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Frequency Of Functional Outcome In Management Of Post Burn Neck Contractures

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Abstract

Objective: To determine the frequency of functional outcomes in managing post-burn neck contractures. Descriptive study. At the department of plastic surgery.

Methods: A total of 150 cases presenting from Liaquat University of Medical and Health Sciences with any degree of post-burn neck contracture admitted to the plastic surgery unit and fulfilling the inclusion criteria, were included in the study. A detailed clinical and radiological examination was carried out. Before the interventional procedure was instituted, the cause of burn injury and functional grade of neck contracture was documented. A follow-up of 6 months was done to evaluate the range of neck motion and postoperative improvement in neck extension to document patient satisfaction. All data was recorded on a predesigned proforma.

Results: The average age of the patient was 29.67±7.67 years. Out of 150, 96 (64%) patients showed satisfactory outcomes, 52 (34.67%) had good outcomes and 2 (1.33%) patients were poor outcomes.

Conclusion: After oral intubation and SSG resurfacing of the raw region, it can be stated that contracture release under tumescent anaesthesia is a successful treatment for individuals with post-burn contractures of the neck.

Keywords: burn , contractures, Management, Skin grafting, Patient satisfaction.

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1. Introduction

In both the developing and developed worlds, burn trauma is second only to automobile accidents as a source of trauma-related mortality.[1] As a result of being unable to move their neck freely, people who have suffered burns often experience a major decline in their quality of life.[2] Due to the intricate mobility and multidirectional of the neck, post-burn neck contractures continue to be a formidable problem for reconstructive surgeons. Contractures cause mobility restrictions, extreme deformity, and psychological difficulties that accompany them.[3-5] It has been found that children with untreated neck contractures have stunted jaw development.

The physical and psychological effects of a neck contracture may be devastating. Central, lateral, and complete types exist. Depending on how much of the anterior neck the tightening band affects, they may be categorised as mild, moderate, extensive, or severe.[1, 4] In cases of anterior cervical contracture, the patient's ability to extend their neck is severely impaired. The synechia effect may be caused by the scar reaching the face and chest. The patient's physical and aesthetic defects have a greater impact on their quality of life than their functional impairment would suggest. Early treatment and prevention measures are optimal for preventing a serious burn neck scar contracture.[6]

Although there have been improvements in the treatment of burns as whole, severe post-burn contractures remain a major challenge for reconstructive surgeons in Pakistan.[7] Neck contractures caused by burns may be treated with various procedures, including skin grafting, local and free flaps, and tissue expansion. The most typical therapy is skin grafting followed by splinting; nevertheless, there is a substantial risk of contracture returning after this procedure.[8-10] The use of a growth factor, such as basic fibroblast growth factor, has been shown to hasten the healing of burn wounds in children and adults while reducing the likelihood of scarring.[11] Although the frequency is lower than that of other joints in the extremities, significant contracture may occur if the neck is neglected during early resuscitation efforts when an adult suffers substantial burns.[12]

Prior research looked at patients' complaints of neck contracture after a burn. 63.33 per cent were female and 36.67 per cent were male. Patients ranged in age from 5 to 56; 33.3% were under 20, 40% were in their 20s to 40s, and 26.67% were in their 50s and beyond. In the study, 83.3% of patients reported high levels of satisfaction with the results of their surgery, whereas 16.6% reported low levels of satisfaction. Based on the reported grades, we find that 26.6% had completed

Grade 1, 40% had completed Grade 2, 20% had completed Grade 3, and 13.3% had completed Grade 4. Twenty-eight per cent of happy customers had a grade of 1, 44% had a grade of 2, 20% had a grade of 3, and 8% were a grade of 4. Forty per cent of the dissatisfied instances received a rating of 4, while twenty per cent had a grade of 1, and the remaining twenty per cent got a grade of 2.[13]

Another research found that women made up the vast majority of participants. Scar types were found to be distributed as follows: 15% linear band, 20% type A wide, 35% type B board, and 30% type C board. Seventy per cent of patients had contracture release followed by skin grafting, whereas flap cover and repeated z-plastics were performed on fifteen per cent of patients each. Complications were seen, with 11% of grafted cases experiencing graft loss of more than 10% and 2% of patients experiencing graft loss of more than 25%. Ten per cent of patients had re-contracture, five per cent required further surgeries, and none experienced flap loss or a hypertrophic scar. There was a 60% use rate of compression garments among our patients. 78% had a cervical mental angle of more than 110 degrees, 14% between 90 and 110 degrees, and 10% were unable to extend their necks over 90 degrees. Repeat surgery was performed on one patient. The majority of patients in their research reported being "okay" with the acceptance outcomes, 27% reported feeling "good," and 11% reported feeling "excellent," while 12% reported being "not happy" with the result.[2]

When rebuilding severe contractures of the neck, the major goals are to restore the full range of motion, improve the appearance of the cervical-mental angle, preserve the cosmetic components of the neck, and stop the contracture from returning. To establish and suggest the best procedure concerning the functional and aesthetic result in our setting, we used several techniques for the restoration of post-burn neck contracture deformities in this research.

2. Materials & Methods

Study Design is a Descriptive study which was performed in the Department of Plastic Surgery at Liaquat University of Medical and Health Sciences Jamshoro, Sindh, during the period 6 months from 01.11.2021 to 30.04.2022. By taking the prevalence of patients who felt okay with the results of acceptance after the surgery of burn neck contracture1=52%2using margin of error (d)=8%, the total calculated sample size is 150 patients with the help of WHO software for sample size calculation taking 95% confidence level. The sampling technique was non-probability consecutive sampling.

Both genders between the age of 18-45 years,& patients with any degree of post-burn neck contracture were included in the study.

Patients with acute burns, taking anti-convulsing drugs, with cervical spine spondylitis or contractures secondary to electrical burns were excluded from the study.

Patients with uncontrolled diabetes mellitus & tracheal alteration interfering with general anaesthesia & associated with post-traumatic or post-inflammatory contractures & ASA class III and IV were not included in the study.

All the cases presenting with any degree of post-burn neck contracture admitted to the plastic surgery unit and fulfilling the inclusion criteria, were included in the study. This study was conducted after the approval of the Ethical Review Committee. Informed consent was taken from all patients or their guardians. A detailed clinical and radiological examination was carried out. The patients were assessed by adequate history, thorough examination and investigations by plain x-rays of joints underlying contractures and other investigations for evaluation of fitness for general anaesthesia. Before the interventional procedure was instituted, the cause of burn injury and functional grade of neck contracture was documented. A follow-up of 6 months was done to evaluate the range of neck motion and postoperative improvement in neck extension to document patient satisfaction. All data was recorded by the principal investigator on a predesigned proforma and then subjected to statistical analysis to measure the objectives. Biasness and confounder were controlled by strictly following the inclusion and exclusion criteria.

Statistical Package for the Social Sciences version 25 was used for data compilation and analysis. Frequency and percentage were computed for functional grade of contracture, Skin quality of neck, Co-morbid, chronic disease, grade, intervention, complications and functional outcome.

3. Results

The average age of the patient was 29.67±7.67 years. The mean height, weight and body mass index of the patients are also reported in Table 1.

Table 1: Demographic characteristics of the patients

Variables	Mean ± SD, F (%)
Age in years	29.67±7.67
Height (M)	162.18±7.92
Weight (Kg)	59.47±7.28
BMI (kg/m^2)	22.75±3.47

Table 2: Frequency Distribution of gender, burn injury, contracture and procedure

		Frequency	Percent
Gender	Male	38	25.33%
	Female	112	74.67%
Cause of burn injury	Flame burn	82	54.67%
	Acid burn	38	25.33%
	Scald burn	30	20%
Grade of contracture	E1	42	28%
	E2	54	36%
	E3	54	36%
Interventional procedure	Release/Z-plastics	24	16%
	Release/STSG	98	65.33%
	Local flap	24	16%
	Others	4	2.67%
Post-burn neck contractures	Poor	2	1.33%
	Good	52	34.67%
	Satisfactory	96	64%

There were 38(25.33%) male and 112(74.67%) female. Regarding the causes of burn injury, 54.67% were burned by flame, 25.33% were burned by acid and 20% were scalded. The functional grade of contraction is also presented. Out of 150, 20(13.3%) had hypertensive, 10(6.7%) epileptic and 4(2.7%) had hepatitis C. Almost 65% of the intervention procedure was release/ STSG. The frequency of functional outcomes in managing post-burn neck contractures is presented. Out of 150, 96(64%) patients showed satisfactory outcome, 52(34.67%) had good outcome and 2(1.33%) patients were poor outcome. Table 2

Table 3: Frequency of functional outcome in management of post-burn neck contractures stratified for effect modifiers

		Outcome			P-Value
		Good	Satisfactory	Poor	
Age (years)	≤ 30	46(45.1%)	54(52.9%)	2(2%)	0.999
	31-40	4(11.8%)	30(%)	0(0%)	
	>40	2(%)	12(%)	0(0%)	
Gender	Male	18(47.4%)	20(52.6%)	0(0%)	1.000
	Female	34(30.4%)	76(67.9%)	2(1.8%)	
Education	Illiterate	16(30.8%)	36(69.2%)	0(0%)	1.00
	Primary/Secondary	32(38.1%)	50(59.5%)	2(2.4 %)	
	Matric / inter	4(28.6%)	10(71.4%)	0(0%)	
Occupation	Housewife	18(25%)	54(75%)	0(0%)	1.00
	On Job	28(42.4%)	36(54.5%)	2(3%)	
	No Job	6(50%)	6(50%)	0(0%)	
Burn Injury	Flame	32(39%)	40(59.8%)	1(1.2%)	1.00
	Acid	12(31.6%)	26(68.4%)	0(0%)	
	Scald	8(26.7%)	21(70%)	1(3.3%)	
Duration of Hospital stay	1-5	30(40.5%)	44(59.5%)	0(0%)	0.999
	6-12	22(28.9%)	52(68.4%)	2(2.6%)	

4. Discussion

Adults who suffer from severe burns may pay less attention to the neck. Even though the frequency is reduced when compared to other joints in the extremities, significant contracture may occur if initial therapy is focused on resuscitation and care of other locations.[12] Neck contracture, defined by a reduced cervical range of motion, may have devastating effects on both function and appearance. Lip ectropion, micrognathia, and mandibular retrusion are all side effects of cervical burns that affect the face and chest.[14,15] The unique three-dimensional (3D) geometry of this location and the results of contracture make rebuilding more of a challenge. Aesthetic shape is mostly determined by the cerviomental angle and chin prominence in addition to the lip curvature. Sometimes everything is lost because of burn contractures. The 'visible hypothesis' suggests that burn survivors who have scars that are easily seen by others, such as those on the face, would be more likely to feel dissatisfied with their bodies. Restoring a natural, relaxed, and expressive face look is the primary objective of facial burn repair.[16,17]

The average age of the participants in our research was 29.67+7.67 years. The male-to-female ratio was 75.33% to 25.3%. Flames were responsible for 54.67 per cent of burn injuries, acids for 25.33 per cent, and scalds for 20

per cent. Sixty per cent of research participants were female, and 63% of patients were between the ages of 11 and 30. Seventy per cent of the patients had burns of between 21 and 40 per cent, and eighty per cent of them were caused by flames. Complaints of neck tightness after a burn were the subject of prior research. There were 63.33 per cent women and 36.67 per cent men. Patients ranged in age from 5 to 56, with 33.3% being under the age of 20, 40% being between the ages of 20 to 40, and 26.67% being above the age of 40.[13]

We found that 64.7% of patients with post-burn neck contractures who underwent treatment had a tolerable functional result, 34.67% % had a good outcome, and 1.33% % had a bad outcome. According to a study by Hassan et al., just 16.6% of patients were dissatisfied with the results of their surgery, while 83.3% were very happy. Regarding education levels, we saw that 26.6% had completed Grade 1, 40% had completed Grade 2, 20% had completed Grade 3, and 13.3% had completed Grade 4. Grades 1, 2, and 3 were present in 28% of happy customers, whereas grades 3 and 4 were present in 20% and 8%, respectively. There were 40% grade 4 cases, 20% grade 3 cases, 20% grade 2 cases, and 20% grade 1 cases. The survey found that although 52% of participants were satisfied with the acceptance findings, 27% were pleased, and 11% were thrilled, just 12% were dissatisfied overall.[13]

In Mody et al., study out of 22 patients that underwent contracture release, 86% were resurfaced with SSG and 14% with flaps.[18] Fifteen per cent of the patients in the study by Devi et al. had a z-plasty alone, and the same percentage had a combination of a z-plasty and SSG. The other patients all received flap covers.[19] Thirty patients in the Makboul et al. research had contracture release and SSG, while another 110 patients had z8 plasty. Seventy per cent of patients in the research by Kumar et al. had contracture release followed by SSG, while fifteen per cent each underwent flap cover and multiple z plasty. Ninety per cent of patients in the PremaDhanraj et al. research had release and SSG, while the remaining ten per cent got z-plasty.[20] All 12 patients in the research by Al Zacko et al. received SSG after PBC neck release.[21] Only one flap cover was performed with a z-plasty or release + SSG in research by Saygin et al. of 18 patients with PBC neck. After contracture release was performed on 10 of 43 participants in a study by Karn et al. A total of 46.51% had SSG resurfacing, 25.58% had FTSG resurfacing, and 27.9% had z-plasty.[22]

After surgery, the cervical-mental angle of all patients in research was between 100 and 120 degrees, and the distance from the chin to the sternum greatly improved with neck flexion. Devi et al. found that a cervical-mental angle of 100–125 degrees was achieved in all patients.[19] In the research by Kumar et al., 78% of patients were able to attain a neck extension of more than 110 degrees, whereas 10% were limited to an extension of less than 110 degrees. Ten per cent more cases saw diminished performance when the tilt was less than ninety degrees.

5. Conclusion

In this analysis, 64% of patients with burn-related neck contractures reported a positive functional result after treatment. Contracture release under tumescent anaesthesia, followed by oral intubation and resurfacing of the raw region with SSG, is a successful treatment for patients with neck contractures resulting from a burn. After surgery, patients with severe degrees of neck rigidity might expect enough extension to be attained and the cervico-mental angle to be normalized, resulting in a favourable functional outcome. Splinting, physical therapy, and emotional and social support all play crucial roles in the patient's recovery after surgery.

INSTITUTIONAL REVIEW BOARD

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Contributions:

S.M - Conception of study
M.A - Experimentation/Study Conduction
S.R - Analysis/Interpretation/Discussion
A.B - Manuscript Writing
S.N - Critical Review
- Facilitation and Material analysis

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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