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ORIGINAL ARTICLE

Platelet count: Is it a possible marker for severity and outcome of community acquired pneumonia?

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KEYWORDS

Community acquired pneumonia;
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Respiratory intensive care unit

Abstract *Background:* Platelets have been increasingly recognized as an important component of innate and adaptive immunity. Platelet response in antimicrobial host defense is similar, in many ways, to the leukocyte response: both cell types contain antimicrobial peptides that act against a broad range of pathogens.

Objective: The aim of this study was to detect whether platelet count could be used as a marker for severity of community acquired pneumonia or not.

Subjects and methods: The study included 40 cases of community acquired pneumonia admitted at Chest Department and Respiratory ICU at Ain Shams University Hospital, as well as, Chest Department and Respiratory ICU at Ain Shams University Specialized Hospital. All cases were subjected to the following: full history taking, thorough clinical examination including general and local examination, arterial blood gases, electrocardiography, radiological work up, routine laboratory investigations including compete blood picture and CURB-65 score as a marker for severity of pneumonia.

Results: The results showed that there was a significant relation between the occurrence of respiratory complications and both thrombocytopenia and thrombocytosis. Also, there was a significant relation between both thrombocytopenia and thrombocytosis and the CURB-65 score as a score for severity of CAP. There was a significant relation between both thrombocytopenia and thrombocytosis and mortality among the patients with CAP. Finally, platelet count is considered better positive than a negative predictor value to the outcome.

Conclusion: A better understanding of the role of platelets in the outcomes of patients with community acquired pneumonia may generate new prognostic and therapeutic modalities for patients with severe disease.

Introduction

Platelets have been increasingly recognized as an important component of innate and adaptive immunity. Platelet response in antimicrobial host defense is similar, in many ways, to the

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leukocyte response: both cell types contain antimicrobial peptides that act against a broad range of pathogens. After platelets and neutrophils are activated, they accumulate at the site of infection to produce direct contact between their antimicrobial peptides and invading bacteria. Leukocytes need to phagocytize bacteria to achieve interaction with intracellular peptides; platelets can also internalize microorganisms into phagosome-like vacuoles, enhancing pathogen clearance. Antimicrobial peptides from both cells exert a rapid, potent, and direct antimicrobial effect that contributes to limiting the infection [1].

Clinicians have always evaluated the degree of leucocytosis in patients with pneumonia as an indication of systemic inflammatory response and severity of disease. Thrombocytopenia is also a recognized marker of poor outcomes in patients with pneumonia due to the association of low platelet counts with disseminated intravascular coagulation and severe sepsis. Abnormalities in the coagulation system can be due to low as well as high platelet count. However, the association between thrombocytosis and clinical outcomes in adult patients with community-acquired pneumonia (CAP) has not been investigated [2].

Considering that platelets play a crucial role in antimicrobial host defenses and the coagulate system, it is hypothesized that an abnormal platelet count may be an important marker to assess severity of disease in patients with CAP [3,4].

Subjects and methods

This was a prospective study of the relation between platelet count abnormality and the severity and outcome of community-acquired pneumonia cases. The study included 40 cases of CAP admitted at the Chest Department and Respiratory ICU at Ain Shams University Hospital, as well as, Chest Department and Respiratory ICU at Ain Shams University Specialized Hospital.

Table 1 Distribution of the studied patients as regards the general data.

Variables	Number	%
Gender		
Male	30	75
Female	10	25
Site		
Lobar	32	80
Multilobar	8	20
Respiratory failure		
Non	8	20
Type 1	12	30
Type 2	20	50
Outcome		
Alive	17	42.5
Died	23	57.5
Complications		
No	19	47.5
Respiratory	12	30.0
Non respiratory	7	17.5
Both	2	5.0
Length of hospital stay	11.5 ± 5	3–25
Age	60 ± 17	17–84

All cases were subjected to the following:

1. Full history taking.
2. Thorough clinical examination including general and local examination.
3. Arterial blood gases.
4. Electrocardiography.
5. Radiological work up (conventional CXR, CT scan and/or chest ultrasound).
6. Routine laboratory investigations including compete blood picture.
7. CURB-65 score tool.

CURB-65 Mortality Prediction Tool for Patients with Community-Acquired Pneumonia [5].

Prognostic variables*		
Confusion		
Blood urea nitrogen level >20 mg per dL (7.14 mmol per L)		
Respiratory rate ⩾30 breaths per minute		
Blood pressure (systolic <90 mmHg or diastolic ⩽60 mmHg)		
Age ⩾65 years		
Score	Inpatient vs. outpatient	30-day mortality (%)
0 or 1 point	Treat as outpatient	0.7–2.1
2 points	Treat as inpatient	9.2
⩾3 points	Treat in intensive care unit	15–40
*Assign 1 point for each variable		

Study definitions

CAP is defined as the presence of a new pulmonary infiltrate on chest radiograph at the time of hospitalization associated with at least one of the following: (1) new or increased cough, (2) an abnormal temperature (<35.6 °C or > 37.8 °C), (3) an abnormal serum leukocyte count (leucocytosis, left shift, or leucopenia defined by local laboratory values). CAP severity was measured using CURB-65 scoring tool.

Hypotension is defined as a systolic blood pressure <90 mmHg or diastolic blood pressure <60 mmHg.

Alteration of gas exchange is defined as Pa O2 <60 mmHg or Pa O2/FIO 2 < 300 or O2 saturation <90%.

Thrombocytopenia and thrombocytosis are defined as platelet counts <150,000/L or >400,000/L, respectively.

Patients with immunosuppression, neoplasms, active TB or hematologic diseases were excluded.

Statistical methodology

Analysis of data was done by IBM computer using *SPSS* (statistical program for social science version 16) as follows:

- Description of quantitative variables as mean, SD and range.
- Description of qualitative variables as number and percentage.
- **Fisher exact test** was used instead of chi-square test when one expected cell or more less than or equal 5.