HEAD AND NECK BURNS: ACUTE AND LATE RECONSTRUCTION. DATA OF BURN INJURY MANAGEMENT IN 2007

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SUMMARY. Modern burn care is based on operative wound management. The evidence is clear that prompt excision and closure can be lifesaving for patients even with large burns. Facial burns that are full-thickness need grafting. Deep dermal facial burns need surgery in the third week post-burn. Deep burns to the eyelids should be excised and grafted early in order to prevent cicatricial ectropion and corneal exposure. Following healing from burns, the reconstruction of severe deformities and scars of the face, head, and neck confronts the surgeon with some of the most challenging problems in reconstructive surgery. Our purpose is to provide some retrospective data on acute and late reconstruction of head and neck burns in 2007. Eighty-one patients are considered who were operated on in the Burns and Plastic Surgery Service of the University Hospital Centre in Tirana, Albania, suffering from burns and also from burn deformities in the head and neck regions. A description is given of the different types of operative techniques used for head and neck reconstruction as also of developmental aspects of burned face deformities (physical and psychological) and of their correction. In all, 246 patients with burns and burn deformities were subjected to surgery in 2007. Of these we have extracted 81 cases in which the pathology concerned the head and the neck, including 13 cases of full-thickness facial burns needing excising and grafting. The other 68 cases were burn deformities. This last group of patients included 19 with facial deformities, 14 with perioral deformities, 12 with burn alopecia, ten with upper and lower eyelid deformities, nine with ear deformities, and four with cervical deformities. The operative techniques used were skin grafts (split-thickness or full-thickness), composite grafts, pedicle flaps, and tissue replacement. In burn alopecia cases, we used tissue expansion for the correction. Head and neck burns constitute some of the most challenging problems in acute wound care and in the subsequent rehabilitation and reconstruction. With knowledge of the reconstruction techniques available, plus an accurate diagnosis of tissue deficiency and secondary distortion, a carefully performed surgical plan is the first step for achieving improvements in a burn-deformed face.

Introduction

Modern burn care is based on operative wound management. The evidence is clear that prompt excision and closure is lifesaving for patients even with large burns. Facial burns that are full-thickness need grafting as soon as swelling has subsided, but in most cases no earlier than day 5 post-burn.[1] Deep dermal facial burns need surgery in the third week post-burn, because if they are left longer, they are prone to hypertrophic scarring.[2] Deep burns to the eyelids should be excised and grafted early in order to prevent cicatricial ectropion and corneal exposure. Each region thus requires special and accurate techniques.[3]

However, the reconstruction of severe deformities and scars in the face, head, and neck following healing from burns confronts the surgeon with some of the most challenging problems in reconstructive surgery. There are various techniques for planning burn reconstruction of the face, head, and neck, such as scar revision, split-thickness skin grafts, full-thickness skin grafts, composite grafts, pedicle flaps, and tissue replacements.[4]

To provide information about the acute and late reconstruction of the head and neck and about burn deformities, we propose this clinical study.

Our main research aim was to evaluate the surgical procedures used for reconstruction of the head and neck.

Method

This is a retrospective clinical study.

Eligibility criteria. The study concerns patients with severe burns and head and neck burn deformities treated in our operating theatre. Patients were of all age groups: children, adults, and the elderly. Patients were not admitted to the study if any of the following criteria were present: wounds or deformities following trauma or other pathologies similar to burns.

Setting and location. The study was carried out in the Burns Service of the Mother Teresa University Hospital Centre in Tirana, Albania. The patients were from Tirana and the rest of Albania.

The study collated information recorded in charts and in operating theatre records from January 2007 to December 2007.

Results

In 2007, 246 patients with burns and burn deformities were operated on in our Service. Of these, we extracted 81 cases in which the pathology concerned the head and neck. Children accounted for eight cases, and one patient was more than 65 years old; most of the patients were adults, i.e. 72 cases, or 87% of the total number. Thirteen patients had burns and 68 had burn deformities. In the

burns group we performed debridement in four cases and skin grafts in nine. In the burn deformity group of patients, 19 (24%) had facial scars, 14 (17%) had perioral deformities, 12 (15%) had burn alopecia, 10 (12%) had upper and lower eyelid ectropions, nine (11%) had ear defects, and four (5%) had neck contractures (*Table I*).

Table I - Presentation of head and neck burns and deformities

Burn deformities	Number of patients	Percentage
Facial scars	19	24
Perioral deformities	14	17
Fresh burns	13	16
Burn alopecia	12	15
Eyelid ectropion	10	12
Ear defects	9	11
Neck contractures	4	5
Total	81	100

Table II presents reconstructive interventions: scar revision was performed in 49% of such cases and debridement and grafting in 16%; a split-thickness skin graft was done in 12% of cases and a full-thickness skin graft in 8%; a skin expander was applied in 8%; other procedures presented lower values.

Table II - Reconstruction of burns and deformities

Reconstructive action	Number	Percentage
Scar revision	40	49
Debridement and grafting	13	16
Split-thickness skin grafts	10	12
Full-thickness skin grafts	6	8
Composite grafts	2	2
Pedicle flaps	3	4
Tissue replacement	1	1
Skin expander	6	8
Total	81	100

Table III presents the anaesthesia procedures during these reconstructive interventions. In the majority of patients we performed general anaesthesia rather than local anaesthesia (58 cases versus 23).

Table III - Types of anaesthesia used in all patients with burns and burn deformities

Anaesthesia	Number	Percentage
Endotracheal tube	32	39
Laryngeal mask airway	24	30
Intravenous	2	2
Local anaesthesia	23	29
Total	81	100

Discussion and conclusion

Reconstruction of the head and the neck confronts the surgeon with some of the most popular operative techniques applied in reconstructive surgery. Three major situations that plastic surgeons have to deal with in everyday practice are represented by the burn wound, wounds formed of granulation tissue, and post-burn deformities.

In each distinct condition, various techniques have to be used. Thus, if the patient is suffering from burn injury, importance has to be given first of all to local treatment, while at the same time attention has to be paid to general treatment. This strategy stimulates epithelialization of superficial dermal burns for which plans are made for surgical treatment. Usually face grafting can be scheduled for operation as soon as swelling has subsided, but not earlier than the first week post-burn. In such cases prompt wound closure with full-thickness skin graft should prove to be of great profit not only for the functional parts of the face but also for aesthetic parts correlating with normal mimicry.[5]

This strategy is highly advisable in non-severe burns and when the clinical situation allows this manner of treatment. In severe burns, where the clinical situation does not permit wound covering immediately after excision, it is more opportune to perform repeated non-radical debridements in order to profit in optimal time from granulation tissue that is ready for subsequent skin grafting. In a second moment, when the patient is clinically stable, corresponding to week three post-burn, plastic surgery can achieve definitive wound closure. Split-thickness skin graft is recommended for the face and forehead, and full-thickness skin graft for functional body parts.[1,2]

After recovering from the burn illness, patients return to the Burns Service for reconstruction of sequelae and deformities. Reconstruction with multiple procedures can take several years, during which time the plastic surgeon develops a plan to adjust the defects and modulate the scars. Pre-operative discussion between the surgeon and the patient can encourage the long-term plan and alleviate the procedures, thus being more profitable. We believe that operative procedures should be scheduled not only depending on patient needs but also on priorities determined by the burn team in collaboration with the patient.[6,7]

In the Tirana Burns and Plastic Surgery Service in Albania, when we are dealing with head and neck reconstruction, we define the priorities with regard to the body parts to be operated on stage by stage (*Fig. 1*). We thus give priority to the release of deformities in the peri-oral zone, followed by reconstruction of upper and lower ectropion, thirdly by reconstruction of chin and neck contractures, and fourthly by the correction of burn alopecia through tissue expansion and eyebrow reconstruction. The last two forms of intervention can be performed simultaneously if we use the tissues efficiently.

We have left to last the reconstruction of the ear and nose because such operations may be carried out in several stages needing lengthy special procedures. Certainly, nothing is fixed, and at the same time we can evidently perform more than one operation at a time. It is very important to define the main problem in order to realize the

procedures with a general consensus and common understanding.[8-11]

Our material clearly shows that surgical procedures performed in the head and neck region constitute one-third of the pathologies treated surgically by the burn team in one year. Our efforts have focused on choosing the appropriate techniques that at the same time should give functional and cosmetic results. We have recently used full-thickness skin grafts, composite grafts, and local flaps as well as modulation or tissue replacements, because we are convinced of their benefits.

The use of tissue expansion is irreplaceable for the treatment of burn alopecia.[12] In cases of diffuse scars in the head region we make special efforts to use tissue flaps generated not only as advancing flaps but also as rotating flaps in order to reach distant defects. To achieve this object, it is absolutely necessary to prepare a precise preoperative plan in order to position the tissue expander in a territory that is supplied by an arterial-venous couple, with a view to delineating the future flap in this area. We have observed that this method gives satisfactory results, avoiding repeated expander use. We would underline the importance of closing the donor site directly after transfer of the flap from the expanded area.

Our statistics how that most of these surgical operations in the head and neck were performed under general anaesthesia, with an endotracheal tube or a laryngeal mask airway. This reflects not only the careful work of our medical staff but also for severity of the pathologies, which require lengthy and at the same time high-quality procedures.

RÉSUMÉ. Aujourd'hui la thérapie des brûlures dépend de la gestion chirurgicale des lésions. L'évidence est claire que l'excision précoce et la fermeture sauvent la vie des patients, y inclus les grands brûlés. Les brûlures faciales de toute épaisseur nécessitent des procédures de greffage. Les brûlures faciales dermiques profondes doivent être greffées dans la troisième semaine après la brûlure. Les brûlures profondes aux paupières doivent être excisées et greffées précocement pour prévenir l'ectropion cicatriciel et l'exposition cornéenne. La reconstruction des difformités sévères et des cicatrices du visage, de la tête et du cou, à guérison complète, présente au chirurgien quelques-uns des problèmes les plus difficiles de la chirurgie reconstructrice. Le but des Auteurs est de présenter des données rétrospectives sur la reconstruction aiguë et tardive des brûlures de la tête et du cou en 2007. Après avoir décrit 81 patients opérés au Service des Brûlures et de Chirurgie Plastique au Centre Hospitalier Universitaire di Tirana (Albanie) atteints de brûlures et de difformités dues aux brûlures dans la région de la tête et du cou, ils présentent les différents types de techniques opérationnelles utilisées dans la reconstruction de la tête et du cou, comme aussi certains aspects du développement des difformités du visage brûlé (soit physiques soit psychologiques) et leur correction. En tout, 246 patients atteints de brûlures et de difformités causées par les brûlures ont été opérés chirurgicalement en 2007. De ceux-ci nous avons extrait 81 cas où la pathologie touchait la tête et le cou; dans 13 cas, il s'agissait de brûlures du visage à toute épaisseur qui avaient besoin d'excision et de greffage. Dans les autres 68 cas, il s'agissaient de difformités dues aux brûlures. Ce dernier groupe comprenait 19 patients atteints de difformités faciales, 14 de difformités périorales, 12 d'alopécie, due aux brûlures, dix de difformités des paupières supérieures et inférieures, neuf de difformités des oreilles et quatre de difformités cervicales. Les techniques chirurgicales utilisées étaient la greffe cutanée, la greffe variable ou à toute épaisseur, la greffe composite, le lambeau à pédicule et la substitution des tissus. Dans les cas d'alopécie due aux brûlures, les Auteurs ont utilisé pour la correction l'expansion tissulaire. Les brûlures de la tête et du cou constituent des problèmes parmi les plus difficiles pour ce qui concerne les soins des lésions en état aigu, la rééducation successive et la reconstruction. A part la connaissance des techniques disponibles de reconstruction et le diagnostic précis de l'insuffisance tissulaire et de la distorsion secondaire, un plan chirurgical attentivement exécuté constitue le premier pas dans la réalisation des améliorations du visage défiguré par les brûlures.

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