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Original Article

Effects of acupoint catgut embedding on the postmenopausal osteoporosis patients and related mechanism

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Abstract: Objective: To study the effect and mechanism of acupoint catgut embedding on patients of postmenopausal osteoporosis (PMOP). Methods: In this prospective study, 90 patients with PMOP who received treatment in our hospital were randomly divided into the drug treatment group (n=45) and drug treatment + catgut embedding group (n=45) according to SPSS random table method. The drug treatment group was given conventional western medicine treatment, and the drug treatment + catgut embedding group was given point embedding therapy. Bone mineral density (BMD), calcium (Ca^{2+}), osteoprotegerin (OPG), estrogen (E_2), receptor activator of nuclear factor-kB ligand (RANKL), liver and kidney function and blood lipids were detected before treatment in the two groups, and visual analogue score (VAS) and PMOP symptom score were evaluated. The above-mentioned indexes were detected again 3 months and 6 months after treatment. Results: At 3 and 6 months after treatment, the BMD and the levels of Ca^{2+} and E_2 in the two groups were increased, while the levels of OPG and RANKL were decreased, and the improvement in the drug treatment + catgut embedding group was significantly better than that in the drug treatment group ($P<0.05$). The symptom scores of VAS and PMOP in the drug treatment + catgut embedding group were significantly lower than those in the drug treatment group (all $P<0.001$). There was no significant difference in the levels of alanine aminotransferase (ALT), total bilirubin (TBil), albumin (ALB), blood urea nitrogen (BUN), serum creatinine (SCr) and serum uric acid (SUA) between the two groups, but the levels of total cholesterol (TC) and triglyceride (TG) in the drug treatment + catgut embedding group were significantly lower than those in the drug treatment group (all $P<0.001$). Conclusion: Acupoint catgut embedding has a good effect on PMOP, and it can increase BMO and improve the clinical symptoms of patients, which is worthy of clinical promotion.

Keywords: Postmenopausal osteoporosis, acupoint catgut embedding, bone mineral density, bone metabolism, pain score, symptom score

Introduction

Osteoporosis is a systemic disorder of bone metabolism. Due to the decrease of estrogen level in postmenopausal women, the microstructure of bone tissue will be gradually degraded and damaged, and the bone matrix and bone mineral components in the tissue will continuously lose, causing the reduction of the number of bone trabeculae, the increase of thinner bone, and the increase of the risk of fracture [1, 2]. According to epidemiological data, the increased risk of osteoporosis and its associated brittle fractures are important causes of aging and disability in aged women, affecting 50% of postmenopausal women worldwide [3]. Full attention should be paid to this, and the active implementation of multidisciplinary comprehensive treatment is of positive significance in reducing the occurrence of osteoporotic fractures. As the pathogenesis of postmenopausal osteoporosis (PMOP) is more complicated, and mainly related to estrogen, calcitonin, 1-25 hydroxyvitamin D3, parathyroid hormone and other factors, with the main clinical manifestations including low back bone pain and spinal deformity [4]. Therefore in modern medical treatment, the PMOP is mostly

Table 1. Comparison of the baseline data between two groups ($\bar{x} \pm sd$)

Groups	Age (years)	Menopausal time (years)	Course of disease (years)	Body mass (kg/m^2)
Drug group (n=45)	57.5±5.2	6.1±0.4	5.9±0.3	24.14±1.96
Drug treatment + catgut embedding group (n=45)	57.1±5.0	6.2±0.4	6.0±0.3	24.02±1.74
t	0.372	1.186	1.581	0.307
P	0.711	0.239	0.117	0.760

treated with basic supplements, bone resorption inhibitors, and bone formation promotion agents [5, 6]. Although the temporary improvement of clinical symptoms is effective, the long-term prognosis is still not ideal.

In traditional Chinese medicine, PMOP is classified as "bone arthralgia" and "bone impotence". The pathogenesis mostly include a fever of fatigue, exhaustion of fluid injuring the kidney, with marrow exhaustion and kidney deficiency as the fundamental factor, spleen deficiency and liver depression as the promoting factor, and blood stasis as the pathological basis. Therefore, the treatment should take tonifying the kidney and promoting blood circulation as the criterion [7]. Catgut embedding at acupoint can cause continuous acupuncture effect at a specific point by embedding catgut, which has a rapid short-term effect and a sustained long-term effect, so as to achieve the purpose of treating diseases and is widely used in a variety of diseases [8]. Peng et al. have reported that the use of catgut embedding at acupoints to treat primary osteoporosis can significantly improve bone density, improve bone metabolism, and alleviate patient suffering [9]. At present, there is still a lack of comprehensive evaluation of the mechanism of acupoint catgut embedding in the treatment of PMOP. This study will investigate the effectiveness of acupoint catgut embedding in postmenopausal osteoporosis.

Materials and methods

Baseline data

In this prospective study, 90 patients with PMOP who were treated in Linyi People's Hospital from July 2019 to October 2019 were randomly divided into drug treatment group (n=45) and drug treatment + catgut embedding group (n=45) according to SPSS random table method. There was no significant difference in the baseline data between the two groups (P>0.05), and they were comparable (**Table 1**). This study was approved by the Medical Ethics Committee of Linyi People's Hospital.

Inclusion and exclusion criteria

Inclusion criteria: In Western medicine, patients should meet the diagnostic criteria of the 2011 Guidelines for the Diagnosis and Treatment of Primary Osteoporosis in China [10]. And X-ray bone density examination shows that the T value of the density of the 2nd-4th femoral neck and lumbar vertebrae are no more than -2.5 or there is a spinal compression deformation, and the T value is no more than -1.0. In traditional Chinese medicine, patients should meet the syndrome of kidney deficiency and blood stasis in the Guiding Principles for Clinical Research of New Chinese Medicines [11]. With the main symptoms of soreness of the waist and knees, lumbar spine tingling, fixed pain, severe pain, with the secondary symptoms of lower limb weakness, gait difficulty, tinnitus and dizziness, and with the tongue pulse of purple or dark tongue, ecchymosis, fine pulse or deep and astringent pulse. All the patient has signed an informed consent form.

Exclusion criteria: Patients who have taken drugs that affect bone metabolism in the past 3 months, and have a history of joint replacement, limb deformity or multiple fractures; Patients with vertebral tuberculosis; Patients with malignant tumor; Patients with vitamin D deficiency and osteomalacia; Patients with hyperthyroidism, osteogenic insufficiency and other diseases affecting bone metabolism; Patients who are allergic to research drugs; Patients with poor compliance who do not cooperate with the study.

Methods

Drug treatment group: Caltrate D® (Wyeth Pharmaceutical Co., Ltd., China, specification: 600 mg * 60 s) was given orally, 2 tablets per

time, once a day; Alfacalcidol® (Chongqing Yaoyou Pharmaceutical Co., Ltd., China, specification: 0.5 μg * 10 s) was given orally, 0.25 μg/time, once a day. The two drugs were taken together for 6 months.

Drug treatment + catgut embedding group: Acupoint catgut embedding therapy was performed on the basis of the drug group, once a week, one side of acupoint was selected each time, and a single acupoint was selected alternatively. A total of 6 months of treatment was recorded. The main point includes Pishu point (both side), Kidney Shu point (both side), Zusanli point (both side), Zhongwan point, Guanyuan point, Juegu point (both side), and Sanyinjiao point (both side). The auxiliary point including Liver Shu point and Taixi point that suit the case of the deficiency of liver-yin and kidney-yin; Mingmen point that suit the case of the deficiency of the kidney-yang; Mingmen point and Energy Sea point that suit the case of the asdthenic splenonephro-yang; Diaphragm Shu point and Taichong point that suit the case of the stagnation of Qi and blood.

Outcome measurements

Main outcomes: (1) Bone mineral density (BMD) before treatment, 3 months after treatment and 6 months after treatment: the BMD was measured by dual energy X-ray densitometer (manufacturer: OsteoSys, Korea, model: EXA-PRESTO, SFDA Certified No:20152301019). The BMD of the L2-L4 lumbar were chosen for the measurement. (2) Bone metabolic indexes before treatment, 3 months after treatment and 6 months after treatment: The 4 mL of fasting venous blood was taken from the patient and centrifuged for about 10 min with a centrifugal radius of 13.5 cm and a rotation speed of 2000 r/min. The serum was separated and preserved for examination. The levels of osteoprotegerin (OPG) and receptor activator of nuclear factor-kB ligand (RANKL) were measured by enzyme-linked immunosorbent assay (ELISA) from Beckman IAMMGE. The serum calcium (Ca^{2+}) level was detected by electrode method. With the aid of the gc-2010 radioimmunocounter (Anhui USTC Zonkia Scientific Instrument Co., Ltd., China), the level of estrogen (E_2) was detected by radioimmunoassay. All the kits were purchased from BIOVENDOR Company of the United States [12]. (3) Pain before treatment, 3 months after treatment and 6 months after treatment: Pain was evaluated by visual analogue score (VAS) [13]. A score of 0 point means no pain; A score of 1-3 indicates mild pain, slightly affected daily life and work and basically unaffected sleep that is acceptable by the patients. A score of 4-6 indicates severe pain, which has affected part of daily life and work, and the sleep. A score of 7-10 means unbearable, which has severely affected the daily life and work, with tossing and turning sleepless. (4) Symptom score before treatment, 3 months after treatment, and 6 months after treatment [14]. The six items of primary and secondary syndromes were chosen to evaluate the improvement of clinical symptoms including the waist and knee soreness, lumbar spine tingling, walking difficulties, tinnitus and dizziness, lower limb weakness and fixed pain. A 0-4 scale was used for each symptom with a total score of 24 points. Lower score indicates better recovery.

Secondary outcomes: (1) Liver function before treatment, 3 months after treatment and 6 months after treatment: The levels of alanine aminotransferase (ALT), total bilirubin (TBil) and albumin (ALB) were measured by enzyme-linked immunosorbent assay (ELISA, Beckman IAMMGE). (2) Renal function before treatment, 3 months after treatment and 6 months after treatment: The levels of blood urea nitrogen (BUN), serum creatinine (SCr) and serum uric acid (SUA) were detected by fluorescence polarization immunoassay with the aid of Mindray semi-automatic biochemical analyzer (BA-90) of Shanghai Saimo Biotechnology Development Co., Ltd., China. (3) Blood lipid indexes before treatment, 3 months after treatment and 6 months after treatment: The indexes of total cholesterol (TC) and triglyceride (TG) were detected by glycerophosphate oxidase method with the aiding of OTA-400 automatic biochemical analyzer provided by Shenyang Wantai Medical equipment Co., Ltd., China.

Statistical methods

The data were processed by SPSS 23.0. The measurement data in accordance with normal distribution were expressed as ($\bar{x} \pm sd$). Independent sample t-test was used for inter-group comparison, and paired t-test was used for intra-group comparison. One-way analysis of variance was used to compare the single index of the two groups at multiple time points, the

Table 2. Comparison of bone mineral density and bone metabolic indexes between the two groups ($\bar{x}$ ± sd)

Categories	Before treatment	3 months after treatment	6 months after treatment	F	P
Bone mineral density (g/cm^2)					
Drug group (n=45)	0.61±0.06	0.74±0.09***	0.85±0.16***	52.239	<0.001
Drug treatment + catgut embedding group (n=45)	0.62±0.07	0.80±0.11***	0.93±0.19***	61.612	<0.001
t	0.094	2.832	2.160		
P	0.925	0.006	0.033		
OPG (pmol/L)					
Drug group (n=45)	12.57±2.26	12.04±2.03***	11.51±1.34***	3.440	0.035
Drug treatment + catgut embedding group (n=45)	12.41±2.13	11.08±2.00***	10.77±1.89***	8.463	<0.001
t	0.346	2.260	2.143		
P	0.730	0.026	0.035		
RANKL (pmol/L)					
Drug group (n=45)	302.32±36.17	296.84±32.61***	287.69±30.42***	2.237	0.111
Drug treatment + catgut embedding group (n=45)	305.63±36.61	283.24±30.47***	273.81±29.34***	11.523	<0.001
t	0.431	2.044	2.203		
P	0.668	0.044	0.030		
Ca^{2+} (mmol/L)					
Drug group (n=45)	1.95±0.14	2.05±0.20***	2.17±0.29***	11.399	<0.001
Drug treatment + catgut embedding group (n=45)	1.96±0.15	2.22±0.22***	2.41±0.34***	36.941	<0.001
t	0.327	3.836	3.603		
P	0.744	P<0.001	0.001		
E_2 (ng/L)					
Drug group (n=45)	67.87±7.08	72.54±7.53***	80.47±8.37***	30.968	<0.001
Drug treatment + catgut embedding group (n=45)	65.79±7.05	76.51±8.49***	85.63±9.12***	64.958	<0.001
t	1.397	2.347	2.796		
P	0.166	0.021	0.006		

Note: Compared with before treatment, ***P<0.001. Ca^{2+}: calcium; OPG: osteoprotegerin; E_2: estrogen; RANKL: receptor activator of nuclear factor-kB ligand.

counting data were expressed by (n, %) and the χ^2 test was used. P<0.05 was considered statistically significant.

Results

Baseline data

There was no significant difference in the baseline data of age, menopausal time, course of disease and body mass between the two groups (P>0.05). It can be seen that the two groups of general data are comparable. See **Table 1**.

Bone mineral density, bone metabolism and estrogen

Before treatment, there was no significant difference in bone mineral density, bone metabolism and estrogen between the two groups (P>0.05). After 3 and 6 months of treatment, the bone mineral density and Ca^{2+} and E_2 levels of both groups were significantly higher, and the levels of OPG and RANKL were decreased. The improvement of the drug treatment + catgut embedding group was significantly better than those of patients in the drug group (both P<0.05). It can be seen that the acupoint catgut embedding combined with drug therapy is more conducive to the improvement of the BMD of lumbar spine L2-L4, the bone tissue metabolism, and the increase of E_2 level. See **Table 2** and **Figure 1**.

Visual analogue score (VAS) and postmenopausal osteoporosis (PMOP) symptom score

Before treatment, there was no significant difference in VAS and PMOP symptom scores between the two groups (P>0.05). After 3 and 6 months of treatment, the VAS and PMOP symptom scores in both groups were decreased significantly, and those in the drug treatment +

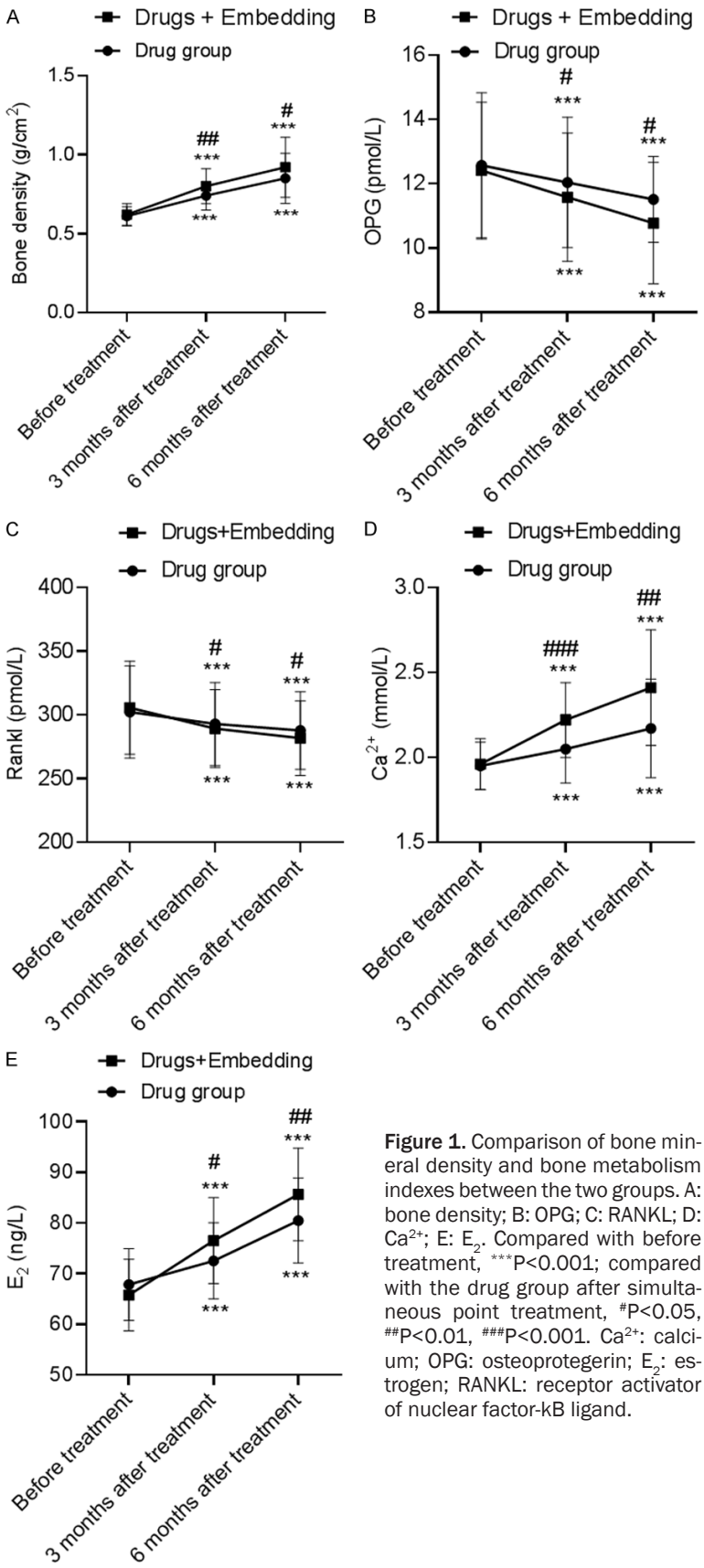

Figure 1. Comparison of bone mineral density and bone metabolism indexes between the two groups. A: bone density; B: OPG; C: RANKL; D: Ca^{2+}; E: E_2. Compared with before treatment, ***P<0.001; compared with the drug group after simultaneous point treatment, $^{\#}$P<0.05, $^{\#\#}$P<0.01, $^{\#\#\#}$P<0.001. Ca^{2+}: calcium; OPG: osteoprotegerin; E_2: estrogen; RANKL: receptor activator of nuclear factor-kB ligand.

catgut embedding group were significantly lower than those in the drug group (all P<0.001). It can be seen that acupoint catgut embedding combined with drug therapy is more beneficial for pain relief and clinical symptoms improvement of the patients. See **Table 3** for detail.

Liver function

Before treatment, there was no significant difference in liver function between the two groups (P>0.05). After 3 and 6 months of treatment, there were no abnormal changes in the levels of ALT, TBil and ALB between the two groups, and there was no significant difference between the two groups (P>0.05). It can be seen that acupoint catgut embedding combined with drug therapy will not cause liver function impairments. See **Table 4** for detail.

Renal function

Before treatment, there was no significant difference in renal function between the two groups (P>0.05). At 3 and 6 months after treatment, there were no abnormal changes in the levels of SCr, SUA and BUN between the two groups, and there was no significant difference between the two groups (P>0.05). It can be seen that acupoint catgut embedding combined with drug therapy will not cause adverse effects on the renal function of the patients. See **Table 5** for detail.

Blood lipids

Before treatment, there was no significant difference in blood lipid indexes between

Table 3. Comparison of VAS and PMOP symptom scores between the two groups ($\bar{x}$ ± sd, points)

Categories	Before treatment	3 months after treatment	6 months after treatment	F	P
VAS					
Drug group (n=45)	6.34±1.02	4.04±0.73***	2.21±0.43***	328.834	<0.001
Drug treatment + catgut embedding group(n=45)	6.48±1.08	3.21±0.77***	1.74±0.14***	446.754	<0.001
t	0.632	5.248	6.972		
P	0.529	<0.001	<0.001		
PMOP symptom					
Drug group (n=45)	17.36±2.19	12.29±1.52***	10.69±1.18***	192.609	<0.001
Drug treatment + catgut embedding group(n=45)	17.63±2.53	10.28±1.11***	6.81±0.84***	494.154	<0.001
t	0.541	7.164	17.969		
P	0.590	<0.001	<0.001		

Note: Compared with before treatment, ***P<0.001. PMOP: postmenopausal osteoporosis; VAS: visual analogue score.

Table 4. Comparison of liver function between the two groups ($\bar{x}$ ± sd)

Categories	Before treatment	3 months after treatment	6 months after treatment	F	P
ALT (nmol/s·L)					
Drug group (n=45)	20.16±2.91	20.65±3.14	21.14±3.36	1.094	0.338
Drug treatment + catgut embedding group (n=45)	20.86±2.98	21.28±3.11	21.41±3.14	0.393	0.676
t	1.127	0.956	0.394		
P	0.263	0.342	0.695		
TBil (μmol/L)					
Drug group (n=45)	5.14±0.36	5.27±0.39	5.17±0.36	1.521	0.222
Drug treatment + catgut embedding group (n=45)	5.22±0.38	5.19±0.34	5.16±0.35	0.318	0.728
t	1.025	1.037	0.134		
P	0.308	0.303	0.894		
ALB (μmol/L)					
Drug group (n=45)	35.16±3.37	35.71±3.45	34.84±3.09	0.797	0.453
Drug treatment + catgut embedding group (n=45)	36.06±3.57	35.61±3.42	35.06±3.17	0.982	0.377
t	1.230	0.138	0.333		
P	0.222	0.891	0.740		

Note: ALT: alanine aminotransferase; TBil: total bilirubin; ALB: albumin.

the two groups (P>0.05). After 3 and 6 months of treatment, the levels of TC and TG in both groups decreased, and those in the drug treatment + catgut embedding group were lower than those in the drug group (all P<0.001). It can be seen that acupoint catgut embedding combined with drug therapy is more beneficial for blood lipid metabolism improvement in patients. See **Table 6** and **Figure 2** for details.

Discussion

Estrogen has two-way regulation roles in cell apoptosis. The secretion of estrogen and the function of hypothalamus-pituitary-ovary axis in postmenopausal women decrease. Failure to inhibit osteoclast activity will promote osteoclast apoptosis, leading to the imbalance of bone resorption and formation, thereby, causing osteoporosis [15, 16]. Calcium is an essential substance to maintain the normal function of the human skeletal system. About 95% of the calcium in the human body is recombined into the bone matrix through osteoblasts [17]. Therefore, modern medical treatment often uses calcium supplementation as the basic drug treatment. Each tablet of Caltrate D contains 0.75 g of calcium carbonate, which is equivalent to 300 mg calcium. It also has 60 international units of vitamin D3, which can participate in calcium and phosphorus metabolism to promote bone resorption and bone for-

Table 5. Comparison of renal function between the two groups ($\bar{x}$ ± sd)

Categories	Before treatment	3 months after treatment	6 months after treatment	F	P
SCr (μmol/L)					
Drug group (n=45)	54.57±5.26	54.74±5.63	55.41±5.94	0.334	0.717
Drug treatment + catgut embedding group (n=45)	55.41±5.63	54.18±5.90	55.67±5.89	0.845	0.432
t	0.731	0.461	0.208		
P	0.467	0.646	0.836		
SUA (μmol/L)					
Drug group (n=45)	122.32±13.17	122.54±13.61	121.69±12.62	0.051	0.950
Drug treatment + catgut embedding group (n=45)	123.63±13.21	121.26±12.55	124.81±13.54	0.856	0.427
t	0.471	0.464	1.131		
P	0.639	0.644	0.261		
BUN (mmol/L)					
Drug group (n=45)	3.05±0.38	3.02±0.34	3.09±0.50	0.326	0.722
Drug treatment + catgut embedding group (n=45)	3.07±0.41	3.09±0.53	3.06±0.40	0.052	0.949
t	0.240	0.746	0.314		
P	0.811	0.458	0.754		

Note: BUN: blood urea nitrogen; SCr: serum creatinine; SUA: serum uric acid.

Table 6. Comparison of blood lipid indexes between the two groups ($\bar{x}$ ± sd, mmol/L)

Groups	Before treatment	3 months after treatment	6 months after treatment	F	P
TC					
Drug group (n=45)	5.18±0.78	4.45±0.51***	4.21±0.32***	35.489	<0.001
Drug treatment + catgut embedding group (n=45)	5.24±0.72	4.02±0.45***	3.75±0.21***	111.218	<0.001
t	0.379	4.241	8.062		
P	0.706	<0.001	<0.001		
TG					
Drug group (n=45)	1.71±0.25	1.65±0.21***	1.20±0.14***	83.118	<0.001
Drug treatment + catgut embedding group (n=45)	1.74±0.26	1.50±0.15***	1.01±0.10***	186.698	<0.001
t	0.558	3.899	7.408		
P	0.578	<0.001	<0.001		

Note: Compared with before treatment, ***P<0.001. TC: total cholesterol; TG: triglyceride.

mation, and alleviate the collectively negative calcium state [18, 19]. Alfacalcidol can promote the absorption of calcium ions in the gastrointestinal tract, thereby increase the content of calcium ions in the blood, and improve the symptoms of abnormal vitamin D metabolism, so as to alleviate bone loss, stabilize the bone microenvironment and improve clinical symptoms [20]. According to traditional Chinese medicine, the location of the lesion of postmenopausal osteoporosis is in the bone. As the root of yin and yang of the five internal organs, the kidney is responsible for bone and bone marrow regeneration. The kidneys store the essence in the bones, which are filled with it. If the kidney have sufficient essence, the muscles and bones flourish, and if the kidney essence is insufficient, the bone is withered and medullary deficiency [21]. After menopause, women have exhausted of kidney-essence with deficiency of the kidney essence. The bone and vein are lack of nourishment, resulting in bone pain. As kidney deficiency can't nourish the waist causing weakness in the waist and knees. Deficiency of kidney-essence cannot prosper upward causing tinnitus and dizziness [22]. After a long period of circulation, osteoporosis developed. So, the kidney deficiency is the main pathogenesis of this disease. In addition, kidney deficiency will make the pulse channel ossified and lose its softness, causing the blood to lose its effect of

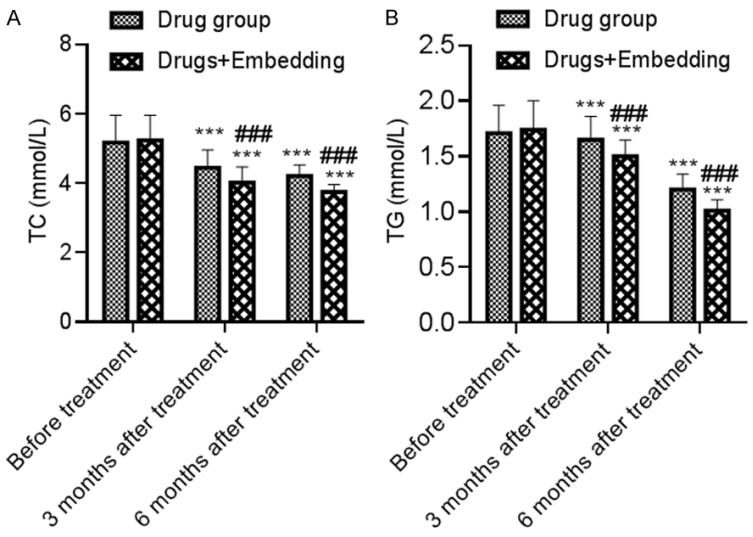

Figure 2. Comparison of blood lipid levels between the two groups. A: TC; B: TG. Compared with before treatment, ***P<0.001; compared with the drug group after simultaneous treatment, ###P<0.001. TC: total cholesterol; TG: triglyceride.

moisturizing and warming. Qi acting as the commander of blood, while kidney deficiency failing to promote the flow of Qi, leading to the impede circulation of qi and blood, blocking the channels or intramedullary tissue. It will lead to the disorder of bone microcirculation which are caused by blood stasis. And the obstruction that causes the pain will finally result in kidney deficiency and blood stasis [23, 24]. Therefore, the disease is the syndrome of deficiency in origin and excess in superficiality, and the treatment should tend to tonify the kidney and activate blood circulation and cure both the symptoms and the root causes.

Acupoint catgut embedding is a special form of puncture treatment. Its main principle is to produce continuous stimulation by inserting needles and medical threads into the relevant acupoints. It achieves the purpose of treatment only by adjustment of the viscera, regulation of Qi and blood and balancing yin and yang [25]. It has been reported that the total effective rate of acupoint catgut embedding in the treatment of PMOP was significantly higher than that of conventional western medicine, which can significantly increase bone density [26]. The results of this study showed that the bone mineral density in the drug treatment + catgut embedding group was higher than that in the drug treatment group, and the improvement of bone metabolism in the drug treatment + catgut embedding group was also better than that in the drug treatment group. Among all the acupoints, the Pishu point has the effect of removing the dampness and sending up the lucid yang, strengthening the spleen and replenishing Qi. The Shenshu point has the effect of relieving the back pain and strengthening the kidney Qi. The Zusanli point has the effect of strengthening the body's immunity, regulating the spleen and stomach and tonifying middle-Jiao and Qi. The Zhongwan point has the effect of soothing liver and strengthening spleen, and nourishing and normalizing the stomach. The Guanyuan point has the effect of replenishing Qi and Yang, tonifying kidney and fixing astringency. The Juegu point has the effect of tonifying kidney and soothing liver, clearing heat and invigoration of vitality, myeloablative fever, free the channels and network vessels. The Sanyinjiao point has the effect of fortify the spleen and nourish the stomach, tonifying the liver and kidney, calming nerves and regulating menstruation. The Ganshu point has the effect of dispersing and rectifying the depressed liver-energy, benefiting liver and reducing fire, promoting circulation of Qi and to relieve pain. The Taixi point has the effect of tonifying the kidney-yin, supplying vital essence and marrow. The Mingmen point has the effect of tonifying kidney, strengthing waist. The Qi reservoir point has the effect of warming and nourishing qi, tonifying kidney to arrest spontaneous emission, strengthing constitution; The Diaphragm Shu point has the effect of invigorating spleen and tonifying heart, promoting blood circulation to dispel blood stasis. The Taichong point has the effect of dredging the meridian passage, regulating liver Qi. By stimulating these acupoints together, the visceral energy can flow into the meridians, tonifying the kidneys and collaterals, filling the essence and marrow, thereby removing blood stasis, strengthening bones and muscles, enhancing bone density, promoting bone metabolism, and improving clinical symptoms [27].

The results of this study showed that after treatment, the pain score and symptom score of the drug treatment + catgut embedding group are lower than those of the drug group. It can be seen that acupoint catgut embedding has a significant effect on improving clinical symptoms, which can effectively improve the operation of Qi and blood, and solve the problem of "the obstruction that causes the pain". In addition, taking the indexes of liver and renal function and blood lipid as auxiliary observation indexes, it was found that the blood lipid index of the drug treatment + catgut embedding group was better than that of the drug treatment group, the liver and kidney function had no abnormal changes, and with higher safety. It is proved that the influencing factors can be reduced to prevent the liver depression and spleen deficiency from exacerbating disease development by stimulating the acupoints. Which can promot blood circulation to remove blood stasis, sooth the liver and replenish the kidney to strengthen the circulation of qi and blood in the viscera. At the same time, acupoint catgut embedding has significant advantages over other treatments in overcoming the high cost of health care and reducing drug toxicity and side effects.

To sum up, catgut embedding at acupoint has a good effect on PMOP, and can increase bone mineral density and improve patients' clinical symptoms, which is worthy of clinical promotion. However, the sample size is small, and there is no evaluation of the long-term efficacy and safety of acupoint catgut embedding in PMOP. Future studies should increase the number of patients included and prolong the follow-up time.

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Disclosure of conflict of interest

None.

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