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Skin Graft in Post Burn Neck Contractures

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ABSTRACT

Introduction: Severe post burn neck contracture causes distortion and limitation of neck movement. Reconstruction of this distortion is challenging for both the plastic and reconstructive surgeon and the anesthesiologist.

Patients and Methods: Seventeen cases were subjected to operative release of post burn neck contracture under general anesthesia. For intubation, patients were divided into Group I were glidiscope (video assisted) laryngoscope was used while in Group II, the fibreoptic laryngoscope was used. Surgically, patients were divided into two groups. In group A, the raw area was covered with full-thickness skin graft. While in group B, the raw area was covered with partial-thickness skin graft.

Results: The time of intubation was significantly shorter in Group I than in Group II. Surgically, in group A, the rerelease was fewer while in group B the recontracture and rerelease were more especially in children due to the different growth rate of normal skin and scarred tissue. Complications were mild like infection, partial graft loss, hypertrophic scar, hypopigmentation or hyperpigmentation of the skin graft.

Conclusion: Glidiscope has less time than fibreoptic technique and laryngeal mask is an alternative technique in failed intubation. The use of skin graft in treatment of post burn neck contracture is simple reliable and safe procedure. Full-thickness skin graft gives better results than split-thickness skin graft.

INTRODUCTION

Patients with post burn neck or mentosternal contractures are frequently seen in the Plastic and Reconstructive Surgery Department in El Mataria Teaching Hospital. This deformity not only causing cosmetic and social embarrassment but also causes anatomical distortion and restriction of neck movement resulting in varying degrees of difficulty in airway management **[1]**. The critical function and aesthetic importance of the cervicomental angle is emphasized. The neck is subdivided into 3 anatomical subunits: (1) lower lip/chin subunit (2) sub mental subunit (3) anterior neck subunit. After release of the contractures the three subunits are resurfaced individually by skin graft or flap **[2]**. Goals of reconstruction are to obtain full range of neck movement and to restore the aesthetic appearance of the neck and face. Several methods have been described. Although all of them focus on achieving full extension and resurfacing of the neck, they often fail to restore an aesthetic contour to the neck especially in lateral view **[3]**.

In several cases with post burn neck contractures, the most common complications are difficulties with eating, drooling and chronic follicular infection in men. In neglected cases in children, mandibular underdevelopment and deformity is a distressing consequence of this injury. Despite the increasing application of early debridement and skin grafting with contracture release and pressure treatment, the number of post burn contractures continues to be a problem in plastic and reconstructive surgery **[4]**.

PATIENTS AND METHODS

Seventeen patients with severe post burn neck contractures with age between 18 to 46 years old were managed in Al Mataria Teaching Hospital. Twelve patients (70.6%) were females and five patients (29.4%) were males. All of them were operated under general anesthesia under the supervision of qualified anesthesiologist.

Anesthesia: All patients gave their informed consent. A peripheral intravenous line were started with standard monitoring (electrocardiogram, non-invasive blood pressure and finger tip oxygen saturation) applied. All patients were premedicated with 0.04mg/kg midazolam I V. induction of anesthesia was standardized with 2mg/kg propofol, 2ug/kg fentanyl and 1mg/kg succinyl choline. For intubation, the patients were randomized into two groups, in Group I (10 patients) Glidiscope was used while in Group II (7 patients), fibreoptic

laryngoscope was used. Two cases needed neck incision release to facilitate endotracheal intubation while another two cases were operated under general anesthesia with laryngeal mask (L M).

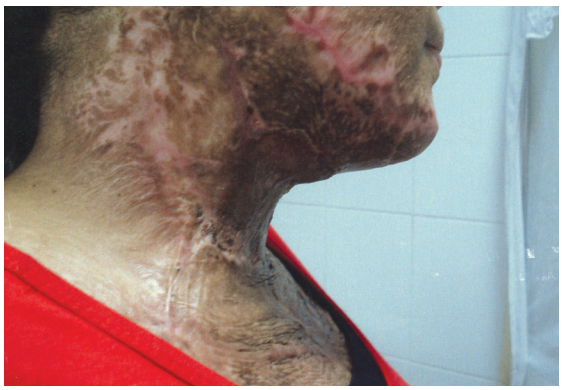
In this study, assessment criteria for intubation were: (1) Number of attempts and (2) time for each attempt (measured from opening of mouth until cuff of the tube is inflated). Maintaining of anesthesia by using the intermediate-acting muscle relaxant, Atracurium (0.2mg/kg) and controlled mechanical ventilation with O_2/volatile agent "Isoflurane" but in one case from each group, laryngeal mask was used and spontaneous respiration was maintained (O_2/Isoflurane). At the end of operation, the intubated patients received Neostigmine (0.04-0.07mg/kg) and Atropine (15ug/kg) after spontaneous respiration was regained. Fluid replacement was given according to blood loss and each patient was given 100mg corticosteroid to avoid any laryngeal edema.

Surgical technique: The patient was in supine position with the head hyperextended on a head ring. The lower face, neck and upper chest were prepared and draped. Skin incision was done in the area of neck contracture with excision of all scarred tissue. Good haemostasis was secured using electrocautery and ligatures. The skin graft was harvested from the lateral side of either right or left thigh. The skin graft was fixed by sutures to the raw area after full extension of the head of the patient. Few holes were done in the graft to prevent possible hematoma formation under the graft. Sofra-tull and tie-over dressing was applied over the graft followed by a well fitted soft neck collar. The donor area was dressed using sofra-tull and crepe bandage. In the postoperative period, patients were advised to keep the neck hyperextended by putting pillows under both shoulders.

Case (1): Preoperative.

Case (1): Postoperative.
Full-thickness skin graft.

Case (2): Preoperative.



Case (2): Postoperative.
Partial-thickness skin graft.

RESULTS

None of the seventeen patients suffered from any complication related to the anesthesia. According to the number of attempts for both groups for successful intubation:

No of attempts	1st	2nd	3rd	After neck release	Failed intubation (L M)
Group I	1	4	3	1	1
Group II	1	2	2	1	1
Total	2	6	5	2	2

There was difficult intubation in two cases. They needed neck release before intubation. Another two cases were operated under laryngeal mask with general anesthesia. Time of attempt (measured from opening the mouth until the cuff of the tube is inflated). In Group I the time was 66±22 seconds. While in Group II it was 112±28 seconds. So, the time was significantly (p<0.01) shorter for the glidiscope than the fibreoptic technique.

Surgically, patients were divided into two groups, Group A: 10 cases were treated with neck release and full-thickness skin graft while Group B: 7 cases were treated using split-thickness skin graft. Two cases (20%) of group A were suffered from partial loss of the skin graft. They were operated with another session of skin graft before hospital discharge. Two cases (20%) of group A and three cases (42.8%) of group B presented after 6 months with recurrent neck contractures corrected later by another procedure of neck release and skin graft. Full range of neck movement was achieved with natural good neck contour. However, one of the drawbacks of skin graft is difficult expectation of the skin graft color; it ranged from hypopigmentation, normal to hyperpigmentation of different areas of the skin grafted area. Hypertrophic scar was also noticed in few patients at the edge of the graft donor site.

DISCUSSION

Release of post burn neck contracture poses a challenging procedure to both the plastic surgeon and anesthesiologist. Usual techniques of anesthesia in those patients include blind naso-tracheal intubation, laryngeal mask, fiber-optic bronchoscope or release of contractures under local anesthesia followed by intubation **[5]**. Emlan HY et al., in 2008 stated that fixed flexion deformities in post burn mentosternal contractures could present serious airway challenges to the attending anesthesiologist during contracture release and skin cover. This could be overcome by the use of ketamine, inhalation anesthesia as well as the use of laryngeal mask airway before contracture release **[6]**. However, some patients can be intubated without much difficulty even without prior division of the contracture **[7]**. In this study, either glidiscope laryngoscope or fibreoptic technique was used for intubation in both groups but the standard Macintosh laryngoscope was not used to avoid any complication. Alternative techniques with higher success rates are desired. The use of different variations of laryngeal masks has been shown to improve success rate significantly **[8]**.

Achauer in 1991, classified anterior neck contractures into mild, moderate, extensive and sever depending on what fraction of the anterior part of the neck is involved in the contracting band **[9]**. While Onah in 2005 classified post burn neck contracture into four groups based on location of the contracting band(s) and extent of flexion and extension away from the anatomical position of the neck and jaws. Each group can be further subclassified depending on the width of the contracting segment(s) and availability of the surrounding supple skin **[7]**.

Neck release followed by split-thickness skin grafts was associated with more rerelease of the contracture than with full-thickness skin graft. The interval between the initial release and first rerelease was shorter than with full-thickness skin graft. It was also noted that children required more procedures during growth spurts reflecting the differential effect of the growth of normal skin and contracture tissue **[10]**.

This previous study results is comparable to our study as there was fewer rerelease in adult cases treated with release and full-thickness skin graft compared to those treated with release and split-thickness skin graft. Also, it was noted that there was more rerelease in younger than in older age cases. The color, appearance and quality of the skin in cases after full thickness skin graft were better than in cases after split- thickness skin graft.

Conclusion: In patients with post burn contracted neck, Glidiscope (video assisted) technique has less time than fibreoptic technique. Laryngeal mask is an alternative and safe technique in cases with failed intubation. The use of skin graft still has a role in treatment of post burn neck contracture. It is simple, reliable and safe procedure. The recommendation is the use of full-thickness skin graft in preference to split-thickness skin graft in released post burn neck contractures.

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