

PLATELET COUNT, ITS SIGNIFICANCE IN BURN INJURY MANAGEMENTShanti Prakash Kujur¹, Devpriya Lakra²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: INTRODUCTION: Platelet count evaluation in a burn trauma patient has much significance because it has been studied in literature that decrease in platelet count is an indicator of septicaemia in the patient and vice versa thus knowing the count level of platelets, the treatment of burn patients can be done accordingly. Septicaemia is most important cause of mortality in burn patients, the survival of the patients can only be assured if septicaemia is detected early and controlled. Platelets play an important role in haemostatic disorder and immune response impairment in burn patient.^[1] The aim of study is to see the significance of platelet count investigation in burn patient and then their outcome, whether survival or not survival. **MATERIAL METHODS:** We investigated 480 burn patients within the ages of 18 and 60 Years and the percentage of the burn was between 20% and 70%. Platelet count was investigated by visual method in all patients. The investigation of the platelet count was done on day 1, 3, 7, 14 & 21 of the patients. Other parameters TLC, neutrophil count was done by visual methods. Serum creatinine estimation was also done in all patients. **RESULT:** In our study we found that the platelet count gradually increased towards normal count and maintained till the discharge in survival patients, and in non-survival the platelet count gradually declined. The statistical significant of difference in mean platelet counts on different post burn days in survivors and non survivors were studied by using standard t test. It was observed that the actual difference between two means is more than double of the SED between two means in different post burn days -i.e., (Day 1, 3, 7, 14 & 21). So difference is significant (P<0.05). **CONCLUSION:** It can be concluded that platelet count decreases initially in all cases of burn sepsis. It gradually rises to normal in case of survivors and declines gradually in non survivors. So serial declining of platelet count can be used as prognostic indicator in burn patients for early detection of septicemia. It helps in early institution of treatment against septicemia resulting in favorable outcome of the patient.^[2] Other laboratory parameters such as TLC, Neutrophil count and serum Creatinine does not vary significantly with appearances and progression of septicemia, so its use as prognostic indicators of septicemia is of less significance.

KEYWORDS: Platelet, Burn patient, Outcome, Survivor, Non Survivor.

INTRODUCTION: Burns are extremely traumatic condition which can be caused by flame hot liquid scalds electrical burn explosion chemical burn. The severity of burn can be calculated by depth, size, and area involved in injury. Age and general status of the patients is also seen.

Thermal burn leads to impairment of skin structure & loss of skin function. There is heat coagulation of structural protein, severe impairment of homeostatic balance & immune response. Platelet plays important role in modulation of these responses.

Platelets are small fragments of megakaryocyte cytoplasm they play a fundamental role in secondary homeostasis & also act as an inflammatory cell. They release inflammatory mediators & take part in induction of acute & chronic immune response.

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Previous studies & investigations regarding platelet count & its use as a prognostic indicator in the patients of burn have been clearly established. The study of platelet count is not only useful in understanding the clinical course of the burn patient but also in monitoring the efficacy of the treatment & the prognostic outcome of the patient.^[3]

The aim of our study was to study the platelet count parameter in context with the severity survival & death of the patient.

MATERIALS AND METHODS:

- Study was carried out in Burn Unit, Department of Surgery. CIMS, Bilaspur for the period of October 2013 to November 2014.
- The cases were all adult patients above the age of 18yrs and below the age of 60yrs.
- The percentage of burns included in our study was between 20% to 70% of burns.
- Soon after the patient was admitted in the burn unit, proper resuscitation, dressing was done. Antibiotics, analgesics and fluids were started accordingly.
- Every patient was subjected to following investigations, platelet count, by visual method, TLC and DLC by visual method, Serum Creatinine. All the patients were investigated on day 1, 3, 7, 14 & 21.
- All the patients were daily observed in rounds for the clinical signs and symptoms of septicaemia.
- The patients were divided into two groups, Survivors and Non survivors. And the laboratory parameters, were analyzed correspondingly.

OUR OBSERVATIONS:

- Out of 480 patients, 220 patients were survived and got discharged and were survivors. And 260 patients died and were non-survivors.
- The laboratory tests, for the four different parameters which was taken to detect the septicemia namely, platelet count, total count, Neutrophil count and serum Creatinine, It was observed that in survivors the platelet count gradually increased and maintained till the discharge of the patients. And in non survivors, the platelet count gradually declined.

Post burn day	Mean Platelet Count (X 10 ³ /c. mm.)	Mean TLC (X 10 ³ mm.)	Mean Neutrophil Percent (%)	Mean Creatinine (mg%)
In Survivors (n= 220)				
1 st	2 ± 0.21	11.24±2.40	82.76±7.20	1.18±0.34
3 rd	1.94±0.41	11.09±3.50	84.60±7.58	1.15±0.34
7 th	2.03±0.41	10.76±3.60	79.41±11.15	1.14±0.26
14 th	2.06±0.32	10.59±3.68	81.86±7.40	1.18±0.43
21 st	2.20±0.6	9.70±2.30	81.4±8.65	1.13±0.21
In Non- Survivors (n=260)				
1 st	1.97±0.34	11.63±3.41	84.86±5.49	1.45±0.44
3 rd	1.75±0.54	11.26±4.26	80.67±7.52	1.40±0.46
7 th	1.74±0.41	11.70±3.68	83.32±7.80	1.46±0.34
14 th	1.56±0.54	12.76±4.87	86.94±7.18	1.48±0.80
21 st	1.14±0.50	12.8±5.64	82.46±8.50	1.42±0.36

Table I: Showing different laboratory parameters in survivors on different post burn days

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- Below is another table which is showing the platelet count in relation to the percentage of burn. In this table, it depicts the survival and non-survival pattern same as the table above, that means if septicemia decrease in platelet count, and no septicemia the platelet count rises to normal values.

S.No.	% of Burn	No. of Patients	Mean Platelet count (in Lac/c. mm.)				
			1 st day	3 rd day	7 th day	14 th day	21 st day
In Survivors							
1.	20-30%	130	2.2±0.4	2.1±0.4	1.98±0.06	2.11±	2.24±0.5
2.	31-40%	70	2.02±0.3	1.80±0.6	2.8±0.4	2.30±0.3	2.35±0.4
3.	41-50%	20	1.98±0.2	1.90±0.4	1.89±0.2	1.75±0.2	2.15±0.6
Total		220					
In Non- Survivors							
1.	20-30%	15	1.9±0.12	2.0±0.3	1.9±0.5	1.9±0.4	1.5±0.8
2.	31-40%	47	1.6±0.2	1.5±0.2	1.6±0.2	1.1±0.3	Exp.
3.	41-50%	60	2.1±0.4	1.85±0.7	1.62±0.5	1.63±0.44	1.2±0.2
4.	51-60%	68	1.9±0.3	1.72±0.4	1.26±0.8	1.26±0.8	1.15±0.3
5.	61-7-%	70	1.95±0.3	1.73±0.6	1.25±0.2	1.24±0.21	0.7±0.2
Total		260					

Table II: Showing mean platelet counts survivors and non-survivors in different burn percentage groups

- Other laboratory parameters which were observed that is TLC DLC serum Creatinine, no significant variations were seen. But in platelet count 260 patients who were non survivors platelet count was less than 1.5 lakhs before their death and 220 survivors, the platelet count was normal before their discharge.

DISCUSSION:

- Long before 1966, it was studied by Cohen and Gardner the relationship between the platelet count, WBC and burn injury. They studied six septicemic patients irrespective of causes of septicemia. He observed marked decrease in platelet count.^[4] And it was also associated with leucocytosis. He concluded that effect of bacteria and their endotoxins cause early depletion of platelet reserve leading to thrombocytopenia and bone marrow depression. In 1993 Housinger TA3 et al studied the relationship between platelet count, sepsis and survival of the burn patients. it was suggested by him that in septicemia platelet count decreases at very low level of stimulus which is insufficient to induce other inflammatory responses.^[5]
- Robb HJ7 in 1967^[6] in his study of Dynamics of microcirculation during burn suggested that thrombocytopenia occurs due to huge consumptions of platelets by formation of precipitates and micro thrombi in arterioles and venules.^[6]
- Scoring system for immediate post traumatic patient evaluation classification and outcome prediction has gained increased acceptance during the past three decades. The importance of prognostic indices of burn patient not only as a predicting outcome of patient but also as a therapeutic and research purpose.^[7] The platelet count decreases initially in cases of burn wound abscess but later it rises to normal in patient who survive but in non-survival patient the platelet count maintained the downward trend. Thus the declining platelet count in a burn patient is a useful prognostic indicator.

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- Statistical significance of difference in mean platelet counts on different post burn days in survivors and non survivors were studied by using standard t test. It was observed that difference in mean platelet count increases significantly on subsequent post burn days. Reason behind this is gradual rise in platelet count in case of survivors and gradual decline in platelet count in case of non-survivors with occurrence and progression not septicemia.

Sl. No.	Post Burn Day	Survivor		Non Survivor		SED Between two mean	Actual Difference between two mean	P-Value
		Mean	S.D.	Mean	S.D.			
1	1	2	0.105	1.97	0.17	0.0127	0.03	< 0.05
2	3	1.94	0.205	1.75	0.27	0.0217	0.19	< 0.05
3	7	2.03	0.205	1.74	0.205	0.0187	0.29	< 0.05
4	14	2.66	0.16	1.56	0.27	0.0199	1.1	< 0.05
5	21	2.20	0.2	1.14	0.25	0.0205	1.06	< 0.05

Table III: Showing statistical significance in mean platelet counts on Different post burn days in survivors & non survivors

As actual difference between two means is more than double of the SED between two means in different post burn days – (1, 3, 7, 14, 21) so difference is significant ($P < 0.05$).

CONCLUSION:

- It can be concluded that platelet count decreases initially in all cases of burn sepsis. It gradually rises to normal in case of survivors and declines gradually in non survivors. So serial declining platelet count can be used as prognostic indicator in burn patients for early detection of septicemia. It helps in early institution of treatment against septicemia resulting in favorable outcome of the patient.^[8]
- Other laboratory parameters such as TLC, Neutrophil count and serum Creatinine does not vary significantly with appearances and progression of septicemia, so cannot be used as prognostic indicators of septicemia.

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