

A Hospital Based Study of Management of Post Burn Sequelae in Western UP, India

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Abstract: In a developing country like India, the estimated annual burn incidence is approximately 6-7 million every year. The high incidence is attributed to illiteracy, poverty and low level of safety consciousness in the population at large. The incidence of upper extremity burns constitutes a major chunk amongst them. In addition to physical disabilities the burn patients suffer psychologically and are unable to take, their proper place in the society. The non-utilization of their abilities is loss to the family, community and country. Help from any conceivable quarter for their rehabilitation is welcome so burn rehabilitation team in addition to plastic surgeon, nursing personnel, burn technicians also consists of physical and occupational therapists, social workers, psychiatrists and planning coordinators. The study comprises of 100 cases admitted with various post burn sequelae in the CSSH Subharti Hospital admitted from October 2016 to June 2018 in General Surgery and Plastic Surgery Units in CSSH Subharti Hospital Meerut. According to our study 100 patients maximum numbers of patients 63 % were in the age group of 11-30 yrs. The study showed that accidental burn 97% was the major cause of burn. The study showed out of 100 patients with post burn sequelae, the most common was contractures 69 patients, followed by hypertrophic scars in 11 patients & hyper-pigmentation in 7 patients with hypo-pigmentation in 3 patients, keloids in 6 patients & syndactyly in 4 patients. The most common surgical technique used for correction of post burn sequelae was excision and grafting followed by z-plasty & flap cover. Various topical agent like Trimacilone/ Flavonoid/ Hydroquinone were also used in addition to Pressure garments & Silicon Sheets. Our findings are that management of post burn sequelae is often a complex process and plan to be customized for each patient combining various available methods.

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I. Introduction

In India around 7 million people suffer from burn injuries each year with 1.4 lakh deaths and 2.4 lakh people suffer with disability. Burn death rates have been decreasing in high income countries.¹ The management of burn patients has made rapid advancements with better understanding and monitored fluid resuscitation, more effective control of infection with systemic and topical antimicrobials² and early surgical intervention with the good post-surgical resuscitation measures, thus greatly improving the mortality rate in burned patients. On the contrary due to these advancements more severely burned patients are surviving hence the morbidity due to post burn remain high. In developed countries and affluent societies, such disabling conditions have been successfully reduced with improved standards of initial care.^{3,4,5).}

A survey of past few years indicated a mortality rate of between 25-49% for adult and between 6-20% for children. 10% of all accidental death and 7% of all suicide in India is caused by fire⁶. Burn trauma is still rising in India and is second largest killer after road traffic accident. Thousands of victims of burn are mutilated and handicapped every year.

More than half of the cases are aged between 11-40 years. In this age group burn is more common in female. 69.9% patient belong to low socioeconomic status while 21.8% patient are from middle and only 8.6% are of high socioeconomic status. 42.6% belong to an urban area while the rest are from rural area. Etiology of burn as follows : dry burn, scald, electric burn, chemical burn, petrol burn, coal tar burn, industrial burn.

II. Materials And Methods

MATERIALS:

Present study comprises of 100 cases admitted in emergency ward and opd with various post burn sequelae in the CSSH Hospital from October 2016 to June 2018 in General Surgery and Plastic Surgery Units in CSSH SUBHARTI Hospital Meerut.

METHODS:

Following surgical procedure and medications therapies were employed:- Single or Multiple Z-Plasty, Flap cover, Split thickness skin graft/ Full thickness skin graft. Trimacilone/ Flavonoid/ Hydroquinone/physiotherapies,Pressure garments/ Silicon Sheet

Follow-up

The follow-up of our cases ranged from 6 months to 1 year. The patients were follow up weekly or monthly intervals for 1 year . During the period of follow-up, patients were examined for functional, as well as cosmetic outcomes.

Inclusion criteria :-

All patients of post burn sequelae admitted in Subharti Hospital and followed up subsequently .Patients presenting with sequelae like post burn hypertrophied scar, keloids and contracture, syndactyly, Hypo-Hyperpigmentation . And also neglected cases of post burn sequelae.

Exclusion criteria: -

Patients who were lost during follow up . Electric burns.

III. Result

In our study of 100 patients, youngest member was 3 year old girl, and the oldest was a 65 years old man .Maximum numbers. of patients 63%were in the age group of 11-30 years. The study showed that 68% were females and 32% were male. The study showed that, accidental burn 97% was the major cause of burn followed by suicidal which was seen in only 2% patients with only 1% patient having homicidal burn (table.1). The most common mode of burn was dry burn 96% followed by scald seen in and 4% . In our study of 100 patients, most common anatomical site of post burn sequelae were upper limb 46%) followed by lower limb 28%) and head and neck 12 %) and multiple region 4%) .(table-2)

The study showed out of 100 patients who developed post burn sequelae after burn, the most common post burn sequelae was contracture 69 patients , followed by hypertrophic scar in 11 patients & hyper-pigmentation in 7 patients with hypo-pigmentation in 3 patients, keloid in 6 patients ,& syndactyly in 4 patients .(table.3)

In our study of 100 patients , 69 patients had post burn contractures as sequelae, ,52 patients underwent release with SSG , 15 patients underwent Release with Z- plasty with or without SSG (Fig.1.1-1.2)and 2 patients were subjected to release with flap cover (Fig.2.1-2.3) (table 4). In our study , 4 patients who developed syndactyly as post burn sequelae underwent. The following 4 surgical steps, preparation of the dorsal flap; syndactyly release; inseting and suturing of the flap to its new position; and skin graft to fill the remaining spaces.(table.5)(Fig-3.1-3.2) 11 patients who developed hypertrophic scar as post burn sequelae , 4 patients underwent excision+ grafting(Fig.4.1-4.2) followed by pressure garments/ silicon gel , 3 patients were treated with Trimacilone + Flavonoid+ silicon gel/ pressure garments ,3 patients were treated with Trimacilone + pressure garment/ silicon gel sheet, 1 patient was treated with Flavonoid alone .Pressure garments and silicon gel sheet given to all patients as supportive treatment.(table 6)

. In our study of 100 patients, 6 patients developed keloid ,out of which 4 patients were treated with Trimacilome + Pressure Garments / silicon sheet & 2 patients underwent excision ,out of which 1 patient developed keloid again(table 7). In our study of 100 patients, 7 patients developed hyper-pigmentation as post burn sequelae , out of which 4 patients were treated with hydroquinone & 3 patients with excision & grafting(table.8). In our study of 100 patients , 3 patients develop hypo-pigmentation who underwent excision & grafting had no complications after the procedure.(table 9) (Fig. 5.1-5.2)

. In our study of 100 patients, 4 patients had graft failure , 3 patients developed recurrence of contracture,& 3 patients had loss of flexion, 1 patients flap tip necrosis as complication.(table.10)

TABLE 1 DISTRIBUTION ACCORDING TO INCIDENCE

INCIDENCE DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Accidental	97	97%
Suicidal	2	2 %
Homicidal	1	1 %
Total	100	100%

The study showed that, accidental burn(97%) was the major cause of burn followed by suicidal which was seen in only 2 patients (2%) with only 1 patient (1.0%) having homicidal burn.

TABLE 2 DISTRIBUTION ACCORDING TO ANATOMICAL SITE OF SEQUELAE AND ACUTE BURN

SITE DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Head and neck	12	12%
Trunk	10	10%
Upper limb	46	46%
Lower limb	28	28%
Multiple region	4	4.0%
Total	100	100%

In our study of 100 patients , most common anatomical site of post burn sequelae were upper limb (46%) followed by lower limb (28%) and head and neck (12 %) and multiple region (4%)

TABLE 3 DISTRIBUTION ACCORDING TO SEQUELAE

SEQUELAE DISTRIBUTION	NUMBERS OF PATIENTS	PERCENTAGE
Contracture	69	69%
Syndactyly	4	4%
Keloid	6	6 %
Hypertrophic scar	11	11%
Hyper pigmentation	7	7 %
Hypo-pigmentation	3	3 %
Total	100	100%

The study showed out of 100 patients who developed post burn sequelae, the most common post burn sequelae was contracture (69 patients), followed by hypertrophic scar in 11 patients & hyper-pigmentation in 7 patients with hypo-pigmentation in 3 patients, keloid in 6 patients, & syndactyly in 4 patients.

TABLE 4 DISTRIBUTION ACCORDING TO TREATMENT OF CONTRACTURE

TREATMENT DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Release with Z-Plasty With or without SSG	15	15%
Release with Flap	8	8 %
Release with SSG	46	46 %
Total	69	100%

In our study of 100 patients , 69 patients who developed post burn contracture as sequelae, 46 patients underwent release with SSG, 15 patients underwent Release with Z- plasty with or without SSG and 8 patients were subjected to release with flap

TABLE 5 DISTRIBUTION ACCORDING TO TREATMENT OF SYNDACTYLY

TREATMENT DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Z- Plasty + dorsal flap + ssg+ k-wire + splint	4	100%
Complication	0	0%
Total	4	100%

In our study 100 patients, 4 patients who developed syndactyly as post bur sequelae, all underwent reconstructive surgery. The following 4 surgical steps were used to treat all patients: preparation of the dorsal flap; syndactyly release; migration and suturing of the flap to its new position; and skin graft to fill the remaining spaces.

TABLE 6 DISTRIBUTION ACCORDING TO TREATMENT OF HYPERTROPHIC SCAR

TREATMENT DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Trimacilone + pressure garment/ silicon gel sheet	3	27.27%
Trimacilone + Flavonoid + silicon gel/ pressure garments	3	27.27%
Excision + pressure garments/ silicon gel	4	36.36%
Flavonoid + pressure garments/ silicon gel	1	9.09%
Total	11	100%

In our study of 100 patients , 11 patients who developed hypertrophic scar as post burn sequelae , 4 patients (36.6%) underwent excision+ pressure garments/ silicone gel) , 3 patients (27.7%) were treated with Trimacilone + Flavonoid+ silicon gel/ pressure garments),3 patients (27.2%) were treated with Trimacilone + pressure garment/ silicon gel sheet), 1 patient (9.0%) was treated with Flavonoid alone) .Pressure garments/ silicon gel sheet given to all patients as supportive treatment.

TABLE 7 DISTRIBUTION ACCORDING TO TREATMENT OF KELOID

TREATMENT DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Trimacilone + Pressure Garments / silicon sheet	4	66.6%
Intra lesional Excision + Pressure Garments / silicon sheet	2	33.3%
Total	6	100%

In our study of 100 patients, 6 patients developed keloid ,out of which 4 patients (66.6% treated with Trimacilone + Pressure Garments / silicon sheet) & 2 patients underwent excision ,out of which 1 patient developed keloid again

TABLE 8 DISTRIBUTION ACCORDING TO MEDICAL/ SURGICAL TREATMENT FOR HYPER-PIGMENTATION

TREATMENT DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Hydroquinone	4	58%
Excision and grafting	3	42%
Complication	0	0%
Total	7	100%

In our study of 100 patients, 7 patients presented with hyper-pigmentation as post burn sequelae , out of which 4 patients were treated with hydroquinone & 3 with excision & grafting.

TABLE 9 DISTRIBUTION ACCORDING TO TREATMENT OF HYPO-PIGMENTATION

TREATMENT DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Excision and grafting	3	100%
complication	0	0%
Total	3	100%

In our study of 100 patients , 3 patients develop hypo-pigmentation who underwent excision & grafting had no complications after the procedure.

TABLE 10 DISTRIBUTION ACCORDING TO POST OPERATIVE COMPLICATIONS

COMPLICATION / SUQALAE DISTRIBUTION	NUMBERS. OF PATIENTS	PERCENTAGE
Numbers complication	85	85%
Loss of flexion	3	3%
Skin loss	3	3%
Recurrence of contracture	3	3%
Recurrence of keloid	1	1%
Graft failure	4	4%
Flap tip necrosis	1	1%
Total	100	100%

In our study of 100 patients, 85 patients had numbers complication or re- sequelae, 4 patients had graft failure, 3 patients developed recurrence of contracture, & 3 patients had loss of flexion, 1 patient flap tip necrosis as complication.

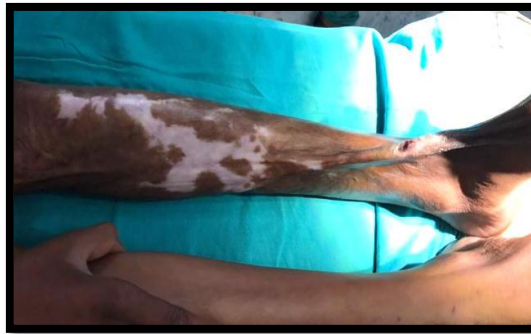


FIG .1.1 HYPOPIGMENTATION WITH LEG CONTRACTURE



FIG .1.2 EXCISION OF HYPOPIGMENTATION WITH RELEASE OF CONTRACTURE WITH Z-PLASTY



FIG .2.1 FINGER CONTRACTURE



FIG .2.2 INTRAOPERATIVE PHOTO OF THE PATIENT SHOWING RELEASE OF CONTRACTURE WITH CROSS-FINGER FLAP



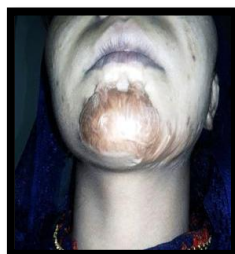
FIG .2.3 FOLLOWUP AFTER 1MONTH AFTER SURGERY



FIG .3.1 POST BURN SYNDACTYLY WITH CONTRACTURE



FIG .3.2 FOLLLOWUP AFTER 2 WEEKS WITH CONTRACTURE RELEASE WITH SYNDACTYLY CORRECTION WITH K- WIRE FIXATION



**FIG .4.1
HYPOTROPHIC SCAR
WITH POST BURN
CONTRACTURE
OVER CHIN**



**FIG .4.2 FOLLOW-UP
AFTER 12 WEEKS
WITH EXCISION +
RELEASE WITH SSG**



**FIG .5.1
HYPOPIGMENTATION
WITH CONTRACTURE**



**FIG .5.2
FOLLOW UP AFTER
8 WEEKS WITH EXCISION
+ RELEASE WITH SSG**

IV. Discussion

Present study comprise of 100 cases admitted in o.p.d with various post burn sequelae admitted from October 2016 to June 2018 in General Surgery and Plastic Surgery Unit in CSSH Subharti Hospital Meerut. Clearly, the best treatment is prevention. **Potokar**^[7] notes that preventive strategies can be primary, secondary, and tertiary. Primary prevention aims at reducing burn incidence through safer cooking methods, fireguards, and education of fire hazards in schools and community settings. Secondary prevention is aimed at reducing the severity of the burn through promoting good first aid practices.

Reish RG, Eriksson E et al 2008)⁸ In case of hypertrophic scars, timing of surgical treatment is an important consideration in the treatment protocol of strategies for scar revision. Scars mature during a period of at least 1 year and can show decreased contractures along with flattening, softening, and re-pigmentation without any physical manipulation .

Atiyeh BS. 2007 et al)⁹ An important finding was that intralesional corticosteroid injections, when used alone, have the most effect on younger keloids, which can become completely flattened. In older scars and keloids, corticosteroids can soften and flatten the scars only to some extent and can provide symptomatic relief, results are similar to our study.

Nast A, Eming S, Fluhr J, et al 2012.)¹⁰ Silicone sheets are usually being employed 12–24 hours per day over a period of 12–24 weeks, beginning 2 weeks after wounding. Currently published studies are concluding mostly positively in favour of the evaluated silicone-based therapy.

Tertiary prevention is aimed at reducing the mortality and morbidity of burns. The mainstay in tertiary prevention is allowing uncomplicated healing of burns whenever possible and using early primary excision and grafting to achieve stable skin cover when not possible. Our study reflects the high frequency of post burn sequelae in our country. In developed countries and affluent societies, such disabling conditions have been successfully reduced with improved standards of initial care. It is now well established that a burn victim who receives the best of initial treatment is expected to heal without any post burn sequelae. In our study in order to prevent the formation of post burn sequelae, we instituted Intensive care programs and rehabilitation at the very beginning of burn management, Early excision and skin grafting of deep second degree and full thickness burns was done along with splintage and anti-deformity positioning, pressure garments , silicon sheet was used to avert the risk of development of post burn sequelae.

V. Conclusion

The surgical treatment of burns sequelae is a difficult process and often requires the application of a combination of surgical techniques, and the development of individual treatment protocols. Reconstructive procedures often need to be repeated and may require a long time to be performed. In patients with acute burn, prevention is the key to prevent post burn sequelae, contracture is the most common sequelae occurring after burn. Z-plasty and release with split skin graft had equal result for release of contracture. Surgical manipulation for hypertrophic scar is more effective than keloid as keloid excision showed higher recurrence rate. Silicon gel sheet and pressure garments has to be given in both patients with keloid and hypertrophic scar. For hypopigmentation ,excision with split skin grafting has good results at a lower cost and less time consuming as compared to other available method. Hperpigmentation can be treated with hydroquinone alone or excision . In the treatment of contractures, though split thickness skin graft appears an easy solution, it is not so. The patients discomfort and numbers compliance is high. Thus is the possibility of secondary procedures required for re-contractures. Wherever possible skin flaps should be used. The choice between Z-plasty, local

flaps, regional flaps and free flap should be dictated by the amount and type of skin available, the amount of skin desired and the available expertise

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