

APPLICATION OF THE ABACTERIAL MEDIUM IN DIFFERENT FORMS OF PANARIZATION

Latipov O.Z., Boltaev T.Sh.

Bukhara State Medical Institute

✓ *Resume*

Purulent-inflammatory diseases of the upper limb are a serious medical and social problem. The relevance of this topic is due to the high morbidity among the working-age population, the predominant lesion of the functionally active right upper limb, as well as the unsatisfactory organization of surgical care at the pre-hospital stage of treatment.

Purpose: to improve the results of treatment of patients with purulent destructive surgical diseases of the fingers of the hand by using an abacterial environment on an outpatient basis.

Materials and methods: the analysis of the results of treatment of 86 patients with acute purulent destructive surgical diseases of the fingers of the hand was carried out; they were conditionally divided into 2 groups. The first comparison group included 57 patients who used the traditional method of treatment, which included surgical treatment of a purulent focus followed by debridement of the wound with 25% dimethyl sulfoxide solution. In the second (main) group, 53 patients were additionally exposed to the abacterial environment on the purulent focus for 8 hours 2 times a day in accordance with the objectives of the study.

Conclusion: the developed method of additional influence on a purulent wound in case of purulent destructive surgical diseases of the hand of the abacterial environment with a solution of dimethyl sulfoxide accelerated the transition of the wound process and reduced the duration of outpatient treatment by 5-7 days.

Key words: panaritium, dimethyl sulfoxide, abacterial environment.

ПРИМЕНЕНИЕ АБАКТЕРИАЛЬНОЙ СРЕДЫ ПРИ РАЗЛИЧНЫХ ФОРМАХ ПАНАРИЦИЯ

Латипов О.З., Болтаев Т.Ш.

Бухарский государственный медицинский институт

✓ *Резюме*

Гнойно-воспалительные заболевания верхней конечности представляют собой серьёзную медико-социальную проблему. Актуальность данной темы обусловлена высокой заболеваемостью среди трудоспособного населения, преимущественным поражением функционально активной правой верхней конечности, а также неудовлетворительной организацией хирургической помощи на достационарном этапе лечения.

Цель: улучшение результатов лечения больных с гнойными деструктивными хирургическими заболеваниями пальцев кисти путем применения абактериальной среды в амбулаторных условиях.

Материалы и методы: проведен анализ результатов лечения 86 больных с острыми гнойными деструктивными хирургическими заболеваниями пальцев кисти, они были условно разделены на 2 группы. В I-ую группу сравнения включены 57 больных, которым использовался традиционный метод лечения, включавший хирургическую обработку гнойного очага с последующей санацией раны 25% раствором диметилсульфоксида. Во II-ой (основной) группе 53 пациентам дополнительно в соответствии с задачами исследования проводилось воздействие абактериальной среды на гнойный очаг по 8 часов 2 раза в сутки.

Заключение: разработанный метод дополнительного воздействия на гнойную рану, при гнойных деструктивных хирургических заболеваний кисти абактериальной среды раствором диметилсульфоксида ускорил переход раневого процесса и сократил сроки амбулаторного лечения на 5-7 суток.

Ключевые слова: панариций, диметилсульфоксид, абактериальная среда.

✓ Резюме

Қўлларнинг йирингли-яллигланиш касалликлари жиддий тиббий ва ижтимоий муаммоси ҳисобланади. Ушбу мавзунинг долзарблиги меҳнатга лаёқатли аҳоли орасида касалланиш даражаси юқори бўлганлиги билан боғлиқ бўлиб, асосан функционал фаол ўнг қўл шикастланиши кузатилади шунингдек, касалхонага қадар даволаниш босқичида жарроҳлик ёрдамини қониқарсиз ташкил этиш билан боғлиқдир.

Тадқиқот мақсади: амбулатория шароитида абактериал муҳитни қўллаш орқали бармоқларнинг йирингли деструктив жарроҳлик касалликлари билан касалланган беморларни даволаш натижаларини яхшилаш.

Материаллар ва услублар: қўл бармоқ соҳаси ўткир йирингли деструктив жарроҳлик касалликлари билан касалланган 86 беморни даволаш натижаларини таҳлил қилишда шартли равишда 2 гуруҳга бўлинди. I таққослаш гуруҳига 57 беморга анъанавий даволаш, II асосий гуруҳдаги 53 беморга эса тадқиқот вазифаларига асосланиб қўшимча абактериал муҳит таъсири 8 соатдан кунга 2 маҳал қўланилди.

Хулоса: ишлаб чиқилган диметилсульфоксиднинг 25% ли эритмаси билан абактериал муҳитнинг қўл бармоқ йирингли деструктив жарроҳлик касалликларда, йирингли жароҳатга қўшимча таъсир ўтказиш усули жароҳатни битиш жараёнини 2-фазасига ўтишини ва амбулатория даволаниш вақтини 5-7 кунга тезлаштирди.

Калит сўзлар: панариций, диметилсульфоксид, абактериал муҳит.

Relevance

Purulent-inflammatory diseases of the upper limb are a serious medical and social problem. The relevance of this topic is due to the high morbidity among the working-age population, the predominant lesion of the functionally active right upper limb, as well as the unsatisfactory organization of surgical care at the pre-hospital stage of treatment [1,3]. Among all suppurative processes of soft tissues and bones in patients who first applied for surgical help, the proportion of purulent diseases of the hand is, according to modern Russian and foreign authors, from 8 to 30% [2,4,5]. Every fourth panaritium is accompanied by damage to bone tissue [5,6,7]. Bone panaritium is 56% among hospitalized patients with other forms of panaritium and 17.9% among patients with other purulent diseases of the fingers and hands [8].

One of the ways to reduce the number of complications is to create a high concentration of antibiotic, which allows achieving a therapeutic effect even in cases where the purulent process is caused by antibiotic-resistant strains. For example, for lincomycin-resistant staphylococcus strains, the concentration of lincomycin, equal to 20 µg / ml, is the minimum bacteriostatic [3,4,6,7]. Such high concentrations of antibiotics are achieved by methods of local antibiotic therapy. With the most widely used methods of local antimicrobial chemotherapy (intraarterial, intravenous and intraosseous regional

administration, intraosseous lavage with an antibiotic, lymphotropic administration), complications associated with vascular puncture, pain when using a tourniquet are possible [6,8,12]. Cases of skin necrosis with lymphotropic administration are described. It is not always possible to insert a needle for intraosseous lavage due to osteoporosis. The complexity of some techniques limits their application [9,10]. Thus, the intravascular route of antibiotic administration is not very promising in pediatric practice, while about 10% of patients with bone panaritium are children under 15 years of age [6,11].

Another direction in the fight against antibiotic-resistant bacteria is the use of new types of antibiotics and substances that reduce antibiotic resistance (enzymes, clavulanic acid, dimethyl sulfoxide). Dimexide (dimethyl sulfoxide DMSO), in addition to being bacteriostatic itself, and for a number of bacteria and bactericidal action, has the ability to increase the sensitivity of microorganisms to antibacterial drugs. It is able to carry out transcutaneous antibacterial drugs, create their depot in tissues and is used as part of local antibacterial therapy [3,4,10,11].

About dimethyl sulfoxide S.W. Jacob, R. Hersehler said that “there can be significant benefits if we learn to better use a large number of existing antibiotics, rather than continue to spend large resources on the development of new drugs to overcome antibiotic resistance” [3,4]. The

interest in purulent surgery of the fingers has not waned to the present day. Based on high-tech research methods (ultrasonography, thermography), the severity and prevalence of the purulent process is determined and the further course of the disease is predicted. This review provides an assessment of various authors in the process of shaping hand surgery. The choice of the correct treatment tactics for a patient with purulent-inflammatory diseases of the fingers of the hand, undoubtedly, affects the outcome of the disease and the development of complications, the choice of a therapeutic algorithm allows to improve the results of treatment, and, accordingly, to preserve the social image and the usefulness of the function of the fingers.

Objective of the study: to improve the results of treatment of patients with purulent destructive surgical diseases of the fingers of the hand by using an a bacterial environment on an outpatient basis.

Material and methods

The analysis of the results of treatment of 110 patients with acute purulent destructive surgical diseases of the fingers of various etiologies, who entered the clinical base of the Bukhara State Medical Institute, was carried out. The patients were conditionally divided into 2 groups. The first comparison group included 57 patients who used the traditional method of treatment, which included surgical treatment of a purulent focus followed by debridement of the wound with 25% Dimexidum solution. Systemic antibiotic therapy was also carried out, taking into account the sensitivity of microflora secreted from wounds, detoxification therapy and symptomatic treatment. In the II (main) group, 53 patients additionally, in accordance with the objectives of the study, were additionally exposed to the abacterial environment of the purulent focus for 8 hours 2 times a day.

In group I, out of 57 (51.8%) patients, there were purulent destructive diseases of the fingers in the form of paronychia 9 (15.8%), subungual 13 (22.8%), articular 7 (12.3%), bone panaritium

12 (20.05%) and pandactylitis 16 (28.05%), after various etiological factors.

53 (48.2%) patients of group II had purulent destructive diseases of the fingers in the form of paronychia 10 (18.9%), subungual 13 (24.5%), articular 6 (11.3%), bone panaritium 11 (20.7%) and pandactylitis 13 (24.5%), after various etiological factors.

An important characteristic criterion for assessing the wound process was the identification of the amount of microbial contamination, the determination of the species composition of the microflora. Revealed species composition of microflora sown from the exudate of infected wounds in patients with purulent destructive surgical diseases of the fingers.

In patients of both groups, the indicators of the qualitative and quantitative analysis of the microflora of wounds in dynamics, the degree of intoxication, the timing of cleansing and healing of wounds were studied.

Result and discussion

Comparison group I included 57 patients with acute purulent destructive surgical diseases of the fingers. All patients on admission had symptoms of general intoxication - mild and moderate severity. In parallel with the general symptoms, local manifestations of the inflammatory process were noted - hyperemia, edema and tissue infiltration in the wound area. More than 92% of patients were admitted within 2 to 6 days after the onset of the disease.

Analysis of the results of indicators of intoxication of the body of patients with purulent destructive surgical diseases of the fingers of the first group of comparison revealed the following changes (Table 1). As can be seen from the table, on the first day of treatment, the body temperature of the patients averaged 38.7 ± 0.32 °C. The content of leukocytes in the blood was on average $9.8 \pm 0.35 \times 10^9 / l$. The volume of medium molecules averaged 0.208 ± 0.011 units. Similarly, an increase in LII and ESR was noted.

Table 1.

Dynamics of indicators of intoxication in patients with purulent surgical diseases of the fingers of the 1st comparison group (n=57)

Indicators	Observation time				
	day of admission	3 day	5 day	7 day	9-10 day
t ⁰ body	38,7±0,32	37,8±0,16*	37,3±0,22*	37,1±0,11	36,7±0,12*
L blood	9,8±0,35	8,6±0,34*	7,8±0,27	6,2±0,31	6,0±0,28

$\times 10^9 / l$	$0,208 \pm 0,01$ 1	$0,175 \pm 0,007^{**}$	$0,161 \pm 0,008$	$0,128 \pm 0,00$ 7**	$0,103 \pm 0,005$ **
MSM units	$2,3 \pm 0,08$	$1,85 \pm 0,08^*$	$1,8 \pm 0,06$	$1,5 \pm 0,07$	$1,1 \pm 0,06^{**}$ *
LII unit	$45,4 \pm 1,77$	$36,3 \pm 1,48^*$	$31,2 \pm 1,34^*$	$26,5 \pm 1,12^*$ **	$14,3 \pm 0,68^*$ **

Note: * - differences relative to the data of the previous day are significant (* - $P < 0.05$, ** - $P < 0.01$, *** - $P < 0.001$)

On the third day of treatment, there was a slight decrease in body temperature indicators from 38.7, 30.32 to 37.8 ± 0.16 , the number of blood leukocytes decreased on average to $8.6 \pm 0.34 \times 10^9 / l$. The volume of medium molecules averaged 0.175 - 0.007 units. There was a decrease in LII and ESR indices to 1.850.08 and 36.3 ± 1.48 , respectively. By the seventh day of treatment, these figures, although they tended to further decrease, however, remained above the norm.

With further treatment and observation by the tenth day, all analyzed parameters of intoxication, except for ESR of blood, were within normal limits.

The following criteria for assessing the dynamics of the wound process in patients were the pH of the wound environment, the percentage of reduction in the area of the wound surface, and PC indicators according to MF Mazurik (Table 2).

Table 2.

Dynamics of biochemical parameters and rate of wound healing in patients of the 1st comparison group (n = 57)

Indicators	Observation time				
	1 day	3 day	5 day	7 day	9-10 day
pH of the wound environment	$4,5 \pm 0,17$	$4,8 \pm 0,14$	$5,6 \pm 0,12^{***}$	$6,2 \pm 0,22$	$7,1 \pm 0,31^{***}$
Percentage reduction in wound surface area	0	$1,3 \pm 0,02^{***}$	$2,5 \pm 0,06^{***}$	$3,3 \pm 0,11^{***}$	$3,4 \pm 0,21$
Wound exudate protein (g / l)	$58,9 \pm 1,59$	$55,9 \pm 1,37$	$47,4 \pm 1,29^{***}$	$43,7 \pm 1,17$	-
Total blood protein (g / l)	$64,4 \pm 2,39$	$67,7 \pm 1,88$	$69,7 \pm 1,78$	$72,6 \pm 1,84$	$76,2 \pm 3,41$
PC according to M.F. Mazurik	$0,9 \pm 0,04$	$1,2 \pm 0,03^{**}$	$1,4 \pm 0,05^{***}$	$1,6 \pm 0,03^*$	-

Note: * - differences relative to the data of the previous day are significant (* - $P < 0.05$, ** - $P < 0.01$, *** - $P < 0.001$)

By the seventh day, the PC was 1.6 ± 0.03 , and the wound area per day significantly decreased by $3.3 \pm 0.11\%$. The pH of the wound environment averaged 6.2 ± 0.22 . Only by the tenth day of treatment did the pH of the wound environment become neutral. The decrease in the area of the wound surface per day became equal to $3.4 \pm 0.21\%$. The release of exudate from the wound has ceased, which, in our opinion, is due to the transition of the wound process from the 1st to the 2nd phase.

Dynamic control of the level of microbial contamination of purulent wounds in patients of this subgroup revealed the following: at the time of admission, the microbial contamination, on average, was 108 mt / g, on the next day, after surgical treatment of the wound with the imposition of an ointment bandage, its values

were 105 mt / g. By the sixth day of complex treatment in these patients, the degree of microbial contamination was below the critical level and amounted to 102 mt / g of tissue.

Thus, in the patients of the comparison group, the wound was cleared of infection only by day 5.5, the beginning of the appearance of granulations - by the 7th day, the beginning of epithelialization - by the 10th day. Biochemical parameters of wound exudate are normalized only by the 10th day of treatment.

With the traditional method of treating patients of group I with purulent destructive surgical diseases of the fingers of the hand, the average duration of outpatient treatment was 11 ± 0.5 days. Group II (main) consisted of 53 patients with acute purulent destructive surgical diseases of the fingers, who underwent surgical

treatment of the purulent focus on the day of admission. Then, additional wound treatment was applied in an abacterial environment using a 25% dimethyl sulfoxide solution.

The abacterial environment was created using a latex medical sterile fingertip, with a size larger than the patient's fingers. The lumen of a sterile medical fingertip was filled with a 25% solution of dimethyl sulfoxide to the upper border of the finger, and then the patient's affected finger was immersed there. The upper part of the finger cot was hermetically fixed using a fixing material.

Dynamic control of the level of intoxication of the organism of patients of group II revealed a significantly accelerated rate of normalization of indicators than in patients of the comparison group. As evidenced by the data in Table 3, on 3 days of treatment, the remaining indicators of

intoxication: MSM, L-blood, LII decreased almost to normal values, on the 5th day of treatment, with the exception of ESR of blood, reliably normalized. With further treatment with the use of an abacterial medium with a 25% solution of dimethyl sulfoxide, by 9-10 days the ESR of the blood also had normal values.

Thus, comparing the indicators of intoxication of the body of patients with purulent destructive surgical diseases of the fingers of the comparison group, the previous group I revealed that the body temperature of patients, L - blood, LII and MSM in patients of group II for 3 days of treatment corresponded to 7 days of the comparison group, i.e. when using a local abacterial medium with a 25% solution of dimethyl sulfoxide, intoxication indices regressed 4 days earlier than in the comparison group (Table 3).

Table 3.

Dynamics of indicators of intoxication in patients with purulent surgical diseases group II truth (n = 53)

Indicators	Observation time				
	Day of admission	3- Day	5- Day	7- Day	10- Day
t ⁰ body	38,9±0,08	37,3±0,07***	36,7±0,08***	36,6±0,08	36,5±0,09
L- blood • 109 / l	9,8±0,38	7,0±0,32***	6,2±0,34*	5,6±0,18	5,7±0,26
MSM units	0,218±0,012	0,121±0,007***	0,093±0,004*	0,082±0,004***	0,072±0,005
LII unit	2,7±0,14	1,3±0,07***	0,9±0,05***	0,7±0,03	0,5±0,04***
ESR mm / h	49,8±2,24	28,5±1,4***	18,4±0,85***	11,6±0,44***	6±0,34***

Note: * - differences relative to the data of the previous day are significant (* - $P < 0.05$, ** - $P < 0.01$, *** - $P < 0.001$)

Table 4.

Dynamics of biochemical parameters and rate of wound healing in patients of group II (n = 53)

Indicators	Observation time				
	Day of admission	3 день	5 день	7 день	10 день
pH of the wound environment	4,1±0,24	5,6±0,28***	6,7±0,34*	7,1±0,38	7,1±0,38
% reduction of the wound surface	0	2,4±0,14***	3,2±0,16***	3,3±0,12	3,9±0,21
Wound exudate protein (g / l)	54,7±2,62	43,6±2,28**	38,8±1,39**	-	-
Total blood protein	64,7±1,32	69,7±3,64	71,8±3,25	72,1±2,28	76,2±3,35
PC according to M.F. Mazuriku	0,9±0,04	1,4±0,07***	1,6±0,06***	-	-

*Note: * - differences relative to the data of the previous day are significant (* - $P < 0.05$, ** - $P < 0.01$, *** - $P < 0.001$)*

Dynamic control of the pH of the wound environment, the percentage of reduction of the wound surface and the indicators of PK protein according to MF Mazurik revealed the following (Table 4).

By the 6th day, the pH of the wound environment was reliably neutral. The daily decrease in the area of the wound surface was $3.9 \pm 0.15\%$. It should be noted that the normalization of these indicators of the wound process in patients of the comparison group was observed only on the 10th day of treatment. As our study shows, when using a local abacterial medium with a 25% solution of dimethyl sulfoxide, by the 6th day of treatment, all the pH values of the wound environment and the rate of wound healing were normalized. In our opinion, this is mainly due to the positive effect of complex treatment using a local abacterial environment with a 25% dimethyl sulfoxide solution.

The study of the dynamics of contamination of wounds against the background of complex treatment and the use of a local abacterial medium with a 25% solution of dimethyl sulfoxide showed that at the time of admission the degree of contamination was the same as in the patients of the comparison group, i.e. quite high, averaging 108 mt / y. But in dynamics against the background of complex treatment after surgical treatment, the use of a local abacterial environment with a 25% solution of dimethyl sulfoxide, on the next day the microbial contamination of wounds decreased to 103 mt/g and already on the 3rd day of treatment these figures were below the critical level and corresponded to 102 mt / g of fabric. It should be noted that similar phenomena in patients of the comparison group were achieved only on the 5th day of treatment.

Against the background of complex treatment of purulent destructive surgical diseases of the fingers using a local abacterial environment with a 25% solution of dimethyl sulfoxide, the time for cleansing wounds from infection was reduced to 2.5 ± 0.5 days, which in patients of the comparison group was noted only by 5.0 ± 0.5 days.

Resorption of the infiltrate was noted after 2.0 ± 0.3 days. The appearance of granulations was observed, on average, by 3.0 ± 0.5 days, epithelialization by 5.3 ± 0.3 days. Comparison of these indicators revealed that with the combined use of a local abacterial medium with a 25% solution of dimethyl sulfoxide, the time

of infiltrate resorption in patients of group II was significantly ahead of the data of the comparison group by 2 days, the appearance of granulation by 3 days, and the onset of epithelialization by 4 days.

The use of a local abacterial environment with a 25% solution of dimethyl sulfoxide of wounds in the complex treatment of patients with purulent destructive surgical diseases of the fingers of the hand contributed to the complete cleansing of wounds from infection by 3 days of treatment. By the 2nd day, active resorption of the infiltrate around the wounds was observed.

The average duration of outpatient treatment for patients in group II was 5.5 ± 0.7 days.

The proposed method improves the biochemical and cytological parameters of wound exudate, makes it possible to accelerate the time of wound cleansing by 2 ± 0.3 days and to reduce the length of stay in outpatient treatment of patients in the main group by 6.0 ± 0.4 days compared to the comparison group.

Conclusion

1. The use of an abacterial medium with a 25% solution of dimethyl sulfoxide in patients with acute purulent destructive surgical diseases of the fingers of the hand is the most optimal, because it promotes faster and better cleaning of the wound surface from purulent-necrotic tissues and microbial bodies, a decrease in intoxication indicators and an acceleration of regenerative processes, which together can reduce the time of their treatment and rehabilitation.

2. Taking into account the results of a comparative analysis, an optimal method of treatment of patients with purulent destructive surgical diseases of the fingers of the hand on an outpatient basis was developed by local application of an abacterial medium with a 25% solution of dimethyl sulfoxide.

LIST OF REFERENCES:

1. Azolov V.V., Alexandrov N.M., Petrov S.V., Ruchkina E.V. New approaches to the reconstruction of the fingers of the hand // Medical Almanac. 2010.No. 2 - P. 67-68.
2. Aleksandrov N.M., Petrov S.V., Bashkalina E.V. New aspects of the reconstruction of the fingers by the distraction method // Genius of Orthopedics. 2014. No. 1. - S. 27-31.
3. Boltaev T.Sh., Safoev B.B., Borisov I.V., Rakhimov A.Ya. Improvement of the method of treating purulent wounds in patients with

- purulent surgical diseases of soft tissues // Problems of Biology and Medicine. - 2019, No. 4.2 (115) - S. 261-264.
4. Boltaev T.Sh., Safoev B.B.. Local treatment of purulent-surgical diseases of soft tissues with a chemical preparation dimethyl sulfoxide and its combination with a physical method of treatment // Problems of Biology and Medicine. - 2020, No. 1 (116) - S. 27-31.
 5. Deikalo V.P. The use of skin autoplasty in the rehabilitation of patients with hand injuries / Deykalo V.P., Tolstik A.N. // Journal of Surgery News - 2015. - T. 23; No. 5. - S. 577-588.
 6. Kantsaliev L.B., Soltanov E.I., Teuvov A.A. Microbiological substantiation of ozone therapy for purulent-inflammatory diseases of fingers and hands // Fundamental research. - 2007. - No. 8. - S. 53-55;
 7. Kolodkin B.B., Purulent-inflammatory diseases of the hand: modern features of complex treatment / Krainyukov P.E., Safonov O.V., Kolodkin B.B., Kokorin V.V. // Bulletin of the National Medical and Surgical Center. N.I. Pirogov. - 2016. - T.11, No. 3. - S.48-54.
 8. Kuzin M.I., Kostyuchenok B.M. Wounds and renal infection. A guide for doctors. M.: Medicine, 1990; 591 s.
 9. Petrushin Alexander Leonidovich Analysis of errors in the diagnosis and treatment of subcutaneous panaritium in rural residents // Kazan med.zh. 2011. №4.
 10. Safoev B.B., Latipov O.Z., Boltaev T.Sh. Modern approaches to the treatment of purulent diseases of the hand on an outpatient basis (Literature review) // Tibbiyotda yangi kun. - 2020, -№3 (31). - S. 700-705.
 11. Boltaev T.SH., Safoev B.B., Borisov I.B., Yarikulov Sh.Sh., Khasanov A.A., Rahmatov Sh.Sh., Rajabov V.B. Effectiveness of the application of the physical method on a wound by plasma flow of argon in the complex treatment of patients with purious diseases of soft tissues // Asian Journal of Multidimensional Research. – 2019, №8(12), p.161-167.
 12. Brug E. Panaritium of the distal finger joint and subcutaneous infections of the hand / E. Brug, M. Langer // Kongressbd Dtsch Ges Chir Kongr. - 2001. - Vol. 118. -P. 402-3.

Entered 09.02.2021