Clinical application of neutrophil / lymphocyte ratio combined with high sensitive C reactive protein in evaluation of community acquired pneumonia

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ABSTRACT

Objective: To explore the application value of neutrophil / lymphocyte ratio (NLR) combined with high sensitive C reactive protein (hs-CRP) in the evaluation of community acquired pneumonia (CAP).

Methods: From November 2015 to October 2016, 58 cases of CAP patients admitted in our department were selected as research objects and were divided into low risk group and high risk group according to the PSI score and CURB-65 standard for evaluation. They were divided into improved group (48 cases) and death group (10 cases) according to prognosis. Hs-CRP was determined by immunoturbidimetric assay, procalcitonin (PCT) by immunofluorescence, NLR by count method of laser scattering, and white blood (WBC) was counted. The differences in WBC, PCT, NLR and hs-CRP between different risk groups were compared, and the correlation was evaluated using Spearman's rank correlation analysis method. The changes in indexes were observed in the improved and death cases.

Results: The high risk group had higher NLR, PCT and hs-CRP than low risk group (P<0.05), while no significant difference was found in WBC (P>0.05). No correlation was found between NLR and WBC, while a strong correlation was found between hs-CRP and PCT. The WBC, PCT, NLR and hs-CRP levels were significantly lower in the improved group than the death group (P<0.05).

Conclusions: NLR combined with hs-CRP, WBC, and PCT has a good assessment of the severity of CAR, and high levels of NLR, hs-CRP, WBC, and PCT predict the severity of the disease and poor prognosis.

1. Introduction

Community acquired pneumonia (CAP) is outside the hospital, infected with clear pathogens of pneumonia in the incubation period, average incubation period after admission, for infectious diseases of lung parenchyma, including extensive pulmonary interstitial inflammation in CAP[1]. With the population aging, changes in pathogens, antibiotic resistance rate increased, the incidence of CAP and mortality rate has not decreased significantly, because the old organ aging, decreased immune function, the incidence rate was 2 times[2] in youth. CAP assessment of the severity of a direct impact on the treatment and prognosis of patients, it is necessary to seek a fast and accurate response to the severity of the CAP index is particularly important for[3,4]. The author combined detection of CAP patients with neutrophil / lymphocyte ratio (NLR), high sensitive C reactive protein (hs-CRP), calcitonin (PCT), in order to explore the value of CAP severity assessment.

2. Materials and methods

2.1. General information

From November 2015 to October 2016, our department treated 58 cases of CAP patients as the research objects, are in line with the “CAP diagnosis and treatment guidelines” diagnostic criteria[5].
There were 38 males and 20 females; aged 60 to 82 years old; according to the PSI score and CURB-65 standard for evaluation is divided into low risk group (low-risk group) (PSI I–II) and 32 cases in high risk group (Gao Weizu) (PSI III–IV on the basis of 26 cases); prognosis is divided into improved group 48 cases, 10 cases of death group. There were no significant differences in age and gender between the groups ($P>0.05$).

2.2. Inclusion and exclusion criteria

In accordance with the "CAP diagnosis and treatment guidelines" diagnostic criteria[5], (1) patients with newly developed cough and expectoration, or purulent sputum, or aggravate respiratory disease, with or without chest pain; (2) lungconsolidation signs and (or) rales; (3) WBC>10×10^9/L or <4×10^9/L, with or without nuclear left shift; (4) T of more than 38 DEG C; (5) new or progressive pulmonary infiltrates; more than 1 to any one of 4 + Fifth, and the exclusion of non infectious pulmonary fibrosis quality disease, lung tumor, pulmonary atelectasis, pulmonary vasculitis, pulmonary edema, pulmonary tuberculosis, pulmonary embolism and pulmonary eosinophilia; patients and their families and informed consent. Exclusion of clinical data is not complete or does not meet the requirements; excluded for various reasons to give up treatment, the presence of AIDS malignant tumor, after splenectomy, transplantation, long-term oral administration of immunosuppressive agents.

2.3. Method

Fasting peripheral venous blood collection, hs-CRP were measured by immunoturbidimetry, PCT were measured by fluorescence method, determination of NLR, white blood cell count method of laser scattering (WBC) count, the difference between different risk groups, WBC, PCT, NLR, hs-CRP, Spearman rank correlation analysis on correlation between the price of NLR, PCT hs-CRP, WBC; observation of improvement and changes of death cases of group index.

2.4. Statistical analysis

<table>
<thead>
<tr>
<th>Group</th>
<th>$n$</th>
<th>WBC ($\times 10^9$/L)</th>
<th>PCT (ng/mL)</th>
<th>NLR</th>
<th>hs-CRP (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk group</td>
<td>32</td>
<td>8.58±4.56</td>
<td>1.57±1.36</td>
<td>5.47±2.35</td>
<td>57.45±49.73</td>
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<tr>
<td>High risk group</td>
<td>26</td>
<td>9.07±4.57</td>
<td>7.48±4.12</td>
<td>12.15±4.31</td>
<td>105.47±41.25</td>
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<tbody>
<tr>
<td>Improvement</td>
<td>48</td>
<td>6.36±1.26</td>
<td>0.43±0.27</td>
<td>2.71±1.15</td>
<td>17.48±4.63</td>
</tr>
<tr>
<td>Death</td>
<td>10</td>
<td>18.97±5.62</td>
<td>8.26±5.24</td>
<td>14.16±3.62</td>
<td>117.68±35.47</td>
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of severe pneumonia incidence rate was 11.6%, the mortality rate is up to 50%–61%. Thus, CAP has become one of the major diseases that endanger the health of residents.

At present, PSI and CURB-65 score evaluation system has been widely used in medical staff, but the two scoring systems have different degrees of defects, PSI operation and evaluation is more complex, there is also dispute on the treatment site assessment, not suitable for outpatient and emergency patients, CURB-65 for predicting patients as "non high risk" can be considered good prognosis. But the relatively low sensitivity of[9,10]. In terms of biomarker research in recent years, a large number of domestic and foreign scholars PCT and hs-CRP serum markers for assessing the severity and prognosis of CAP[4]. The results show that the marker for evaluating the severity of CAP, positive correlation with the severity of CAP into[11]. The peripheral blood WBC count is a commonly used laboratory project, when the total number of more than 1 × 10⁹/L is considered abnormal, can rise rapidly in acute bacterial infection, and the infection was often related to the degree, when in some severe infection, the infection and toxin stress factors inhibit and reduce assessment the index that WBC increased more significantly in bacterial infection, viral infection and the majority does not rise, so that the determination of hs-CRP can be used as a sensitive index for diagnosis of respiratory tract infections, differential diagnosis of[1] can be used as bacterial and viral infection. Hs-CRP as a systemic inflammatory response index, positive level and its duration and degree of infection, continues to rise or rise again that should pay attention to the condition changes, reflecting the severity of CAP in certain circumstances, to play an important role in deciding which patients receive the corresponding treatment[5]. NLR was first used to predict the prognosis of cancer, in recent years, there is evidence that NLR is an ideal indicator of systemic inflammation, can reflect the severity of the disease, and for immunocompromised patients, the detection of NLR and WBC is to count more[16]. In infectious diseases, inflammatory mediators stimulate thyroid secretion of PCT, and reached the peak at 12–24 h, and the level of infection was proportional to the extent of clinical diagnosis of bacterial infection, often as a matter and disease severity and prognosis assessment of marker[17]. The high risk group of NLR, PCT and hs-CRP were higher than that of low risk group (P<0.05), while WBC had no significant difference (P>0.05) between NLR and WBC, the correlation is not strong, there is a strong correlation between hs-CRP and PCT; WBC, PCT, NLR improved group, hs-CRP levels were significantly lower than the death group (P<0.05). The combined detection of NLR, hs-CRP, WBC and PCT can be used as a reference index for the diagnosis and severity of CAP.

In summary, NLR combined with hs-CRP, WBC, PCT on the severity of CAR has a good assessment of the value, and high levels of NLR, hs-CRP, WBC, PCT predict the severity of the disease and poor prognosis.

References


