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Issue Article

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OUR EXPERIENCE IN TREATMENT OF BURN SCARS

Abstract: *This article summarizes and systematizes the entire range of conservative and surgical methods of prevention and treatment of the consequences of burn injury. The process of rehabilitation of burnt victims is long and labor-intensive. The development and implementation of new methods of conservative and surgical treatment of scars and the improvement of existing means and methods of rehabilitation allows us to achieve the desired results, reduce disability, and improve the quality of life of patients.*

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Introduction

Cutaneous scarring remains the pathognomonic feature following burns to the skin and characteristically underlies post-burn physical and psychosocial morbidity. Over the past several decades, improvement in acute burn care has reduced mortality, enabling survival of burn injuries covering up to 100% of total body surface area (TBSA) [1]. Patients with these massive burns have extensive scarring and contractures, itch, and pain. They are dissatisfied with their appearance and experience restricted movement, itch, and loss of function for many years [2, 3].

The consequences of burns are diverse, but they are all united by one anatomical substrate - scars. A scar occurs as a result of a wound resulting from thermal or chemical exposure, which results in the loss or destruction of substances [4]. The body's response to these processes is the formation of collagen connective tissue. This replacement of tissue is always imperfect and leads, depending on the type of replacement, to different types of scars [5]. Wound healing refers to the replenishment of a skin defect with connective tissue, followed by epithelization. In the final stage of wound healing, a stable scar appears [6]. Scars and cicatricial deformities are a serious problem, especially if they are widespread and involve functionally and aesthetically significant areas [7].

Purpose of the work: To summarize and systematize the entire range of conservative and surgical methods for the prevention and treatment of the consequences of burn injury.

Materials and methods

The main principle of preventing severe post-burn scars is early surgical treatment of burn wounds; for deep ones, early necrectomy with simultaneous autoplasty or closing the defect with complex flaps. If these principles are observed, it is possible to reduce the number of severe post-burn deformities and contractures by 2-2.5 times. Subsequent clinical observation and therapeutic measures can improve the

aesthetic results of treatment and restore the quality of life of those burned.

Research results

This study was approved by Samarkand Center of Emergency Medical Care (RCSUMA) and Inter-Regional Burn Centre, Samarkand, Uzbekistan. These centers admit patients from Samarkand region, with the population of more than 2 million.

A scheme for the prevention and treatment of post-burn scars has been developed and is being used, which is prescribed to all convalescents who have suffered deep lesions, as well as superficial widespread burns and burns of special localization.

After discharge.

From the hospital, such patients are prescribed to wear compression clothing, exercise therapy, and the use of silicone preparations. With the rapid progression of scar tissue, we additionally prescribe phonophoresis with steroids, longidase intramuscularly, and with the formation of keloid scars, steroids are injected into the scar tissue. For a large area of damage with severe itching and pain, systemic steroids and sanatorium-resort treatment are prescribed. The most common method of influencing developing scars is physical therapy.

Phonophoresis with anti-inflammatory, hormonal drugs is indicated for the treatment of immature scars with signs of inflammation. We prescribe 10-15 procedures for the scar area. Carrying out a massage in the scar area leads to increased blood flow and tissue perfusion, which stimulates the growth and development of scar tissue. Therefore, we prescribe massage only if you wear compression clothing, use silicone preparations, and elastic bandage the affected area immediately after the procedure. If the scar progresses rapidly, have severe signs of inflammation, pustular or eczematous rashes, ulcerations, massage is contraindicated.

Medical physical education is prescribed regardless of the extent of the scar, its condition, and the timing of rehabilitation measures. The main goal of exercise therapy for scar lesions is to prevent the development of scar contractures, restore the range of motion in the joints during surgical rehabilitation, restore the tone and function of the muscles in the affected areas of the body, and have a general strengthening effect. The physical therapy plan is established by the physiotherapist for each patient individually, and is carried out systematically with a gradual increase in the number and frequency of exercises performed, and increasing loads.

Sanatorium-resort specialized treatment is an integral part of the rehabilitation program for patients with widespread scars. The treatment was carried out in the Samarkand regional hydropathic clinic “Nagornaya” in the Nurabat district of the Samarkand region. The treatment method consisted of prescribing baths, from 12 to 16 per course, optimal radon concentrations were 120-140 nCi/l, the duration of the first baths was 10 minutes, and the subsequent ones were 15 minutes. Repeated course of treatment (according to indications) – after 5-6 months.

Compression therapy is recognized as one of the most effective methods for preventing the formation of post-burn contractures and hypertrophic scars. There is ample evidence in the literature to support the use of compression for the treatment of keloids and hypertrophic scars. It is believed that a pressure of more than 25 mmHg reduces interstitial edema, limits new formation of capillaries, and promotes ischemia of scar tissue. Hypoxia leads to degenerative changes in fibroblasts, which reduces collagen production, and the formed collagen fibers are arranged in an orderly manner. We prescribe compression clothing to burn convalescents after wound healing for a period of 6-12 months. An important condition for the effectiveness of compression garments in the treatment of common scars is uniform pressure on all affected areas. We do not recommend wearing compression garments over silicone sheets because we do not see any benefit from using these methods in combination. The drug is injected with an insulin syringe of 0.5-2 ml into the tissue of a small or linear scar slowly once a month 4-6 times; the number of injections is determined by the condition of the scar. The technique is also effective in the treatment and preparation for excision of small keloid scars. A sign of correct injection is the blanching of the scar in the injection area. If the scar is more than 3-7 cm^2, we recommend administering the drug in the form of mesotherapy over the entire area of the scar, but the dose should not exceed 0.2 ml/cm^2 - 1 ml per week. In the same way (into the scar tissue), longidase is also introduced systemically, a drug with enzymatic (hyaluronidase) activity, immunomodulatory, antioxidant and moderate anti-inflammatory properties. For widespread scars with severe symptoms of inflammation, itching, rapid growth, as well as certain laboratory parameters (the presence of cryoglobulins in the blood serum, an increase in the content of IgG, IgM by 30%, an increase in the number of lymphocytes and CEC in the peripheral blood by more than 2 times), we prescribe exchange plasmapheresis. The effect of plasmapheresis is expressed in a decrease in the content of lymphocytes and CIC, suppression of the activity of macrophages and a decrease in the production of inflammatory mediators, suppression of neoangiogenesis of connective tissue. Plasmapheresis is carried out 2 times a week, at least 4 procedures.

Recently, in our clinic, cryosurgery has been successfully used to treat keloid and hypertrophic scars. The therapeutic effect of cryotherapy depends on direct cell damage and changes in microcirculation caused by freezing. Extremely low temperature causes vascular damage with corresponding blood stasis,

which leads to cellular anoxia. Each treatment session should be accompanied by two to three acts of freezing and thawing for 30 seconds each. The healing process takes about a month. We recommend using the method for colloidal scars that are resistant to other types of treatment and show signs of rapid progression and inflammation.

Results and discussion.

To determine the effectiveness of scar treatment, the Vancouver Scar Scale is most widely used [8]. Evaluation of effectiveness is based on observation of a number of scar symptoms that change under the influence of the methods and means being studied. An objective method for determining the effectiveness of conservative treatment of scars is laser Doppler fluometer. We study microcirculation in the scar using a LAAC-2 fluometer before the start of treatment over the entire area of the scar, as well as intact skin of the same area of the patient's limb or torso. If microcirculation indicators in the scar exceed those in intact skin, we prescribe conservative treatment in the form of mono or combination therapy [9]. A repeat study is carried out a month later: if microcirculation indicators have decreased by 20% or more, we consider the prescribed treatment effective and continue. If microcirculation indicators have changed insignificantly or have increased, we correct the prescribed treatment regimen. Thus, all burn convalescents are subject to dispensary observation and the prescription of various means of conservative scar prevention [10].

Surgery treatment keloid scars have a number of features due to the high frequency of keloid recurrence. The main types of surgical treatment of hypertrophic scars are excision, lengthening, replacement with a full-fledged skin or complex flap, and dermabrasion. We perform simple excision of the scar when its width is relatively small and the edges of the wound are well mobile. In this case, after removing the scar tissue, we mobilize the edges of the wound and, after careful hemostasis, apply a two-row suture: an interrupted non-removable suture on the deep layers of the wound and a removable (matching) dermo-dermal suture with an atraumatic thread [11]. If the depth and width of the wound is significant, and the thickness of the subcutaneous tissue is pronounced, a 3-row suture is applied in areas of high mobility. Creating duplication is advisable in cases where the scar has a significant width or is located in an area with inactive surrounding tissues, as a result of which significant tension is created on the suture line. In this case, we do not excise the scar, but de-epidermize it, cutting the tissue along only one of its edges. After a sufficiently wide mobilization of the edges of the wound, we place the first deep row of sutures between the edge of the de-epidermalized scar and the corresponding area of tissue away from the opposite edge of the wound. As a result, the first deep line of sutures takes the main load, which allows the second line of sutures to be placed with virtually no tension. Scar lengthening is performed in cases where hypertrophic scars form contractures, limit movement in the joints, and cause pain [12, 13]. Depending on the degree of shortening of the scar (and therefore on the amount of its required lengthening), we use plastic surgery options with opposing flaps. In this case, the isolated flaps should include the maximum amount of subcutaneous fatty tissue, and their base should be represented by normal tissue. Extensive post-burn scars often form multiple contractures, the elimination of which takes place in several stages. Replacement of scarred tissue with a full-fledged skin flap is performed in case of significant cosmetic defects and/or limitation of movements in the joints of the limbs. We excise the scar field, perform hemostasis, and replace the resulting wound defect with a free full-thickness skin flap identical in shape and size, taken from an area ofthe body where the thickness of the skin and hair are similar to the lost one. If, when excising scars, the bottom of the wound is tendons, bones, joints, we perform a non-free plastic surgery with a fasciocutaneous or musculocutaneous flap, while the donor site is covered with a free split autologous flap. The most aesthetically and functionally acceptable method of replacing scar defects is dermotension, since this method allows in a short time to obtain plastic material identical to the one lost in thickness, turgor, color, and hair. To carry out dermotension we use silicone expanders. The operation is carried out in 3 stages: implantation of an expander, dermotension itself, excision of the scar and replacement of the defect with a dermotension flap. The incision to form the expander bed is made in the area subject to subsequent removal; then we stupidly form the bed for the expander so that it is positioned freely, without folds or kinks. We always bring the nipple out; with large expanders, with a vertical nipple or significant tissue trauma during the formation of the bed, we drain it from the counter-aperture with a polyvinyl chloride tube. Liquid administration is carried out 2 times a week; the volume of a single injection depends on the size of the expander, the number of previous injections, and the reaction of the integumentary tissues. The duration of dermotension is 30-35 days. This technique avoids complications.

Thus, the variety of modern conservative and surgical methods for the prevention and treatment of scars and cicatricial deformities allows the surgeon to select an individual rehabilitation program for each patient and obtain a good functional and aesthetically acceptable result. The process of rehabilitation of burnt victims is long and labor-intensive. The development and implementation of new methods of conservative and surgical treatment of scars and the improvement of existing means and methods of rehabilitation make it possible to achieve the desired

results, reduce disability, and improve the quality of life of patients.

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