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Burn Management at Rural Set Up

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Abstract: *Thermal burn is a common accidental or suicidal injury causing mortality and morbidity in spite of best possible treatment. Hypertrophic scar, keloid, contracture and vitiligo remain the commonest sequel of the conventional treatment. Present study of management of various degree burn of varied age group (Neonates to geriatric) with TBSA < 20% ->50% and altered Hematological , Renal status achieve excellent grade of therapeutic response with reversal of altered Hematological - Renal status in maximum duration of 60 days on application of modified treatment schedule in 1175 patients of thermal burn.*

The modified treatment includes-

- *Reinstation of vital status and optimal Renal blood flow and urine output.*
- *Allowing 24 hrs time to develop blister completely to asses the TBSA.*
- *Covering bandage is soaked with 1% Levofloxacin white petroleum jelly (1gm Levofloxacin with 100 gm white petroleum jelly)*
- *Wound dressed with ointment comprising Oint. Silver sulphadiazine (50 gm) + Oint. Soframycin (50gm) +Inj. Placentrex (2nl) ,made in to paste .*
- *Amikacin ,an aminoglycoside in dose of 7.5 mg/Kg every 12 hours as chemo prophylaxis.*

Keywords: *Mortality, morbidity, suicidal, thermal burn, total burnt surface area, chemoprophylaxis*

1. INTRODUCTION

Burn, a common devastating injury which results in death or life long healing disfigurement and is 3rd leading cause of accidental death and every year millions seek treatment for various grades of burn world wide. Burn injury is well documented in medical literature. WHO documents 10lakhs sufferer in India every year, 6-7 million per year[1]

Outcome of the burn commonly depends on the involvement of surface area,vital parts involved and degree of burn but promptness and modalities of burn management also modify the outcome and quality of life in burn patients[2,3]

The conventional burn management includes [4,5,6 7,8,9].

Clothings, cooling, cleaning, Chemoprophylaxis, covering and comfort and aimed to-

- Preserve vital status
- Anti tetanus coverage
- Rehydration to maintain normal renal blood flow anf glomerular filtration and urine out put
- Remove the clothings

- Application of Sucralfate with Oxcetacain to ensure cytoprotective action and cooling
- Cleaning of wound and debridement of debris to adjudge the degree of burn, severity of burn by assessing total body surface area
- Covering to check wound infection and promote natural wound healing.
- Chemoprophylaxis to check super infection
- To ensure comfort analgesic anti inflammatory drug for relief of inflammation and pain .

Besides these conventional measures a modified therapeutic module ,considering the rural prospect and economical status , an Ernest urge to provide a full proof natural healing in shortest possible duration without any sequel i.e. hypertrophied scar, keloid and vitiligo, a planned study was done at Critical care centre of RA. Hospital & Research Centre, Warisaliganj (Nawada), Bihar and the therapeutic efficacy was adjudged as per the parameters.

2. MATERIAL & METHODS

Patients of burn attending Critical care centre of RA. Hospital & Research Centre were selected for evaluating the treatment module for its clinical efficacy with quality of life and safety profile.

Selected patients were first applied cooling paste to relieve pain and calm the patient and necessary measures to revitalize the vital function and maintain rehydration status and urine output.

Burnt area been assessed after cleansing the burnt area to asses the severity of burn as per following [9]-

Degree of Burn	**characteristics**
Superficial	Dry ,red, blanches with pressure, painful
Superficial partial	blister, moist, red and weeping, blanches with pressure
Deep partial	Blister (easily unroofed),wet or waxy,dry variable
colour(Patchy	To cheesy white to red),does not blanch with pressure.
Full thickness	Waxy, white to leathery, gray to charried and black, dry, inelastic does not blanch with pressure

Burnt surface area was estimated as per the following table:

BODY PART	**0-1 yr**	**1-4 yr**	**5-9 yr**	**10-14 yr**	**15-18 yr**	**ADULT**
Head	**19**	**17**	13	11	9	7
Neck	**2**	**2**	**2**	**2**	**2**	**2**
Anterior trunk	13	13	13	13	13	13
Posterior trunk	13	13	13	13	13	13
Right buttock	2.5	2.5	2.5	2.5	2.5	2.5
Left buttock	2.5	2.5	2.5	2.5	2.5	2.5
Genitalia	1	1	1	1	1	1
Right upper arm	4	4	4	4	4	4
Left upper arm	4	4	4	4	4	4
Right lower arm	3	3	3	3	3	3
Left lower arm	3	3	3	3	3	3
Right hand	2.5	2.5	2.5	2.5	2.5	2.5
Left hand	2.5	2.5	2.5	2.5	2.5	2.5
Right thigh	5.5	6.5	8	8.5	9	9.5
Left thigh	5.5	6.5	8	8.5	9	9.5
Right leg	5	5	5.5	6	6.5	7
Left leg	5	5	5.5	6	6.5	7
Right foot	3.5	3.5	3.5	3.5	3.5	3.5
Left foot	3.5	3.5	3.5	3.5	3.5	3.5

Severity of burn on the basis of surface area involved been assessed as per American Association of Burn Care parameters-

Severity	Characteristics
Minor	< 10 percent TBSA burn in adult, < 5 percent TBSA burn in young or old < 2 percent full-thickness burn
Moderate	10 to 20 percent TBSA burn in adult 5 to 10 percent TBSA burn in young or old 2 to 5 percent full-thickness burn High-voltage injury Suspected inhalation injury Circumferential burn Concomitant medical problem predisposing the patient to infection (e.g., diabetes, sickle cell disease)
Major	> 20 percent TBSA burn in adult > 10 percent TBSA burn in young or old > 5 percent full-thickness burn High-voltage burn Known inhalation injury Any significant burn to face, eyes, ears, genitalia or joints Significant associated injuries (e.g., fracture, other major trauma)

For rehydration and maintaining the urine output for 0.5 ml/kg/hr in adults and 1 ml/kg/hr in children., patients were administered intravenous fluid supplementation as per **Modified Parkland formula.** amount of fluid required for the first 24 hours post burn.[11]

Fluid Replacement	
Total Fluid Estimation for first 24 hours post burn = 3 – 4 ml x TBSA % Burn x Weight (kg)	
Administration schedule:	
50% Fluid Volume to be given in	first 8 hours
Rest 50%	Total Fluid Volume to be given over next 16 hours

After cleansing the wound with boiled water and Savlon ,the ointment paste applied thoroughly and covered with Levofloxacin –white petroleum soaked bandage followed with dry bandage wrapping .

Schedule of bandaging:

Alternate day in the beginning and continue till healthy granulation tissue (marked by bleeding on removal of bandage) followed with twice a week schedule.

Preperation of ointment paste:
Cooling paste : Sucralfate and Oxcetacain solution with Injection Amikacin
(500mg for 100 ml Solution)
Covering paste: Ointment Silver Sulphadiazine + Ointment Soframycin +Placentrex Injection
Dressing gauze: Bandage soaked in white petroleum jelly and Levofloxacin tab powder (100gm White petroleum jelly with 1 gm Levofloxacin)

3. CHEMOPROPHYLAXIS

Considering the commonest pathogen responsible for super infection or commonest dreaded out come tetanus each patients were administered prophylactic anti tetanus toxoid or in suspected cases Tetanus immunoglobulin the safe convenient dose schedule Aminoglycoside AMIKACIN been administered in dose of 7.5mg /Kg every 12 hrs either intravenous or intramuscular with cautious watch on renal function.

3.1. Bacterial Susceptibility of Amikacin

Amikacin is usually used as a last-resort medication against multidrug-resistant bacteria. The following represents susceptibility data on a few medically significant microorganisms.

Pseudomonas aeruginosa -	0.5 μg/mL - 32 μg/mL
Pseudomonas aeruginosa (aminoglycoside-resistant) -	32 μg/mL - 64 μg/mL
Serratia marcescens -	≤0.25 μg/mL - 8 μg/mL
Serratia marcescens (multidrug-resistant) -	32 μg/mL

To make the patients comfortable patients were advocated analgesic anti inflammatory drug Outcome of the therapeutic response was graded as-

Grade of Response	Characteristics
Grade I	Healing without scar and any sequel within 15 days of therapy
Grade II	Healing without scar and sequel with multiple antimicrobial requirement
Grade III	Healing with hypertrophied scar ,keloid and contracture
Grade IV	Poor healing

4. OBSERVATIONS

Among the selected 1175 patients 11 were of age < 1 yr while 106 were of age >40 yrs,male predominates in patients of age <15 yrs while >15 yrs age female predominance was marked.. Majority (34.4%) patients were of age group 30-35 yrs and 38.2% patients were of age >15 yrs.(T-1),(T-2)

Table1. *Distribution of patients as per age and sex*

Age group	**Number of patients**		
	Male	Female	Total
< 1 yr	07	04	11
1-5 yr	29	17	46
5-10 yrs	21	12	33
10-15yrs	18	10	28
15-20yrs	29	48	77
20-25yrs	74	102	176
25-30yrs	78	109	187
30-35yrs	116	288	404
35-40yrs	43	64	107
>40yrs	19	87	10

Among the female majority were of suicidal nature where as in children below 15 yrs almost all cases were accidental, In India incidence in both male ^ female >4 yrs are accidental while among the female of age group 25-30 yrs are about 60% were homicidal . Among male in age group of 20-30 yrs majority were suicidal in nature.

Majority children <15 yrs were of 1st degree burn, and cases of age 20-25 yrs were of 2nd and 3rd degree burn.

Pie diagram showing male female composition of the selected patients:

Among the selected patients 135 has burnt surface area while 99 patients were having burnt surface area >50%, majority (36%) were with burnt area 40-50% (Table-3)

Table3. *Distribution of patients as per age and burnt surface area*

Age Group	Burnt Surface area					
	<20%	20-30%	30-40%	40-50%	>505	Total -
Up to 1 yr		11	-	-	-	11
1-5 yr	46	-	-	-	-	46
5-10 yr	33	-	-	-	-	33
10-15 yr	28	-	-	-	-	28
15-20 yr	10	22	28	10	7	77
20-25 yr	-	76	27	57	16	176
25-30 yr	-	38	50	90	09	187
30-35yr	-	52	104	198	50	404
35-40 yr	-	27	40	29	11	107
>40 yr	07	04	50	39	06	106

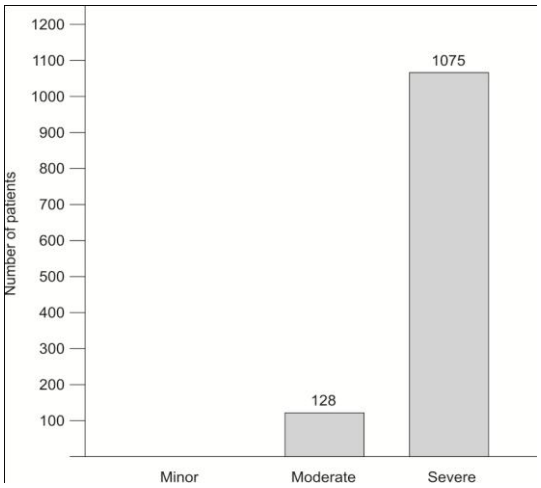
97 patients had superficial burn while 261 patients were with full thickness burn and majority (688) were with deep partial burn (Table-4)

Table4. *Distribution of patients as per degree of burn*

Degree of burn	Number of patients		
	Male	Female	Total
Superficial	60	37	97
Superficial partial	80	43	123
Deep partial	248	440	688
Full thickness	46	221	267

And as per American Association of Burn Care severity grade 128patients are of moderate and rest 1047 were of severe degree burn (Table-5)

Table5. *Bar diagram showing degree of severity as per American Association of Burn Care*



The mean duration required for burn wound healing in cases with total burnt surface area ≤20% was 18 days while with ≥50% taken ≥60days to recover completely (Table-6).

Table6. *Showing mean duration required for wound healing*

% burnt surface area	Duration of therapy required (in days)									
	3	7	10	15	18	21	25	30	45	>60
≤ 20% (135)	28	37	59	06	05	-	-	-	-	-
20-30% (219)	-	38	75	42	32	18	14	-	-	-
30-40% (299)	-	-	-	-	48	76	75	91	09	-
40-50% (423)	-	-	-	07	75	100	65	100	68	08
>50% (99)	-	-	-	-	-	06	24	44	07	18

Irrespective of the severity of burn 1149 cases had grade I (Excellent) therapeutic response while 26 patients grade II (Table -8)

Table8. *Showing clinical out come*

Grade of response	**Number of patients**
Grade I	1149
Grade II	0026
Grade III	-
Grade IV	-

Though prior to therapy 424 cases were with Hemoglobin <10gm% but after completion of therapy except 72 cases all had Hb >10gm%,65 patients show blood urea > 30mg% and 14 cases Serum creatinine ≥1.5mg%,76 patient shows urine albumin positive but on completion of therapy all had normal hematological and renal profile ,No patients had hepatic profile alteration either pre therapy or post therapy .(Table -7)

Table7. *Distribution of patients as per pre and post hemato, hepato renal status*

Particulars	Number of patients			
	Pre therapy		post therapy	
	Male	Female	Male	Female
Hemoglobin :				
<10gm %	132	292	009	063
>10gm%	302	449	425	678
Hepatic:				

SGOT				
>35 IU	-	-	-	-
<35 IU	434	741	434	741
SGPT				
>35 IU	-	-	-	-
<35 IU	434	741	434	741
Renal :				
Blood urea:				
< 30mg%	420	690	434	741
>30mg%	014	051	-	-
Serum creatinine				
<1.5mg%	430	731	434	741
>1.5mg%	004	010	-	-
Urine albumin				
Present	017	059	434	741
Absent	417	682	-	-

5. DISCUSSION

Mortality and morbidity in thermal burn is very high even in expertise burn hospital in cases having total burnt surface area more than 40% and severe degree of burn (As per American Association Of Burn Care)[12,13] but the modified covering procedure and chemoprophylaxis shows an excellent recovery of burn wound without any mortality and morbidity even in severe degree thermal burn involving ≥ 50% total body surface area ,which can be explained as-

- Earliest calming of agonizing pain by cooling with Sucralfate & Oxcetacain gel which ensure cyto protection and nerve block due to local anaesthetic effect of Sucralfate and Oxcetacain respectively .
- 24 hrs time given before cleansing the wound and debries removal prompted complete blister development leading to actual assessment of TBSA (Total burnt surface area) and vital resuscitation.
- Covering the wound with paste of Ointment Silver sulphadiazine ,Soframycine and Placentrex provides sterile zone for healthy and natural granular tissue generation. In addition covering of the pasted wound with broad spectrum quinolone (Levofloxacin) impregnated bandage prevent super infection and facilitate natural healing. Placentrex a bio immune booster promote natural skin recovery.
- Chemoprophylaxis with broad spectrum Aminoglycosides having convenient dose schedule i.e.12 hourly and can be administered either intramuscular or intravenous, assured check on systemic microbial infection.
- Improved Hemoglobin and renal function is an index of cautious vigil watch on Renal function and nutritional supplement.

6. CONCLUSION

1175 cases of varied age group and varied degree and grade of thermal burn admitted in crucial state had grade I (excellent) clinical outcome and reversal of altered hemato renal function in all the cases in maximum period of 60 dayseven in patient with >50% Total burnt surface area, though patients of 1st degree burn shows marked improvement in 72 hours and complete healing by 7th day and elderly patients of 3rd degree burn with >50% TBSA taken >60 days to recover completely. No mortality or morbidity been observed.

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