Experimental Study on Mild Moxibustion for the Treatment of Osteoporosis in Aged Rats

Qing Meng and Lu Yang

ABSTRACT. Objective: To study the therapeutic effect of mild moxibustion on aged rats with osteoporosis. Methods: Forty Wistar rats were randomly divided into four groups: moxibustion group, estrogen group, model group and blank group, and make the models of rats’ osteoporosis. Moxibustion group and estrogen group were treated with mild moxibustion and estrogen respectively. After four weeks, serum alkaline phosphatase (ALP) and bone mineral density (BMD) were measured. Results: Compared with the blank group (82.21±13.45,0.282±0.016), the content of serum alkaline phosphatase in the model group (112.29±10.88,0.203±0.017) increased and the BMD decreased. Compared with the model group, serum alkaline phosphatase levels of moxibustion group (102.22±13.45, 0.255±0.018) and estrogen group (100.69±11.62, 0.262±0.022) were decreased while bone mineral density were increased, and moxibustion group changed more significantly. Conclusion: mild health moxibustion and estrogen have certain effects on the treatment of osteoporosis, and the former’s effect is slightly better than the latter. In addition moxibustion is a natural therapy. Improving osteoporosis in many ways, mild health moxibustion is recommended clinically as a replacement therapy for estrogen in dealing with osteoporosis.

Key words: health mild moxibustion; osteoporosis; serum alkaline phosphatase; bone mineral density

Osteoporosis is a systemic bone metabolic disorder, characterized with bone microstructure damage, continuous reduction of the proportion of bone matrix.
and bone mineral components, bone thinning, reduced trabecular number, and increased bone fragility and fracture risk [1]. Chinese medicine defined it as "bone paralysis", "bone dry", "bone atrophy." Su Asked • Atrophy Theory said: "What is bone atrophy? kidney heat, resulting in lumbar not moving, bone dry and marrow reduction" [2]. Chinese medicine believes that the disease is not only kidney-related, but also has a close relationship with dysfunction of the spleen, stomach and other organs, as well as blocking of blood stasis. Therefore, in order to slow down systemic functional decline, the use of mild moxibustion as a treatment for osteoporosis, effort should be put on improving the functions of spleen and stomach, diminishing blood stasis and dredging the meridians. Chinese call it nourishing your body despite its innate deficiency. day after tomorrow congenital, being an important treatment of osteoporosis[3]. Alkaline phosphatase and bone mineral density are sensitive indicators of osteoporosis [4]. Alkaline phosphatase belongs to phosphate monoester hydrolase. The enzyme is widely distributed in human body fluids and tissues, and especially high in bone and liver. Alkaline phosphatase produced by the bone cells majorly, and a small part from the liver. Alkaline phosphatase is active in the bone tissue, and during the occurrence of osteoporosis, the alkaline phosphatase in blood serum will increase. Bone mineral density is defined by bone mineral content of a certain unit, reflecting the bone mineral loss. It is found clinically that moxibustion has a certain role in regulation of serum alkaline phosphatase content and bone mineral density values. Thus health mild moxibustion has clinical importance in prevention and treatment of osteoporosis [5].

1. Materials and methods


1.3 Experimental Methods

1.3.1 Experimental animals and grouping Choose 40 eight-months, not pregnant female Wistar rats, weighing 200g-300g (provided by Changchun High-tech Medical Experimental Animal Research Center, Certificate No.: SCXK- (Kyrgyzstan) 2011-0007, Quality inspection unit: Laboratory Animal Quality Testing Center of Jilin Province). 40 female Wistar rats were randomly divided into four groups, namely blank group, model group, moxibustion group and estrogen group, 10 in each group.

1.3.2 Animal model preparation Except the blank group, the other three groups (model group, moxibustion group, estrogen group) do ovariectomies. Surgical approach: to 3 groups of rats, give abdominal skin preparation, disinfection, and about 2cm incision along the abdomen midline, cut myometrium layer by layer, find the uterus along which to find pink ovaries, give ovarian ligation, and finally suture the skin [6]. Keep postoperative fasting 12 h. Make intraperitoneal injection of penicillin 0.2–0.3 ml daily to prevent infection [7].

1.3.3 Moxibustion intervention Give moxibustion to the modeling rats 7 days later (to heal the wound). With self-made moxa of 0.5cm diameter, 10cm length, operate health mild moxibustion above the fur 3 cm, selecting in the Sun Bladder Meridian on the side along a lateral line Feishu, Jueyin Yu, Xinyu, liver Yu, bile Yu, Pishu, stomach Yu, San Jiao Yu, Shenshu, large intestine Yu, small intestine Yu, bladder Yu and other points [8] for cyclotron moxibustion. Keep right-to-left clockwise moxibustion 9 laps, and then select Xinyu, Shenshu, Pishu to apply the method of Nodding Head of God Bird for 9 times respectively[9]. It lasts for 30 minutes each time, once two day, and 30 times totally.

1.3.4 Estrogen Group Give estradiol benzoate treatment, according to 0.3mg / kg (21 times of human applying amount of a 70kg person). Take the deltoid muscle injection, and the treatment time and interval are the same as the moxibustion group [7].

1.4 Bone metabolic indicators Serum alkaline phosphatase is detect ed in strict accordance with the kit instructions by ELISA method for each rat in each group. The rats are anesthetized with 10% chloral hydrate and 3ml / kg intraperitoneally. Each rat is taken 5ml of blood from the abdominal aorta. After 2 hours at room temperature, the supernatant was centrifuged at 3000rpm for 10min, then storing at -20 ° C for testing.

1.5 Bone mineral density observation The rats are examined under anesthesia by dual-energy density instrument with the step 0.5mm × 0.5mm, and scanning speed 30mm / s. Choose the right femur, and the measuring time is after the treatment as well as before the sacrifice.

1.6 Statistical analysis of all experimental data Use SPSS19.0 for statistical analysis. Count data are expressed as ± s, and differences between the groups
are analyzed by one-way ANOVA. The test takes \( P < 0.01, P < 0.05 \) as a statistically significant criterion.

2 Findings

2.1 Alkaline phosphatase in serum. See table 1.

Statistical Table 1. Serum alkaline phosphatase levels (\( n = 10 \ \bar{x} \pm s \)).

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Serum alkaline phosphatase (U/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank group</td>
<td>10</td>
<td>82.21±13.45</td>
</tr>
<tr>
<td>Model group</td>
<td>10</td>
<td>112.29±10.88</td>
</tr>
<tr>
<td>Moxibustion group</td>
<td>10</td>
<td>102.22±13.45*</td>
</tr>
<tr>
<td>Estrogen group</td>
<td>10</td>
<td>100.69±11.62*</td>
</tr>
</tbody>
</table>

Note: the above shows each group’s measurement, with the model group compared with the other groups: *(P<0.05), **(P<0.01).

2.2 The comparison of bone mineral density is conducted at the 60th day after modeling. The model group and the blank group are significantly different (P <0.05), proving bone mineral loss of the model group. There is significant difference between model group and moxibustion group and estrogen group (P <0.05). The result of BMD test shows that moxibustion and estrogen decrease the rate of bone loss. See Table 2.

Table 2. Comparison results of bone mineral density of rat femur (\( \bar{x} \pm s \))unit: g/cm\(^2\).

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>After modeling (60 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank group</td>
<td>10</td>
<td>0.282±0.016</td>
</tr>
<tr>
<td>Model group</td>
<td>10</td>
<td>0.203±0.017*</td>
</tr>
<tr>
<td>Moxibustion group</td>
<td>10</td>
<td>0.255±0.018** △</td>
</tr>
<tr>
<td>Estrogen group</td>
<td>10</td>
<td>0.262±0.022** △</td>
</tr>
</tbody>
</table>

Note: comparison between the blank group and model group, moxibustion group and estrogen group: *(P<0.05); comparing Blank group, the moxibustion group and estrogen group with model group: △ (P<0.05); self-comparison of four groups before and after the 60th day: ***(P<0.05).

3 Discussion

7 days after modeling, no rats died. Compared with the blank group, serum alkaline phosphatase levels of the model group increased, and bone mineral density decreased, which proved a successful modeling. By comparison with the model group, the serum alkaline phosphatase levels were reduced, and bone mineral density were increased in both the Moxibustion group and estrogen group, though the moxibustion group decreased and increased more significantly. It is concluded that moxibustion intervention and estrogen therapy are effective to Osteoporosis. The experimental results show that health mild moxibustion has a preventive effect on osteoporosis, and can effectively improve the symptoms of osteoporosis.

It is not until the recent one or two decades that modern technology has
been applied in the study of the mechanism of TCM prevention and treatment of osteoporosis, and the prevention and health care aspect is more inadequate. Acupuncture can delay calcium loss, decrease IL-6 activity and enhance the activity of bone collagen due to clinical research [10]. For the clinical treatment of osteoporosis acupuncture has a certain effect, but currently it is still unable to make the loosened bone tissue transform to the original state [11], therefore the proposed direction of this study concentrate on health prevention perspective. Health mild moxibustion is based on traditional Chinese medicine "treating as a whole" concept, viscera relating, qi and blood cooperating and "treatment before disease happenning" ideas, intervening from multi-respects [12]. This experiment observes the effect of health mild Moxibustion on osteoporosis, by method of bone morphometry dosimetric and inspection of bone calcium metabolism. The results show that mild moxibustion has a certain effect on postmenopausal osteoporosis [13]. Although the role of estrogen therapy is the same as moxibustion intervention, it has an inevitable side effects [14], while moxibustion possesses many advantages, such as convenient, lower-cost, safe and easy to accept, in spite of its gradual showing efficacy sharing by many TCM treatment. Moxibustion has great potential, and it is worth further exploration.

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**References**