Detection of serum biochemical indexes in elderly patients with type 2 diabetes mellitus with osteoporotic fracture

Xian-Jia Yang, Jian-Bing Hu*, Ya-Ling Wang

Department of Orthopedics, Enshi Center Hospital, Enshi, Hubei 445000

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Objective: To study the detection and study of serum biochemical indexes in elderly patients with type 2 diabetes mellitus with osteoporotic fracture, and to provide reference for clinical diagnosis and treatment. Methods: A retrospective analysis of our hospital from December 2014 to December 2017 were elderly type 2 diabetic patients with osteoporotic fractures in 154 cases as the observation object, the other during the same period were selected in elderly type 2 diabetic osteoporosis fracture group of 166 cases of elderly type 2 diabetes mellitus group of 192 cases, 120 cases of healthy persons. The changes of serum biochemical indexes in the four groups were compared, and the changes of serum biochemical indexes in different age and gender patients were compared according to sex and age. Results: Compared four groups of patients with type 2 diabetes, serum CTX, P1NP, ALP and OC group is lower than fracture fracture group, osteoporosis group, control group, serum CTX, P1NP, ALP and OC were lower than the other three groups, the differences were statistically significant, but the fracture group and fracture osteoporosis no comparison between the two groups the difference. In terms of gender, the serum CTX, P1NP, ALP and OC levels in fracture group, osteoporotic fracture group and type 2 diabetes group were lower than those in female patients, and there was no significant difference between the above indexes in the control group and those in the control group. In terms of age, fracture group, osteoporosis group, bone fractures in type 2 diabetic group and control group four group age <60 patients serum CTX, P1NP, ALP and OC were lower than those of 60 years of age or older group. Conclusion: The serum markers of bone CTX, P1NP, ALP and OC in elderly patients with type 2 diabetes mellitus osteoporotic fracture increased significantly, and increased with the severity of the disease, which is worthy of clinical reference.

1. Introduction

As the most common and most frequent endocrine system disease in the clinic, type 2 diabetes has been increasing in recent years with the increasing process of population aging in China. Its main pathophysiological features are the disorder of insulin resistance with internal environment, the secretion of various cytokines and the abnormal[1]. It is widely believed that the risk of osteoporosis in patients with type 2 diabetes is higher, the mechanism is that abnormal cytokines and insulin resistance can affect bone metabolism, thus reducing bone mass and destroying the ultrastructure of bone tissue[2]. It is worth noting that the specific mechanism of osteoporotic fracture in elderly patients with type 2 diabetes and the changes of serum biochemical indexes are not very clear at present[3]. Therefore, we specially develop the serum biochemical indexes of type 1 collagen C terminal cross-linked peptide (type 1 collagen protein C-terminal crosslinking peptide, CTX), type 1 procollagen amino terminal propeptide (procollagen 1 Nterminal peptide, P1NP) and serum alkaline phosphatase. The study of ostephatase, ALP and osteo calcin (OC) levels can provide reference for clinical diagnosis and treatment.

2. General information and methods

2.1 General information

A retrospective analysis was made of 154 patients with type 2 diabetes osteoporotic fractures treated in our hospital from December 2014 to December 2017. In addition, 166 cases of
192 cases of senile type 2 diabetes were treated in the same period, 120 cases of health examination. All patients were in accordance with WHO’s diagnostic criteria for type 2 diabetes. There were 632 cases in four groups, of which 367 were male, 265 women, 50-88 years old, with an average of (68 ± 9) years. The female patients were all stopped for more than 1 years, and they all excluded vitamin D, glucocorticoid and calcium application, excluded other endocrine system diseases and bone metabolic diseases, and excluded acute infection and autoimmune disease. The four groups of patients and their families signed informed consent, and the hospital was approved by the hospital ethics committee. There was no significant difference in age, sex and other general information between the four groups (P >0.05).

2. Methods

The serum biochemical indexes of the four groups were compared, and the serum biochemical indexes of different ages and genders were compared according to sex and age. All subjects received 7-8 mL heparin anticoagulation and centrifugation 10 min (1 500 r/min) for fasting in the morning. Plasma was collected and stored in -80°C refrigerator for testing. The serum CTX, P1NP, ALP and OC level testing instruments all use Hitachi 7600 automatic biochemical analyzer, the method is detected by ELISA, and the kit is purchased in Hangzhou Association Biotechnology Co., Ltd. Type ThermoMultiskanMK3 enzyme labeling instrument, using od as the ordinate, 630/450 nm dual wavelength determination of OD value, standard concentration as horizontal coordinates, drawing standard curve and calculating sample concentration.

2.3 Statistical method

Statistical SPSS 13.0 analysis was used in the results of this study, and the statistical significance was P<0.05. For counting data, the test method was chi square test, the method was percentage, and the measurement data, the test method was t test, and the method was mean standard deviation. The correlation analysis was analyzed by Pearson.

3. Results

3.1 Comparison of serum CTX, P1NP, ALP and OC in the four groups

Compared with the four groups, the level of serum CTX, P1NP, ALP and OC in type 2 diabetes group was lower than that of fracture group and fracture osteoporosis group. The serum levels of CTX, P1NP, ALP and OC in the control group were lower than those of the other three groups, the difference was statistically significant (P<0.05), but there was no difference between the fracture group and the fracture group (P>0.05). It is specific as shown in Table 1.

3.2 Comparison of serum bone markers in different gender groups

In terms of sex, the levels of serum CTX, P1NP, ALP and OC in the fracture group, the fracture group bone and the type 2 diabetes group were lower than those of the female patients (P<0.05), and the difference of the above indexes in the control group was not significant (P>0.05). It is specific as shown in Table 2.

3.3 Comparison of serum bone markers in different age groups

In terms of age, the levels of serum CTX, P1NP, ALP and OC in the fracture group, fracture group bone, type 2 diabetes group and control group were lower than those of age 60 years old (P<0.05). It is specific as shown in Table 3.
4. Discussion

Type 2 diabetes mellitus has multiple system progressive changes in blood vessels and nerves due to long-term insulin resistance and disorder of glucose and lipid metabolism[4]. Since its own study first proposed the concept of diabetic osteoporosis in 1948, the relationship between diabetes and fracture has attracted increasing attention[5]. It is widely believed that the characteristics of osteoporosis are mainly the degradation of bone microstructure and the decrease of bone mass, thus increasing the brittleness of bone, which leads to a systemic disease[6], which is prone to fracture. At present, the relationship between type 1 diabetes and osteoporosis is more clear, but there are still different opinions on the relationship between type 2 diabetes and osteoporosis[7]. Data show that the prevalence of type 2 diabetes with osteoporosis and osteopenia can reach as high as 50% to 60%[8]. It is also reported that the bone mass of type 2 diabetic patients has little difference compared with the health control group. It thinks that this result may be different from the bone mass caused by diabetes in different course, combined with many metabolic disorders, and the difference in the design and detection level of the study, which makes the difference of the conclusion[9].

In this study, the serum levels of CTX, P1NP, ALP and OC in the four groups were lower than those in the fracture group and the fracture group. The serum levels of CTX, P1NP, ALP and OC in the control group were lower than those of the female patients (P>0.05), but there was no difference between the fracture group and the fracture group (P>0.05). The results of this study are similar to those in this paper. It is believed that S-CTX can react better to bone absorption, and it is mainly used to judge the bone absorption of metabolic bone disease and to monitor and evaluate the effect of anti bone absorption drugs[10]. CTX is mainly located in an important section of intermolecular crosslinking of type I collagen, which is closely related to the synthesis rate of type I collagen. The rate of synthesis of type I collagen is quicker, the faster it rises, and the marker of active bone transformation in commonly used[11]. The alkaline phosphatase (ALP) is produced by osteoblasts, and is also one of the mature and active indexes of osteoblasts, which helps to understand the state of osteoblast[12]. Some studies suggest that detection of serum CTX, P1NP and ALP in osteoporotic patients can be helpful for early prediction of fracture risk in osteoporotic patients[13]. In terms of sex, the levels of serum CTX, P1NP, ALP and OC in the fracture group, the fracture group bone and the type 2 diabetes group were lower than those of the female patients (P<0.05), and the difference of the above indexes in the control group was not significant (P>0.05). We believe that most of the women in this study are in the postmenopause. We should do a good job of preventive measures for this special group, and do a good measure of bone mineral density combined with bone metabolism. It is helpful to improve the anti osteoporosis treatment compliance of women[14]. In terms of age, the levels of serum CTX, P1NP, ALP and OC in the fracture group, the fracture group bone, the type 2 diabetes group and the control group were lower than those of the age 60 years old group (P<0.05). The study is similar to that in this article. It is also believed that OC is rich in bone tissue. Once osteolysis or absorption occurs, the deposited OC in the bone matrix can be dissociated and released into the blood[15]. Therefore, for elderly patients, it is suggested that regular detection of OC in blood can not only reflect the activity of osteoblasts, but also maximize the monitoring of bone turnover in patients with it[16].

In conclusion, the levels of serum bone markers CTX, P1NP, ALP and OC in patients with senile type 2 diabetes mellitus with osteoporotic fracture are obviously higher, and they are increased with the aggravation of the disease. It is worthy of clinical reference.

Table 3.

Comparison of serum bone markers in different age groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Sex</th>
<th>CTX(ng/mL)</th>
<th>P1NP(μg/L)</th>
<th>ALP(U/L)</th>
<th>OC(μg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoporosis group (n=83)</td>
<td>≥60 a</td>
<td>0.72±0.03</td>
<td>60.34±7.83</td>
<td>97.36±4.94</td>
<td>28.92±3.84</td>
</tr>
<tr>
<td></td>
<td>&lt;60 a</td>
<td>0.65±0.02</td>
<td>54.47±7.49</td>
<td>91.44±4.17</td>
<td>26.14±3.46</td>
</tr>
<tr>
<td>Fracture group (n=77)</td>
<td>≥60 a</td>
<td>0.78±0.06</td>
<td>61.12±7.33</td>
<td>96.94±3.83</td>
<td>29.14±4.32</td>
</tr>
<tr>
<td></td>
<td>&lt;60 a</td>
<td>0.63±0.05</td>
<td>56.34±6.46</td>
<td>91.46±3.22</td>
<td>25.64±3.93</td>
</tr>
<tr>
<td>Type 2 diabetes group (n=96)</td>
<td>≥60 a</td>
<td>0.74±0.12</td>
<td>49.81±5.42</td>
<td>82.13±3.46</td>
<td>24.13±3.47</td>
</tr>
<tr>
<td></td>
<td>&lt;60 a</td>
<td>0.66±0.05</td>
<td>45.16±3.34</td>
<td>76.35±2.82</td>
<td>20.12±3.04</td>
</tr>
<tr>
<td>Control group (n=60)</td>
<td>≥60 a</td>
<td>0.52±0.03</td>
<td>41.34±3.86</td>
<td>72.84±3.33</td>
<td>18.23±3.15</td>
</tr>
<tr>
<td></td>
<td>&lt;60 a</td>
<td>17.85±2.66</td>
<td>40.82±3.43</td>
<td>0.52±0.06</td>
<td>71.83±3.06</td>
</tr>
</tbody>
</table>

Reference


[3] Komm BS, Morgenstern D, A Yamamoto L. The safety and tolerability...


