

OPTIMIZATION OF SURGICAL TREATMENT OF BURNS

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The effect of high temperature leads to local damage to the skin, as a consequence, to the disruption of the protective functions of the integumentary tissues and intoxication of the body with the products of disintegration in the lesion, followed by a disturbance of hemodynamics, microcirculation, leading to shock and development of a complex of pathological processes throughout the body and skin itself in the region damages [1, 6, 13]. Modern infusion therapy and other methods of resuscitation in most cases can cope with burn shock and restore disturbed homeostasis [8]. Most of the fatal outcomes in burned people are now observed in the subsequent stages of burn disease and is associated with progressive intoxication, burnout, development of purulent-septic complications leading to multiple organ failure syndrome and death of victims [5, 9]. With significant success achieved in reconstructive and plastic surgery, in the development of new methods of surgical interventions, many questions of treatment and rehabilitation of patients who have suffered a thermal trauma remain unresolved. Currently, it is generally accepted that early surgical necrectomy with one-stage or delayed autodermoplasty is the treatment of burned pathogenetically grounded [4, 11]. However, the possibility of using this method is limited for burns occupying a large body surface [2, 10, 14]. Insufficient area of the donor sites is a factor that detracts from the time of autodermoplasty [12]. In addition, the explantation sites themselves are a factor of significant pain on the patient, increase the area of wounds that need healing [3]. The purpose of our study is to improve the methods of active surgical treatment of severely burned, determine the optimal timing of autologous transplantation, and shorten the time spent in hospital. The work is based on the study of 62 patients aged 18 to 60 years with thermal burns, who were treated in the Primorsky burn department of the Far Eastern Federal District Medical

Center of FMBA of Russia in the period from 2007 to 2015. Inclusion criteria were the presence of IIIA–IIIB burns with an area of 10 to 20% of the body surface, the Frank index of 30–60 units. Exclusion criteria were a large area of surface burns of I and II degree, as well as deep IV degrees. Histological examination of biopsy specimens on the first and second days after the burn injury in the pathological foci recorded areas of hemorrhages and there was a slight increase in the number of blood vessels in the loose fibrous connective tissue that was subject to the epidermis or to the wound surface. In the region bordering the zone of damage, low proliferative activity of cambial elements was recorded. In the spiny layer, as well as in the walls of the hair follicles and in the sebaceous glands, the activity of the Ki67 gene was absent. The endothelium of the blood vessels also contained a small amount of proliferating cells. According to our clinical, morphological and histochemical studies of the processes occurring in burn wounds, the optimal time for complete covering of burn wounds is 7–8 days after injury. In the burn wound after autodermoplasty, performed in late terms, there is a violation of reparative processes associated with pathological angiogenesis, an aggressive reaction of immunocompetent cells leading to non-infectious destruction of the graft, to its lysis. Diagnostic criteria for graft lysis can be CD8+ cells and macrophages and Langerhans cells.

REFERENCES

1. Burns [Electronic resource]. – World Health Organization, 2016. URL: <http://www.who.int/mediacentre/factsheets/fs365/en/>.
2. Handbook of burns. Vol.1. Acute burn care /M.G. Jeschke, L-P. Kamolz, F. Sjöberg, S.E. Wolf. – Wien: Springer-Verlag, 2012. – 493p.

3. Burn Incidence and Treatment in the United States: 2016 [Electronic resource]. – American Burn, 2017. URL: <http://ameriburn.org/who-we-are/media/burn-incidence-fact-sheet/> (24.07.2017)
4. Healthcare in Russia. 2015: Statistical Digest / Federal State Statistics Service. – Moscow: Rosstat, 2015. – 174 p.
5. ALEKSEEV AA, TYURNIKOV YU.I. The basic statistical indicators of work of burn hospitals in the Russian Federation for 2015 [Electronic resource]. // *Kombustiology*, №55–56, 2016. – URL: <http://combustiology.ru/journal/tezisy-konferentsii/> (reference date is July 24, 2017)
6. PHAM T.N., CANCIO L.C., GIBRAN N.S. American Burn Association practice guide burn shock resuscitation // *J. Burn Care Res.* 2008. Vol.29. N1: P.257–266; DOI:10.1097/BCR.0b013e31815f3876
7. PURI V, KHARE NA, CHANDRAMOULI MV, SHENDE N, BHARADWAJ S. Comparative Analysis of Early Excision and Grafting vs Delayed Grafting in Burn Patients in a Developing Country // *J. Burn Care Res.* 2016. Vol.37. N5. P.278–282. doi:10.1097/BCR.0b013e31827e4ed6.
8. Clinical recommendations for the provision of medical care to victims with thermal trauma in emergency situations / Ed. Shabanov VE, Savvin Yu.N., Alekseev AA; Krutikov MG; Bobrovnikov A.E.; Demenko V.V. – Moscow: B.I., 2015. – 37s. – URL <http://www.kuzdrav.ru/node/3143/9>.
11. DRIES D.J. Management of burn injuries – recent developments in resuscitation, infection control and outcomes research // *Scand. J. Trauma Resusc. Emerg. Med.* 2009. Vol.17. N1. P.1–14. doi:10.1186/1757–7241–17–14
12. ROWAN M.P., CANCIO L.C., ELSTER E.A., BURMEISTER D.M., ROSE L.F., NATESAN S., CHAN R.K., CHRISTY R.J., CHUNG K.K. Burn wound healing and treatment: review and advancements // *Crit Care.* 2015. Vol. 19. N6. P. 243–253. doi: 10.1186/s13054-015-0961-2.
13. YUROVA YU.V. Diagnosis of readiness of granulating burn wounds to free autodermoplasty: Author's abstract. Dis. ... Candidate of medical sciences. – St. Petersburg, 2014. – 21c.
14. GORSHEEV A.N. Early prophylaxis of purulent-septic complications in severely burned: author's abstract. dis. to the soisk. scientist. step. Cand. honey. Sciences (14.00.27) / Gorsheev Anatoly Nikolaevich; Vladivostok. state. honey. un-t. – Vladivostok, 2006. – 23 p.

SURGICAL CORRECTION OF FUNNEL CHEST DEFORMITY IN CHILDREN WITH USE OF IMPLANTS FROM NITINOL

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INTRODUCTION. Congenital deformations of a thorax represent the malformations connected with change of its form. Most often funnel chest deformity (pectus excavatum (PE)) meets [1]. Except cosmetic defect this malformation is followed also by functional violations from cardiovascular and bronchopulmonary systems. According to authors of Russia PE meets at children from 0,06 to 2,3%, and according to foreign authors from 0,2 to 1,3% [3].

Surgical treatment of PE at children is one of the most serious and actual problems of thoracic surgery. Now there is a set of methods of a thoracoplasty [2]. Improvement and widespread introduction of low-invasive and hi-tech methods in surgical treatment of funnelchest deformity is a step forward in this direction [3, 4]. However, questions of optimum tactics of treatment of patients concerning the choice of a way of the thoracoplasty and ways of fixing of a sterno-costal complex are actual and unresolved nowadays.

Surgical correction of deformations of a thorax has to be timely and full. It promotes improvement of function of cardiorespiratory system and carrying out early rehabilitation of patients. For this purpose we have used an author's method of surgical treatment of funnel chest deformity in the conditions of the growing organism with use of smooth biocompatible composite materials from a nitinol, which have biological inertness, isoelasticity and effect of shape memory.

The purpose of this study was to create a device which allows conducting a pectoral plate without risk of damage to internal organs in difficult anatomical