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PHYSIOLOGICAL BASIS OF IMPROVED AND DEVELOPED METHODS IN ELIMINATION OF POST-BURN SCAR DEFORMATIES AND CONTRACTURES IN CHILDREN

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Abstract. This article presents the physiological basis of improved and developed methods for the treatment of post-burn scar deformities and contractures in children. In this research 104 patients were selected and involved in various surgical procedures.

In conclusion, it should be noted that the improved and developed methods do not affect the general physiological properties of tissues and have high efficiency.

Keywords: burns, burn complications, reconstruction, recovery, tromboplastics, plastic results, percutaneous thermometry, transcutaneous oximetry.

Introduction

The widespread use of polygraphic methods in the implementation of surgical practice and new techniques leads to an increase in the efficiency of the practice [1,2]. Animal experiments have shown that the process of restoration of lymphatic and blood vessels after limb replantation proceeds almost in parallel. According to scintigraphy, lymph outflow from the limbs of the replanted rat begins 3–6 days after replantation [3,4]. In normal tissues, it lasts up to 12 days after surgery. Angiographic study according to T. Nakanishi showed that the newly formed veins were restored on the 12th day after the restoration of the limbs in dogs. It should be noted that although in the late period of finger replantation, in most cases, clinical signs of lymphostasis are not detected, specific screening methods (for example, fluorescent microlymphography) still reveal a slight decrease in lymphatic drainage function [5].

Even 10 years after replantation, the development of hemolymphatic circulation in the wings of replanted vessels (compared to a healthy finger) in thromboplasty has not been studied enough, there are no reliable objective methods for assessing their viability, reliable methods for determining the time of crossing the feeding pedicle [6,7,8]. In practice, flap viability is assessed based on clinical signs and the surgeon's personal experience. Therefore, various methods are being tested for these purposes: the method of electrothermometry, thermography, liquid cholesterol crystals, methylene blue photoplethysmography, and laser dopplerography [9,10]. Contrast lymphography is used to examine the lymphatic circulation of the pedunculated flap. With the help of radioactive isotopes, venous outflow from the valve is detected [11,12].

A review of the literature indicates that the possibility of using the polarographic method in reconstructive surgery for the consequences of burns has not been studied enough.

Aim of the study. Improving the effectiveness of treatment through the introduction of modern surgical methods in the treatment of patients with burns of large joints of the foot, using in practice improved and newly developed methods through analysis based on physiological studies.

Materials and methods

The studies involved 104 patients. Patients underwent 3 types of operations, distributed as follows: skin grafting from 104 to 25 (24%), simultaneous skin grafting 36 (34.7%) and transplantation plasty (M-shaped flap and single plasty) 43 (41).), 3%). As mentioned above, the characteristics of scars, their localization, and the degree of functional impairment during surgical interventions were taken into account. In 87 (83.6%) patients, the scars were superficial, in 17 (16.4%) - deep, in 5 (29.4%) out of 17 - open wound lesions.

Results

To date, various surgical methods have been developed that do not take into account the characteristics of scar tissue and the frequency of damage to scar tissue. Although the benefits of traditional methods have been reported in many sources, their negative results have not been partially or fully demonstrated. Complications that may occur during the visit, postoperative complications, and clear recommendations for improving early and long-term results were not reported. In order to improve operational methods, tissue thermometry and the determination of microcirculation are aimed at scientific substantiation of the developed surgical methods and prevention of possible complications.

To achieve this goal, a thermometer was used to remotely measure skin thermometry and a TSM 400 device to measure tissue oxygen demand. With this method of examination, the timing of surgical intervention (early or delayed), surgical rehabilitation, the possibility of early prediction of the state of the joint, the resulting scar and the choice of the scope of the operation are created.

Research shows that visits do not always bring the expected results. Based on the purpose of the study, it is obvious that the assessment of the functional state of the scar is an effective approach to choosing a burn, depending on the course of the ongoing proliferative process in the scar tissue.

The study was performed in 101 (97.1%) patients of the main group. The patients were divided into 3 groups using local tissues, flaps and skin grafts. At the same time, the temperature in healthy skin on the surface of the large joints of the foot was studied and it was found that the difference is practically small 36.5±0.12. Scar tissue was divided into 3 categories: atrophic, normotrophic, hypertrophic scars. Separately, keloid lesions were observed in 2 patients and scar-changed trophic lesions in 3 patients.

It is well known that blood supply to tissues is carried out by terminal arteries (f<100 μm), arterioles, capillaries and venules, as well as lymphatic vessels. Tissue nutrition depends on the number of capillaries, exchangeable capillary surface area, density and metabolic process proceeding by bilateral diffusion, filtration or reabsorption. Hydrostatic pressure (P) in capillaries is 30-35 mm.cm.st., and in venous vessels 10-15 mm.cm.st. forms. The hydrostatic pressure of the interstitial fluid is 10 mm.cm, the oncotic pressure is 25-30 mm.cm.

Using a universal polyarograph PU-1, the rate of oxygen consumption for the process of energy exchange in tissues during the oxidation of endogenous substrates in free and transposition skin flaps was determined. High energy exchange in freely grafted or flap plastics leads to an increase in interstitial fluid. The protein content in it is higher than in plasma, due to the content of interstitial fluid in it. This increases the tissue's need for oxygen. Incomplete satisfaction of tissue oxygen demand through arteriovenous shunts, the integrity of which is broken as a result of surgical intervention, prevents the absorption of interstitial fluid along the fiber, which leads to a decrease in the rate of oxygen consumption during the oxidation of the endogenous substrate.

The use of hypothermia after surgery reduces blood flow from the artery. Oxygen consumption is reduced by reducing tissue metabolism. This reduces the absorption into the lymph of an intermediate product formed during the breakdown of the protein during the oxidation of the endogenous tumor substrate in the tissue. The rate of oxygen consumption (Vend) during oxidation of the endogenous substrate as a result of free transplantation and coagulation plastics is 2.16 ± 0.11 nmol O_2/min Hmg in the main group and slightly higher in the control group 2.27 ± 0.12 nmol O_2/min Hmg ($p>0.05$). It plays a key role in the interpretation of tissues. A decrease in tissue oxygen demand led to a decrease in interstitial fluid in the postoperative period with pain, a feeling of heaviness, swelling in the wound, and a decrease in leakage of interstitial fluid into the tube.

Dermal thermometry is a method that allows predicting the results of surgical operations performed on the skin and timely identifying possible complications. A non-contact infrared thermometer was used to carry out the method.

These methods allow the surgeon to choose the correct diagnostic tactics at the stage of preoperative treatment, and at the postoperative stage to assess the viability of the transplanted free skin. Our studies have shown that the temperature of a normotrophic scar rises to 36.7°C, of an atrophic scar to 35.7°C, and of a hypertrophic scar to 38.3°C. (Fig. 1). This is important when choosing a surgical method.

During surgery, an intermediate layer was determined in normotrophic scars so that the surgeon could completely dissect the scar with virtually no blood loss. In such cases, the temperature indicators of free skin tissues transplanted on the first, third and seventh days after the visit were studied. On the first day, the temperature increased to 37.2°C, and on the third and seventh days it returned to normal.

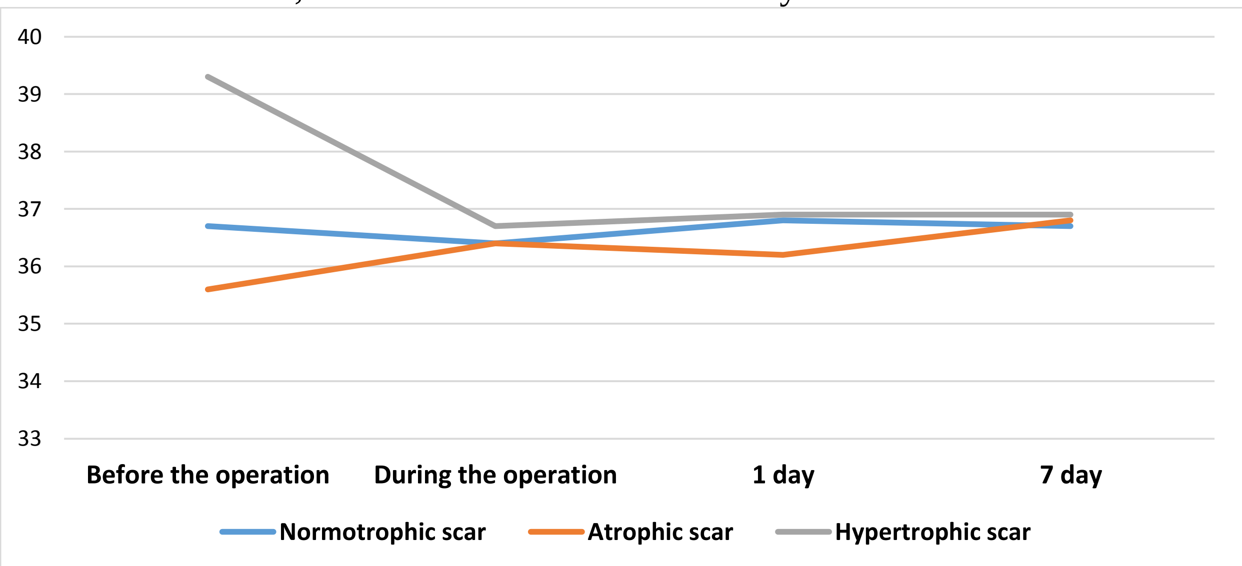

Fig. 1. Temperature indicators of normo-, a- and hypertrophic scarring

In atrophic scars, the interstitial layer is very thin, which makes it impossible to determine the border of the scar dissection without blood loss. This then prevents the surgeon from suturing in a flat position, such sutures often result in rupture of the scar tissue. In the postoperative period, the temperature of transplanted free skin clots was measured on the first, third, and seventh days. On the first day after the visit, the temperature dropped to 35.8°C, from the third day the temperature increased and on the seventh day it returned to normal.

With hypertrophic scars, the interstitial layer is not detected at the time of diagnosis, it does not allow determining the border of the scar due to bleeding. This then prevents the surgeon from suturing in a flat position, such sutures often result in rupture of the scar tissue. In the postoperative period, the temperature of the transplanted free skin flaps was measured on the first, third, and seventh days. On the first day of the postoperative period, the temperature increased to 37.8°C, on the third and seventh days the temperature did not change, and after the tenth day it returned to normal. But by the fourteenth day, the swelling on the soles of the feet remained.

Results of percutaneous determination of transcutaneous partial pressure. When evaluating the effectiveness of the examination methods developed in the scheme, the dynamics of transcutaneous partial pressure was studied according to the following criteria:

1. Oxygen consumption for the oxidation of endogenous substrates in transplanted free skin grafts.
2. Microcirculation of the transplanted free skin flap.

In order to increase the viability of postoperative transpositions and transplanted skin flaps, intradermal oximetry was used. Studies have shown that dynamic changes in transcutaneous oxygen partial pressure ($RtcO_2$) in normotrophic scars are 86.7 mm sim.st. up to 82 mm symbolic st in atrophic scars and 93 mm symbolic st. in hypertrophic scars is equal (Fig. 2). It has been established that normotrophic scars are located close to healthy tissues.

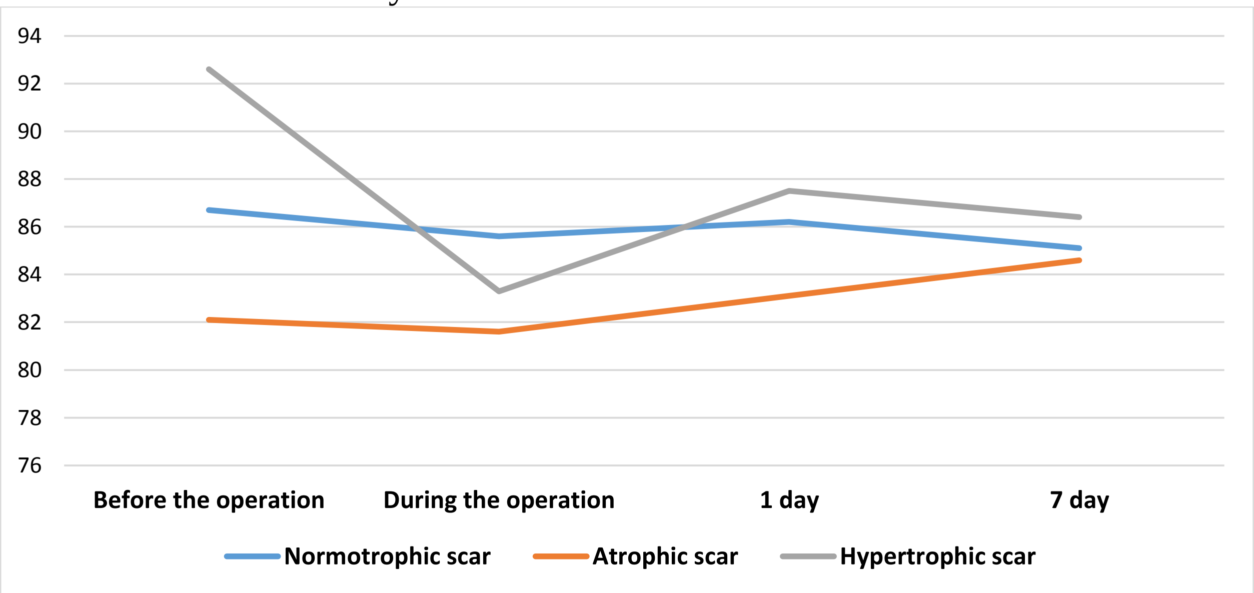

Fig. 2. Transcutaneous oxygen partial pressure in normo-, a- and hypertrophic scars

The parameters of transcutaneous oxygen partial pressure in tissues on the first, third and seventh days with normotrophic scars in the preoperative, preoperative and postoperative periods were studied. On the first day, this figure was 85 mm. rt. Art. in transposition and free skin grafts. and on the third and seventh day decreased to normal.

The parameters of transcutaneous oxygen partial pressure in the tissues of atrophic scars on the first, third and seventh days in the preoperative, during the operative and postoperative periods were studied. On the first day, this figure was reversed and decreased to 80 mm. rt. Art. in free skin clots, and returned to normal on the third and seventh days. The parameters of transcutaneous oxygen partial pressure in the tissues of atrophic scars on the first, third and seventh days in the preoperative, during the operative and postoperative periods were studied. On the first day, this figure was 80 mm. rt. Art. in transposition and free skin grafts, and on the third and seventh days the indicator did not change, only after the tenth day the indicator returned to normal.

Conclusion

Thus, it aims to improve both functional and cosmetic outcomes by determining the effectiveness of improved and newly developed methods based on scar characteristics, reducing the duration of surgical rehabilitation, the number of observed complications, and establishing the scientific basis for local hypothermia.

REFERENCES

1. Madazimov M.M., Isomiddinov Z.D., Teshaboev M.G. Study of the quality of life of a patient after surgical rehabilitation of the consequences of burns of the lower extremities in children // Application of high innovative technologies in preventive medicine. - 2022. - P.1125.

2. Korotkova N.L., Ivanov S.Yu. Surgical tactics in the treatment of patients with consequences of facial burns. Annals of Plastic, Reconstructive and Aesthetic Surgery. - 2012. - No. 4. - P.10-17.

3. Madazimov M.M., Teshaboev M.G., Isomiddinov Z.D., Tuychiev G.U. Surgical treatment of patients with consequences of burns of the lower extremities in children. - 2020. - No. 1 (29). - P.242.

4. Mitrofanov N.V., Korotkova N.L., Menshenina E.G. Development of medical technologies in reconstructive surgery after burns // Issues of traumatology and orthopedics. - 2011. - No. 2 (3). - P.150-151.

5. Polyakova A.G., Korotkova N.L., Malysheva I.E. Control of adaptation reserves in the process of reconstructive and restorative treatment of patients with burn consequences // Medical Almanac. - 2012. - No. 5 (24). – P.184-

6. Rybdylov D.D., Khitrikheev V.E. Surgical tactics for the treatment of deep burns of the anterior surface of the leg. Bulletin of the Buryat State University. - 2011. - No. 2. - P. 64-66.

7. Sarygin P.V., Korotkova N.L. Development of a unified approach to the surgical treatment of cicatricial lesions of the lower third of the face after burns. Annals of Surgery. - 2012. - No. 6. - P.10-15.

8. Soloshenko V.V., Nosenko V.M. Surgical treatment of extensive dermal burns in victims of mine accidents. Medical and social problems of the family. - 2014. - V. 19, No. 1. - P. 88-91.

9. Tyurnikov Yu.I. Modern aspects of providing medical and diagnostic care for thermal injury. Review // Plastic surgery and cosmetology. - 2012. - No. 2. – P.257-266.

10. Burmeister D.M., Cerna C., Becerra S.C. et al. Noninvasive Techniques for the Determination of Burn Severity in Real Time // J. Burn Care Res. – 2017. – Vol. 38, N1. – P. e180-e191.

11. Cui Z., Yang X., Shou J., Wang G. Effectiveness of scar split thickness skin graft combined with acellular allogeneic dermis in treatment of large deep II degree burn scar // Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. – 2014. – Vol. 28, N12. – P. 1502-1504.

12. Daigeler A., Kapalschinski N., Lehnhardt M. Therapy of burns // Chirurg. – 2015. – Vol. 86, N4. – P. 389-401.