Effect of salmon calcitonin on osteoporosis and level of bone metabolism markers

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ABSTRACT

Objective: To study the effect of osteoporosis calcitonin salmon on the level of bone metabolism markers in patients with osteoporosis. Methods: A total of 140 cases with osteoporosis were randomly divided into control group and observation group, with 70 cases in each. Patients in control group were treated with calcitriol soft capsules and chewable calcium vitamin D. Patients in observation group were treated with salmon calcitonin. Results: The total efficiency of the observation group patients was 85.71%, significantly higher than 70.00% that of control group (P < 0.05). After treatment, BMD of Torch, Neck, L1-L4 and Ward's area in observation group patients were significantly higher than that of control group (P<0.01). After treatment, bone metabolism related indicators ß-CTX, N-MID, ALP level in observation group patients were significantly lower than that of control group, and hCT level in observation group patients was significantly higher than that of control group (P<0.01). Conclusions: Salmon calcitonin is effective in treatment of osteoporosis. It can effectively relieve the symptoms, increase bone density and improve bone metabolism.

1. Introduction

Osteoporosis is resulted from the decrease of bone density and changes in bone structure of patients, hence resulting in bone pain and being more prone to have fracture[1]. This research uses salmon calcitonin to treat osteoporosis and achieves excellent results; hence it is reported as follows.

2. Subjects and methods

2.1. General data

140 cases of patients receiving treatment of osteoporosis in our hospital from January 2012 to June 2014 were selected to be the research subjects, with patients aged from 45 to 79 and the course of disease from one to eleven years. 140 cases of patients of osteoporosis were randomly divided into the control group and observation group in accordance with the visiting sequence, each group with 70 cases. The control group consists of 32 male cases, 38 female cases; aged (60.1±8.5), the course of disease (5.3±1.7) years. The observation group consists of 33 male cases and 37 female cases; aged (60.5±8.1), the course of disease (5.6±1.3) years. Two groups of patients have no statistically significant difference regarding gender, age, and the course of disease, etc (P>0.05), hence having comparability.

2.2. Methods

Patients in the control group were treated with calcitriol soft capsules and chewable calcium vitamin D; calcitriol soft capsules were produced by Qingdao Zhengda Haier Pharmaceutical Co., Ltd., with National Medicine Approval Number: H20143142, the dosage was 1 capsule/time, orally administered in the morning after getting up; chewable calcium vitamin D was produced by Anshi Pharmaceutical Co., Ltd., with National Medicine Approval Number: H20143152, the dosage was 1 tablet/time, orally administered in the morning after getting up.
Approval Number: H20020069, the dosage was 2 tablet/time, orally administered in the evening before going to bed. Patients in the observation group were treated with salmon calcitonin while using the aforesaid treatment, salmon calcitonin was produced by Xiangbei Willman Pharmaceutical Co., Ltd., with National Medicine Approval Number: H20052161, spray a time daily, after consecutive two weeks change to 1 drop apart for a drop spray for 12 weeks’ periods.

2.3. Observation index

(1) Bone density\cite{2}: Changes of bone density of patients in two groups before and after the treatment were observed, mainly measuring bone density of torch, neck, lumbar vertebrae L1-4 and Ward’s triangle area. (2) bone metabolism related indexes\cite{3}: hCT related indexes, \( \beta \)-CTX, N-MID, and changes in ALP level of two groups of patients before and after the treatment were observed, including the measurement of N-Mid applied chemiluminescence and hCT applied ACA.

2.4. Efficacy criteria\cite{4} 

With efficacy: patients’ symptoms were obviously improved with increased bone density and improved bone metabolism. Effective: Patients’ symptoms were relieved with increased bone density and improved bone metabolism. Without efficacy: patients’ symptoms, bone density, and bone metabolism were not obviously changed.

2.5. Statistical treatment

The data were processed by SPSS 13.0 as the statistical software. Qualitative data indicates in mean±SD, using \( t \) as test and quantitative data using \( \chi^2 \) as test. \( P<0.05 \) indicates that the difference has statistical significance.

3. Results

3.1. Efficacy comparison

The observation group: with obvious efficacy are 33 cases, with efficacy 27 cases, and without efficacy 10 cases. The control group: with obvious efficacy are 21 cases, with efficacy 28 cases, and without efficacy 21 cases. Patients in the observation group are with overall efficacy rate of 85.71\% (60/70), higher than that of the control group (70.00\%, 49/70). The difference has statistical significance (\( \chi^2=5.013, P<0.05 \)).

3.2. Bone density

After treatment, bone density of Torch, neck, L1-4 and Ward’s area in two groups of patients is higher than that before the treatment; the difference has the statistical significance (\( P<0.01 \)). After treatment, bone density of Torch, neck, L1-4 and Ward’s area in the observation group of patients is higher than that of the control group; the difference has the statistical significance (\( P<0.01 \)). Please see table 1.

3.3. Bone metabolism related indexes

After the treatment, bone metabolism related indexes of \( \beta \)-CTX, N-MID, ALP level of patients in the observation group were lower than those before the treatment, and hCT level was higher than that before the treatment, hence the difference had statistical significance (\( P<0.01 \)). After the treatment, bone metabolism related indexes of \( \beta \)-CTX, N-MID, ALP level of patients in the observation group were lower than those in the control group before the treatment, and hCT level in the observation group was higher than that in the control group before the treatment, hence the difference had statistical significance (\( P<0.01 \)). Please see table 2.

### Table 1

<table>
<thead>
<tr>
<th>Groups</th>
<th>Torch Before treatment</th>
<th>After treatment</th>
<th>Neck Before treatment</th>
<th>After treatment</th>
<th>L1-4 Before treatment</th>
<th>After treatment</th>
<th>Ward’s Before treatment</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.46±0.08</td>
<td>0.51±0.07*</td>
<td>0.50±0.05</td>
<td>0.58±0.06*</td>
<td>0.65±0.10</td>
<td>0.75±0.09*</td>
<td>0.40±0.11</td>
<td>0.46±0.07*</td>
</tr>
<tr>
<td>Observation</td>
<td>0.48±0.09</td>
<td>0.67±0.06*</td>
<td>0.51±0.03</td>
<td>0.75±0.08*</td>
<td>0.62±0.12</td>
<td>0.92±0.12*</td>
<td>0.42±0.14</td>
<td>0.59±0.09*</td>
</tr>
<tr>
<td>( t )</td>
<td>1.390</td>
<td>14.520</td>
<td>1.435</td>
<td>14.223</td>
<td>1.607</td>
<td>9.482</td>
<td>0.940</td>
<td>9.539</td>
</tr>
<tr>
<td>( P )</td>
<td>&lt;0.05</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

Note: Compared with those before the treatment, *\( P<0.01 \).

### Table 2

<table>
<thead>
<tr>
<th>Groups</th>
<th>Hct (ng/L) Before treatment</th>
<th>After treatment</th>
<th>( \beta )-CTX (ng/mL) Before treatment</th>
<th>After treatment</th>
<th>N-MID (ng/mL) Before treatment</th>
<th>After treatment</th>
<th>ALP (IU/L) Before treatment</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>2.41±0.54</td>
<td>2.32±0.58</td>
<td>0.33±0.08</td>
<td>0.26±0.04</td>
<td>15.65±3.13</td>
<td>12.35±2.76</td>
<td>55.24±6.28</td>
<td>45.15±5.86</td>
</tr>
<tr>
<td>Control</td>
<td>2.59±0.46</td>
<td>2.98±0.74*</td>
<td>0.35±0.09</td>
<td>0.17±0.03*</td>
<td>15.70±3.09</td>
<td>7.21±1.25</td>
<td>55.45±6.54</td>
<td>31.41±5.02*</td>
</tr>
<tr>
<td>( t )</td>
<td>0.236</td>
<td>5.873</td>
<td>1.390</td>
<td>15.060</td>
<td>0.095</td>
<td>14.194</td>
<td>0.194</td>
<td>14.898</td>
</tr>
<tr>
<td>( P )</td>
<td>&lt;0.05</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

Note: Compared with those before the treatment, *\( P<0.01 \).
4. Discussion

Surveys indicate that in recent years the patients of osteoporosis have been increasing incessantly in China with main focus on the middle-aged and elderly[5]. Research findings show that the occurrence of osteoporosis is related to endocrine imbalance, lack of vitamins and exercises, and genetic reason, etc[6]. Osteoporosis shows symptoms of pain, with 80% of patients suffering from symptoms of pain; meanwhile patients of osteoporosis are prone to have fracture, after which patients need to recover in bed for a long time and result in infection and disability, hence seriously impacting their life quality[7,8]. The patients of control group in this study used calcitriol soft capsules and chewable calcium vitamin D for treatment, but the patients of observation group added salmon calcitonin while using the aforesaid treatment. Results indicate that the overall efficacy rate of the observation group is higher than that of the control group, the difference had statistical significance (P<0.05), indicating that salmon calcitonin is applicable to the effective treatment and efficacy of osteoporosis.

Researches indicate that when one becomes older, the secretion of body osteocalcin decreases, which is one of the major reasons to induce osteoporosis. Bone density of torch, neck, L1-4, and Ward’s area in patients of osteoporosis are seriously decreased while bone metabolism is abnormal, showing the increase of β-CTX, N-MID, ALP level and the decrease of hCT level; therefore, emphasis should be attached to improve bone density and bone metabolism of patients[10]. Findings of this study indicate that after the treatment bone density of Torch, neck, L1-4 and Ward’s area in observation groups is higher than that of the control group; after the treatment, bone metabolism related indexes of β-CTX, N-MID, ALP level of patients in the observation group were lower than those in the control group, and hCT level in the observation group was higher than that in the control group, hence the difference had statistical significance (P<0.05). It indicates that using salmon calcitonin to treat osteoporosis can improve patients’ bone metabolism. The authors speculate the reason is possibly due to the fact that salmon calcitonin can decrease the activation of bone cells so as to refrain from bone intake and improve the blood calcium intake from the bones, hence ameliorating the growth of bones and improving patients’ bone density. Researches indicate[11,12], that salmon calcitonin can effectively relieve patients from pain, and probably related to the refraining of synthesized prostaglandin and the improvement of central induced pain thresholds. Meanwhile it is found in the research that salmon calcitonin can significantly improve bone metabolism[13]. The efficacy induced time of salmon calcitonin is short with long lasting effect with less side-effect, patients have a better reception for the drug, therefore patients’ willingness for using the drug for treatment is higher[14].

In conclusion, salmon calcitonin has a significant efficacy for the treatment of osteoporosis while being capable of effectively relieving patients of their symptoms and improving their bone density and bone metabolism.

References


