

**Total Platelet Count as an Indicator of Early Septicaemia in Post Burn Patients**Jyotirmaya Nayak<sup>1</sup>, Sridhar Panda<sup>2</sup>, Subhashree Mishra<sup>3</sup><sup>1</sup>Assistant Professor, Department of General Surgery, SCB Medical College, Cuttack<sup>2</sup>Assistant Professor, Department of General Medicine, SCB Medical College, Cuttack<sup>3</sup>Assistant Professor, Department of Anaesthesiology, SJMCH, Puri

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**Abstract:**

Every year, over 1 million burn incidents occur in India. The timely treatment and management of burn victims is necessary to preserve their lives. Recent research has shown that platelet alterations have a tight association with illnesses and medications. Early discovery of the patient's deterioration and timely treatment will aid in the patient's survival.

**Aim of the Study:**

1. To assess the role of platelet count in the early detection of burn septicaemia.
2. To determine the relationship between other variables that induce platelet count alterations in severely burned individuals.
3. To identify the most often seen pathogens in burn septicaemia.
4. Relationship between body surface area burned and platelet levels.

**Results:** When platelet levels in survivors and non-survivors were compared, a progressive rise in platelet count trend was detected in the survivors group. The non-survivor group had a progressive decrease in platelet count. The severity of the burn injuries had no effect on this tendency. On the fifth and seventh post-burn days, the change in platelet counts was considerable. In our analysis of 157 individuals, about 33 experienced inhalation damage. When the platelet count was compared between patients with and without inhalation damage, the patients with inhalation injury had a lower mean platelet count.

**Conclusion:** Early detection and treatment of imminent sepsis when levels of the pathophysiologic cascades that drive the systemic response are still low should be predicted to result in improved results. The use of falling platelet count to identify burn patients at risk of systemic infection may help reduce morbidity and death in these individuals.

**Keywords:** Burn, Platelet Count, Prognostic, Survival On Patient.

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**Introduction**

According to the WHO, burns are responsible for over 265 000 fatalities per year. Almost half of which occur in the WHO South-East Asia Region.[1] Every year, over 1 million burn incidents occur in India. The timely treatment and management of burn victims is necessary to preserve their lives.[2]

Bacterial invasion is not uncommon in burn victims. Despite antibiotics and topical care, burn wounds may harbour up to 100 million organisms per gramme of tissue after 2 days after damage. Infections were shown to be the leading cause of mortality in individuals who survived the first therapy. Septicaemia is thought to be responsible for around 65% of burn patient mortality.[3] *Pseudomonas aeruginosa* (in 29% of cases) and *Klebsiella* sp. (in 28% of cases) are the most

prevalent organisms isolated, either separately or in combination.[4,5]

Recent research has shown that platelet alterations have a tight association with illnesses and medications. Early discovery of the patient's deterioration and timely treatment will aid in the patient's survival. The purpose of this research is to determine the relationship between post-burn septicaemia and platelet count in predicting prognosis.[6]

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3. To identify the most often seen pathogens in burn septicaemia.
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### 1. Trend of platelet count in survivors & non-survivors:

No. of Patients included in the study: 157

No. of survivors in this study: 91

No. of non-survivors in this study: 66

### Observations & Results

**Table 1:**

Post Burn Days	Survivor's Group	Non-Survivor's Group
1 <sup>st</sup> Day	1.98	1.87
3 <sup>rd</sup> Day	2.08	1.83
5 <sup>th</sup> Day	2.17	1.67
7 <sup>th</sup> Day	2.26	1.50

When platelet levels in survivors and non-survivors were compared, a progressive rise in platelet count trend was detected in the survivors group. The non-survivor group had a progressive decrease in platelet count. The severity of the burn injuries had no effect on this tendency.

### 2. Mean platelet counts of the non-survivors and survivors:

**Table 2:**

1 <sup>ST</sup> day	Mean	S. D
Non-Survivor(n=66)	1.87	+/0.28
Survivor(n=91)	1.98	+/0.32
3 <sup>rd</sup> day	Mean	S. D
Non-Survivor(n=66)	1.83	+/.42
Survivor(n=91)	2.08	+/.51
5 <sup>th</sup> day	Mean	S. D
Non-Survivor(n=66)	1.67	+/.51
Survivor(n=91)	2.16	+/.42
7 <sup>th</sup> day	Mean	S. D
Non-Survivor(n=66)	1.50	+/.45
Survivor(n=91)	2.26	+/.50

On the first post-burn day, there is no significant difference in platelet counts between the survivor and non-survivor groups. On the fifth and seventh post-burn days, the change in platelet counts was considerable.

### 3. Inhalation Injury and platelet levels:

Total number of pts. with inhalation injury: 33

Total number of pts. without inhalation injury: 124

Mean platelet count among the inhalation group: 1.81

Mean platelet count among the non-inhalation group: 2.01

**Table 3:**

Inhalational injury	Non survivors		survivors		Total	
	N=66	100%	N=91	100%	N=157	100%
Yes	33	50%	0	0%	33	21%
No	33	50%	91	100%	124	79%

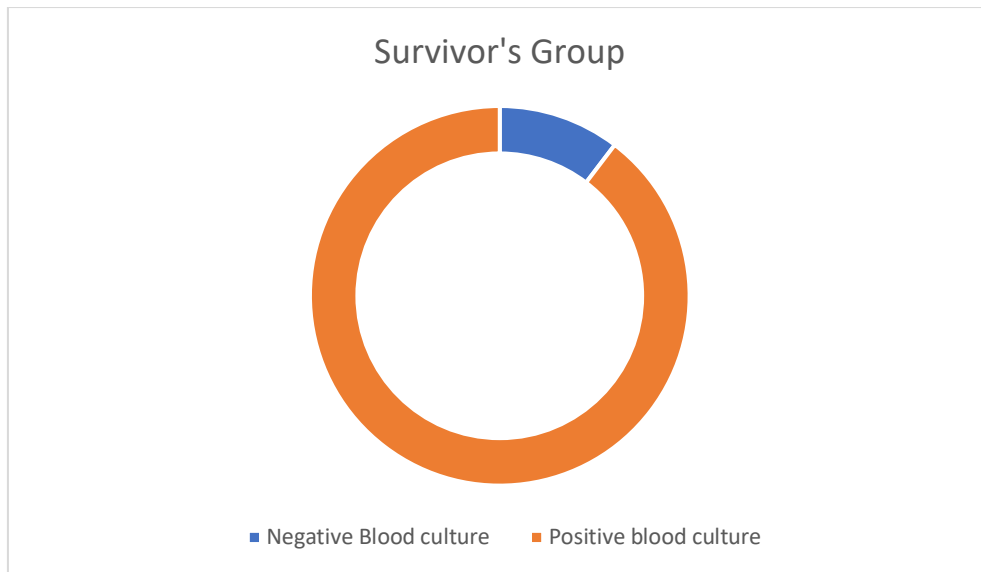
In our analysis of 157 individuals, about 33 experienced inhalation damage. When the platelet count was compared between patients with and without inhalation damage, the patients with inhalation injury had a lower mean platelet count.

### 4. Septicaemia and survivability:

No. of survivors in this study: 91

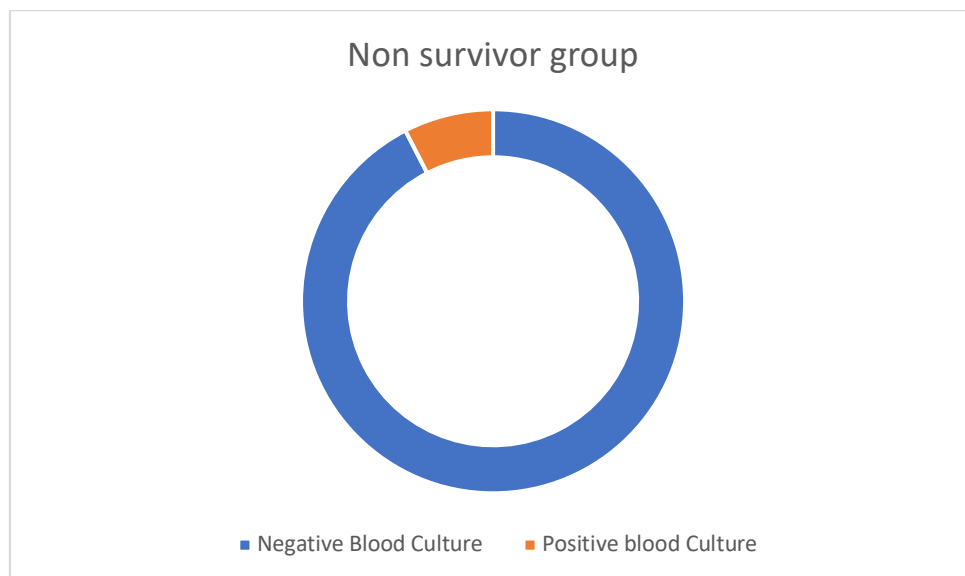
No. of patients with positive blood culture among survivors: 34

That is roughly 37.5%



**Figure 1: Survivor’s Group**

No. of non-survivors in this study: 66  
 No. of patients with positive blood culture among non-survivors: 44  
 That is roughly 67%



**Figure 2: Non-Survivor’s Group**

The incidence of septicaemia in the non-survivor group is higher about 67 % when compared with the incidence of septicaemia in the survivor group is 37.5%.

**Organism Causing septicaemia**

Total number of patients with positive blood culture report: 78

**Table 4:**

<b>Pseudomonas</b>	<b>29</b>
Klebsiella	22
Staph. Aureus	18
Proteus	12
E. coli	12
Acinetobacter	8
Others	15
Mixed	31

The most common organism in causing septicaemia in the burn patients is *Pseudomonas* sp. Others organisms which caused septicaemia are *Klebsiella*, *E. coli*, *Proteus*, *Acinetobacter* sp., *Staphylococcus aureus*.

### Discussion

Many research is being conducted in order to detect septicaemia early. The platelet index is an essential laboratory result that may be utilised to diagnose sepsis. It is well recognised that individuals with sepsis who have more than 18% PDW have a higher risk of mortality.[7] The purpose of this research is to determine the relationship between platelet count and early diagnosis of septicaemia in burn patients.[8]

When platelet levels in survivors and non-survivors were compared, a progressive rise in platelet count trend was detected in the survivor group and a gradual fall in platelet count trend was observed in the non-survivor group.[9] The severity of the burn injuries had no effect on this tendency. Though the precise cause of thrombocytopenia in septicaemia is unknown, there are a few ideas that attempt to explain this drop in platelet numbers in septicaemia. Its quick start shows that there is enhanced platelet breakdown, a process corroborated by the findings of prior platelet survival investigations.[10] Another possibility is that the higher rate of platelet breakdown in patients with septicaemia is caused by either overt or subclinical DIC.

In our research, we found no significant difference in platelet counts between the survivor and non-survivor groups on the first post-burn day, but the difference was significant on the fifth and seventh post-burn days. Just before death, this platelet count was the lowest in the non-survivor group. The drop in platelet levels was greatest just before death.[11,12,13]

Other than septicaemia, there are other reasons that might affect platelet count in burn victims. Inhalation damage is one of the most serious. With the early detection and treatment of septicemia, the percentage of deaths caused by inhalation damage has increased. In our analysis of 157 individuals, about 33 experienced inhalation damage. Despite early intubation and ventilator control, all patients with inhalation injuries died by the fifth post-burn day. When the platelet count was compared between patients with and without inhalation damage, the patients with inhalation injury had a lower mean platelet count.[14,15] When compared to the survivor group, the incidence of septicaemia in the non-survivor group is about 67% higher (p 37.5%). Septicaemia may be caused by direct invasion of organisms from a burn site, as well as lung infection, urinary tract infection, and other causes. *Pseudomonas* sp. is the most prevalent

bacteria responsible for septicaemia in burn victims. *Klebsiella*, *E.coli*, *Acinetobacter* sp., and *Staphylococcus aureus* are among the other species that have caused septicemia. When compared to other species, the death rate among persons infected with *Staphylococcus aureus* is often greater.[16,17,18]

### Conclusions

1. When comparing platelet levels in survivors and non survivors, a steady rise in platelet count trend was detected in the survivor's group, whereas a gradual fall in platelet count trend was observed in the non-survivor group. The severity of the burn injuries had no effect on this tendency.
2. On the first post-burn day, there is no significant difference in platelet counts between the survivor and no survivor groups. On the fifth and seventh post-burn days, the change in platelet counts was considerable.
3. In our analysis of 157 individuals, about 33 experienced inhalation damage. When the platelet count was compared between patients with and without inhalation damage, the patients with inhalation injury had a lower mean platelet count.
4. The incidence of septicaemia in the nonsurvivor group is about 67% greater than the incidence of septicaemia in the survivor group, which is 37.5%.
5. *Pseudomonas* sp. is the most prevalent bacteria responsible for septicaemia in burn victims. *Klebsiella*, *E.coli*, *Acinetobacter* sp., and *Staphylococcus aureus* are among the other species that have caused septicaemia.
6. Survival was better in 1st and 2nd degree burns than in 3rd degree burns. Also, the survivorship increased with age.
7. Burn injuries are more prevalent in men than females between the ages of 20 and 45 years. In this investigation, the start of typical clinical signs of sepsis was shown to be delayed by a drop in platelet count.

This means that the mechanism that results in a reduced platelet count in sepsis, whether greater destruction or a reduction in production or both, begins at a lower stimulus concentration than other processes frequently linked with systemic sepsis. Early detection and treatment of imminent sepsis when levels of the pathophysiologic cascades that drive the systemic response are still low should be predicted to result in improved results. The use of falling platelet count to identify burn patients at risk of systemic infection may help reduce morbidity and death in these individuals.

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