

TREATMENT TACTICS OF CONSERVATIVE AND OPERATIVE METHODS OF TREATMENT DEPENDING ON CHANGES IN BLOOD COAGULATION FACTORS IN PATIENTS WITH DEEP BURNS

Yunusov Oybek Turayevich

Assistant of the General Surgery Department, Samarkand State Medical University, Uzbekistan

Yunusova Guzal Faizullayevna

Assistant of the General Surgery Department, Samarkand State Medical University, Uzbekistan

Saidullaev Zayniddin Yakhshiboevich

PhD, Associate Professor of General Surgery Department, Samarkand State Medical University, Uzbekistan

Djurayev Alisher Anorboyevich

Head of surgical department of Bulungur district medical association, Uzbekistan

Abstract

In order to increase the volume of surgery in burn units, it is necessary to improve the process of preparing burn patients for surgery. Necrectomy and autodermoplasty are observed at blood loss of 0.5-1.5 cm²/mL of wound surface. At this time, the volume of adequate infusion and hemotransfusion at all stages of burn disease is determined empirically. The existing methods of necrectomy in burns are considered to be a preparatory stage for necrectomy and autodermoplasty, the time of their performance is observed in case of such complications as bleeding, hemostasis, microcirculation disturbance, removal of the scar from the skin surface for autograft preparation leads to increased bleeding. We have developed a technique of application of polycomposite polymer based on cellulose derivatives in thermal lesions.

Keywords Deep burns, DIC syndrome, early necrotomy, autodermoplasty. skin grafting, necrotomy, hemostasis.

INTRODUCTION

In patients with severe burns, hemostasis disorders are manifested by DIC syndrome. In this case, according to many authors, DIC syndrome is

either not recognized at all, or diagnosed at the stage of clinical manifestation, which is manifested by hemorrhagia and/or organ dysfunction. There

are several forms of DIC: lightning, acute, subacute, chronic, recurrent, latent. The early period of burn disease is characterized by the acute form [1,4,5]. Early necrectomy contributes to the improvement of the general condition due to the removal of necroses, which are the substrate for the development of intoxication and sepsis. Early surgical treatment also accelerates the recovery of victims, with better functional and cosmetic long-term results of treatment due to less scar tissue development, in contrast to staged surgical treatment. When treatment time is shortened, the need for antibacterial therapy decreases [2,5,8,10]. The increase in the volume of operations in burn units requires improvement of methods of perioperative preparation of patients with deep burns. Necrectomies and autodermoplasty are accompanied by blood loss of 0.5-1.5 ml/cm² of the wound surface, hemostasis and microcirculation disorders, and preparation of skin autograft requires taking a skin flap of a significant area, which leads to increased blood loss [6]. It is important to provide adequate infusion preparation and hemotransfusion support during all periods of burn disease. However, the volume of infusions and hemotransfusions is determined empirically, schematically. In this connection at deep burns it is still relevant to improve the methods of preparation of burn wounds and patients for surgical intervention, to conduct balanced infusion and hemotransfusion therapy, to reduce and replenish blood loss and detoxification at autodermoplasty [7].

Purpose of the study: Evaluation of the effectiveness of the domestic hemostatic implant "Chemoben" in severely burned patients.

METHOD

The results of treatment of 42 victims with thermal injuries (15 women and 25 men) aged from 18 to 75 years who were treated in the Department of Combustiology of Samarkand branch of RRCEMP in the period of 2021-2023 were analyzed. In the majority of cases the cause of injury was flame (25 cases), boiling water burns (12 cases), contact burns (3 cases) were also observed. The total area

of lesions in patients ranged from 5 to 20% of the body surface, and deep burns of IIIb-IV degree up to 12-15%. All patients underwent early necrectomy to healthy tissues with the appearance of capillary bleeding with simultaneous autodermoplasty. Hemostasis was carried out with hemostatic powder from cellulose derivatives by the preparation "Chemoben".

RESULTS

Surgical intervention in 32 patients with deep burns consisted in application of hemostatic preparation Chemoben to stop bleeding after excision of necrotized skin and subcutaneous structures. Our studies showed that early surgical necrectomy and taking of split autografts from donor sites is accompanied by blood loss (7-10 ml of blood on the area of 100 cm²), and immediately after application of hemostatic powder "Chemoben" the bleeding stops completely, and the wound surface takes a shiny appearance because of the film adhered to it. Pain sensations were insignificant. When closing the wound defect with a donor autoluskut, good adhesion of the skin flap to the underlying wound was noted.

Evaluation of hemostatic activity of KPM under in vitro conditions. ACTR is a basic technique of hemostasis research, it gives an idea about the state of factors of the internal pathway of X-factor activation (VIII, IX, XI). In control plasma samples, the aChTv was 38.3±1.2 sec. In the presence of Na-Ca-CMC film there was a 2.1-fold shortening of ACTV; in the presence of oxidized cellulose - did not change significantly ($p>0.05$), and in the presence of Chemoben - shortened by 1.9 times compared to control. The results indicate the activation of factors of the internal mechanism of blood coagulation, adsorption and inactivation of factors in the presence of the film (Table 1).

SP allows to estimate the factors of prothrombin complex - II, Y, VII, X. In control plasma samples SP was 14,2±0,8s. In the presence of Na-Ca-CMC film there was a 3.1-fold shortening of APTV, in the presence of CPM - 2.8-fold, in the presence of oxidized cellulose - did not change significantly.

Table 1.

Evaluation of hemostatic activity of Chemoben implant, M±m

Groups	aPTT, s	SP,s	Fibrinogen,mg	VSC, min
Control, P1	38,3±2,3	14,2±0,8	3800±12	9,8±0,6
Film, P2	18,2±1,7	4,5±0,2	3500±43	6,4±0,4
CPM P3	20,1±0,8	6,1±0,4	3700±32	2,4±0,6
P1:2	<0,05	<0,05	>0,05	<0,05
P1:3	<0,05	<0,05	>0,05	<0,05
P 2:3	>0,05	<0,05	>0,05	<0,05

Fibrinogen content at addition of film, oxidized cellulose and Chemoben did not significantly differ from that in control plasma.

The obtained results of ACTR shortening together with PV indicate the activation of blood coagulation in general, both by internal (with the participation of VIII IX XI factors) and external mechanism (with the participation of VII factor) with activation of the whole prothrombinase complex (II,V,X). The effect may be due to the presence of calcium ions - IV plasma factor involved in all phases of coagulation hemostasis. CPM also contains bound calcium, which is the reason for the effect of enhancing blood coagulation.

In the presence of CPM polymer, VSMC by Lee-White shortened 2.1 times relative to the control, which amounted to 2.4±0.6 min; in the presence of film - shortened. The results indicate the activation of blood coagulation in the presence of oxidized cellulose due to the transition of plasma into a gel-like state, which is probably due to the physicochemical properties of oxidized cellulose. At the same time it has no activating effect on plasma coagulation factors.

The obtained results indicate that the process of

donor blood coagulation in vitro is enhanced in the presence of a polycomposite polymer based on cellulose derivatives with viscose, possibly due to the activation of factors involved in both the external and internal pathways of coagulation hemostasis. The presence of such properties in CPM polymer opens the prospect of its use as a hemostatic implant in surgery. On examination on the next day after the operation, no signs of skin graft necrosis were noted. The donor wound was also clean, there were no signs of infection and pain. On the 3rd day after the operation the patients had positive dynamics of the skin graft healing.

There was no separation from the wound. There were no signs of inflammation and infection of the wound on the donor site. On the 8th day after skin transplantation there was almost complete engraftment of the skin graft, the suture line was a clear thin line, without signs of redness or infiltration. The skin graft is soft, elastic, pale pink in color. No signs of infection were noted. The donor site was completely epithelialized, a thin elastic scar without signs of hypertrophy and inflammation, painless remained. On the 13th day there was a complete engraftment of the skin autograft with the full restoration of the defect with

a slight contraction of the defect area. Thus, the application of the film form of hemostatic agent "Chemoben" after necrectomy with the subsequent autodermoplasty in all cases contributed to the complete healing of the donor sites on the 7th day, and complete engraftment of the skin autograft with full restoration of the defect - by the 13th day after the operation. On the basis of the obtained data the following conclusion can be made. Application of Chemoben preparation in autodermoplasty after early necrectomy provides complete hemostasis and reduction of wound pain severity. Local single application of hemostatic preparation Chemoben on the wound after necrectomy at autodermoplasty promotes fast adhesion of the graft, provides fast and complete engraftment of skin flaps.

CONCLUSIONS

Thus, at severe thermal injuries DIC syndrome develops, requiring appropriate correction of hemostasis. In these conditions the use of Chemoben in time of necrectomy and autodermoplasty significantly increased the effectiveness of therapy, reduced hospital stay and decreased mortality. The mechanism of the positive effect of the drug is connected with its influence on external and internal ways of coagulation hemostasis, adhesive ability, providing fast and complete graft engraftment.

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