

Evaluation of Ideal Surgical Method for Management of Post Burn Scar Contracture of Neck.

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ABSTRACT

Background: Post burn neck contractures not only affect the movements of the neck, but also can affect the function of the lower face as well as result in possible tracheal alteration and distortion of the cervical spine. As these contractures cause major functional and cosmetic problems with resultant economic and psychosocial implications, operative correction is generally recommended, particularly in children in whom they can cause growth imbalance in the head and neck area. **Aim:** To determine and recommend the ideal skin cover for the post burn scar contracture release defects with regard to both functional and cosmetic outcome. **Methods:** Patients who were diagnosed as having post burn scar contracture of neck by clinical examination, were taken up for the study. **Results:** In our study, contracture release followed by skin grafting was done in 28(70%) patients, contracture release and flap cover and multiple z plasty in 6 (15%) each. 11 patients (27%) felt good, and 3 patients (11%) felt excellent on cosmetic appearance. **Conclusion:** TYPE A contracture, release and flap cover with supraclavicular flap is highly recommended and should be the first choice. For TYPE B contracture, Supraclavicular flap is not sufficient and has to substituted with a skin grafting. For TYPE C scar, release and skin cover with grafting is the ideal choice provided, proper post op care such as immobilization, positioning and splinting and compression therapy are followed up.

Keywords: Burns, contractures, post-burn scars.

INTRODUCTION

Burn trauma constitutes the second most common cause of trauma-related deaths after vehicular accidents, both in developing as well as the developed world.^[1] With evolution man has lost the ability to regenerate compound organs and has only the relatively simple, and often unsatisfactory, substitute of wound healing by collagen deposition to restore physical continuity.^[2] Contraction is the active biologic component of wound healing that decreases the dimension of the involved connective tissue. Contracture is the end result of the process of contraction. The process of contraction may lead to severe functional and aesthetically incapacitating contractures such as burn scar contractures. Post burn contractures are perhaps the most dreaded and distressing morbidity in patients surviving major burns.^[3] The reconstruction of the burn patient is often a long process requiring multiple procedures. Restoring function, obviously, has a higher priority

than improving cosmetic appearance. However, cosmetic reconstruction will also help the patient improve his/her activities of daily living, improve function, or return to the job.^[4] The term 'Burns Rehabilitation' incorporates the physical, psychological and social aspects of care and it is common for burn patients to experience difficulties in one or all of these areas following a burn injury. Reconstructive techniques are applied in a hierarchy, as per the reconstructive ladder, starting from the simplest procedure like Split Skin Grafts on the first step to compound tissue transfer by Micro vascular surgery at the other extreme.^[5,6] Patients suffering from physical and psychological pain of burn injury and disfigurement are in need of a special level of caring. These patients not only require technical expertise but also a great deal of surgeon's time, understanding and compassion. An optimistic attitude on the part of surgeon is crucial to patients' physical and emotional rehabilitation, but optimism must be tempered with realism.^[7]

AIM

To determine and recommend the ideal skin cover for the post burn scar contracture release defects with regard to both functional and cosmetic outcome.

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MATERIALS AND METHODS

This prospective study was conducted in Department of Plastic surgery, Government Rajaji hospital, Madurai Patients who were diagnosed as having post burn scar contracture of neck by clinical examination, were taken up for the study, after explaining the nature of the disease and various modalities of treatment available. Various presentations, complications, treatments options and there results were analysed. Inclusion Criteria: Burns of minimum 6 months duration, More than 14 yrs age groups, Both sex groups, Contractures secondary to thermal and chemical burns, Associated hypertrophic scar and keloid. Exclusion Criteria: Acute burns, Burns in Children (<14yrs), Associated post traumatic/post inflammatory contractures, Contractures secondary to electrical burns. Factors Assessed: Type of Scar Contracture, Linear Scar, Broad Scar Type A Anterior or any one of the lateral surface is involved, Type B Anterior and either one of the lateral side is involved, Type C Anterior and both the lateral sides are involved. Range of Motion: Neck burn cases have restricted neck movement, during upward and lateral direction. Range of motion is graded. Type of Skin: The contracted skin can be hypertrophic or keloidal in nature and also scar is assessed in terms of maturity. Stiffness, tenderness, erythema are signs immature scar which are better avoided till maturation. Nature of the surrounding skin is examined as it helps us in planning the type of flap. Finally, donor thigh for scarring and previous grafted area is noted. Real defect was calculated as described.

RESULTS

In our study, majority of the patients 12 (30%) were in the age group of 24-35 years of age , followed by 10 (25%) in the age group of 24-35. Above 45 there were 12 patients (30%) and 6 (12%) in 14-25 years. In our study, majority of the patients were female, 32 (80%) of the total 40 patients, Male patients were only 8 in number (20%). In our study majority of patients 35% were belonging to the type B scar, followed by type C 30%. [Figure 1]

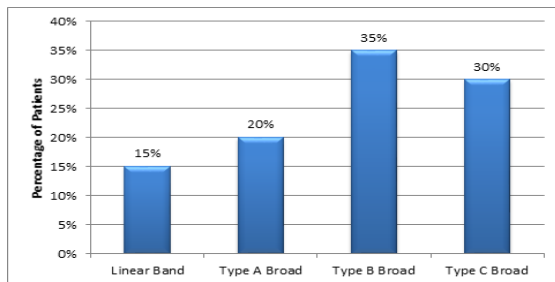


Figure 1: Distribution of Type of Scars

In our study, neck alone was involved in 6 patients (15%). About 50% of the patients (20 pts) had associated hand burns. Axilla was the next

commonly affected, N= 15 (37%). Face was involved in 10 and breast in 9 patients. [Figure 2]

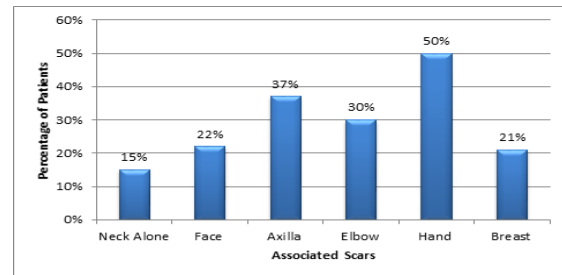


Figure 2: Distribution of Associated Scars

In our study, contracture release followed by skin grafting was done in 28(70%) patients, contracture release and flap cover and multiple z plasty in 6 (15%) each. [Figure 3]

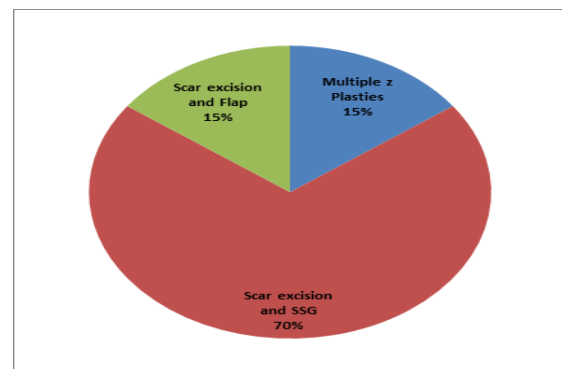


Figure 3: Distribution of Procedures done.

In our study, there were 4 patients out of the 34 grafted cases (11%) who had more than 10% graft loss and one patient who had more than 25% graft loss. One patient under went regrafting. And hypertrophic scar occurred in 3 (8%) of the patients. Recontracture occurred in 4 patients. [Table 1]

Table 1: Distribution of Complications.

Complications	Percentage of Patients	
Graft Loss (34 cases)	> 10%	11%
	> 25%	2%
	> 50%	0%
Flap loss	0%	
Recontracture	10%	
Hypertrophic Scar	0%	
Secondary Procedures	5%	

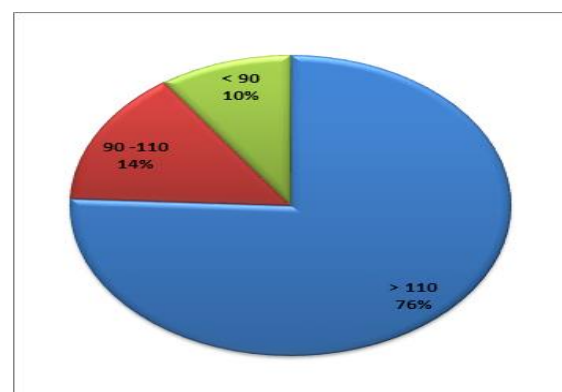


Figure 4: Distribution of Neck Extension Post operative.

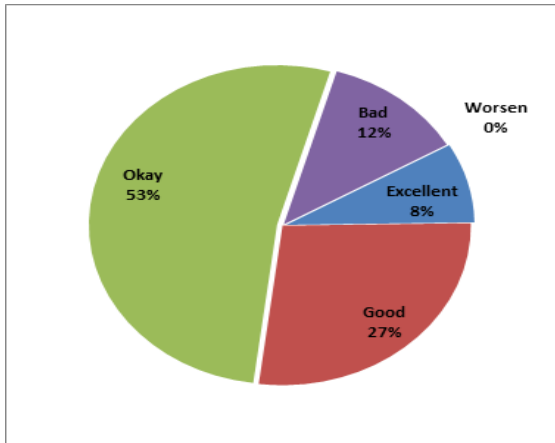


Figure 3: Distribution of Cosmetic Acceptance among patients.

In our study, all our grafted cases were positioned with neck in extension post operatively. Splinting of neck was done for all patients, however, only 28 patients (82%) maintained for 3 months. Compression garment was used by 24(60%) of all our patients. In our study, 31 patients (78%) could achieve a neck extension upto 110 angle, 4 patients developed cervicomentangle angle of less than 90. One patient underwent resurgery. In our study, majority 21 patients (52%) felt 'okay' with the results of acceptance, 11 patients (27%) felt good, and 3 pts (11%) felt excellent. However, 12 % of the patients were not happy with the result. [Figure 4 and 5]

DISCUSSION

Post burn contracture is one of the most common problems in our country and usually seen in lower socio-economic people. Man has lost his ability to regenerate tissue and it is often replaced by scar tissue. Burn contractures of the neck can produce a significant impact on quality of life by reducing a patient's ability to perform activities of daily living. Based on the type of scar contracture that was described earlier they are classified in to 4 types. TYPE B scar contracture (N=14) is the most common type of contracture that occurred in 35% of the cases. TYPE C scar contracture occurred in (N=12) 30% of cases. The less severe form, that is, the TYPE A noted in (N=8) 20% of the cases. Linear band variety which is simple scar contracture happens rarely, (N=6) 15% of cases. In other words, most of the patients suffer severe burns to the neck involving at least anterior and lateral sides. Also majority of the patients required moderate to high tissue replacement. Schwarz RJ et al.,^[8] as well as Stern PJ et al.,^[9] noted that the completeness of release that can be expected from a procedure depends on the age of the patient, the age of the burn injury, and the severity of the deformity. Among the 40 patients, Neck alone was involved in only 6 cases (15%), in other words, involvement of

neck alone is rare and it usually occurs with other parts. About 50% of the patients (20 pts) had associated hand burns because hand forms protective position in case of burns. Axilla was the next commonly involved, N = 15 (37%). Face was involved in 10 (15%) and breast in 9 patients. These occur as they are the congruent regions. These contractures are commonly dealt in a separate sitting.^[10]

With regards to treatment, 60% (N=32) of the patients under went scar excision and SSG. For all the patients with linear band contracture (N=6) multiple z plasty was done. And 15% (N=6) underwent flap cover following scar excision. Majority had to undergo SSG as the defects were larger and they required larger tissue replacement. Availability of the tissue in adjacent area is a greater limitation for flap cover. Greenhalgh et al.,^[11] reported 62% success rate with skin grafting. Where as in our study we could achieve a graft take of more than 90%.

Complication, graft loss were minimal, there were 4 patients (10%) who had more than 10% graft loss, 1 case who had more than 25% graft loss. One patient had to undergo re-grafting and the rest of the cases were managed conservatively. The cause for such minor losses are mainly due to difficulty in achieving immobilization and minor hematoma that occurs. Hypertrophic scar occurred in 3 (8%) of the patients. Recontracture occurred in 10 % of the patients (N=4). Post operative neck splinting is an important cause for low recontracture but still 100% result should be the aim. Carmichael et al.,^[12] reported that 69% of contractures recurred at an average of 17 months post treatment. In our study the contracture rate was only 10 %. There were no cases of flap loss.

We could achieve a good functional results, in 78% (N=31) of our patients we could achieve a neck extension of more than 110 degree. And around in 10 percent it was lesser than 110 degree. In another 10% , the results were poorer with angle less than 90 degree. However, Devi SR et al.,^[13] achieved a neck extension of more than 110 in all cases.

Cosmetic acceptance was surprisingly better. Majority, 21 patients (52%) rated as 'okay' with regards to cosmetic acceptance, 11 patients (27%) rated 'good', and 3 patients (11%) rated as 'excellent'. However, 12 % of the patients were not happy with the results and they rated as 'bad'. The better ratings were probably due to following reasons. Firstly, the commonest age group being 24 to 35 years and post marriage. Secondly, High tolerance among the sect of these working, lower socioeconomic group, who are much happier with functional recovery. But young unmarried girls were not happy with the results. However, we have recommended adjuvant therapy for them to improve the appearance of their scar.

CONCLUSION

Post burn scar contracture is a disabling problem which affects mainly the lower socio economic people and the people of active age group. For a type a contracture, release and flap cover with supraclavicular flap is highly recommended and should be the first choice. For type b contracture, supraclavicular flap is not sufficient and has to be substituted with a skin grafting. Simple cover with skin grafting following release is a good choice but with minor complications. When given a choice, flap with skin grafting should be preferred, because it has good functional outcome and avoids prolonged splinting and less complications, when compared to grafting alone. For type c scar, release and skin cover with grafting is the ideal choice provided, proper post op care such as immobilization; positioning and splinting and compression therapy are followed up. Patience, persistence, and determination are essential to accomplish successful reconstruction. The skilful application of basic surgical techniques to the reconstruction of post burn deformities can be gratifying to patients and surgeons alike.

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