FREQUENCY OF BACTEREMIA IN BURN PATIENTS IN RELATION TO THROMBOCYTOPENIA

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Article Info: Received 09 July 2021; Accepted 29 August 2021

DOI: <https://doi.org/10.32553/ijmbs.v5i9.2176>

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Conflict of interest: No conflict of interest.

Abstract

Burn patients are obviously at high risk for infections due to the immune compromising effects of burn injury. E.coli is an important life-threatening pathogen in burn units [1]. The aim of this study was to determine bacteremia in the surgical and plastic surgery units of Guru Gobind Singh Medical College and Hospital, Faridkot. 25 burn patients were chosen at random study staph aureus (6) was the dominant organism followed by E. Coli (4) in blood culture. Eight (32%) of the total patients died and 68% survived.

Keywords: Burn, Bacteremia, Thrombocytopenia

Introduction

Patients who suffer severe burns are at higher risk for local and systemic infections. Bacteremia is an invasion of the bloodstream by bacteria. Bacteremia develops as a result of damage to the external (skin) or the internal (respiratory tract, digestive tract) barriers of the body [2]. Thrombocytopenia is almost universal in bacterial infections associated with bacteremia and is usually the result of increased platelet consumption. The reduced platelet count may be an isolated finding or may be associated with disseminated intravascular coagulopathy [3].

Thrombocytopenia usually occurs early and can be an early indication of bacteremia in burn patients [4–7]. According to M. Kurtoulu (a study of 54 severely burned patients, mean body surface area burned (BSAB) – 60%, mortality – 83%) sepsis was the cause of death in 66% of cases [4].

Study Materials and Methods

Present study was conducted on 25 burn patients admitted in surgical and plastic surgery units of Guru Gobind Singh Medical College and Hospital, Faridkot. The study was conducted to evaluate burn sepsis with reference to platelet count as a diagnostic and prognostic indicator of sepsis.

All the patients were chosen at random. The extent of burn injury was determined by 'rule of nines' (Wallace).

A quick brief history regarding mode of injury and general physical examination was done in every case. The patients were resuscitated with intravenous fluids and were given appropriate antibiotics and analgesics.

Fluid calculation during first 24 hours was done by using Parkland's formula ($4 \times \text{body weight} \times \text{percentage of burns}$). Maintenance fluids were given after 24 hours

according to daily losses of electrolytes, water, daily caloric needs and urine output.

Blood transfusion was given whenever it was needed. Patients were also fed orally or by nasogastric tube according to the condition of the patient. Any associated disease or illness was recorded. Routine investigations like

Hb

BT

CT

TLC

DLC

Urine-Complete Examination

FBS

Blood urea

Serum Creatinine

Serum Electrolytes were carried out

All the patients were monitored daily regarding general condition, temperature; pulse rate, respiratory rate, urine output and condition of the wound till the patients got completely stabilized.

Appropriate care was given to burn wound in the form of antiseptic dressings or antiseptic application with exposure. Patients were observed daily for any clinical evidence of sepsis. Pus for culture and sensitivity was sent when required. Blood culture was sent whenever there was any clinical evidence of septicemia.

The results so obtained were analysed and compared so as to find out the relationship of platelet counts to burn wound sepsis and their efficacy in predicting morbidity and mortality in burn cases.

Results

Table 1: Mean Platelet Count in Survivors and Non-Survivors

Day	Survivors	Non-survivors
1	2.59	2.01
3	2.38	0.71
7	2.28	0.22
14	2.49	0.17
21	2.61	-

Mean platelet count on first day was 2.59 lacs in survivors whereas in case of non-survivors mean platelet count on first day was 2.01 lacs. On day 3, mean platelet count in survivors was 2.38 and in non-survivors it was only 0.71. On 14th day, mean platelet count in survivors was 2.49 and in non-survivors it was 0.17. On day 21 mean platelet count in survivors was 2.61 and in non-survivors it was 0.

Table 2: Showing type of bacteria in blood culture

Type of organism	No. of cases	%age
Staph Aureus	6	24
E. Coli	4	16

This table shows type of bacteria in the blood culture. Six cases had growth of staph aureus in their blood culture while 16 cases E. Coli in their blood culture.

Table 3: Blood culture of burn patients in survivors and non-survivors

Blood culture	survivors		Non-survivors		Total
	No. of cases	%age	No. of cases	%age	
Positive	4	16	6	24	10
Negative	13	52	2	8	15

Above table shows blood culture and survival of burn patients. Amongst survivors, only 4 patients had positive blood culture while 52% had no growth in their blood culture. Whereas in case of non-survivors 24% of the cases had positive blood culture and only 8% patients had no growth in the blood culture.

Table 4: Mean platelet count and blood culture in burn cases

Platelet Count	Blood culture		Total
	Positive	Negative	
Low (<1.5)	6	1	7
Normal	4	14	18
Total	10	15	25

The mean platelet count and blood culture in burn cases. Six cases with low platelet count had positive blood culture while only 4 patients with normal platelet count had positive blood culture.

Table 5: Mortality

Outcome	No. of patients	% age
Deaths	8	32
Survived	17	68

Above table shows outcome of this study. Eight (32%) of the total patients died and 68% survived.

Discussion

In the present study, mean platelet count decreased up to day 7 in both survivors and non-survivors. However from day 7 onwards, platelet counts steadily rose in case of survivors while maintaining a downward trend in case of non-survivors. Jefferson (2007) reported that 42.9% of non-survivors had <100,000 platelets and 92% of them died. Vasantharaja (2016) found that the fall in platelet count is associated with bad prognosis in burn patients [35].

In the present study staph aureus (6) was the dominant organism followed by E. coli (4) in blood culture. R Bagdonas (2003) concluded staph aureus as most common infection in burn patients. T Alebachew (2011) mentioned staph aureus as most common isolate in their study; similarly Vasantharaja (2016) also reported growth of staph aureus in 18 cases of their study.

In present study, only 4 patients had positive blood culture while 52% had no growth in their blood culture. Whereas in case of non-survivors 24% of the cases had positive blood culture and only 8% patients had no growth in the blood

culture. • The relationship between bacteremia and mortality was studied in 5882 burn patients consecutively admitted to one burn center between 1959 and 1983. Among 5877 patients with adequate data, 1481 had one or more positive blood cultures; 1529 patients died. A predictor of mortality was developed, based on data from the 4396 patients without positive blood cultures, and used to assign a discrete probability of death in the absence of bacteremia to all the patients. Comparisons were then made between observed and predicted mortality in subsets of patients with bacteremia. In 1169 inpatients admitted to the burn unit during the study period, 212 (18%) had suspected sepsis, and 65 (6%) had confirmed bacteremia. Sepsis was considered the primary cause of death in 198 patients (65%; 95% CI 65–70) of the 304 patients that died.

Conclusions

To conclude, it may be said that the factors which contribute towards increased morbidity and mortality in burn cases are advanced age of the patient, extent and depth of burns and delay in starting treatment. However, the development of sepsis with its complications is the most important cause of morbidity and mortality.

Mortality was found to be significantly higher among those patients whose blood cultures were positive. Thrombocytopenia occurred in most of the cases with positive blood cultures indicating thereby that it is an important predictor of development of sepsis and outcome. Also thrombocytopenia preceded the development of early predictors of sepsis like temperature, loss of appetite, enteral feeding intolerance, tachycardia and leukocytosis. So it can be concluded that serial platelet counts can be independently used to identify those at risk to develop systemic infection, its complications and final outcome.

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