Surgical Corrections in a Patient with Face & Neck Burn Deformity

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ABSTRACT

Introduction: Face and neck burn deformity is the most common deformity after deformity of hand. Flame burn and chemical burn are the common causes for the all types of burn contractures. Burn contractures involving the anterior neck represent a surgical problem for the Plastic surgeons. **Objective**: To evaluate the outcome of patients who underwent reconstructive surgery for face and neck burn deformity. **Materials and method:** The study was conducted in the department of surgery in plastic surgery unit, NGMC between February 2013 to June 2015. During this period 36 patients underwent reconstructive surgery. **Result:** In 36 patients, there were 12 males and 24 females. The age of patients ranging from 11 years to 56 years. The overall results were satisfactory in 34 cases and not satisfactory in 2 cases, The clinical satisfaction degree was 94.44% in overall evaluation. The average follow up period was from 3 months to 1 year. **Conclusion:** Among the different types of contractures, neck contractures are also very frequently treated. Common surgical procedure is release of contracture and application of skin graft, the other techniques are applied like expanded or without expansion island flaps, free flaps. Finally the main objective of the different surgical approaches is to obtain the better functional and aesthetical result.

Key words: *Post burn deformity, neck flaps, skin graft*

INTRODUCTION

Burn contractures involving the anterior neck represent a surgical problem for the plastic and reconstructive surgeon. The major problem is to obtain a large amount of skin with the same functional and aesthetical properties as neck skin. Local or distant flap based on the same artery as an island flap can be cover the anterior neck after release and excision of post-burn scars[1]. The reconstructions which are done by means of skin graft, Z- plasty, or other local flaps are performed as early as possible. Sometimes without waiting for scar maturation, an expanded skin flaps or free flaps are used. The best result are obtained when the neck is reconstructed by expanded island flap and skin graft[2]. To evaluate the outcome of patients who underwent reconstructive surgery for face and neck burn deformity is objective of this study.

METHOD AND MATERIALS

This study was conducted in 43 reconstructive procedures (Table III) for 36 patients from February 2013 to June 2015 in the unit of plastic and reconstructive surgery at Nepalgunj Medical Collage Teaching Hospital Nepalgunj & Kohalpur, Banke. All the patient had suffered from flame or chemical burns in the neck and face. All were attended with the aim of reconstruction. Previously none of the patients had received any preventive therapy, such as the application of pressure garments, silicone pads, splints during the late phases of wound healing.

Clinical data

Study was carried on 36 patients (Table I), including 12 male patients (33.33%) and 24 female patients (66.66%). youngest is 11 years and the oldest is 56 years old, average age is 31.4.

Sex	No. of cases	%
Male	12	33.33
Female	24	66.66

Table I: Distribution of case by sex

RESULT

Total number of cases were 36. In 36 patients 43 procedures were done. Among 36 patients 29 patients underwent single stage reconstruction and 7 patients needed reconstructive surgery in two stages. Out of 43 surgical procedures, 11(25.58%) of them were given Full thickness skin graft, 20(46.51%) were split skin graft and 12(27.90%) were Z-plasty as a Local flap (Table II).

Age Group	No. of cases	%
10 - 20	9	25
21 - 30	13	36.11
31 - 40	7	19.44
41 - 50	5	13.88
51 and above	2	5.55

Table II: Distribution of cases by age

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Post-surgery recovery was successful. The evaluations results were made in 5 to 7 days after stitch removal. Out of 36 patients, 29 patients had no graft rejection and they had good functional outcome. In two patients out of 7 patients who underwent reconstruction in two settings had hypertrophic scar. These patients also had good functional outcome and there was no rejection of graft. The clinical satisfaction degree was 94.44% in overall evaluation. The scar after healing was obvious and a second stage repair was needed. The follow–up visit period was from 3 months to 1 year.

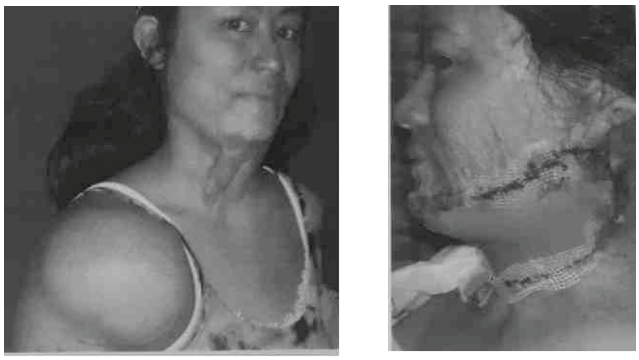
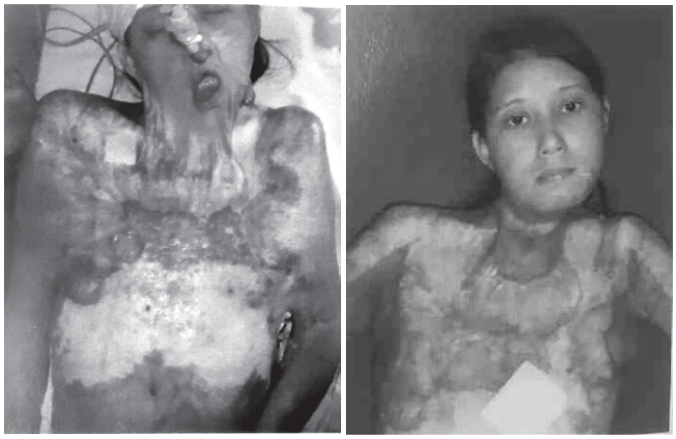


Figure 1: Pre operative **post operative**



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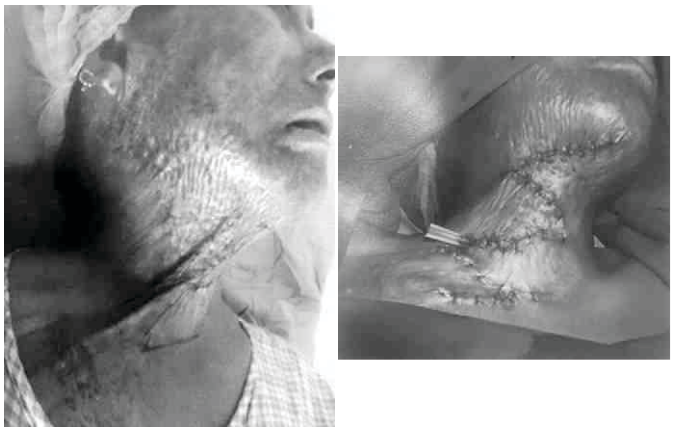

Figure 1: Pre operative **post operative**

Surgical Procedure	No. of cases	%
Full thickness skin graft	11	25.58%
Split Skin graft	20	46.51%
Local flap (Z-plasty)	12	27.90%
Total	43	100%

Table III: Types of surgical procedures

DISCUSSION

Severe post burn neck contracture poses difficult problems to the anesthesiologist[3]. Usual technique includes blind naso-tracheal intubation or release of contracture under local anesthesia followed by intubation of the patient[5]. Other methods include use of the fibre-optic bronchoscope and laryngeal mask used for genral anaesthesia are expensive and may not be available in most places. Retrograde intubation is not possible because of presence of scar in the anterior aspect of neck. The neck contracture can be released under tumescent local anesthesia and extension was achieved[5,6].

Skin graft harvested under anesthetic dose of ketamine. If there is any problem associated with ketamine that can be dealt easily by intubating the patient, as the neck is completely extended. In children, ketamine is given right at the beginning of the procedure followed by injection of tumescent local anesthesia then release of neck contracture and skin grafting is performed. This method is very safe, as the respiration and swallowing reflex remains intact under ketamine. Burn scar contracture involving the anterior cervical neck presents a unique set of problems compared with the rest of the body. The challenge lies in the restoration and function of the body region[4]. Lawrence,C. explained that skin of the neck is thin and pliable and it is prone to the formation of contractures, which can affect the movement of neck and the function of the lower face[7].

Shiby Ninan showed in pigs that expansion as the same effect on skin vascularity as elevation of the area. (Mayo, 1992) that an expended parascapular free flap constitutes a large thin flap that can be used to fill large defects while still permitting the donor site to be close directly[8].Local flaps have the advantage of color and texture match with the injury site, with respect to the cervicohumoral shoulder region[9]. According to Lamberty and Cormack such flaps can be divided into three categories. Cervicohumoral flaps[17]. Random pattern cutaneous flaps, as describe by the Demurgasso F.,Three musculocutneous trapezius muscle flaps[10,11]. Zaki presented his experience in the management of post-burn neck contracture using the supraclavicular island flap[12]. Karacaoglan used expanded fasciocutaneous supraclavicular and shoulder flaps for the reconstruction of post-burn neck contracture[13]. In 1979, Lamberty was the first to describe the axial pattern of the shoulder flap based on the Supraclavicular artery[14].

The Supraclavicular artery arises from the transverse cervical artery (TCA) about 2-3 cm after the origin of TCA from the first part of the subclavian artery[15]. Though Lamberty has given the name to this artery , up to now misconceptions about the terminology still exist, and the angiosomes have not been defined exactly[14,16]. The boundaries of the flap fall within the skin territories of the Supraclavicular artery. The vascular territory extends from the Supraclavicular region to the shoulder cap[17].

Tissue expanders can increase skin territory; however maximum skin gain after tissue expansion is generally about 25%[18]. Local or pedicle skin flaps with similar color, thickness, and texture are limited to the territory of uninvolved skin[19,20]. Skin grafts alone or in combination with a dermal substitute like Integra has been described with varying success[21].

Free fascio-cutaneous or perforator flaps provide a better alternative.Tsai et al have described a series of burn neck reconstructions with free tissue transfer. Free as well as pedicle myocutaneous flaps have been successfully used for neck release with subsequent debulking procedures often advocated[22]. Hyakusoku pioneered the field of extended vascular-augmented and thinned cutaneous island flap[23,24]. The thinned occipito-scapular flap with microvascular augmentation is an excellent option for single-stage reconstruction of severe neck contracture[25].Efforts to minimize the potential disabling deformities of neck burns should be initiated during the acute period. The priorities include the functional goals of the preservation of tissue loss, and the prevention of deformed neck contracture[26].

For skin-grafted necks, a period of six months of cervical collar usage is advised as otherwise contracture may reoccur. To prevent secondary contracture, mouth splints are recommended to be used for at least six months. Aesthetic restoration of the neck and face for an acceptable normal appearance can be delayed until the scars are mature. After a certain time the scars may become less prominent, thus reducing the need for reconstructive procedures[27,28].

CONCLUSION

Treatment of post burn contractures are the routine work for plastic surgeons worldwide. Among the different types of contractures, the neck contractures are also very frequently treated. In moderate type of neck contracture skin graft with combination of Z-plasty is very useful and giving very good functional as well aesthetic result. Reconstruction of the anterior burn neck by local flap may offer advantage over the traditional technique of skin grafting and delayed reconstruction. It can be indicated in selected patients, obtaining good aesthetic results, with earlier functional recovery and reducing the number of surgical procedures required.

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