

HEMOSTASIS SYSTEM DISTURBANCES IN THE STAGE OF TOXEMIA WITH ACUTE BURN INJURIES

(literature review)

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Annotation. Thermal injury represents a serious medical, social and economic problem. The development of heavy industry and the chemical industry, as well as the widespread use of electricity in domestic and industrial conditions, lead to a significant increase in burn injuries. The purpose. The state of the hemostasis system and blood biochemical indicators were studied in 59 patients aged 18 to 75 years in the acute toxemia stage of burns in the burned area of more than 20% of the body surface, 4-5 to 12 days after the injury. In 59 patients with severe burns in the stage of acute toxemia, we examined the state of the hemostasis system.

Key words: Könning's disseminated thrombocytopenic purpura (DTP) - syndrome, circulating blood volume (FVV), recalcification time, antithrombin, prothrombin index, injury.

НАРУШЕНИЯ СИСТЕМЫ ГЕМОСТАЗА В СТАДИИ ТОКСЕМИИ ОСТРЫХ ОЖОГОВЫМИ ТРАВМАМИ

(обзор литературы)

Аннотация. Термическая травма представляет собой серьезную медицинскую, социальную и экономическую проблему. Развитие тяжелой промышленности и химической промышленности, а также широкое использование электроэнергии в бытовых и производственных условиях приводят к значительному увеличению ожоговой травмы. Цель. Изучено состояние системы гемостаза и биохимические показатели крови у 59 больных в возрасте от 18 до 75 лет в острой токсемической стадии ожогов площадью более 20% поверхности тела в сроки от 4-5 до 12 суток после травмы. У 59 больных с тяжелыми ожогами в стадии острой токсемии исследовано состояние системы гемостаза.

Ключевые слова: синдром диссеминированной тромбоцитопенической пурпуры Кёнинга (ДТП), объем циркулирующей крови (ООК), время рекальцификации, антитромбин, протромбиновый индекс, травма.

Relevance.

Any injury initiates the coagulation process, but thermal injuries, such as shock, cause dramatic changes in all coagulation systems. Jilinsky E.V., Tsvirko V.N. 2018y. Any damage to the vessel wall, "blood damage", on the one hand, leads to various levels of plasma loss, and on the other hand, it can be considered physiological, and then pathological changes in the hemostasis system can cause the death of the organism by itself. Acute disseminated thromboembolism syndrome is one of the serious and common complications of massive injury. Hemostasis disorders in patients with severe burns are manifested by QDTQ-syndrome. Krylov K.M., Shlyk I.V., Pivovarova L.P., 2010y. Disseminated intravascular coagulation (DAC) syndrome cannot be detected at all, or is detected at the stage of presenting a clear clinical picture, such as hemorrhage and organ dysfunction. There are several forms of QDTQ-syndrome: acute, acute, acute, chronic, recurrent, latent. The acute form is characteristic for the acute period of the burn disease.

The purpose of the study is to study the disorders in the hemostasis system during the stage of burn toxemia in burn victims.

Table 1.

Acute QDTQ in the toxic phase of acute burns Laboratory diagnostics _

Indicators	The norm	Acute toxemia after burns , n =59	
		4-5 days	6-12 days
Connie Lee-White b'yyicha ivish va'kti , min ut	5-12	7.8±0.3	8.7±0.8
Lahtani spontaneous lysis testi _	N	Tezlashgun lysis	Tezlashgan Lysis
Test thrombin, sec und	7-11	16.4±0.1	17.8±0.3
Thrombocyte lar sony , x10 ⁹ /l	175-425	100.0±7.0	105.0±8.5
PFTV (partially activated thromboplastin time) , three days	21-35	40,5 ±0,01	38,45 ±0,01
International Harmonizing Relationship (IHR)	0.7-1.1	1.6±0.01	1.5±0.01
Fibrinogen concentration , g / l	2-4	1.8±0.1	1.75±0.1
Thrombin time , seconds	24-34	47.5±0.1	46.5±0.1
AT III , %	80-100	65±1.0	68±1.0
EMFK , mg/l	0-35	185.0±9.3	192.4±10.3
Plasminogen, in %	100-105	80.8±4.5	92.5±5.2

Izox : QFTV - partially activated thromboplastin time ; XMM patient's prothrombin time; donor's prothrombin time ; AT III – antithrombin III ; E FMK - soluble fibrin-monomer complexes

burn toxemia in patients after a burn injury, indicators of coagulation tests in different directions, which are characteristic for the beginning of the development of acute QDTQ-syndrome, were determined (table 1). So if testthrombin, QF TV , XMM , prothrombin time, E FMK indicators clearly increased compared to the norm, while fibrinogen , plasminogen and AT-III decreased, clot dissolution accelerated. Indicators of the development of acute QDTQ-syndrome were in the form of increased consumption of coagulation substrates - platelets and fibrinogen. In our study, thrombocytopenia occurred in the majority of patients, in which the platelet count was $100.0 \pm 7 \times 10^9 / l$, which was 32.8% lower than normal ($r < 0.05$), and the amount of fibrinogen in patients with burn toxemia was 1, respectively. It was 7 times lower. More specific differences between patients with severe burn toxemia and the control group were determined by indicators of one of the markers of thrombinemia: the presence of intermediate products of transformation of fibrinogen to fibrin in plasma. The amount of EFMK was 5.3 times higher in patients with burn toxemia. It was found that patients with burn shock significantly decreased physiological anticoagulants S by 1.6 times and AT III by 20% ($r < 0.05$) compared to the norm. At the same time, the amount of plasminogen, which is part of the anti-coagulation system, decreased by 1.3 times ($r < 0.05$) compared to the norm.

In the stage of toxemia of the burn disease, the initial stage of development of the KDTK-syndrome is observed: thrombocytopenia, the amount of EMFK increases against the background of a decrease in the anti-coagulation mechanisms of the hemostasis systems.

Disturbances in the hemostasis system during the stage of toxemia in burn victims. The tests showed that in 15 patients of the 1st group (with sepsis), a reduction in blood clotting time (5.5 ± 0.5 min) was observed. Plasma recalcification time was 66 ± 3.8 seconds and increased to 82 ± 4.2 seconds by the end of the third day . In the 2nd group of patients (with severe sepsis and

PO E) , blood clotting time was 3.6 ± 0.3 min . At this time, the age of plasma recalcification decreased to 40 ± 5.0 seconds and reached 76 ± 3.8 seconds by the end of the third day . In group 3 burns (septic shock with refractory hypotension), blood clotting time was 4.0 ± 0.4 minutes and increased to 5.8 ± 0.5 minutes on the third day. Plasma recalcification time decreased to 33 ± 7.8 seconds on the first day and remained reduced to 45 ± 3.5 seconds by the end of the third day. The concentration of fibrinogen increased in the first day after the burn in the 2nd and 3rd groups of the injured.

The concentration of fibrinogen increased significantly only on the first day and was 5.3 ± 0.3 g/l on average. The reaction to fibrinogen "V" was strongly positive . The results of the tests show that a burn injury causes a decrease in the anticoagulant activity of the blood. Similarly, in patients with FI of 90 units and above, fibrinolytic activity decreased to $3.7 \pm 0.6\%$ in the first days and remained sharply decreased until the end of the third day.

In the stage of toxemia, after complex anti-shock therapy in the main group, we performed various surgical interventions: 23 necrotomies with deep burns of 11-15% of the body surface, early necrectomy in 40 patients, and autodermoplasty in 49 patients. The analysis of the blood coagulation system and fibrinolytic activity after surgical intervention showed a tendency towards normalization of all indicators (table 1.1).

Table 1.1

Blood clotting disorders after autodermoplasty in patients with deep burns (n=49)

Coagulogram indicators	Main group (degree of shock according to plasma loss)			The norm
	I degree	II degree _	III degree	
PTI, %	91.6 ± 3.9	91.0 ± 1.0	95.6 ± 12.1 *	90.2 ± 1.0
Fibrinogen, g/l	2.3 ± 0.3 *	2.92 ± 0.29 *	2.15 ± 0.25 *	3.4 ± 0.2
Thrombotest, sec.	5.0 ± 0.14 *	4.4 ± 0.2 *	4.06 ± 1.1 *	5.0 ± 0.1
Hematocrit (%)	46.0 ± 3.9	53.1 ± 1.4 *	59.4 ± 2.1 *	44.0 ± 0.8
R recalcification of waqti , sec.	92.6 ± 2.6 *	97.3 ± 3.0 *	85.0 ± 5.6 *	74.0 ± 3.2
Tolerant to heparin , sec.	252.3 ± 32.3 *	215.6 ± 8.4 *	282.3 ± 6.1	290 ± 7.4
Fibrinolysis, %	20.1 ± 0.45 *	7.7 ± 0.45 *	7.4 ± 1.9 *	15.4 ± 0.6

Note : * - the level of results without doubt $P < 0.05$.

In patients with 1st degree of plasma loss In the postoperative period, due to adequate preoperative therapy, a tendency to normalization of all indicators of the coagulogram was determined. In this PTI was statistically $91.6 \pm 3.9\%$, fibrinogen - 2.3 ± 0.3 g/l, thrombotest - 5.0 ± 0.14 ($R < 0.05$) . However, the response time of the patients from the hospital was maintained with a slight decrease in fibrinolytic activity of $20.1 \pm 0.45\%$ ($R < 0.05$). It was found that patients with moderately severe plasma loss have significantly improved response time indicators. This is indicated by the normalization of PTI, fibrinogen and blood hematocrit indicators.

Conservative and surgical __ the effect of treatment methods on the blood coagulation system. Early necrectomy intoxication and to improve the general condition of the patient in exchange for the removal of necroses, which are the substrate for the development of sepsis brings The difference between early surgical treatment and staged surgical treatment is that patients recover faster by reducing the development of scar tissue with better functional and cosmetic long-

term results. Due to the reduction of treatment time, the need for antibacterial therapy is reduced [94; pp. 6-9]. Expanding the volume of surgery in patients with deep burns in burn departments requires improvement of perioperative preparation methods. Necrotomy and autodermoplasty are observed with blood loss of 0.5-1.5 ml/cm² preparing an autograft requires removing the skin from the surface, and this condition leads to increased bleeding. At this time, adequate infusion preparation and hemotransfusion support are important in all stages of burn disease. At the same time, infusion and hemotransfusion should be carried out based on determining the volume. In this regard, at the time of autodermoplasty in deep burns, it is as important as ever to improve methods of preparing burn wounds and patients for surgery, carrying out balanced infusion and hemotransfusion therapy, reducing and replenishing blood loss, and detoxification.

Thus, adequate local hemostatic therapy performed during surgery can prevent blood loss and therefore improve treatment outcomes in this cohort of patients. For this purpose, the use of local hemostatic agent "Heprocel" is promising.

All patients were subjected to early necrotomy until the appearance of capillary bleeding at the border of healthy tissues, and autodermoplasty was performed at the same time. Hemostasis was carried out by using the hemostatic powder "Heprocel" obtained from the derivative of cellulose, 10 mg per day for 3 days.

Clinical evaluation included the following criteria: the amount and nature of fluid coming out of the wound; wound bleeding; the time of epithelization in the donor areas of transplanted autodermografts; completeness of epithelization; the extent to which pain is expressed in the injury. Operative intervention in 35 patients with deep burns consisted in the use of hemostatic drug Heprotsel to stop bleeding after excision of necrotic skin and subcutaneous structures.

Our studies have shown that early surgical necrotomy and sliced autografts are bleeding from the donor areas (6-10 ml per 100 cm² area), the bleeding stops completely after the immediate application of Heprotsel hemostatic powder, and the wound surface is covered with a membrane. it gets shiny. The sensation of pain will be very low. When closing a wound defect with a donor autograft, good adhesion of the skin graft to the underlying wound was observed.

Conclusion _ Taking into account the above, comprehensive anti-shock measures aimed at improving water-salt balance, acid-alkaline balance and homeostasis disorders should be carried out at the time of hospitalization of all patients.

References:

1. Bocharov R.V., Solnyshko A.L., Udut V.V. Optimization of diagnosis of burn shock and correction of hemostasis disorders in children with thermal trauma. // Russia. west perinatol. and pediatrician. 2011. 56(1). - c . 220-233.
2. Dutkevich I.G. Syndrome of disseminated intravascular coagulation (DIC) in surgical practice. Vestnik Khirurgii imeni I.I. Grekov. 2013.-№2. - With. 67-71.
3. Presnyakova M.V., Sidorkin V.G., Sidorkina A.N. and others. Imbalance of the hemostasis system - the basis for the development of DIC in the acute period of burn disease // Sat. scientific papers of the II Congress of combustiologists of Russia "World without burns", Moscow (June 2–5) . 2008. - p. 67-68.
4. Presnyakova M.V. Informational significance of hemostasiological disorders in the development of "early" sepsis in severely burned patients . 2013– No. 5. – p. 41-50.
5. Tarkova A . , Chernyavsky A.M., Morozov S.V., Grigoriev I.A., Tkacheva N.I., Rodionov V.I. Hemostatic material of local action based on oxidized cellulose. Sib Nauch Med

Zhurn. 2015 . No. 35(2) . - with . 11-15.

6. Voloshchenko K.A., Berezenko E.A., Akopyan S.R. Violation of hemostasis and correction in severely burned patients // Ambulance. Mat. int. conf. dedicated To the 60th anniversary of the burn center of the Research Institute of Emergency Medicine named after A.I. I.I. Dzhanelidze. St. Petersburg (June 20-22) . 2006. - No. 3. - T. - s . 47-49.

7 . Yunusov O.T., Karabaev H.K., Khakimov E.A., Daminov F.A. Study of the hemostasis system in patients with burn injury and DIC // Uzbekiston Surgery and Ilmiy Amaliy Journal. - Tashkent. - 2018. - No. 3 (79) - S. 167-168.

8 . Yunusov O.T., Karabaev H.K., Tagaev K.R., Rustamov M.I. DIC in burned patients: a modern view of the problem // Problems of Biology and Medicine. –Samarkand. - 2018. No. 3 (102). -WITH. 108-112.

9 . Yunusov O.T., Sadykov R.A., Karabaev H.K., Tagaev K.R., Saidullaev Z.Ya. Evaluation of the effectiveness of local use of the hemostatic agent "Geprocel" in the treatment of patients with deep burns // Problems of biology and medicine. –Samarkand. - 2019. No. 2 (109). - S. _ 158-160. (14.00.00, No. 19).

10. Yunusov OT State of Hemostasis System at Exposure of the Thermal Agent during Shock and Toxaemia // International Journal of Psychosocial Rehabilitation Vol. 24, Issue 04, 2020 ISSN: 1475-7192. Scopus basesidagi journal.

11. Yunusov O.T., Daminov F.A., Karabaev H.K. Efficiency of Heprocel in Treatment of Patients with Deep Burns. American Journal of Medicine and Medical Sciences 2020, 10 (8):624-626.

12. Абдурахманов Д. Ш., Хайдарова Л. О. Алгоритм ведения больных с эхинококкозом печени //Вопросы науки и образования. – 2020. – №. 41 (125). – С. 92-103.

13. Абдурахманов Д. Ш., Хайдарова Л. О. Качество жизни больных, перенесших эхинококкэктомия из печени //Вопросы науки и образования. – 2020. – №. 41 (125). – С. 81-91.

14. Абдурахманов Д. Ш., Хайдарова Л. О. Современные взгляды на патологию эхинококкоза печени //international scientific review of the problems of natural sciences and medicine. – 2020. – С. 44-57.

15. С.А. Абдуллаев, С.Т. Хужабаев, М.М. Дусяяров, И.М. Рустамов. ТАКТИКА ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ ГНОЙНО-НЕКРОТИЧЕСКИХ ОСЛОЖНЕНИЙ МЯГКИХ ТКАНЕЙ У БОЛЬНЫХ САХАРНЫМ ДИАБЕТОМ И ДИАБЕТИЧЕСКОЙ СТОПЫ //Research Focus. – 2023. – Т. 2. – №. 1. – С. 399-404.

16. Abdullaev S., Akhmedov A. T. A., Djalolov D. Problems of surgical tactics for the treatment of diabetic foot syndrome //International Journal of Advanced Science and Technology. – 2020. – Т. 29. – №. 5. – С. 1836-1838.

17. Abdullaev S. et al. Features of Complex Surgical and Infusion Treatment of Sepsis in Diabetes Mellitus //Annals of the Romanian Society for Cell Biology. – 2021. – С. 2283-2288.

18. Abdullaevich A. S. et al. Problems of Sepsis Diagnostic and Treatment in Diabetes Mellitus //American Journal of Medicine and Medical Sciences. – 2020. – Т. 10. – №. 3. – С. 175-178.

19. Abdullaev S. et al. Problems of Diagnostics, Prevention and Surgical Tactics of Treatment of Adhesive-Intestinal Obstruction //Annals of the Romanian Society for Cell Biology. – 2021. – С. 2289-2294.

20. Абдуллаев С. А., Джалолов Д. А. Особенности течения болезни Фурнье при сахарном диабете //Наука в современном мире: приоритеты развития. – 2020. – №. 1. – С. 9-11.
21. Абдуллаев С. А. и др. ПРОГНОЗИРОВАНИЕ ТЯЖЕСТИ ТРАВМЫ И ИСХОДА ЛЕЧЕНИЯ ПОСТРАДАВШИХ С СОЧЕТАННОЙ ТРАВМОЙ ГРУДИ И ЖИВОТА //Скорая медицинская помощь. – 2003. – Т. 4. – №. 4. – С. 19-20.
22. Абдуллаев С. А. и др. КЛАССИФИКАЦИЯ СОЧЕТАННОЙ ТРАВМЫ ГРУДИ И ЖИВОТА //Скорая медицинская помощь. – 2003. – Т. 4. – №. 4. – С. 18-18.
23. Абакумов М. М. и др. Разрывы диафрагмы при сочетанных повреждениях груди и живота //Вестн. хир. – 1991. – №. 5-6. – С. 64-68.
24. Abdullaev S. A. et al. SURGICAL TACTICS FOR THE TREATMENT OF SEPSIS IN DIABETES MELLITUS //IN SCIENCE AND INNOVATION IN THE 21ST CENTURY: CURRENT ISSUES, DISCOVERIES AND ACHIEVEMENTS. – 2019. – С. 190-194.
25. Абдуллаев С. и др. Состояние перекисного окисления липидов и антиоксидантной системы у обожженных //Журнал вестник врача. – 2012. – Т. 1. – №. 03. – С. 12-13.
26. Шеркулов К.У., Рустамов И.М., Усмонкулов М.К. РЕЗУЛЬТАТЫ ЛЕЧЕНИЯ БОЛЬНЫХ ОСТРЫМ ГАНГРЕНОЗНО НЕКРОТИЧЕСКИМ ПАРАПРОКТИТОМ //Research Focus. – 2023. – Т. 2. – №. 1. – С. 483-486.
27. Abakumov M. M. et al. Diaphragmatic ruptures in combined injuries to the chest and abdomen //Vestnik Khirurgii Imeni II Grekova. – 1991. – Т. 146. – №. 5. – С. 64-68.
28. I.M. Rustamov, J.A. Karabayev. MODERN APPROACH TO THE TREATMENT OF PATIENTS WITH ACUTE GANGRENOUS-NECROTIC PARAPROCTITIS //Research Focus. – 2023. – Т. 2. – №. 1. – С. 469-472.
29. Murodulla R. et al. A RARE CASE OF KERATOAKANTOMA //Thematics Journal of Education. – 2022. – Т. 7. – №. 3.
30. РУСТАМОВ М. И. и др. Современная тактика лечения острого парапроктита //Журнал биомедицины и практики. – 2022. – Т. 7. – №. 2.
31. Ismailov S. I. et al. Predictors of postoperative complications in patients with ventral hernia //Khirurgiia. – 2022. – №. 1. – С. 56-60.
32. Dusiyarov M.M., Eshonxodjaev J.D., Xujabaev S.T., Sherkulov K.U., & Rustamov I.M. (2021). Estimation of the efficiency of antisseal coating on the model of lung wound in experiment. Central Asian Journal of Medical and Natural Science, 1(4), 1-6. <https://doi.org/10.47494/cajmns.v1i4.57>.
33. Rustamov M.I., Rustamov I.M., Shodmonov A.A. Optimising surgical management of patients with acute paraproctitis //Frontline Medical Sciences and Pharmaceutical Journal. – 2022. – Т. 2. – №. 02. – С. 36-42.
34. Рустамов М.И., Давлатов С.С., Сайдуллаев З.Я., & Рустамов И.М. Хирургическое лечение больных гангреной фурнье //Журнал гепато-гастроэнтерологических исследований. – 2020. – Т. 1. – №. 2. – С. 69-71.
35. Дусяяров М.М., Рустамов И.М., Муртазаев Х.Ш., Шербекова Ф.У. Выбор оптимального метода лечения эпителиально-копчикового хода //Молодежь и медицинская

наука в XXI веке. – 2017. – С. 358-358.

36. Дусияров М.М., Рахматова Л.Т., Рустамов И.М. Результаты хирургического лечения сложных свищей прямой кишки //Молодежь и медицинская наука в XXI веке. – 2017. – С. 358-359.

37. Рустамов И.М., Кан С.А., Рустамов М.И., Шербеков У.А., Дусияров, М. М. Анализ результатов хирургического лечения больных гангреной фурнье //Современные технологии: актуальные вопросы, достижения и инновации. – 2017. – С. 83-86.

38. Abdullaev S. A. et al. PROBLEMS OF DIAGNOSIS AND TREATMENT OF SEPSIS IN DIABETES MELLITUS //DOCTOR'S BULLETIN. – Т. 6.

39. Камолов Т. К. и др. Причины возникновения послеоперационной недостаточности анального сфинктера //Национальная ассоциация ученых. – 2016. – №. 1 (17). – С. 12-14.

40. Муртазаев З. И. и др. Оптимальная Хирургическая тактика при эхинококкозе легких //Достижения науки и образования. – 2019. – №. 11 (52). – С. 61-66.

41. Murtazaev Z. I. et al. Our experience in the surgical treatment of liver echinococcosis //Journal of critical reviews. – 2020. – Т. 7. – С. 2454-2458.

42. Мустафакулов И. Б. и др. Хирургическое лечение повреждений желудка при сочетанной травме //Национальная ассоциация ученых. – 2016. – №. 3-1 (19). – С. 46-47.