patients of the group B was 93.3%, which was higher than 83.3% of the effective rate in patients of the group A. The difference was statistically meaningful ($P < 0.05$). It indicated that alendronate combined with functional exercise had more meaningful effect in improving the pain and joint movement of patients.

5. Conclusions

In summary, alendronate combined with functional exercise can effectively alleviate the pain in patients with degenerative OA, promote the functional recovery of limb movement, improve joint mobility, and improve the muscle strength and quality of life. And has important clinical application and popularization values.

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