

**Original Article**

A Study of Prognostic Factors for Prediction of Complications and Outcomes in Burns Patients

Authors

Dr J.Selvaraj¹, Dr G.Venkatesh², Dr A.Deepa³, Dr N.Mohammed Niyamathullah⁴

¹Associate Professor of Surgery, Chengalpattu Medical College

²Associate Professor of Surgery, Thanjavur Medical College

^{3,4}Post Graduate, Thanjavur Medical College

Abstract

Introduction: Ever since man discovered fire he also accidentally burnt himself. India has an ancient culture where the fire is worshipped traditionally. It is probably the potential fury of an unharnessed fire that made man bow before it. Burns are among the oldest injuries than man still suffers from. The burn injury can be one of most serious and devastating forms of trauma that man can sustain. A burn injury not only destroys the cutaneous barrier but it also leads to profound changes in almost all other organ systems so much. So, burn injury has been considered to be the “Universal Trauma Model”¹. In this study 50 patients admitted in our institution under burns unit are accounted and a comparison is made among the survivors and dead patients. Results are been analyzed as a comparison between the two groups meeting our inclusion criteria and knowing whether there is statistical significance between the two groups. The success or failure of treatment of burn victim is difficult to measure. Survival or death is not necessarily an adequate yardstick. Death of the victim with a nearly total body surface injury and so deep as to preclude full functional recovery may not be considered as failure.

Materials and Method: This is prospective clinical trial done in thanjavur medical college and hospital and the study period extends from January 2015 to January 2017. Various clinical and haematological factors were assessed with the survival and the prognosis of the patient were predicted with the available reports.

Conclusion: Burn wound care is really a tough clinical problem which needs close monitoring and follow up. Here, in this study, an attempt is made to study about the factors that can be accounted to know the outcome and prognosis in burns patients. This study was useful in improving the patient care and providing the best and extravagant treatment for the patient whose factors were favourable for good prognosis.

Keywords: Degrees of burns, haematology, mortality, survival, prognosis.

INTRODUCTION

A burn is a tissue injury from thermal (heat or Cold) application or from the absorption of physical energy or chemical contact. Millions of people around the world are hospitalized for the treatment of burns each year and thousands die². The daily cost of care for a burn victim is

tremendous. The economic loss to any nation is staggering and must be measured not only in currency but in the permanent loss of millions of productive years³. Painful and lengthy hospitalization, multiple stages of surgery, permanent disfigurement and disability, prolonged rehabilitation, loss of income and job and

enormous financial burden are some of the horrors looming large over the burn victims⁴.

Similarly, survival without consideration of the functional and social rehabilitation of the victim should not be the only measure of success. The burn team must treat the patient as a whole person and measure success or failure not on how they understand and treat the burn but on how they understand, treat and rehabilitate the burned patient.^(4,5)

The aim of the study is to arrive at a conclusion to know about the hematological factors that influence the prognosis and outcome of burns patients. The following are the factors that are taken into account in this study, Serum cholesterol levels, Haemoglobin level, Serum albumin level, Total leukocyte count.

METHODS AND MATERIALS

This is prospective clinical trial and the study period extends from January 2015 to January 2017. Of all the burns patients admitted to Thanjavur Medical College Hospital during the above said period 50 patients were selected based on the following selection criteria and these patients are subjected to this clinical trial. First and second degree burns, Total burns surface area of 40% - 90%, Admissions within 24 hours of incidence⁹. At admission, all the patients were subjected to following investigations-Serum cholesterol, Hemoglobin, Serum albumin, Total leukocyte count, and other routine investigations were done¹¹.

Final results are analyzed as whether there is any significant statistical difference between the survivors and dead ones.

STATISTICAL DATA

This was done using Mann Whitney statistical test. Parameters which had a significant difference are thus concluded as prognostic factors which influences the outcome in burns patients and P < 0.05 were considered to be significant. The unpaired t- test was used for this analysis¹². It is a non- parametric test that is used to compare two populations with unequal sample size.

OBSERVATION

Thanjavur medical college is one of the tertiary care institutes of health care delivery systems of our state. It provides health care to the patients coming from thanjavur, pudukottai, thiruvavarur, nagappatinam and perambalur districts. It is provided with a burn care unit to which approximately 400 patients are being admitted every year. The following is the statistical analysis of the data of patients treated here from January 2015 to January 2017.

The following epidemiological variables are analyzed and presented here: Total admissions every year, Age distribution, Sex distribution, Extent of burns, Mortality rates.

TOTAL ADMISSIONS

YEAR	FLAME	ELECTRICAL	TOTAL
2013	376	27	403
2014	400	38	438
2015	392	35	427
2016	372	21	392
Upto JAN'17			

AGE DISTRIBUTION

YEAR	<13 YEARS	14-20 YEARS	21-40 YEARS	41-60 YEARS	>60 YEARS
2013	18	76	231	55	23
2014	23	78	268	51	18
2015	18	70	267	42	30
2016	12	63	260	40	17
UPTO JAN'17					

SEX DISTRIBUTION

YEAR	MALE	FEMALE	TOTAL
2013	117	286	403
2014	112	326	438
2015	106	321	427
2016	88	304	392
UPTO JAN'17			

EXTENT OF BURNS

YEAR	<30%	30-50%	50-70%	>70%
2013	127	153	58	53
2014	134	169	40	95
2015	118	173	44	92
2016	113	158	19	126
UPTO JAN'17				

MORTALITY

YEAR	TOTAL ADMITTED	TOTAL DEAD	% OF DEAD
2013	396	140	34.6
2014	403	153	35.9
2015	438	152	35.5
2016	397	138	34.5
UPTO JAN'17			

Parameters analysed are: Serum cholesterol, Hemoglobin, Serumalbumin, Total leucocyte count¹³.

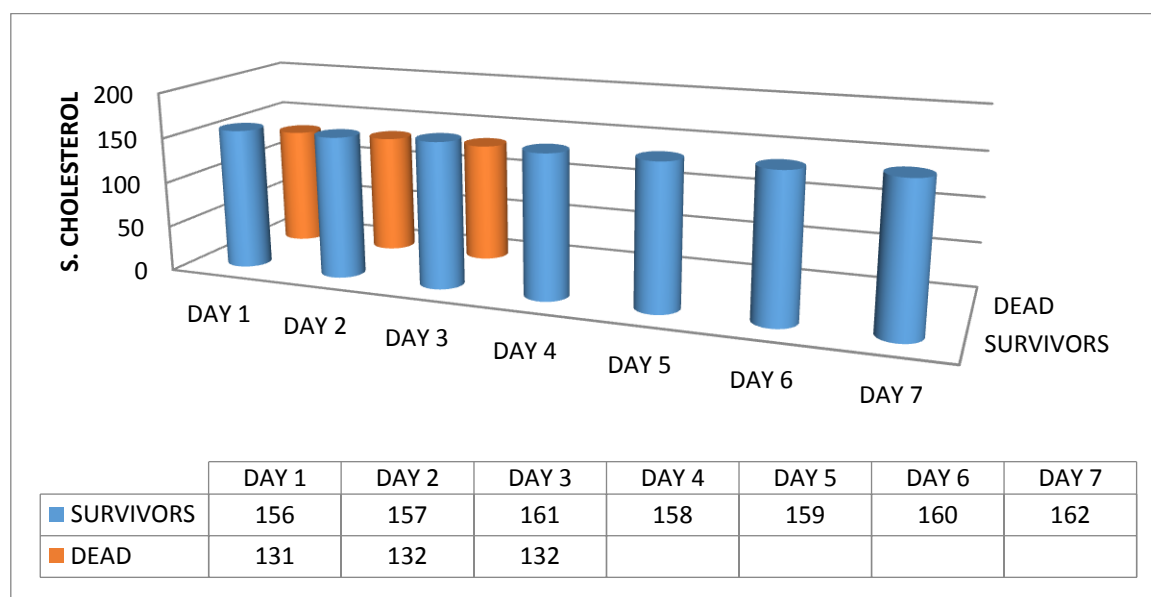
All the patients are admitted and treated as per above discussed protocols and daily blood Investigations are taken for the first seven days⁷. The above parameters are selected on the Basis that they are simple standard investigations and obtaining samples are simple. Sample Size this study is 50 patients. Usually patients in a burn unit are monitored by simple basic Investigations. In this study we have analysed whether those basic above mentioned blood Investigations are statistically significant or not.

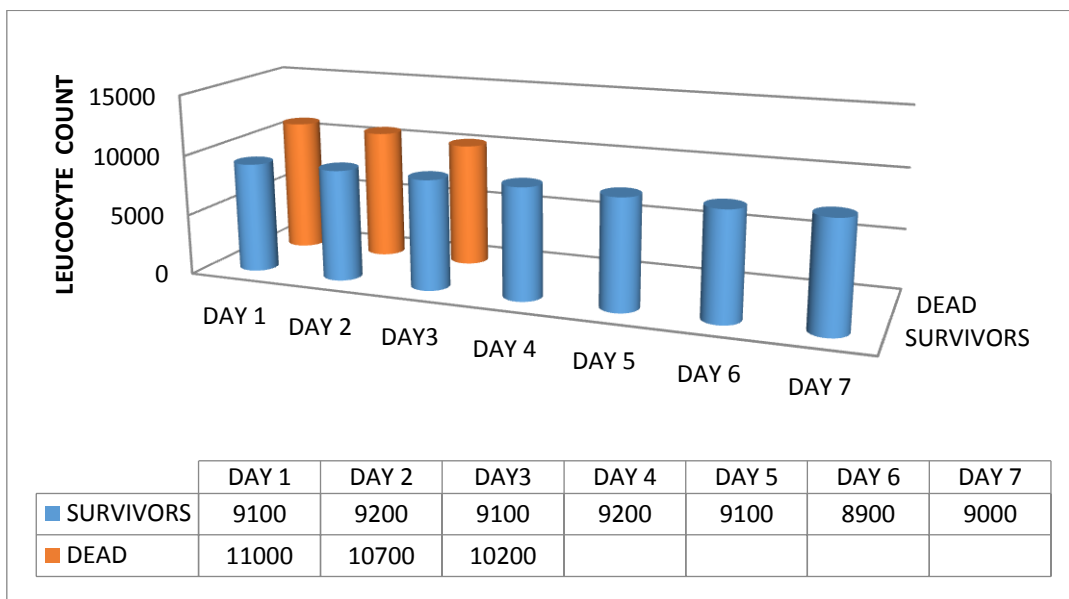
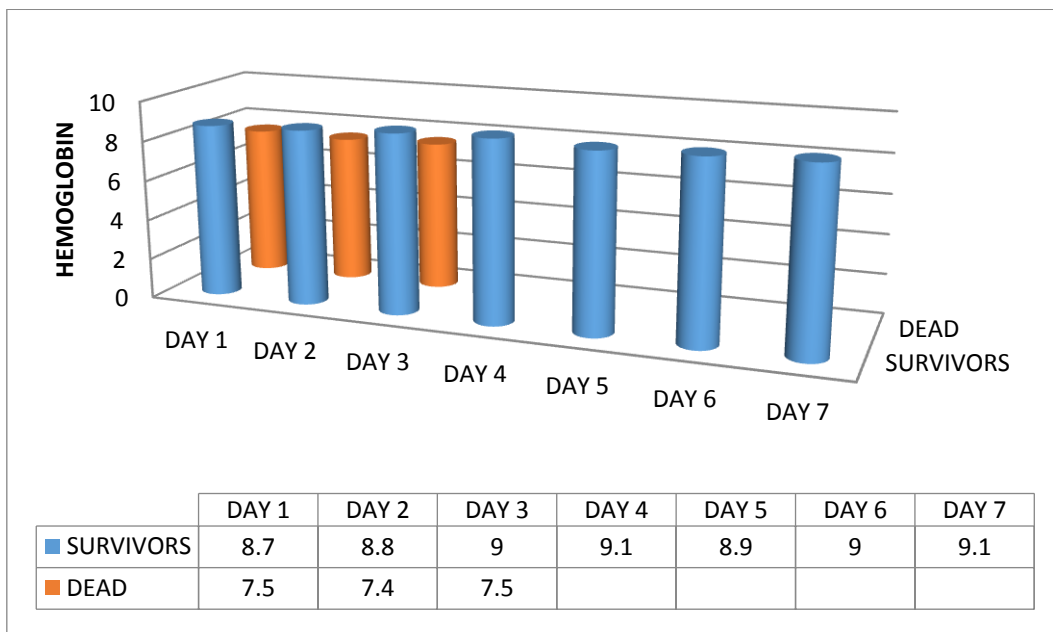
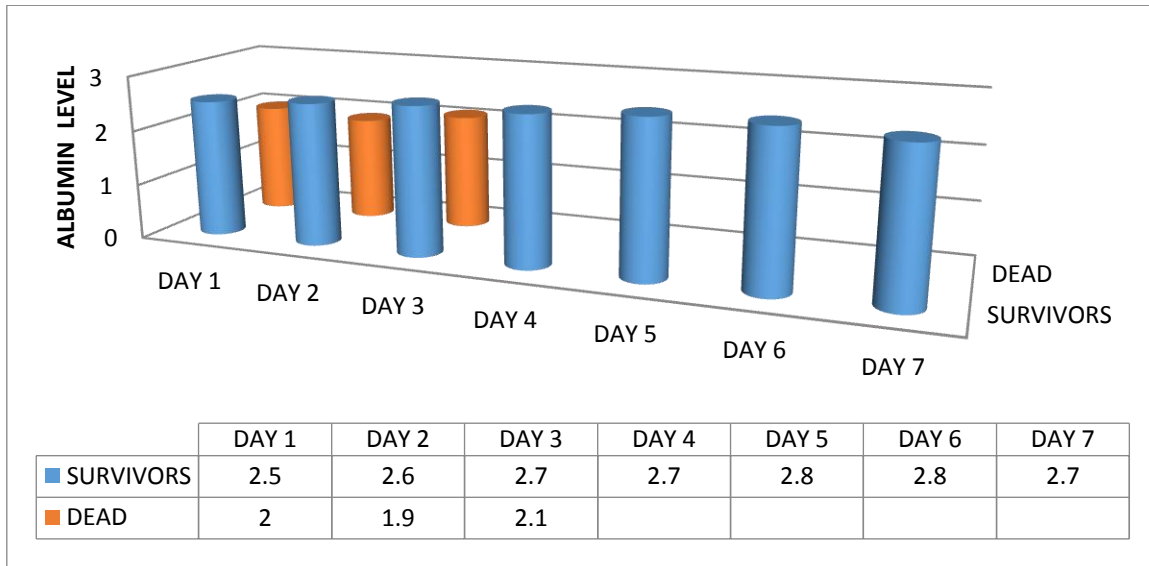
Data were analysed with statistical package for the social sciences for Quantitative data analysis. Data are expressed as mean +/- standard deviation to test changes in dependence on time after burns incident, comparisons were performed using Mann-Whitney U- test and $P < 0.05$ were considered to be significant. The unpaired t-test was used for this analysis . It is a non- parametric test that is used to compare two populations with Unequal sample size. The values calculated were from the third post burns day as mortality was high in that day from the data collected. There are two groups 1) Patients who Improved and got discharged 2) Patients who were dead on the course in our hospital.

RESULTS

Accurate assessment of the burn injury is not only crucial to the management but is also an important factor to indicate prognosis. The process of assessment and recording is essential throughout the treatment to know the progress of the patient. This study is a small sample clinical trial with a sample size of n= 50. All the conclusions drawn are from within the sample size .The mortality rates are higher among the women than the men. Mortality rates are higher on post burns day 3. Poor outcome was seen in patients with low serum cholesterol levels, low serum albumin levels, low haemoglobin levels. There was an increase in total leucocyte count in observed patients. But the mean difference was not statistically significant. There was a significant difference in the values of serum cholesterol, serum albumin, haemoglobin levels. Thus validating them as a prognostic factor determining outcome in burn patients. Just a mere count of leucocytes is not satisfactory. Evaluation must include more detailed study of leucocytes such as presence of toxic granules and their numbers.

PARAMETERS	P VALUE ON THIRD POST BURN DAY ($P \leq 0.05$ IS SIGNIFICANT)
SERUM CHOLESTEROL	0.0092
SERUM ALBUMIN	0.001
HEMOGLOBIN	0.0029
TOTAL LEUCOCYTE COUNT	0.872





DISCUSSION

While discussing about the epidemiological variables analysed and haematological Parameters ,Majority of patients admitted to the burn care unit belonged to rural folks of Thanjavur and thiruvavur.95% of the patients treated belonged to lower economic strata.Nearly90% are due to flame burns , while the remaining were due to electric burns of Variousreasons. In 95% of the patients, the mode of sustaining burn was accidental.

Remaining were attributed to suicidal attempts.60-65 % of the females were predominantly in the reproductive age group. The average mortality was found to be between 34 -38 % every year. The mortality rate was higher in women than men. This is a prospective clinical trial which analyses the blood parameters of 50 patients admitted to our burn unit with:

- First and second degree burns
- Total burns surface area of 40% - 90%
- Admissions within 24 hours of incidence

Usually patients with third degree burns have a worst Outcome. Also patients getting admitted after 24 hours of incidence are more prone for Dehydration and infections. Mortality is almost a rule in total burns surface area of >90%. So to remove all these factors such an inclusion criteria is set. From the following chart it is evident that the p value on the third post burns day for serum cholesterol is $P=0.0092$. The result is significant at $p\leq 0.05$. Which shows that serum cholesterol is a significant prognostic factor influencing the outcome in a burns patient. The P value for serum albumin was 0.001 which is $p\leq 0.05$. so serum albumin has statistical significance.

The analyzed P value for haemoglobin was 0.0029 ($p\leq 0.05$) so statistical difference between recovered and dead patients is significant. But in case of total leucocyte count, the P value obtained was 0.872 ($p >0.05$) which is statistically not a significant value. Even though total leucocyte count is increased in the incidence of burns , more than just cell count, the further analysis such as a

presence of toxic granules should be studied which is more significant than the cell count¹⁴.

REFERENCES

1. Indian Journal of Burns – Volume 1, Number I April 1993 Edited by Rajeev B. Ahuja
2. Hand Book of Burns Management -1991 II Edition Edited by Marella L. Hanumandass and MathangiRamakrishnan
3. Essential Surgical Practice – Third Edition Edited by A. Cushieri, G.R. Giles, A.R. Moosa
4. Text Book of Surgery – Fourteenth Edition Edited by David C.Sabiston Jr.
5. Bailey and Love's –Short Practice of Surgery -26nd Edition
6. Journal of American College of Surgery – Volume 186, Number 2 Feb 1998
7. Pye's Surgical Handicraft -22nd Edition Edited by J. Kyle, JAR Smith, D Johnson
8. Hamilton Bailey's Physical Signs -18th Edition Edited by Prof. John S.P. Lumley
9. Principles and Practice of Surgery – First Edition 1995 Edited by Dr. Sunil Kumar
10. Burns and their treatment –III Edition Edited by I.F.K. Muir, T.C. Bare lay, J.A.D. Settle
11. Advances in Burn Care – Clinics in Plastic Surgery Jan 1986
12. Hamilton Bailey's Emergency Surgery - 12th Edition Edited by B..W ELLIS; S. Paterson – Brown
13. Surgical Clinics of North America – Clinics in Plastic Surgery –Jan 1986
14. Essentials of Surgery – Edited by Sanjaj Azad.