



“STUDY OF PROGNOSIS, COMPLICATION, MANAGEMENT AND OUTCOMES OF POST BURN UPPER LIMB CONTRACTURES”

Surgery

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ABSTRACT

Background- Postburn contractures are perhaps the most dreaded and distressing morbidity in patients surviving major burns. Repair of these is essential to make the patient productive and socially acceptable and more importantly to functionally rehabilitate the burn victim.

Method- It was a prospective observational study consisted of 53 cases of post-burn contracture affecting the upper limb.

Result- In our study out of 53 patients of post-burn contracture 28 patients (53%) were treated by contracture release with SSG and 20 (38%) had Z-plasty and 5 (9%) had contracture release with K wire. In the present study, 49 (95.45%) of patients had a satisfactory range of motion and 4 (7.54%) of patients had an unsatisfactory range of motion.

Conclusion- Early treatment of established contracture prevents tissue fibrosis, tendon shortening, and joint stiffness. Careful planning and timing of different stages of treating a contracted burned upper limb are very important for better results.

KEYWORDS

Postburn contracture, upper limb, complication, management

INTRODUCTION

Burn-related deaths and injuries constitute one of the main public health problems. Although there are multiple causes of burn injury, some patterns appear in almost every epidemiological study. Wound healing in humans is by collagen deposition to restore physical continuity, the ability to regenerate compound organs has been lost with evolution. Unfortunately, repair in a general sense is regarded as beneficial, yet the method of restoring integrity with fibrous tissue deposition may produce functional and cosmetic complications worse than the original wound. Even after normal progression of wound healing many burns patients develop proliferative scars, hypertrophic scars, or keloid which appear to be related to wound contraction.

Postburn contractures are perhaps the most dreaded and distressing morbidity in patients surviving major burns. Repair of these is essential to make the patient productive and socially acceptable and more importantly to functionally rehabilitate the burn victim. Every patient deserves a team effort that involves a reconstructive plastic surgeon, a physical and occupational therapist, a psychiatrist, and a vocational rehabilitation counselor.

The reconstruction of the burn patient is often a long process requiring multiple surgical procedures. The results are usually satisfactory at best. The primary aim of the surgeon is to prevent burn scar deformity by early wound closure, correction of tissue deficiencies, and cautious attention to postoperative splinting, traction, and compression therapy. Burns rehabilitation should be a team's approach, incorporating the patient and their family. The term 'Burns Rehabilitation' has three aspects physical, psychological, and social aspects of care and it is common for burn patients to have difficulties in one or all of these areas following a burn. Burns can lead to severely debilitating and deforming contractures, which can lead to disability when adequate treatment is not given. Burn rehabilitation aims to maintain range of movement, minimize contracture development and impact of scarring, maximizing functional ability, maximizing psychological wellbeing, maximizing social integration.

This study was undertaken to observe prognosis, complication, management, and outcome of post-burn upper limb contracture in burn patients admitted to our institute and to enhance patient care and management using available medical resources with the help of results obtained.

MATERIAL AND METHODS

All patients who are reported to surgical OPD in the Shyam Shah

Medical College and Associated Sanjay Gandhi Memorial Hospital, Rewa, Madhya Pradesh, casualty or transferred from other department diagnosed as upper limb burn contracture during the period of study will be included in the study. Patients after being admitted and essentials of registration, history, physical examination, investigation, pre-anesthetic assessment, and informed written consent in own language to enroll as a study subject.

INCLUSION CRITERIA

All cases of post-burn contracture affecting upper limb appearing in the surgical department are included in the study.

EXCLUSION CRITERIA

1. Contracture involving upper limb due to trauma
2. Contracture involving upper limb due to cellulitis
3. Contracture involving upper limb due to fusion of bone

Data collection

All the patients who were admitted with post-burn contracture affecting upper limb in the department of surgery through outpatient department OPD, casualty and transferred from other department diagnosed as upper limb burn contracture during the period of study will be included in the study. They were interviewed by the principal investigator. Patients' detailed information including registration details, a brief history about presenting complaints, and history regarding burn injury.

Patients were then examined to record a preoperative range of motion (ROM). Patients were explained about the surgical management in their language. With informed and written consent patients were taken for surgery.

We carried out surgical procedures depending on site, size, and nature of scar contracture.

Types of surgeries performed:

1. Single/multiple Z plasty
2. Contracture release with SSG
3. Contracture release with K wiring

Then patients were monitored for any postoperative complications such as surgical site infection, skin necrosis, and graft loss and treated accordingly. Each patient's total duration of hospital stay was documented. Patients after discharge followed up for 6 months during which postoperative range of motion was recorded. The outcome was tabulated according to the patient's satisfaction range of motion.

STATISTICAL ANALYSIS

Data from each patient collected and tabulated using Microsoft excel. All the statistical analysis was carried out by SPSS version 16. Microsoft word and excel have been used to generate graphs, tables, etc. Statistical method use was Z test, p

RESULT

In our study,

1. Out of 53 patients, in 44 patients (83.01%) the mode of injury was accidental and suicidal in 9 patients (16.98%). (Table no 1)
2. In the majority of patients (35 patients, 66.03%) source of heat was thermal burn, in 11 patients (20.75%) source of heat was scald and in 7 patients (13.20%) source of heat was electric. (Table no 2)
3. Out of 53 patients, 21 patients (40%) had Hand contracture, 14 patients (26%) had finger contracture, 10 patients (19%) had elbow contracture and 8 patients (15%) had Axillary contracture (Table no 3)
4. Out of 53 patients of post-burn contracture patients, 28 patients (53%) were treated by Contracture release with SSG and 20 patients (38%) had Z-plasty and 5 patients (9%) had contracture release with K wire (Table no 4)
5. Out of 53 patients who got operated on 2 patients had surgical site infection, 1 patient developed graft loss and 1 patient had skin necrosis (Table no 5)
6. In the present study out of 53 patient's majority of patient 36 patients (67.92%) had 4-7 days of hospital stay, 14 patients (26.41%) had 8-10 days of hospital stay, 3 patients (5.66%) had greater than 10 days of hospital stay (Table no 6)
7. In the present study out of 53 patients, 49 (95.45%) of patients had a satisfactory range of motion and 4 (7.54 %) of patients had an unsatisfactory range of motion (Table 7)

Table No 1- Distribution of patients according to a mode of Injury

S. No.	Mode of Injury	No. of cases	Percentage
1	Accidental	44	83.01%
2	Suicidal	9	16.98%
3	Homicidal	0	0.00%
4	Total No.	53	100%

Table No 2- Distribution of patients according to Source of heat

Source of heat	No. of Cases	Percentage
Thermal	35	66.03%
Electric	7	13.20%
scald	11	20.75%

Table No 3-Distribution of patients according to Site of contracture

S. No.	Contracture site	No of cases	Percentage
1	Axillary contracture	8	15%
2	Elbow contracture	10	19%
3	Hand contracture	21	40%
4	Finger contracture	14	26%
	Total no.	53	100%

Table No 4- Distribution of patients according to Type of surgery

S. No.	Type of surgery	No. of cases	Percentage
1	Z plasty	20	38%
2	Contracture release with SSG	28	53%
3	Contracture release with K wire	05	9%
	Total No.	53	100%

Table No 5-Distribution of patients according to complication of surgery

Complications of surgery	No of cases	%
Surgical site infection	2	3.77%
Skin necrosis	1	1.88%
Graft loss	1	1.88%
None	49	92.45%

Table No 6- Distribution of patients according to Hospital stay

Hospital stays	No of cases	%
4-7 days	36	67.92%
8-10 days	14	26.41%
>10 days	3	5.66%

Table No 7- Distribution of cases according to Outcome

Outcome	No of cases	%
satisfactory	49	92.45%
Nonsatisfactory	4	7.54%

DISCUSSION:

53 patients with post-burn upper limb contracture fulfilling the inclusion and exclusion criteria included in the study carried out from 1st June 2019 to 31st May 2020, in the surgery department at Sanjay Gandhi memorial hospital attached to Shyam Shah Medical College, Rewa MP.

In our study out of 53 patients, 44 (83.01%) patients had accidental burn injury, 9 (16.98%) patients had suicidal burn injury.

In the study by **Bhatnagar et al**¹ 561 (71.4%) of patients had accidental burn injury, 172 (21.9%) patients had suicidal burn injury and 53 (6.7%) patients had homicidal burn injury. In another study with similar results by **Gupta A et al**² where out of 80 total patients 76 (95%) cases had accidental burn injury while only 4 (5%) patients had suicidal burn injury.

In another study by **Saaiq M et al**³ out of 213 patients, various causes of burn were domestic accidents with natural gas 83 patients (38.96%), fire accidents in the household 67 patients (31.45%), electrical accidents 21 patients (9.85%)

In our study out of 53 patients 35 patients (66.03%) had Thermal as a source of heat, 7 patients (13.20%) had electricity as a source of heat and 11 patients (20.75%) had scald as a source of heat.

In another study done by **Saaiq M et al**³ out of 213 patients burn insult comprised flame burns in 174 cases (89.69%), electric burn in 21 (9.85%), scalds in 17 (8.45%), and acid burns 1 (0.47%) of patients.

Observations from the present study show that out of 53 patients 21 patients (40%) had hand contracture, 10 patients (19%) had elbow contracture, 8 patients (15%) had axillary contracture and 14 patients (26%) had finger contracture. Findings of the present study were similar to the following studies,

In the study conducted by **Bhatnagar et al**¹ in which out of 786 patients 297 (37.8%) patients had Hand contracture, 118 (15%) had axilla contracture, 194 (24.7%) patients had elbow contracture and 145 (18.5%) patients had finger contracture. Thus, findings were similar to our study.

In the study conducted by **Dogra et al**⁴ out of 100 cases 23 cases (23%) had axillary contracture, 17 cases (17%) had elbow contractures, 20 cases (20%) had wrist region contracture, 46 cases (46%) had contractures involving various digits of the hand.

In our study out of a total of 53 patients, 28 (53%) patients were treated with contracture release with SSG, 20 (38%) patients were treated with Z plasty and 5 (9%) patients were contracture with K wire. Findings of the present study were similar to the following studies,

In the study conducted by **Bhatnagar et al**¹ 572 (72.8%) patients were treated with split-thickness grafting and 61 (7.8%) patients were treated with split-thickness with Z plasty.

In another study by **Rajan et al**⁵ out of 45 cases 25 patients (55.5%) were treated with contracture release and split skin grafting and contracture release with K wire insertion and coverage was done in 8 (17.7%) patients.

In another study by **Iwuagwu FC et al**⁶ out of 129 patients, full-thickness skin grafting was used in 81 patients (63%) and split-thickness skin grafts in 26 (20%) and 22 patients (17%) had both types used on different occasions.

In another study done by **Dogra et al**⁷ out of 100 cases release of contracture by Z plasty was carried out in 30 cases however as many as 51 cases were managed by release/excision of scar/contracture and soft tissue cover by SSG. Contracture release and cover by FTSG were employed in 19 cases.

In our study out of 53 patients 36 patients (67.92%) had 4-7 days of hospital stay, 14 patients (26.41%) had 8-10 days of hospital stay, and 3 patients (5.66%) had > 10 days of hospital stay.

In the study done by **Dogra et al**⁷ average hospital stay was found to be least for the Z plasty group (9.40 days) whereas patients in FTSG and SSG had longer stay (14.15 and 15 days respectively) in hospital.

In our study out of 53 patients, 2 patients (3.77%) had surgical site infection after surgery, 1 patient (1.88%) had skin necrosis and 1 patient (1.88%) had Graft loss.

In another study done by **Rajan et al**³⁶ out of 45 patients postoperatively, 42 patients (93.33%) patients good graft take, 3 patients there was minimal graft loss

In our study out of 53 patients, 49 patients (92.45%) had a satisfactory outcome, 4 patients (7.54%) had an unsatisfactory outcome.

In another study done by **Rajan et al**³⁶ out of 45 patients, 42 patients (93.3%) functional restoration was satisfactory while in 3 patients (6.6%) range of motion was not optimal.

In another study done by Kraemer MD et al⁴⁰ restorations were possible in 88% of procedures while only 12% of cases provided unsatisfactory results.

CONCLUSION:

With this study, we can conclude that post-burn upper limb contracture is common in females, post-burn upper limb contractures are better prevented than treated, post-burn upper limb contracture must be treated as soon as possible this will yield better results. Early treatment of established contracture prevents tissue fibrosis, tendon shortening, and joint stiffness. Careful planning and timing of different stages of treating a contracted burned upper limb are very important for better results. At the time of discharge proper education of post-operative care and adequate information on oil massage, physiotherapy, and pressure garment should be given to the patients and their relatives.

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