EFFECT OF LEUCOCYTE COUNT ON LENGTH OF STAY AND IN HOSPITAL MORTALITY IN STEMI PATIENTS

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ABSTRACT

Objective: To evaluate association of total leucocyte Count (TLC) count with length of stay and in hospital mortality.

Methodology: This cross sectional study was conducted at Department of Cardiology, Jinnah Hospital Lahore from 1st October 2017 to 31st March 2018. Patients fulfilling the inclusion criteria were selected for the study. TLC count was taken at time of admission and after 48 hours. The cohort was followed up for 7 days for adverse outcome i.e. in hospital mortality. All the collected data was entered and analyzed on SPSS version 17.

Results: Total of 200 subjects were included in study. Mean age was 57.47 ± 11.942 years. About 61.0% were males. Mean hospital stay was 4.18 days ± 1.462 days. Mean TLC count at admission among patients who died was 11336.36 ± 4754.349. Mean TLC count after 48 hours was 15154.55 ± 2388.616. (t = 7.226, p = .000) Mean hospital stay among patients who died was 5.78 ± 1.134. (t = 12.920, p = .000)

Conclusion: Mean TLC count and length of hospital stay is significantly associated with in patient mortality among STEMI patients.

Key Words: In hospital mortality, Hospital stay, TLC
INTRODUCTION

Cardiovascular disease (CVD) is the number cause of the death worldwide, estimated more than 17.9 million people died in 2015 and by 2030 this number is likely to grow to more than 23.6 million deaths per year. Among Noncommunicable disease deaths, CVD accounts for most number of deaths. In North America and Europe around 20 million patients present to emergency departments (ED) with symptoms probably suggestive of acute coronary syndrome (ACS).

The relation between ACS and inflammatory process is multifaceted. The atherosclerotic process of ACS is a chronic inflammatory disease on its own, while on the top of it an inflammatory process within the atherosclerotic plaque may lead to plaque rupture and subsequent thrombus formation with resultant myocardial ischemia. The severity of this inflammatory surge determines the short- and long-term consequences of ACS. The elevation of white blood cell (WBC) count in the background of an acute myocardial infarction (AMI) has been linked with adverse cardiovascular events, signifying not only a role pertaining to physiological process, but a pathologic basis. In the recent times a special consideration had been given to WBC count as a potential risk stratification tool by the research workers because of ease to get its result, cost effectiveness, and widespread obtainability.

There has been anticipated several mechanisms for the justification of the association between WBC count and mortality in patients with AMI. The major constituent of the systemic inflammatory response to injury and the reparative mechanism is the leucocyte response after ST elevation myocardial infarction (STEMI), which then start the process of collagen replacing the infarcted tissue. The leucocyte response depends upon the extent of myocardial infarction; greater the area of the myocardial infarction, the greater the leucocyte response both locally as well as systemically.

Even though previously an elevated WBC count after AMI, a gauge of systemic inflammation, has been acknowledged as part of the healing process, now it has often been revealed to be a prognosticator of hostile cardiovascular events. A study conducted by Nunez et al on 1118 consecutive patients admitted with the diagnosis of AMI: 569 non-STEMI and 549 STEMI. The white cells were measured after 24 hours of their admission in cardiac unit. Patients were categorized into 3 different groups depending on WBC level: WBC1 (count <10 x 103 cells/mL), WBC2 (count, 10-14.9 x 103 cells/mL), and WBC3 (count ≥15x103 cells/mL). The mortality rate was 18.5% in non-STEMI patients and 19.9% in STEMI patients.

This study was designed to establish the relation of elevated WBC-count with length of stay and in hospital mortality at 30 days and one year after STEMI in these patients.

METHODOLOGY

A cross sectional study was conducted at Department of Cardiology, Jinnah Hospital Lahore from 1st October 2017 to 31st March 2018. 200 patients those fulfilling the inclusion criteria for STEMI were selected for the study. TLC count was taken at time of admission and after 48 hours. The subjects were followed up for 7 days for adverse outcome i.e. in hospital mortality. All the collected data was entered and analyzed on SPSS version 21.0. Mean and standard deviation was calculated for numerical variables and frequency and percentage were calculated for qualitative variables like history of diabetes mellitus, smoking, family history of MI. Independent t test statistics were used to compare in hospital mortality, TLC and length of hospital stay with p < .05 as statistical significance.

RESULTS

A total of 200 subjects included in study. Mean age was 57.47 ± 11.942. Minimum age was 23 years and maximum age was 79 years. 72.0% were fifty years and above. 61.0% were male and 39.0 % were females. 38.0% had history of diabetes mellitus and 40.0% had a positive family history of IHD. 39.0% were smokers. (Table no:1). Mean hospital stay was 4.18 days ± 1.482 days. 92.5% of subjects had hospital stay of less than 7 days. TLC at base line showed only 18.0% had a High (> 11,000 cumm) and at 48 hours 42.0% patients had a positive family history of IHD. 39.0 % were females. 38.0% had history of diabetes mellitus and 40.0% had a positive family history of IHD. 39.0% were smokers. 35.0% of subjects had hospital stay of less than 7 days. TLC at base line showed only 18.0% had a High (> 11,000 cumm) (Table 3).

<table>
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<th>Variables</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
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Table 1: Demographic and Clinical Profile of Subjects (n=200)
Inflammation have an injurious role in the context of ACS by promoting atherosclerotic plaque rupture and an evolving concept of changes in adaptive immunity is the main pathological basis of this plaque rupture. One of the important mediators of inflammation are White Blood count Cells (WBCs). That’s why WBC counts have been studied to determine the outcome of CVDs. Among them Neutrophils bring atherosclerotic plaque rupture through the process of proteolytic enzymes release, arachidonic acid derivatives, and superoxide free radicals. These results are consistent many studies which depicted predictive value of TLC in patients with ACS.

Nunez et al in his study found WBC on admission was an independent predictor of increased in-hospital i.e., 7 days mortality (5.6%).

While conventionally an elevated white blood cell count (WBC), a predictor of systemic inflammation, has been acknowledged as acute myocardial infarction (AMI) healing phase response, it has been commonly revealed to be a predictor of adverse cardiovascular events after AMI. Our study was designed to assess the association between WBC and length of hospital stay and in-hospital mortality in AMI patients with ST-segment elevation (STEMI) in Pakistan. The results showed 27.5% patient died in hospital. Mean TLC count at admission among patients who died was 11336.36 ± 4754.349. Mean TLC count after 48 hours was 15154.55 ± 2388.616. (t =7.226, p = .000). Mean hospital stay among patients who died was 5.78 ± 1.134. (t =12.920, p = .000). These results are consistent many studies which depicted predictive value of TLC in patients with ACS.

In a study by Munir et al showed long-term mortality in patients with ACS was 6.4% in WBC1(< 7000/mm3), 18.2% in WBC2(7100-10,000/mm3) and 18.5% in non-STEMI patients and 19.9% in STEMI patients. Long-term mortality during follow-up was 18.5% in non-STEMI patients and 19.9% in STEMI patients. Cannon CP et al in a study of 7,651 patients with ACS that a WBC of > 10,000 was related with increased 30-day and 10-month mortality (6.2% vs 3.2% to 3.6% for WBC count < 10,000; p < 0.000). Barron HV et al found that WBC within 24 h of admission for an AMI is a strong and independent predictor of in-hospital and 30-day mortality as well as in-hospital clinical events. Nunez J et al found N/L ratio as a useful marker to predict subsequent mortality in patients admitted for STEMI. In a study by Munir et al showed long-term mortality in patients with ACS was 6.4% in WBC1(< 7000/mm3), 18.2% in WBC2(7100-10,000/mm3) and 18.5% in non-STEMI patients and 19.9% in STEMI patients. Long-term mortality during follow-up was 18.5% in non-STEMI patients and 19.9% in STEMI patients. Cannon CP et al in a study of 7,651 patients with ACS that a WBC of > 10,000 was related with increased 30-day and 10-month mortality (6.2% vs 3.2% to 3.6% for WBC count < 10,000; p < 0.000). Barron HV et al found that WBC within 24 h of admission for an AMI is a strong and independent predictor of in-hospital and 30-day mortality as well as in-hospital clinical events. Nunez J et al found N/L ratio as a useful marker to predict subsequent mortality in patients admitted for STEMI. In a study by Munir et al showed long-term mortality in patients with ACS was 6.4% in WBC1(< 7000/mm3), 18.2% in WBC2(7100-10,000/mm3) and 18.5% in non-STEMI patients and 19.9% in STEMI patients. Long-term mortality during follow-up was 18.5% in non-STEMI patients and 19.9% in STEMI patients. Cannon CP et al in a study of 7,651 patients with ACS that a WBC of > 10,000 was related with increased 30-day and 10-month mortality (6.2% vs 3.2% to 3.6% for WBC count < 10,000; p < 0.000). Barron HV et al found that WBC within 24 h of admission for an AMI is a strong and independent predictor of in-hospital and 30-day mortality as well as in-hospital clinical events. Nunez J et al found N/L ratio as a useful marker to predict subsequent mortality in patients admitted for STEMI. In a study by Munir et al showed long-term mortality in patients with ACS was 6.4% in WBC1(< 7000/mm3), 18.2% in WBC2(7100-10,000/mm3) and 18.5% in non-STEMI patients and 19.9% in STEMI patients. Long-term mortality during follow-up was 18.5% in non-STEMI patients and 19.9% in STEMI patients. Cannon CP et al in a study of 7,651 patients with ACS that a WBC of > 10,000 was related with increased 30-day and 10-month mortality (6.2% vs 3.2% to 3.6% for WBC count < 10,000; p < 0.000). Barron HV et al found that WBC within 24 h of admission for an AMI is a strong and independent predictor of in-hospital and 30-day mortality as well as in-hospital clinical events. Nunez J et al found N/L ratio as a useful marker to predict subsequent mortality in patients admitted for STEMI. In a study by Munir et al showed long-term mortality in patients with ACS was 6.4% in WBC1(< 7000/mm3), 18.2% in WBC2(7100-10,000/mm3) and 18.5% in non-STEMI patients and 19.9% in STEMI patients. Long-term mortality during follow-up was 18.5% in non-STEMI patients and 19.9% in STEMI patients. Cannon CP et al in a study of 7,651 patients with ACS that a WBC of > 10,000 was related with increased 30-day and 10-month mortality (6.2% vs 3.2% to 3.6% for WBC count < 10,000; p < 0.000). Barron HV et al found that WBC within 24 h of admission for an AMI is a strong and independent predictor of in-hospital and 30-day mortality as well as in-hospital clinical events. Nunez J et al found N/L ratio as a useful marker to predict subsequent mortality in patients admitted for STEMI. In a study by Munir et al showed long-term mortality in patients with ACS was 6.4% in WBC1(< 7000/mm3), 18.2% in WBC2(7100-10,000/mm3) and 18.5% in non-STEMI patients and 19.9% in STEMI patients. Long-term mortality during follow-up was 18.5% in non-STEMI patients and 19.9% in STEMI patients. Cannon CP et al in a study of 7,651 patients with ACS that a WBC of > 10,000 was related with increased 30-day and 10-month mortality (6.2% vs 3.2% to 3.6% for WBC count < 10,000; p < 0.000). Barron HV et al found that WBC within 24 h of admission for an AMI is a strong and independent predictor of in-hospital and 30-day mortality as well as in-hospital clinical events. Nunez J et al found N/L ratio as a useful marker to predict subsequent mortality in patients admitted for STEMI.
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10,000/mm3 and 40.9% in WBC3 (>) 10,000/mm3). categories, while short term mortality respectively was 2.6%, 3.0% and 18.2%. In comparison to patients with lower 2 WBC, patients with the highest category were 7 times more likely to die during 30 days (HR 7.83, p = 0.017) and more than 9 times during the total follow up period (HR 9.42, p < 0.001). Cox regression analysis showed WBC3 a strong independent predictor of mortality (HR 6.36, p = 0.016).28

CONCLUSION
Mean TLC count and length of hospital stay is significantly associated with in patient mortality STEMI patients.

REFERENCES
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