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REHABILITATION BIOACTIVATE FOR BURNS OF MAXILLOFACIAL AREA

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Summary. *The article is devoted to the question of early surgical necrectomy in the maxillofacial area in case of dermal superficial burns and subsequent treatment of postoperative wounds in a wet environment under silicone coating using bioactivation. The basis of the clinical studies is monitoring of 125 patients with superficial dermal burns in maxillofacial area.*

Key words: *burns, early surgical treatment, silicone coating, xenodromimplant, wet environment, bioactivation therapy.*

Резюме. *Стаття присвячена питанню ранньої хірургічної некректомії в щелепно-лицевій ділянці при дермальних поверхневих опіках та наступного лікування післяопераційних ран в умовах вологого середовища під силіконовим покриттям з використанням біоактивації. Основу клінічних досліджень становлять спостереження за 125 хворими з дермальними поверхневими опіками щелепно-лицевої ділянки.*

Ключові слова: *опіки, раннє хірургічне лікування, силіконове покриття, ксенодермоімплантат, вологе середовище, біоактиваційна терапія.*

Резюме. *Статья посвящена вопросу ранней хирургической некрэктомии в челюстно-лицевой области с последующим лечением послеоперационных ран в условиях влажной среды под силиконовым покрытием с использованием биоактивации. Клинические исследования выполнены на материале наблюдений за 125 больными с дермальными поверхностными ожогами челюстно-лицевой области.*

Ключевые слова: *ожоги, раннее хирургическое лечение, силиконовое покрытие, ксенодермоімплантат, влажная среда, биоактивационная терапия.*

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Introduction

The wounds of the maxillofacial area reach 33% of thermal localizations, and their treatment remains an actual problem of modern surgery. This is due to their value in the aesthetic and functional terms, the complexity and frequent negative results of conservative and surgical treatment [1].

After self-rejection of necrosis, fibrous granulation is formed in the wound, whose thickness depends on the duration of the wound. Early recovery of the skin prevents the development of granulations in height and prevents the process of formation of deforming scarring [2]. As a result of scarring of the soft tissues of the maxillofacial area, there is shortening of the eyelids and their eruption, the formation of pulling scars in the area of the oral crack and chin and deformation of the ear lotions [7, 9, 10]. Emerging deformations inflict the patient physical and moral suffering, summon a complex of inferiority, difficult psycho-emotional experiences and violations of social adaptation in society.

It is expedient to carry out radical surgical necrectomy 2-3 days after the injury with the simultaneous closure of the wounds with lyophilized xenodermic implants ("the first and last operation" independent of the area and localization of the burn wound). It facilitates the course of burn disease, improves the aesthetic and functional results of treatment [3; 5; 8]. But until now, there are discussions about the feasibility of applying:

- conservative or surgical tactics (?);
- "open" (without bandage) or "closed" (under the bandage) methodology (?);
- in the "dry" or "wet" conditions of rehab (?).

A new component in the complex rehabilitation practice is the use of "bioactivation therapy without external sources of current" using the method of V.G.Makats and V.I.Nahaychuk [4]. His goal is to increase rehabilitation efficiency in patients with superficial burns of the face.

Materials and methods

The research was conducted on the basis of the Clinical Center of Thermal Injury and Plastic Surgery of the Regional Clinical Hospital named after M.I. Pirogov. The study group consisted of 125 patients diagnosed with: Dermal superficial burns of the maxillofacial area, which were combined with the burns of other localizations of different areas and depth of defeat. The factors of the injury were "burns to the flame" (93 patients - 74.4%), "Burning liquids" (14 patients - 11.2%), "Chemical burns" (11 patients - 8.8%) and " "Burning by a couple" (7 patients - 5.7%). "Burnings of the respiratory tract" were diagnosed in 95 (76.0%) patients. Age of patients with burns from 21 to 50 years, of which males were 68.0% (85 patients) and females - 32.0% (40 patients).

The examined patients are divided into 2 groups: "1gr." - main (90 burnt - 72,0%); "2gr." - control (35 fired - 28,0%). In turn, the main group is divided into three subgroups, depending on the local therapy after the early surgical necrectomy. The groups "1a" and "1b" consisted of 20 heaters (32.0%), "1v" - 50 patients (40.0%)

At the first clinical stage (after the provision of primary care), the burn wound was in a "moist environment under a silicone coating", which allowed for 2 days to remove the scalpel burn necrosis.

At the 2 nd clinical stage (after early necrectomy), in the therapeutic program of patients "1a" subgroups were used "bioactivation therapy without the use of external sources of current" [4]. Bioactivation was not performed in patients with "1b" group. In the group "1", a burn wound was covered with lyophilized xenodermic implants.

The control group consisted of 35 (28.0%) patients, wound treatment of which was carried out under multilayered gauze bandages infused with betadine, followed by independent peeling of necrotic tissues, stage nephrectomy and subsequent wound epithelization.

The methods of the study included clinical examination, laboratory diagnosis, assessment of pain sensation using the "visual analog scale of pain" in balls, questionnaires, photographing using a digital camera "Panasonic" with subsequent computer processing (no additional correction was made). Printing of photo materials is carried out on the HP Color Laser Jet CP1215 printer.

The statistical processing of the obtained results was carried out using STATISTICA (Stat Soft Inc, USA) and Ms Excel programs in Windows-2007 (Microsoft, USA) with a mean value of M, an average error **±m** mean, probability t.

Results and discussion

1. Intensity of pain syndrome.

Within 1 day after burn injury, patients in the main and control group experienced severe and intolerable pain in the wound area (3.25-3.3 points). After early necrectomy (3 days), 6.66% of the patients in the main group did not feel pain. Minor pain sensations were noted by 46.66% of patients, and in 6.6% of the pain feelings were "average in intensity". In the control group for 3 days, 45.0% of patients described their pain symptoms "average in intensity", 50.0% noticed severe pains, and 1 patient noted "unbearable pain". The intensity of pain in patients in the main group reached 1.3-1.45 points, and in the control group - 2.6 points (the sufferers needed painkillers). According to the score, the pain was 2.0 times weaker in patients with "1a" subgroups, and in patients "1b" and "1v" subgroups 1.8 times (compared with the control group $P < 0.001$).

At 8 days after the injury, the patients "1a" and "1b" subgroups did not feel pain. Minor pain sensations were noted by 85.0% of patients in the "1в" subgroup, 5.0% called their feelings "average in intensity", and 10,0% - did not feel pain. In the control group at 8 days after the

injury, 25.0% of patients described their feelings "average in intensity", 65,0% noticed "severe pain", and 10,0% noticed "unbearable pain". 66,66% of the patients in the main group noted a "no pain" or "mild pain" (0,95 points), and control patients suffered from "severe pain" (2.9 points).

2. The general implications of rehabilitation burn technology.

The effectiveness of early rehabilitation technologies in the treatment of patients with burns is presented in Table. 1

Table 1

Results of the treatment of the burnt core and control groups (bed-day, M ± m)

Dermal surface burns (n = 125)							
1 g - the main (n = 90)						2 gr. - control (n = 35)	
"1a" subgroup (n = 20)		"1b" subgroup (n = 20)		"1v" subgroup (n = 50)		The term for the termination of noncretomy	The term of complete wound epitheliza-tion
Before surgery	After the opera-tion	Before surgery	After the opera-tion	Before surgery	After the opera-tion		
1,3±0,04	5,4±0,14	1,5±0,05	7,1±0,16	1,4±0,06	12,9±0,2	11,7±0,25	21,6±0,61
Together		Together		Together		Together	
*6,7±0,14**		*8,6±0,16**		*14,3±0,18**		*21,6±0,61**	

Note. According to the data of the control group (P <0.001).*

According to tabl. 1, the average duration of burn wound necrosis in wounds in the main group was 1.4 ± 0.16 l / day versus 11.7 ± 0.25 l / day in the control group, which is 8.36 times less (P <0.001) . Accordingly, the average term of healing of the dermal surface burn wounds of the face, the neck in the "1a" subgroup was reduced by 3.22 times compared with the control group (6.7 ± 0.14 versus 21.6 ± 0.61 l / day). In the "1b" subgroup, it is reduced by 2.57 times (8.4 ± 0.16 versus 21.6 ± 0.61 l / day), and in "1v" subgroup 1.52 times (14.3 ± 0 , 18 versus 21.6 ± 0.61 l / day) compared with the control group (P <0.001). More rapid healing of burn wounds in patients of the main group indicates a short-term inflammatory process in the wound, prevention of the formation of granulations in height, as the basis for the development of coarse hypertrophic scarring.

Among the complications that arose in the treatment of patients with dermal superficial burns of the maxillofacial area, in the first place are hypertrophic scars in the submandibular region - 2 (4.0%) in the main group and 4 (11.4%) in the control group. In the second place, the burn wounds of the maxillofacial region are 1 (2.0%) in the main group and 3 (8.5%) in the control group. The burn scar deformation of the eyelids was observed in 2.9% of patients, lips in 2.9% and ears in 2.9% of patients in the main group compared with the control group. Complications in the main group have been reduced by 8.69 times.

3. The consequences of burn injury rehabilitation in subgroup "1b"

Results of treatment of superficial burns under gauze bandages permeated with antiseptics in all patients are similar.

Clinical example 1. A patient G., 31 years old, a medical card number 1284, entered the burn center on August 4, 1999, with a diagnosis: a burn with a flame II-III centuries. 20% of the head, neck, trunk, upper extremities. Treatment of burn wounds was carried out under gauze bandages filled with betadine. At day 21 the wounds of the maxillofacial area were healed. At day 35, the wounds were fully healed in other parts of the body. The patient was discharged from the hospital

and two weeks after the discharge was sent to the sanatorium and resort rehabilitation at the sanatorium "Avangard", the city of Nemirov. At 90 days, the patient came to a control check (fig. 1).

Fig.1 Ill G., 31 years old, medical card number 1284, burn with flame II-III centuries.
1.1) 90 days after discharge from the hospital; 1.2) One year after discharge from the hospital.

Clinical Example 2. Expected phased rejection of necrotic tissues and subsequent wound epithelization causes the formation of pathological scars and is accompanied by deformation of the neck, chin, lips and eyelids. As can be seen from the results of treatment (Figure 2), this leads to unsatisfactory aesthetic and functional effects that cause patients suffering moral suffering and cause psycho-emotional disorders.

Fig.2. Patient K., 25 years old, a year after burn flame II^{аб} article oral and maxillofacial region.

4. The consequences of rehabilitation of burn injury in the subgroups "1a" and "1в"

A better progress of the wound process is observed after early surgical necrectomy followed by "bioactivation" under the conditions of a "wet chamber under a silicone coating".

Clinical example 3. Patient S., 40 years old, medical card 4233, entered the burn center 03.03.2010g. Burns of flames IIab stage. On the area of 12% of the body surface received 02.03.2010g. The first medical aid is provided in the CRC. Early surgical necrectomy was performed on 04.03.2010. After noncretomy, the abdominal and upper limbs are closed with

lyophilized xenodermic implants followed by bioactivation. Facial wounds were treated in a humid environment using bioactivation therapy (Fig. 3). In the process of treatment, the patient felt comfortable. Pain in wounds did not bother.

Fig. 3. Patient S., 42 years old, medical card number 4233, burn with flame Iаб article.
3.1) Conduction of early non-crispness; 3.2) Bioactivation under silicone film (2 days)

At 4 days after the surgery wounds are clean, there are signs of epithelization. At day 6 the wounds of the maxillofacial area were healed. We used zinc ointment as a marker for wound epithelization (Figure 4). At day 19 after injury, the patient was satisfactorily discharged from the hospital.

Fig. 4. Patient S., 42 years old, medical card number 4233, burn with flame Iаб article.
4.1) Epithelization of wounds for 6 days of treatment; 4.2) Patient 1 year after injury.

Thus, the proposed technology of treating superficial burn wounds of the maxillofacial area involves early surgical removal of necrotic tissues, followed by "bioactivation rehabilitation" under the conditions of a "wet environment under a silicone coating". It reduces the wound healing period from burn necrosis by 8.36 times, and the average wound healing time is 3.22

times. In addition, it prevents the formation of deforming cicatricial complications and contributes to significantly better functional and aesthetic treatment outcomes.

Conclusions and prospect of research

1. Treatment of patients with superficial burns of the face, neck under gauze bandages, soaked betadin, with self healing of wounds leads to the formation of hypertrophic deforming scars.

2. Treatment of postoperative wounds in the conditions of "wet environment under silicone coating" using "bioactivation therapy without external sources of current" ("1a" gr.) Causes the best conditions for their epithelization. This confirms the reduction of burn time wounds:

- on 14,9 "bed/days" in comparison with the control group (P <0,001);
- 7.6 beds/days compared with "1в" subgroup (P <0.001);
- 1.9 beds/ ays compared with "1b" subgroup (P <0.001).

3. Analysis of the results of treatment of superficial burns of the maxillofacial area indicates the expediency of "early surgical necrectomy" and complex "bioactivation without external sources of current" in the conditions of "humid environment". This causes pain relief to decrease by 2.0 times (P <0.001), accelerating wound healing from burn infections at 8.36 times (P <0.001), accelerating wound healing 3.22 times (P <0.001) prevents the formation of deforming cicatricial complications (P <0.001), which forms a significantly better aesthetic and functional results of treatment.

4. Early surgical treatment using "bioactivation therapy without external sources" under the conditions of a "wet chamber" under a silicone coating is a promising method for treating patients with superficial dermal burns of the maxillofacial area.

5. The prospect of further research is the controlled rehabilitation of burn patients on the basis of conservative correction of functional disorders of the autonomic nervous system.

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