THROMBOCYTOPENIA AMONG TRAUMA PATIENTS ADMITTED IN ICU: FREQUENCY AND RELATIONSHIP WITH OUTCOME

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ABSTRACT

Objective: To assess the frequency of thrombocytopenia among the patients of trauma at an intensive care unit and to look for its relationship and other socio-demographic factors with the outcome.

Study Design: Cross-sectional study.

Place and Duration of Study: Intensive Care Unit, Combined Military Hospital Peshawar, from Mar to Aug 2017.

Methodology: Thrombocytopenia was defined as platelet count of <150,000/µl and was performed on the fifth day of admission in the Intensive Care Unit. Age, gender, presence of thrombocytopenia, history of platelet transfusion, and length of stay in the Intensive Care Unit were correlated with the outcome in our study population.

Results: A total of 107 patients admitted to intensive care unit with traumatic injuries during the study period were included in analysis. Mean age of the patients was 37.93 ± 6.697 years. Thrombocytopenia developed in 35 (32.7%) of the patients while 72 (67.3%) had normal platelet count. Less than 18% patients died in the intensive care unit. Long duration of Intensive Care Unit stay and presence of thrombocytopenia were statistically significantly associated (p<0.05) with the presence of poor outcome in our sample population.

Conclusion: Frequency of thrombocytopenia was high among patients admitted with trauma in intensive care unit and was also related to poor outcome in these patients.

Keywords: Intensive care unit, Outcome, Thrombocytopenia.

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INTRODUCTION

Trauma is one of the leading cause of death among all the age groups specially the young.[1] Our country is facing a similar challenge and traumatic injuries are on a rise posing a great burden on overall health care budget.[2] Critical care medicine specialized for trauma patients is an emerging specialty with very limited scope in the low and middle income countries countries.[3]

Normal hematological parameters are necessary for the overall homeostasis of the human body. Platelets are one of the most important components of human blood and play the main role in hemostasis on exposure to trauma and other conditions of injury to the body.[4] Thrombocytopenia has been studied with various non-hematological conditions including medical and surgical conditions. Some of them are pregnancy, sepsis, malaria, typhoid and cholecystitis.[5-8] Various factors have been correlated with the development of thrombocytopenia in the intensive care settings. Some of them include age, severity of underlying illness, co-morbid illnesses, duration of ICU stay, presence of associated renal injury and APACHE III score at time of presentation.[9,10] These factors may cause thrombocytopenia by physical, physiological or immunological mechanisms among the patients admitted and treated vigorously in the critical care setting.

Limited local data was available on thrombocytopenia in ICU patients in our part of the world. This study was planned with the objective to look for the frequency of thrombocytopenia among the patients of trauma at an ICU and look for its relationship and other socio-demographic factors with the outcome.

METHODOLOGY

This cross-sectional study was conducted at the Intensive Care Unit of Combined Military Hospital Peshawar from March to August 2018. All patients of trauma admitted to ICU during this period were included in this study using non probability consecutive sampling technique. Sample size was calculated by using the population prevalence proportion of thrombocytopenia in critically ill as 9%.[11]

Inclusion Criteria: Patients between the age of 18 and 60 years admitted in intensive care unit for at least five days after any traumatic injury. This included patients

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who were referred from other military, public sector and private hospitals who required the admission in critical care unit and also patients shifted from other wards of the hospital were also included.

Exclusion Criteria: The patients shifted before five days from ICU were excluded from the study. In addition, patients with malignancies, autoimmune disorders, chronic liver disease and pregnant women were also excluded from the study.

After ethical approval from the ethical review board committee and written informed consent from the patient or their care-givers, patients who were admitted after traumatic injuries in the intensive care unit of CMH Peshawar fulfilling the above mentioned inclusion and exclusion criteria were included in the study. Intensive care unit is a twelve bedded facility with around 450 admissions per year for various ailments requiring the organ support. The diagnosis of thrombocytopenia was made with platelet count of <150,000/µl which was performed on the fifth day of admission in the ICU.[12-14] Age, gender, presence of thrombocytopenia, history of platelet transfusion, and length of stay in the ICU were correlated with the outcome in our study population. Good outcome included shift of the patient to the ward or step down unit and poor outcome was death of the patient.

Characteristics of patients and the distribution of the outcome were described by using the descriptive statistics. Chi-square was used to determine between-group variances in categorical variables. Differences between groups were considered significant if *p*-values were ≤0.05.

RESULTS

A total of 119 patients were initially approached to get them included in the analysis, out of which twelve patients were excluded due to different reasons, seven patients were out of the age bracket of inclusion criteria, one had leukemia prior to admission in ICU and two patients were pregnant. Care-givers of two patients did not give consent to include them in the study. Out of 107 patients included in the final analysis 92 (85.9%) were male and 15 (14.1%) were female. Mean age of patients admitted with trauma in ICU was 37.93 ± 6.697 years. Table shows that out of 107 patients, 35 (32.7%) developed thrombocytopenia while 72 (67.3%) had normal platelet count, 19 (17.8%) of the patients had a poor outcome, presence of thrombocytopenia (p=0.002) and long duration of ICU stay (p= 0.001) had significant association.

Table-I: Characteristics of the study group and outcome in the patients of trauma admitted in ICU.

Parameters	Good Outcome n (%) 88 (82.2)	Poor Outcome n (%) 19 (17.8)	*p*-value
Age			
≤35 years	38 (43.2%)	06 (31.6%)	0.345
35-60 years	50 (56.8%)	13 (68.4%)	
Gender			
Male	75 (85.2%)	17 (89.4%)	
Female	13 (14.8%)	02 (10.6%)	0.618
Duration of ICU Stay			
<1week	76 (86.3%)	10 (52.6%)	0.001
≥1 week	12 (13.7%)	09 (47.4%)	
History of Platelet Ransfusion			
No	64 (72.7%)	16 (84.2%)	0.277
Yes	24 (27.3%)	03 (15.8%)	
Thrombocytopenia			
No	65 (73.9%)	07 (36.8%)	0.002
Yes	23 (26.1%)	12 (63.2%)	

DISCUSSION

Trauma is a major problem worldwide. Apart from morbidity and mortality, it puts a lot of economic burden on individuals and countries.[15-18] There is a global trend of male predominance in trauma patients as pointed out by Agarwal *et al*, Stephan *et al*, and Koyamak *et al*,[10,20,21] but is specifically high in our study. The likely reason is that the law enforcing agencies mostly consist of male gender in Pakistan and CMH Peshawar receives the main bulk of casualties from operational areas and females in our set up have lesser chance of receiving critical traumatic injuries.

Outcome in our patients was very promising i.e. most of our patients had a good outcome and they were stepped down either to HDU or surgical ward. Less than 20 percent of them died during the ICU stay. This outcome was better than the outcome seen in past studies done on similar patients especially study conducted by martini *et al*,[22] Reason might be age of our patients as most of our patients were young or it might be the flaw of study design as long term follow up was not scope of our study.

Presence of thrombocytopenia has been associated with the presence of poor outcome after the trauma in a critical care setting. Studies of Goliriz *et al*, and Stephan *et al*, have been important in this regard.[8,11] Results in our study were similar and thrombocytopenia emerged as independent risk factor relate to the poor outcome in ICU patients of our population. Decrease in the platelet count effect their functionality as well. There might be a bi-directional link between thrombocytopenia and underlying illness which worsen the prognosis among these patients.

High mortality rate has been a problem in intensive care units all over the world. This holds true for both adult and pediatric intensive care units.[22,23] Longer duration of stay has been linked with various problems among the patients admitted in the ICU in the past. Poor outcome i.e. death in our study participants was strongly linked with the longer stay in the critical care unit. Reason might be infections or other ICU hazards or it may be the original intensity of trauma which contributed both in the longer ICU stay and the development of the fatal complications. More studies with the control of confounding factors may be required to clear this association.

CONCLUSION

Frequency of thrombocytopenia was high among patients admitted with trauma in intensive care unit and was also related to poor outcome in these patients.

LIMITATION OF STUDY

Patients were not followed up for long term after the discharge. More strict exclusion criteria could have excluded all the other co-morbidities which could contributed to thrombocytopenia so that exact link of trauma and ICU admission could be made with this phenomenon.

Conflict of Interest: None.

Authors' Contribution

AF: Article writing, EA: Data compiling, ZFB: Data compiling, UAS: Data compiling, TBT: Data compiling, AK: Data compiling

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