Original Article
Correlation between platelet parameters, platelet/lymphocyte ratio and the severity and prognosis of chest trauma patients

Defeng Zhang, Chuan Liu, Yunbin Zhou, Xudan Tu, Jianting Zhu, Yinpo Lu

Department of Traumatology, Yuyao People’s Hospital, Yuyao, Zhejiang Province, China

Received June 19, 2020; Accepted July 19, 2020; Epub November 15, 2020; Published November 30, 2020

Abstract: Objective: To investigate the correlation between platelet count (PLT), mean platelet volume (MPV), platelet distribution width (PDW), platelet/lymphocyte ratio (PLR) and the severity and prognosis of chest trauma patients. Methods: A total of 84 chest trauma patients admitted to the Department of Traumatology Surgery in Yuyao People’s Hospital were selected as observation group, and 84 healthy people were selected as control group. Platelet parameters and PLR levels of both groups were compared. Correlation between each indicator level of observation group and APACHE II score was analyzed. According to injury severity score (ISS), observation group was divided into non-dangerous group (38 cases), dangerous group (29 cases) and extremely dangerous group (17 cases), and all the indicator levels of the three subgroups were compared. Also, observation group was divided into survival group (53 cases) and death group (31 cases) according to its survival condition. The levels of each indicator in both subgroups were compared, the prognostic indicators were analyzed by multivariate logistic regression, and the clinical value of each indicator in evaluating the prognosis of patients was analyzed by ROC curve. Results: Compared with healthy people, MPV and PDW levels in observation group were significantly increased, while PLR and PLT levels were significantly decreased (P<0.05). APACHE II score was positively correlated with MPV and PDW, and negatively correlated with PLR and PLT (P<0.05). The more severe the patient, the higher the MPV and PDW, and the lower the level of PLR and PLT (P<0.05). Compared with survival group, death group had higher MPV and PDW levels and lower PLR and PLT levels (P<0.05). The results of logistic regression analysis showed that PACHE II score, ISS, MPV, PDW, PLR, and PLT levels were the influencing factors for poor prognosis of chest trauma patients (P<0.05). ROC curve results showed that the area under the curve of MPV, PDW, PLT and PLR in evaluating the prognosis of chest trauma patients were all higher than 0.70 (P<0.05). Conclusion: Platelet parameters and PLR in chest trauma patients were closely related to the severity of the disease, and MPV, PDW, PLT and PLR had certain clinical value in evaluating the prognosis of chest trauma patients.

Keywords: Platelet parameters, platelet/lymphocyte ratio, chest trauma

Introduction

With the progress and development of modern society, the occurrence of trauma is increasing day by day. Severe trauma patients account for 10-15% of all trauma patients, and about 1/5-1/4 of the patients who died of trauma were chest trauma [1]. About 2/3 of trauma patients are accompanied by chest trauma, and the patients who die directly of chest trauma account for 1/5-1/4 of all patients who die of trauma, and the complications of chest trauma are closely related to another 1/4 case fatality rate [2]. However, due to the complex injury mechanism of chest trauma, it is easy to misjudge the severity of the disease clinically, which may eventually delay the best diagnosis and treatment time [3-5]. Therefore, it is of great significance to evaluate the severity of the disease effectively and correctly before the diagnosis and treatment of trauma.

As one of the main components of human blood, platelets are directly involved in hemostasis, coagulation and fibrinolysis [6]. Platelets are in a resting state under normal physiological environment. When blood vessels are damaged or platelet activating factors are acti-
Platelet parameters, PLR and the severity and prognosis of chest trauma patients

Activated in the body, platelets will rapidly change into functional activation state, with significantly enhanced adhesion and aggregation between platelets. Activated platelets can also promote the coagulation reaction of the body, and in serious cases, it will lead to the formation of thrombus [7]. Therefore, platelets play a very important role in the traumatic process. Platelet/lymphocyte ratio (PLR), as an emerging indicator of thromboinflammation in recent years, is mainly used in relevant studies in the field of cancer. The rising of PLR level indicates poor prognosis of cancer patients, but there are few reports on its application in the field of severe trauma [8-10]. Based on this, this study investigated the correlation between platelet parameters, PLR and the severity and prognosis of chest trauma patients, aiming to provide relevant evidence for clinical diagnosis and treatment of chest trauma patients.

Materials and methods

General information

A total of 84 chest trauma patients admitted to the Department of Traumatology Surgery in Yuyao People's Hospital from January 2017 to January 2019 were selected as observation group, and 84 healthy people with matching age and gender were selected as control group during the same period. All subjects investigated in this study or their families signed the informed consent, and this study was approved by the Ethics Committee of Yuyao People's Hospital.

Inclusion and exclusion criteria

Inclusion criteria for observation group: (1) Patients who aged between 18 and 70 years and diagnosed with chest trauma; (2) patients who were injured until the time of admission <24 h; (3) patients with expected hospital stay ≥ 1 week.

Exclusion criteria for observation group: (1) Patients with acute and chronic infectious diseases recently; (2) patients with surgical history 3 months before admission; (3) patients combined with coagulation dysfunction or anemia; (4) patients who had used anticoagulants and antiplatelets drugs that may affect the experimental results in the past 6 months.

Inclusion criteria for control group: (1) People aged between 18 and 70 years; (2) people who had conducted a physical examination in the past 1 month and the results were normal.

Exclusion criteria for control group: (1) Those who had other diseases recently; (2) those with a history of surgery 3 months before enrollment; (3) those with coagulation dysfunction or anemia; (4) those who had used anticoagulants and antiplatelets drugs that may affect the experimental results in the past 6 months.

Methods

First, 5 mL of venous blood was extracted from all subjects within 24 h of enrollment without any treatment that might affect the experimental results. Then platelet count (PLT), mean platelet volume (MPV), platelet distribution width (PDW) and PLR were measured by a fully automated biochemical analyzer (Hitachi 700).

Patients in observation group underwent measurement of APACHE II score and injury severity score (ISS) within 24 h of enrollment [11, 12]. According to ISS, the patients were divided into three subgroups: >25 points, extremely dangerous group (17 cases); 17-25 points, dangerous group (29 cases); <17 points, non-dangerous group (38 cases).

According to the death on the 28th day of hospitalization, observation group was divided into two subgroups: survival group (53 cases) and death group (21 cases).

Outcome measures

Main outcome measures: PLT, MPV, PDW and PLR levels in observation group and control group; the above indicator levels in patients with different severity; the above indicator levels in patients with different prognosis, and multivariate logistic regression analysis of indicators with statistical differences was carried out to observe the risk factors of death. The ROC curve was used to analyze the diagnostic efficacy of each indicator in evaluating the prognosis of patients.

Secondary outcome measures: The correlation between APACHE II score and the level of each indicator.
Platelet parameters, PLR and the severity and prognosis of chest trauma patients

Table 1. General information

<table>
<thead>
<tr>
<th>Item</th>
<th>Observation group (n=84)</th>
<th>Control group (n=84)</th>
<th>χ²/t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>22</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (year)</td>
<td>43.49±8.55</td>
<td>42.96±8.73</td>
<td>0.398</td>
<td>0.691</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>22.48±3.31</td>
<td>22.51±3.24</td>
<td>0.059</td>
<td>0.953</td>
</tr>
<tr>
<td>History of diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>76</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of hypertension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>74</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causes of trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic injury</td>
<td>43</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall injury</td>
<td>26</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blunt injury</td>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fracture of rib</td>
<td>31</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemopneumothorax</td>
<td>22</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung contusion</td>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fracture of pelvis and limbs</td>
<td>7</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined craniocerebral injury</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal organ injury</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APACHE II score (point)</td>
<td>19.78±3.39</td>
<td>21.97±3.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISS (point)</td>
<td>21.97±3.33</td>
<td>21.97±3.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: BMI: body mass index; ISS: injury severity score.

Table 2. Comparison of each indicator level

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Observation group (n=84)</th>
<th>Control group (n=84)</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPV (fL)</td>
<td>12.87±1.12</td>
<td>9.73±0.48</td>
<td>23.618</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PDW (%)</td>
<td>18.33±2.21</td>
<td>14.17±1.98</td>
<td>12.849</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PLT (×10⁹/L)</td>
<td>159.82±23.38</td>
<td>229.78±29.94</td>
<td>16.879</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PLR (%)</td>
<td>102.48±18.76</td>
<td>189.24±24.67</td>
<td>25.657</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Note: MPV: mean platelet volume; PDW: platelet distribution width; PLT: platelet count; PLR: platelet/lymphocyte ratio.

Statistical analysis

SPSS22.0 was used for statistical analysis. The measurement data were expressed as mean ± standard deviation (±sd), and the enumeration data were expressed as number or percentage. One-way analysis of variance was used to compare the measurement data among multiple groups, Bonferroni test was used for comparison between two groups, and χ² test was used to compare the enumeration data. Pearson analysis was used to analyze the correlation between each indicator and APACHE II score. ROC curve was used to analyze the clinical value of each indicator level in evaluating the prognosis of patients. There was a significant difference with P<0.05.

Results

General information

There was no significant difference in general information such as age and gender between the two groups (P>0.05). See Table 1.

Comparison of each indicator level

Compared with control group, the MPV and PDW levels were higher in observation group,
Platelet parameters, PLR and the severity and prognosis of chest trauma patients

Table 3. Comparison of each indicator level in patients with different severity

<table>
<thead>
<tr>
<th>Group</th>
<th>MPV (fL)</th>
<th>PDW (%)</th>
<th>PLT (×10⁹/L)</th>
<th>PLR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-dangerous group (n=38)</td>
<td>10.98±0.55</td>
<td>16.79±2.87</td>
<td>177.98±27.62</td>
<td>211.96±25.38</td>
</tr>
<tr>
<td>Dangerous group (n=29)</td>
<td>12.54±0.75</td>
<td>18.95±2.26</td>
<td>154.82±21.75</td>
<td>187.49±23.54</td>
</tr>
<tr>
<td>Extremely dangerous group (n=17)</td>
<td>14.89±0.89*</td>
<td>21.73±2.74*</td>
<td>140.36±22.58*</td>
<td>161.23±22.43*</td>
</tr>
</tbody>
</table>

F 185.97
P <0.001

Note: Compared with non-dangerous group, *P<0.05; compared with dangerous group, #P<0.05. MPV: mean platelet volume; PDW: platelet distribution width; PLT: platelet count; PLR: platelet/lymphocyte ratio.

Table 4. Correlation between APACHE II score and each indicator level in observation group

<table>
<thead>
<tr>
<th>Value</th>
<th>MPV (fL)</th>
<th>PDW (%)</th>
<th>PLT (×10⁹/L)</th>
<th>PLR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>0.578</td>
<td>0.448</td>
<td>-0.218</td>
<td>-0.436</td>
</tr>
<tr>
<td>P</td>
<td>&lt;0.001</td>
<td>0.003</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Note: MPV: mean platelet volume; PDW: platelet distribution width; PLT: platelet count; PLR: platelet/lymphocyte ratio.

while the PLR and PLT levels were lower (P<0.001). See Table 2.

Comparison of each indicator level in patients with different severity

The more severe the patients, the higher the MPV and PDW levels, and the lower the PLR and PLT levels (P<0.05). See Table 3.

Correlation between APACHE II score and each indicator level in observation group

In observation group, APACHE II score was positively correlated with MPV and PDW, and negatively correlated with PLR and PLT (P<0.05). See Table 4.

Comparison of each indicator level between survival group and death group

There were significant differences in hypertension history, APACHE II score, ISS, PLT, MPV, PDW and PLR levels between the two groups (P<0.05). See Table 5.

Logistic regression analysis results

The indicators with significant difference in single factor analysis were assigned: with hypertension history was 1, without hypertension history was 0; APACHE II score ≥ 18.21 was 1, <18.21 was 0; ISS ≥ 20.94 was 1, <20.94 was 0; MPV ≥ 11.85 fL was 1, <11.85 fL was 0; PDW ≥ 17.29% was 1, <17.29% was 0; PLT ≥ 168.67×10⁹/L was 1, <168.67×10⁹/L was 0; PLR ≥ 210.65% was 1, <210.65% was 0.

Logistic regression analysis results showed that APACHE II score, ISS, MPV, PDW, PLR and PLT levels were the influencing factors for poor prognosis of chest trauma patients (P<0.05). See Table 6.

ROC curve results

All the indicators had certain clinical value in evaluating the prognosis of patients (area under the curve (AUC) >0.700, P<0.001). See Table 7; Figure 1.

Discussion

Currently, medical researchers believe that the prognosis of trauma patients is influenced by multiple factors, and trauma patients are prone to coagulation dysfunction in the early stage, while the aggravation of bleeding may increase the fatality rate and the incidence of complications [13, 14]. Floccard et al. have found that about 1/4 to 1/3 of trauma patients have coagulation dysfunction at the time of admission, and coagulation dysfunction in patients with severe traumatic death is significantly abnormal compared with the healthy people [15]. Therefore, it is of clinical significance to investigate the abnormality of coagulation indicator level in the diagnosis, treatment and prognosis evaluation of chest trauma patients.

PLT can reflect the number of platelets in the body and has been widely used in the assessment of trauma severity. The main reasons for the decrease of PLT level in patients with severe multiple trauma are: a large number of platelets gather around the wound and lead to a significant increase of platelet consumption, while
Platelet parameters, PLR and the severity and prognosis of chest trauma patients

Table 5. Comparison of each indicator level between survival group and death group

<table>
<thead>
<tr>
<th>Item</th>
<th>Survival group (n=53)</th>
<th>Death group (n=31)</th>
<th>χ²/t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>39</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (year)</td>
<td>43.12±7.74</td>
<td>43.85±8.21</td>
<td>0.408</td>
<td>0.684</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>22.41±3.39</td>
<td>22.53±3.17</td>
<td>0.16</td>
<td>0.873</td>
</tr>
<tr>
<td>History of diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of hypertension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>7</td>
<td></td>
<td>0.021</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causes of trauma</td>
<td></td>
<td></td>
<td></td>
<td>0.164</td>
</tr>
<tr>
<td>Traffic injury</td>
<td>28</td>
<td>15</td>
<td></td>
<td>0.921</td>
</tr>
<tr>
<td>Fall injury</td>
<td>16</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blunt injury</td>
<td>9</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of trauma</td>
<td></td>
<td></td>
<td></td>
<td>1.285</td>
</tr>
<tr>
<td>Fracture of rib</td>
<td>21</td>
<td>10</td>
<td></td>
<td>0.864</td>
</tr>
<tr>
<td>Hemopneumothorax</td>
<td>12</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung contusion</td>
<td>10</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fracture of pelvis and limbs</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined cranioencebral injury</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal organ injury</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APACHE II score (point)</td>
<td>18.21±3.32</td>
<td>21.44±3.17</td>
<td>4.374</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ISS (point)</td>
<td>20.94±4.78</td>
<td>24.83±4.11</td>
<td>3.784</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MPV (fL)</td>
<td>11.85±1.06</td>
<td>13.67±1.16</td>
<td>7.352</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PDW (%)</td>
<td>17.29±1.99</td>
<td>20.55±2.17</td>
<td>6.993</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PLT (*10^9/L)</td>
<td>168.67±18.84</td>
<td>144.71±27.95</td>
<td>4.688</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PLR (%)</td>
<td>210.65±16.20</td>
<td>181.57±18.26</td>
<td>7.334</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Note: BMI: body mass index; ISS: injury severity score; MPV: mean platelet volume; PDW: platelet distribution width; PLT: platelet count; PLR: platelet/lymphocyte ratio

Table 6. Logistic regression analysis results

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>SE</th>
<th>OR</th>
<th>P</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>APACHE II</td>
<td>0.124</td>
<td>0.085</td>
<td>2.21</td>
<td>&lt;0.001</td>
<td>1.65-3.14</td>
</tr>
<tr>
<td>ISS</td>
<td>0.187</td>
<td>0.094</td>
<td>1.87</td>
<td>&lt;0.001</td>
<td>1.42-2.67</td>
</tr>
<tr>
<td>MPV (fL)</td>
<td>0.042</td>
<td>0.069</td>
<td>1.83</td>
<td>0.003</td>
<td>1.33-2.48</td>
</tr>
<tr>
<td>PDW (%)</td>
<td>0.087</td>
<td>0.093</td>
<td>1.71</td>
<td>0.012</td>
<td>1.41-2.15</td>
</tr>
<tr>
<td>PLT (*10^9/L)</td>
<td>0.092</td>
<td>0.042</td>
<td>1.48</td>
<td>&lt;0.001</td>
<td>0.22-0.76</td>
</tr>
<tr>
<td>PLR (%)</td>
<td>0.038</td>
<td>0.073</td>
<td>0.56</td>
<td>&lt;0.001</td>
<td>0.32-0.81</td>
</tr>
</tbody>
</table>

Note: ISS: injury severity score; MPV: mean platelet volume; PDW: platelet distribution width; PLT: platelet count; PLR: platelet/lymphocyte ratio; CI: confidence interval; OR: odds ratio; SE: standard error of mean.

the more serious the tissue injury is, the more platelet consumption will be; the immune function of trauma patients is in abnormal activation state, thus the immune platelets are damaged; but for some patients, the number of platelets produced by bone marrow decreases due to the presence of infection [16, 17]. MPV is one of the indicators reflecting platelet production and activity in the body, and its level rise often indicates the disorders of megakaryocyte metabolism, platelet production and activity in bone marrow [18]. PDW, as one of the indicators to evaluate the distribution of platelets, its level reflects the dispersion of platelet volume. The increase of PDW level indicates that the volume distribution of
Table 7. ROC curve results

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Cut-off value</th>
<th>AUC</th>
<th>95% CI</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPV (fL)</td>
<td>12.457</td>
<td>0.876</td>
<td>0.791, 0.962</td>
<td>0.871</td>
<td>0.792</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PDW (%)</td>
<td>18.755</td>
<td>0.866</td>
<td>0.786, 0.946</td>
<td>0.774</td>
<td>0.887</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PLT (*10^9/L)</td>
<td>146.15</td>
<td>0.811</td>
<td>0.697, 0.924</td>
<td>0.925</td>
<td>0.710</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PLR (%)</td>
<td>192.669</td>
<td>0.809</td>
<td>0.701, 0.908</td>
<td>0.811</td>
<td>0.839</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Note: MPV: mean platelet volume; PDW: platelet distribution width; PLT: platelet count; PLR: platelet/lymphocyte ratio; AUC: area under the curve; CI: confidence interval.

Figure 1. ROC curve results. MPV: mean platelet volume; PDW: platelet distribution width; PLT: platelet count; PLR: platelet/lymphocyte ratio.

Platelet parameters, PLR and the severity and prognosis of chest trauma patients

Platelets is uneven. However, for platelets with larger volume and more active dense particles, they tend to have strong adhesiveness and aggregation, which can promote the inflammatory response of the body [19]. In this study, compared with the healthy people, the PLT level of chest trauma patients was significantly decreased, while the MPV and PDW levels were significantly increased, and the severity was negatively correlated with PLT, but positively correlated with the MPV and PDW levels. The decrease of PLT level and the increase of MPV and PDW levels were the risk factors for poor prognosis, which also suggested that chest trauma patients had a certain degree of coagulation dysfunction.

At present, PLR is mainly used in the field of tumor, but there are few reports on PLR in trauma, especially chest trauma. The higher the PLR level in tumor patients, the worse the prognosis may be [10, 20]. Fu et al. have found that the decrease of PLR level often indicates that severe trauma patients may have a poor prognosis [21]. This study showed that compared with the healthy people, the PLR level of chest trauma patients was significantly decreased, and the more serious the disease, the lower the PLR level. In addition, it was negatively correlated with APACHE II score, which was contrary to the results of the related study in the field of tumor, but was more consistent with the results of Fu et al. [21]. In this study, chest trauma patients mainly suffered from coagulation dysfunction and inflammatory response, so the platelet level tended to decline, leading to the decrease of PLR level. However, the specific mechanism still needs to be further studied. This study further discussed the clinical value of the above indicators in the evaluation of patients’ prognosis, and the results suggested that AUC of each indicator in the evaluation of prognosis was more than 0.70, with high specificity. Moreover, blood samples are easily available and the detection method is simple, which also suggests that platelet parameters and PLR can be used as one of the auxiliary indicators for evaluating the prognosis of chest trauma patients.

In conclusion, platelet parameters and PLR in chest trauma patients were closely related to the severity of the disease, and MPV, PDW, PLT and PLR had certain clinical value in evaluating the prognosis of chest trauma patients. However, this study also had the following defi-
Platelet parameters, PLR and the severity and prognosis of chest trauma patients

iciencies, such as small sample size and lack of dynamic observation of changes in the level of each indicator, so it still needs to be confirmed by subsequent studies.

Disclosure of conflict of interest

None.

Address correspondence to: Chuan Liu, Department of Traumatology, Yuyao People’s Hospital, No. 800 Chengdong Road, Yuyao 315400, Zhejiang Province, China. Tel: +86-0574-62619138; E-mail: liuchuhan1yy@163.com

References


Platelet parameters, PLR and the severity and prognosis of chest trauma patients

