

Complex Post Burn Scarring and Contracture in the Neck and Chest with Secondary Sinus Formation-A Case Report

Shriya Reddy A¹, Manimaran Ramachandran², Kanchana Koppolu^{2*}, Barathi Raja¹, C. Srinivasan¹

¹Department of General Surgery, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India

²Department of Plastic Surgery, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India

Abstract

One of the most prevalent burn sequelae is postburn contracture (PBC). Contractures involving the neck lead to severe deformities as well as functional debilitation like loss of neck movements and lip seals. Moreover, cosmetic disfigurement has social implications which affect the daily life of the patient. It is a surgical challenge to release the contracture and reconstruct the area by giving a good cosmetic outcome as well as restoring the functions.

Keywords: Aesthetic Outcome, Cervico-Mental Angle, Functional Improvement, Postburn Contracture, Split Skin Grafting.

Introduction

Severe burns particularly involving the exposed areas like the face and neck, are prevalent in both domestic and professional incidents involving patients who did not wear proper protective gear [1]. The severity of scarring and deformity after damage is determined by the depth of the burns. The time taken for the burn wound to heal is more as the depth of the burn increases, and no amount of therapy will eliminate scarring and contracture [2]. Scarring does not occur during the healing process of burns that are superficial, but 2nd degree-deep dermal burns and full-thickness burns heal with severe scarring. Neck burns result in anterior cervical contractures, where neck extension is restricted, in particular. The scar creates a synechia effect if it meets or covers the face and chest. This kind of disfigurement causes physical and aesthetic malformations in exposed regions like the neck and face [3].

These deformities may induce considerable depression, which affects the patient's quality of life in ways beyond merely physical or functional incapacity. Considering both aesthetics and functionality, cervicofacial contractures would be the first to undergo release [4]. Reconstructive surgery principles state that pliable donor tissues with a similar texture and colour should be used to fill the defect [5]. The considerable surface area needed can lead to significant donor site morbidity if the surgeon intends to entirely release and restore in a single procedure, a big neck defect that follows scar release. Finding a happy medium between limiting donor site morbidity and achieving total scar resurfacing is no easy task [6]. The size of the affected area, the specific location, and the availability of non-scarred tissue for skin grafting all play a role. Additionally, skin grafts are a safe, dependable, and easy approach [7].

Methodology

The patient, a 39-year-old woman, sustained severe burns of about 35 % TBSA (Total Body Surface Area) involving the neck, upper torso and both upper limbs 3 years ago, which was treated conservatively. She developed a contracture neck at a later date for which she underwent a release and skin grafting at another centre. Two years after the procedure, she developed a recurrent contracture of the neck with ectropion of the lower lip and presented to us with problems like drooling of saliva,

inability to talk, hair inclusions that make it difficult to wash, recurrent, medically resistant folliculitis, and a leaking sinus (Figure 1). After complete evaluation and obtaining fitness, contracture release and excision of the scar with SSG were performed (Figures 2 and 3). Postoperatively, she showed a considerable improvement in aesthetics, personal cleanliness, speech and good lip seal. Neck splinting was done initially which was later replaced by a soft collar. The patient kept on long-term follow-up and was compliant with the physiotherapy and splint usage (Figure 4).



Figure 1. Pre-Op Picture Showing Severe Grade-3 Extensive Current PBC Neck & Chest



Figure 2. Intra-Op Picture Showing Complete Neck Scar Excision Resulting Huge Defect



Figure 3. Immediate Post-Op Picture Showing Cervico-Mental Angle and Lip Seal are Restored



Figure 4. Six Months Post-Op Picture Showing Good Graft Uptake and Functional Improvement

Results

The patient recovered well after the procedure with good graft uptake. The lip seal was restored, therefore there was an improvement in speech and oral continence. The patient was able to extend her neck and establish a forward gaze. The Cervico-mental angle was maintained and there were no recurrent infections. The cosmetic outcomes were good with good colour match of the skin and restoration of the contour of the neck.

Discussion

Reconstructive surgeons have a dilemma with post-burn neck contracture, a crippling functional and aesthetic deformity experienced by patients [8]. There is a greater prevalence of severe contractures in underdeveloped regions, where access to primary and secondary burn care is often restricted, and where splinting, physical therapy, and primary excision and grafting are not always effective treatment choices [9]. One common complication of

letting burns heal naturally is the development of hypertrophic scars and severe contractures. This is especially true for younger patients with darker skin tones who sustain severe second or third-degree burns [10].

Onah's Classification of Postburn Contracture of the Neck: 1. Mild anterior contracture: limited extension, full flexion to normal anatomic position, skin, subcutaneous tissue involved 2. Moderate anterior contracture: extension causes significant pull at uninvolved lower lip skin, subcutaneous tissue involved. 3. Severe anterior contracture: restricted extension, skin, subcutaneous tissue and strap muscles involved. 4. Posterior contracture: neck held in extension; skin subcutaneous tissue involved.

Problems Associated: Grossly restricted neck movements, fixed flexion deformity, malnourishment, anaemia and hypoproteinaemia. Possibility of restricted mouth opening and narrowed nasal passages, difficult laryngoscopy and endotracheal intubation, compromised airway, Psychiatric tendencies in patients and possible drug interactions in anaesthesia. Poor oral hygiene, vision problems, discharging sinus formation & synechia formation.

To manage burn contractures surgically, it is necessary to release the contracture completely while protecting vital anatomical structures like arteries, nerves, tendons, etc [11].

Incision vs Excision: Rather than an excision, an incision is usually the better choice for releasing a contracture. Just making an incision reduces the need to cover the skin. You can't risk making a huge raw area if you try to remove even a little portion of a scar when the scars are that deep.

In some cases, excision may be necessary. For example, (a) removing small, nearby areas that are either depigmented or hypertrophic will improve the overall aesthetic outcome. (b) To provide a secure foundation for the split-skin

graft "take," it could be required to remove scars that are too thin or unstable, chronic ulcers that don't heal, sinuses that don't drain, and any contracture that hasn't healed. (c) Following the principles of aesthetic units, it may be necessary to eliminate scars before applying the graft or flap [12].

In our case we have done an excision of the contracture along with the surrounding scar tissue, discharging sinuses and synechia.

Immediate vs Gradual Release: Typically, the whole release of the contracture should be made available on the table simultaneously. Joint subluxation or dislocation, together with the considerable shortening of musculotendinous units and neurovascular systems, makes the rapid and complete release of severe long-standing contractures an impractical goal [13]. In all of these cases, following as much relaxation as possible, full correction is achieved gradually over several weeks using serial splinting, skin/skeletal traction, or modern distractor systems. The skin cover is supplied after the complete correction has been accomplished [14]. In our case, it was possible to release the contracture completely in a single stage.

Provision of Skin Cover: Commonly, skin grafts are used to cover the bare regions that occur when post-burn contractures are released. The gold standard for contracture treatment is the use of thick or intermediate split skin grafts, though flaps are also used to cover the defects after contracture release.

Coverage with flaps is used in unique cases. Tensor fascia lata flaps are used for groin contractures and supraclavicular flaps are used for neck contractures. For linear or webbed contractures, a single local flap treatment like Z plasty, V-Y plasty, V-M plasty, etc., may be sufficient to address the condition [15]. However, the risk of necrosis is constant when these flaps are elevated in scar tissues. Additionally, they can only be used in mild instances. Both free and pedicled flaps are

possible [2]. The tissue expander is another technique where a subcutaneously implanted expander is gradually expanded in size with sterile isotonic saline. This tissue expander stays in place for six weeks until the tissue is completely grown. After that, the expander is removed and the expanded skin is used to cover the raw area after contracture release [16].

In our patient, a thick SSG was used because the excision surface was large measuring about 28x20cm, because of which any kind of flap was not possible and tissue expanders can't be used, due to scarring in the surrounding areas.

Postoperative Care: After the graft becomes stable or the flap margins heal, which typically takes three weeks, the corrected or released position must be maintained [17]. Static or dynamic splints, together with regular physical therapy exercises, are necessary to maintain a complete range of motion for the joints after surgery, particularly with static splinting [18]. The grafts must develop and full range of motion must be attained before this treatment may be discontinued. In our case, we used static splinting for 3 weeks which was replaced by a soft collar for 6 months. Physiotherapy for neck movements was started after 3 weeks and the patient continued to do the exercises at home for 6 months.

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Conclusion

Post-burn contractures should be addressed for functional as well as cosmetic improvement. The process of skin grafting is a straightforward, dependable, and risk-free procedure to resurface the raw area after contracture release. Postoperative splinting and physiotherapy are as important as the surgery to prevent recurrence. Improvement in postoperative neck function, cosmetic appearance (colour match, cervico-mental angle), and overall health were all outcomes of using sheets of unmeshed SSG in the neck and lower face.

Acknowledgement

We acknowledge everyone who contributed to this article whose names are not mentioned here. Our sincere gratitude to the anaesthesia team for taking up this case of difficult airway and managing the patient intraoperatively and postoperatively. The cooperation of the patient in being compliant with the treatment protocol and postoperative splinting is commendable.

Conflict of Interest

The authors declare that there is no conflict of interest in the publication of this case report.

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