



## Burns Management In Tertiary Health Care Centre

Ajitsingh .P. Chadha, Nehadeepkaur .A. Chadha, Kshirsagar A Y\*

Department of Plastic Surgery, Krishna Institute Of Medical Sciences and Research Centre, Karad Dist-Satara 415110, Maharashtra, India



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### ABSTRACT

In rural places of our country, burns have become frequent accidents due to the use of floor-based stoves & kerosene lamps. Suicides due to burns are also quite usual in our country. *The objective of this study is to evaluate the necessity of early excision of the burn wound and skin grafting to decrease the morbidity, mortality, complications of burns and stay at the hospital. Calculate pressure garment efficacy in preventing burn scar and contracture formation. To lay out cost-effective management for patients at rural hospitals.* 50 patients were included in this study presenting with burn injuries, admitted in the department of plastic surgery from June 2019 to December 2020. In a recent study, Females (52%) suffered more as compared to males. Scalds were the prime root cause of the burns constituting the 52% of the cases. Infections of Burn wound was seen in 20 patients (40%). Pseudomonas was prime organism isolated. Wound excision was required in 19 patients (38%). Around 6 to 12 days, elapsed between the injury to the surgical excision. 19 patients required (38%) covering of wound permanently with STSG. The mean admission period in hospital for burns of 41-60% was 62 days, 33.4 days for 21-40% burns and 19.6 days for <20%. Amongst 50 patients, 3 died accounting to 6% of overall cases. This study concluded that initiation of resuscitation with untimely wound excision and permanent coverage with grafting can bring significant fall in mortality, painful debridements, limiting complications, decreasing the duration of stay at a hospital, curtailing the cost of health care and time apart from work.

### \*Corresponding Author

Name: Kshirsagar A Y  
Phone: 9422400435  
Email: medicaldirector.kh@gmail.com

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### INTRODUCTION

Considering the injuries caused from fire, we can conclude that fire is a blessing and also a curse to mankind.

Burns injuries are frequent accidents in both developed and developing Countries as their predisposing causes are universal (WHO, 2002). They are simplest in extreme of ages. Children are injured because they have not learnt about these environmental dangers. Elderly become victims when they forget the dangers or don't have the strength or capability to avoid it. In India maximum thermal accidents take place at home, particularly at the time of cooking, due to substandard cooking stoves, substandard housing, kerosene lamps & stoves.

The clinical compass of burn care constitutes fluid as well as surgical intervention, electrolytes management, cardiopulmonary support, nutritional support and wound management. These cant be looked upon & treated as different units without interpretation of complete disease process. Therefore it needs

an integrated approach. The likelihood of disfigurement, death and emotional trauma due to burns is a devastating experience to the victim & his/her family. Proper initial management can salvage many such unfortunate victims. (COL.BB.Dogra, 2001)

Unfortunately, without necessary facilities in first-aid, surgical management and facilities in rehabilitation, patients who survive injuries, usually have disabling long term outcomes. A Ghanaian study found that 18% of childhood burns patients had suffered a physical impairment or disability. (McLoughlin, 1990) Burn injuries and their related morbidity, disability and the mortality denote a public health problem and increasing prevalence in the developing countries. (Forjuoh *et al.*, 1996).

Burn injury survival ratio has improved over the past few decades. In 1950's and early 1960's surviving from 30% TBSA burn injury irrespective of age was nearly unprecedented. Burn injuries represent an extremely stressful experience and constitute a major concern in the paediatric age group. (Cheng *et al.*, 1990) The multiplicity of the methods and the difference in the opinion in the management of burns show that we have not yet mastered the question of management. (Forjuoh *et al.*, 1996)

### Aims and Objectives

1. The objective of this study is to evaluate the necessity of early excision of the burn wound and skin grafting to decrease the morbidity, mortality, complications of burns and stay at the hospital.
2. Evaluate pressure garment usefulness in preventing post burns scar hypertrophy and the formation of contracture.
3. To lay out cost-effective management to patients in the hospital.

### MATERIALS AND METHODS

Patients admitted with burn injury of varying percentage to Krishna Hospital, Karad between June 2019 to December 2020. Patients who happen to be successfully resuscitated and remained in hospital till the treatment was complete & able to follow up for a reasonable period were selected in the study group. Random selection of 50 patients was done from 150 total burns admissions in Krishna Hospital & Medical Research Centre, Karad between June 2019 to December 2020.

#### Inclusion criteria

Burn injury upto 80% of TBSA

#### Exclusion criteria

Burn injury > 80% of TBSA

Burn injury correlated with comorbidities like diabetes & immunosuppression.

#### History and examination

History was taken giving special attention to the following:

1. Age, gender & socio-economic status.
2. Cause, type & site of injury.
3. The time gap between burn injury & hospitalisation.
4. The general state of the patient during the time of admission.
5. Vitals & systemic examination.
6. Burn Percentage & degree.

Routine investigations were performed in every patient along with culture and sensitivity of pus for infected burn wounds.

#### Management plan

Post admission, firstly securing a peripheral venous line with a wide bore venous cannula was done.

Percentage of burns injury was calculated with the help of 'Rule of 9' and compared along with Lund & Browder chart and accordingly, fluids were administered using the Parklands formula.

To all of the patients, anti-tetanus prophylaxis along with prophylactic antibiotic was given & wound swab for culture sensitivity was sent. In initial 24 hours plasma expanders as well blood transfusion weren't given. After 24 hours, plasma expanders, 20% albumin & blood transfusion were given only after analysing the general state of the patient and blood values.

Oxygen support with a mask was given to every patient suspected to have an inhalational injury. The bladder was catheterized in every patient having burns >30%TBSA. Ryles tube was inserted, and patients were advised to remain NBM whenever paralytic ileus was suspected.

After improvement of general condition & initial resuscitation, the wound was cleaned using the normal saline. Silver sulfadiazine with chlorhexidine gluconate cream were applied as the topical antibiotics. Patients with burns injury of <60% TBSA were given treatment by closed wound dressing & burns injury >60% TBSA were given treatment by open

wound dressing. For the dressings, foremost layer consists of antibiotics, followed by Vaseline gauze & cotton pads on the top. Dressings had been changed regularly on alternate days.

Every patient was monitored for early complications like septicaemia, hypovolemic shock, acute renal failure, pulmonary complications, septicaemia & psychiatric complications.

Second-degree burns were managed conservatively using closed dressings. In affording patients, collagen dressing was used.

Burns injury of third-degree were excised at the earliest opportunity and permanent wound covering was performed by taking an autologous STSG in one or multiple settings depending upon donor site availability. 5 days later, graft wounds were inspected & pressure dressings along with physiotherapy were initiated. Donor site dressing was not disturbed until dressing falls by itself.

For delayed complications like hypertrophic scar & keloids treatment included the pressure garments as well as intralesional steroid injections. In cases who developed residual contractures, 'Z' plasty was performed.

Patients with electrical burns ECG along with strict monitoring of the cardiac status was done.

Patients were mobilised as early as possible, rehabilitated & discharged post complete recovery. For patients with burn injuries of second and third degrees who underwent skin grafting were advised to utilise pressure garments until 6 months minimum. At the time of death of a patient, an effort was made to manifest cause of the death.

## RESULTS

The study constituted of 50 subjects selected randomly amongst 150 burns patients admitted in the Krishna Hospital & Medical Research Centre, Karad.

Table 1 showed Patients between 21-30 years were a significant part of this study, comprising 26% of the total group.

Table 2 reveals that the 52% population in this study was of females and 48% population was of males

Table 3 reveals accidental burns was seen in 84% of patients

Table 4 depicts scald injury in 52% patients & amongst them, 3.8% of patients died. Burns injury due to fire was seen in 40% patients, of which 10% of patients had died.

Table 5 reveals the Time span between burn injury and admission to our hospital. 52% of patients

arrived hospital within 6 hours of the injury. Only 8% of patients reported beyond 24 hours.

Table 6 depicts most of the patients had burn injuries <40% TBSA(86%) along with no mortalities. In patients with >80%, burns mortality was 100%. Patients with 41-60% TBSA burns showed 25% mortality.

Table 7 reveals occlusive dressings were done in patients with burns < 50% TBSA and remaining patients who had burns injury >50% TBSA, wound dressing was done by the open method.

Table 8 depicts organisms were sensitive to Polymixin B, Chloromycetin, Clindamycin, and cefatoxime after Amikacin as well as Netilmycin in the majority.

Table 9 reveals that the majority,i.e., 9 patients, underwent escharotomy.

Table 10 depicts 20 patients required permanent wound closure, of which 19 required STSG & 1 required fasciocutaneous flap.

Table 11 depicts Wound infection was an early complication in 40% of patients. The hypovolemic shock was seen amongst 4% of the cases.

Table 12 depicts 14 patients (24%) had delayed complications. Amongst these 7 cases (14%) had developed contractures while 3 patients (6%) developed hypertrophic scar.

## DISCUSSION

Random selection of 50 patients was done from 150 total burns admissions in Krishna Hospital & Medical Research Centre, Karad between June 2019 to December 2020

Table 13 compares the distribution of age in the present study which is 21-30 years, with (Shires burn centre, 1977) which is 0-6 years and (Naveen *et al.*, 2013) which is 21-30 years.

Table 14 depicts that present study has 52% of scald injury whereas (Shires burn centre, 1977) study shows 37% of scald injury.

Table 15 shows the percentage of burns below which there is no mortality. In the present study it is below 40% burns and in (Shires burn centre, 1977) it is below 20% burns.

Table 16 depicts 80% of pseudomonas isolated on culture in the present study and 46% of pseudomonas isolated in (Naveen *et al.*, 2013) study

Table 17 shows 19 patients required wound excision in present study whereas 30 patients required wound excision in (Papini *et al.*, 1995) study.

**Table 1: Age distribution**

Age in Years	No.	Percentage
0-10	9	18
11-20	8	16
21-30	13	26
31-40	9	18
>40	11	22

**Table 2: Sex distribution**

Sex	No. of Patients	Percentage
Male	24	48
Female	26	52

**Table 3: Burns etiology**

Cause	No. of patients	Percentage
Accidental	42	84
Homicidal	1	2
Suicidal	7	14

**Table 4: Burn types**

Type	No of patients	Percentage	Mortality	
			Number	Percentage
Fire	20	40	2	10.0
Electric	2	4	0	0.0
Scald	26	52	1	3.80
Chemical	5	10	0	0

**Table 5: Time span between injury and admission to hospital**

Time	No. of patients	Percentage
< 6 hours	26	52
6-24 hours	20	40
>24 hours	4	8

**Table 6: Percentage of burns & correlation with mortality**

Percentage of burns	No. of patients	Percentage	Mortality	
			Number	Percentage
0-20	26	52	0	0
21-40	17	34	0	0.0
41-60	6	12	2	67.6
61-80	1	2	1	33.3
81-100	0	0	0	0

**Table 7: Method of dressing**

Time	No. of patients	Percentage
Open	8	16
Occlusive	42	84

**Table 8: Organism isolated in wound culture and sensitivity**

Organisms	No. of Patients	Percentage
Pseudomonas	17	80.10
Coagulase +ve staphylococcus	3	14.20
Klebsiella	1	4.70
Acinobator	0	0

**Table 9: Method of wound excision**

Type of Excision	No.of Patients
Escharotomy	9
Tangential Excision	7
Fasical excision	1
Fasciotomy	1
Amputation	1

**Table 10: Method of permanent closure done**

Type	Number of Surgeries			Total
	1	2	3	
STSG	17	2	1	19
Fasciocutaneous flap	1	0	0	1

**Table 11: Early complications**

Complications	No.of Patients	Percentage
Wound Infection	20	40
Hypovolemic shock	2	4
Depression	2	4
Septicemia	2	4
Multiorgan Failure	1	2
Respiratory distress	1	2
Suppurative Thromboplebitis	0	0
Injection Abscess	0	0
Bed sore	1	2
Electrolyte Imbalance	1	2
Acute renal failure	0	0

**Table 12: Delayed complications**

Complications	No.of Patients	Percentage
Contractures	7	14
Hypertrophic scar	3	6
Hypopigmented patch	0	0
Osteomyelitis	1	2
Handicapped	1	0

**Table 13: Age distribution**

STUDY	Majority of age group (Years)
Present Study	21-30 YEARS
(Shires burn centre, 1977)	0-6 years
(Naveen <i>et al.</i> , 2013)	21-30 years

**Table 14: Burns etiology**

Study	Scald Injury	Burns due to fire
Present study	52%	40%
(Shires burn centre, 1977)	37%	33%
National Burn Information Exchange1(1978-1995)	-	26-60%

**Table 15: Percentage of burns & correlation with mortality**

Study	% of burns with no mortality
Present study	<40 % TBSA
(Shires burn centre, 1977)	<20% TBSA

**Table 16: Organism isolated in wound culture and sensitivity**

Study	Organism isolated on culture	
	pseudomonas	coagulase positive staph
Present Study	80%	14.2%
(Naveen <i>et al.</i> , 2013)	46%	20%

**Table 17: Wound excision**

Study	No. Of patients required wound excision
Present Study	19
(Papini <i>et al.</i> , 1995)	30

**Table 18: Method of wound closure**

Study	Wound closure by STSG
Present study	38%
(Naveen <i>et al.</i> , 2013)	51.4%

**Table 19: Duration of hospital stay**

Study	% of Burns	Mean Hospital study
Present Study	41-60% TBSA	62 days
National Burn Information Exchange1(1978-1995)	41-60% TBSA	50-60 days

**Table 20: Cause of mortality**

Study	Cause of Mortality	
	Resuscitation failure	Septicemia
Present Study	2%	2%
(Shires burn centre, 1977)	60%	40%

Table 18 depicts that in the present study, 38% of patients wound closure was done by STSG, and in (Naveen *et al.*, 2013) study 51.4% of patients wound closure was done by STSG.

Table 19 shows mean hospital stay in 41- 60 % TBSA burns – in the present study it is 62 days, and in National Burn Information Exchange<sup>1</sup>(1978-1995) it is 50-60 days

Table 20 depicts cause of mortality which could be either resuscitation failure or septicaemia. In the present study, it is 2% due to resuscitation failure and 2% due to septicemia. In (Shires burn centre, 1977) study it is 60% due to resuscitation failure and 40% due to septicaemia.

### Use of pressure garments

47 cases were advised to utilise pressure garments for a minimum duration of 6 months. Most patients were well co-operative. Only 14% of cases (7 patients) developed the residual contractures. All 7 cases went through reconstructive surgeries.

Only 3 cases in the present study developed hypertrophic scars.

(Naveen *et al.*, 2013) series 65% of the study group developed the late complications by like hypertrophic scars, keloids, and post-burn contractures. He didn't use the pressure garments.

## CONCLUSIONS

The study concluded that initiation of resuscitation with untimely wound excision and permanent coverage with grafting can bring significant fall in mortality, painful debridement, limiting complications, decreasing the duration of stay at a hospital, curtailing the cost of health care and time apart from work.

### Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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