



ASSESSMENT OF THE EFFECTIVENESS AND TOLERABILITY OF THE WOUND-HEALING GEL “TYMOGEL”

U. K. Qosimov,

Atajonov Tulkin Shavkatovich

Workplace: Tashkent Medical Academy.

Address: Tashkent city, Olmazor district, Farobiy-2.

adidassan@mail.ru

tolikatajoniv@gmail.com

Abstract

A clinical study was conducted to study the wound healing activity and tolerability of the original "Timogel" preparation, which contains antibacterial, antiseptic and immunomodulating components. In comparison with "infection of soft tissues of different localization" (carbuncle, phlegmon, purulent-necrotic lesions of the legs, trophic ulcers, trophic ulcers, trophic ulcers, levomekol), the wound healing activity and tolerability of the drug were evaluated. abscess, felon) against the background of diabetes mellitus. A significant reduction in wound area by 70% was observed when using thymogel, and by 40% when prescribing levomecol ($p < 0.01$).

Wound release from purulent-necrotic masses was achieved in 78% with thymogel and 45% with levomecol ($p < 0.01$). The result of counting the number of leukocytes showed that on the 7th day after the introduction of the drug, their number decreased by 41.3% in the Timogel group and by 25% in the Levomekol group. Thymogel accelerates the development of the wound process, helps to clean wounds, promotes the formation of granulation and epithelization on the surface of the wound, is well tolerated and can be recommended as a set of measures for the treatment of wounds against the background of the main therapy.

Keywords: purulent wound; wound healing efficiency; wound area; gel, diabetes

INTRODUCTION

The problem of treating purulent wounds remains relevant [1, 9, 10]. There are 3 phases of the wound process: the first period is the inflammation phase; the second is the regeneration phase; the third is the phase of scar reorganization and epithelization [2].

In phase I, it is necessary to cleanse the wound from dead and non-viable tissue, create conditions for the outflow of wound exudate, suppress the vital activity of



wound microflora, for which use ointments on a water-soluble polyethylene oxide base “Levosin”, “Levomekol”, which include: chloramphenicol and methyluracil. In phase II, it is necessary to create conditions for the growth of granulation. Acceleration of regeneration is possible with the use of creams and ointments “Solcoseryl”, “D-Panthenol”, “Bepanten”, “Actovegin”. “Solcoseryl” and “Actovegin” contain a natural biological component - hemoderivat, which has the ability to accelerate wound healing by stimulating cell growth and collagen synthesis [3, 5,11].

In the III phase of scar maturation and epithelization, “Timalin”, “T-activin”, dexapanthenol-based products (“Bepanten”, “Panthenol”), “Actovegin” are widely used in any dosage form for external use.

However, the above drugs have some disadvantages. Chloramphenicol is known to cause agranulocytosis and aplastic anemia. Nevertheless, chloramphenicol, which is part of the drugs “Levomekol” and “Levosin”, due to its pharmacotherapeutic properties, can be used for treatment in the first phase of the wound process, and in ointment bases - for the second phase of this process. Such disunity generally leads to a decrease in the effectiveness of existing drugs. The drugs “Solcoseryl” and “Actovegin” do not have an antibacterial effect and sometimes cause side effects: severe redness of the skin; hyperthermia of the treated area; increased heart rate, arrhythmia; sharp pain in the temporal region; sudden dizziness, sometimes fainting; nausea, vomiting; urticaria, skin itching, swelling [4]. A significant drawback of currently widely used drugs for the local treatment of purulent wounds is also the unidirectionality of their action (only antimicrobial or dehydrating, immunomodulatory, etc.).

The combined original drug “Timogel” that we have developed has anti-inflammatory, antibacterial and immunomodulatory properties, which allows it to be used in the treatment of purulent wounds at all phases of the wound process.

In diabetes mellitus (DM), wounds in patients heal poorly due to reduced immunity, cracks appear in the wounds, the drug “Levomekol” is mainly used for treatment, which is why it was chosen as a comparison drug in this study.

The purpose of the study was to evaluate the wound-healing activity of the original combination drug “Timogel” in comparison with the drug “Levomekol” to identify the possibility of recommending Timogel for clinical use. The object of study was an original wound-healing drug on a gel base, “Timogel,” which contains the antibacterial drug metronidazole, the antiseptic drug chlorhexidine, and the immunomodulatory drug thyoptin.



The drug “Levomekol” (Nizhpharm, Russia), which contains chloramphenicol and methyluracil, was used as a comparison drug.

RESEARCH METHODS

The object of the study was an original wound-healing drug on a gel base “Timogel”, which includes the antibacterial drug metronidazole, an antiseptic - chlorhexidine and immunomodulatory - thyoptin.

The drug “Levomekol” (Nizhpharm, Russia), which contains chloramphenicol and methyluracil, was used as a comparison drug.

The study is based on the results of observation of 60 patients who were treated at the Republican Center for Purulent Surgery and Surgical Complications of Diabetes of the Ministry of Health of the Republic of Uzbekistan. The patients were divided into 2 groups: the main group, in which the drug “Timogel” was used for 30 patients, and a control group in which the comparison drug “Levomekol” was used for 30 patients. The groups were comparable in terms of clinical, anamnestic and laboratory data.

The criteria for inclusion of patients in the study were the following diagnoses: a) surgical infections of soft tissues of various locations that developed against the background of diabetes (carbuncle, phlegmon, purulent-necrotic lesions of the feet, trophic ulcers, abscess, panaritium). Patients were informed and included in the study after their written consent to participate in this clinical study.

Drug prescription scheme. Patients of the main group (30 people) were prescribed thymogel in the form of applications to the wound 1-2 times a day against the background of basic therapy (antihyperglycemic drugs, as well as cefazolin, heparin, sodium chloride, diphenhydramine, glucose) during their hospital stay. The patients who made up the comparison group (30 people) received levomekol in a similar way, according to the instructions, against the background of similar basic therapy.

The dose of the drugs “Levomekol” and “Timogel” was selected individually depending on the area of the wound, taking into account that the daily dose of “Levomekol” ointment should not exceed 3 g, and the drug “Timogel” - may be more than 3 g.

Sterile wipes with the drug were applied to large wounds and fixed with a bandage. The tampon was changed as pus and necrotic masses accumulated.

A general blood test was performed once a day before treatment; 1 analysis on days 3 and 7 during treatment; measurement of wound area in the dynamics of treatment:



1 measurement on days 1.7; cytological examination using the fingerprint method: 1 analysis on days 1.7; tank culture from a wound: 1 test on days 1 and 3. Before starting the study, all patients included in the study gave informed consent to the study in accordance with the Declaration of Helsinki. The study was carried out under the supervision of the ethical commission of the Pharmacological Committee of the Republic of Uzbekistan.

Cytological studies were carried out using the imprint method according to the method of M. P. Pokrovskaya and M. S. Makarov [6,7].

Statistical data processing and calculation of the reliability of differences were obtained using Microsoft Office Excel®, Biostat 4.03. To compare the results obtained on the entire population of subjects receiving Timogel, in relation to the initial indicators and the comparison group, the significance level (p) was set to 0.05 and 0.01. The p value = 0.01 is used in this case as an additional assessment of the severity of the drug's effect or the difference in the effects of the drugs.

RESULTS AND ITS DISCUSSION

The original drug "Timogel", which we previously developed, has anti-inflammatory, antibacterial and immunomodulatory properties, which allows it to be used in the treatment of purulent wounds at all phases of the wound process [7, 8]. In table 1 presents the results of the research.

One of the main criteria for the course of a wound process is its local appearance, which especially needs to be taken into account in DM. The use of the drug "Timogel" made it possible to clean the wound from necrotic tissue much earlier, with a reduction in the area of the wounds by 70%, in comparison with the "Levomekol" ointment, where this indicator corresponded to 40% on the 7th day of use. Timogel more effectively cleanses the wound from purulent-necrotic masses by 78% than the drug "Levomekol" (45%).

Determination of the number of leukocytes, which characterizes the activity of the inflammatory process in the wound, on the surface of the wound, was carried out using the imprint method on a glass slide with further staining with hemotoxylin-eosin. The result of counting the number of leukocytes in the field of view showed that their number decreased in the Timogel group of patients by 41.3%, and in the Levomekol group by 25%.

When studying the indicators of intoxication and the course of the inflammatory process, it was revealed that when using the drug "Timogel" there was a significant decrease in ESR, in comparison with the drug "Levomekol". Thus, in both groups



on the day of admission this indicator was almost the same; during treatment, by the 3rd day it decreased by 3 times, or by 67.1% in the Timogel group, and in the Levomekol group it decreased by 1.3 times, or 25.2%. This fact indicates that the inflammatory process and intoxication decrease faster when using timogel. A similar picture is observed in the dynamics of leukocytosis. In patients in the Timogel group, the number of leukocytes decreased by 1.42 times or by 29.7%, and in the group of patients receiving levomekol - by 1.24 times or by 19.7%. The atypical development of surgical infection in diabetes is not always accompanied by high levels of leukocytosis, which indicates suppression of the body's reactivity, despite the severity of local manifestations and the presence of intoxication. However, the use of the drug "Timogel" made it possible to stop the purulent-inflammatory process with the normalization of the leukocytosis rate, which manifested itself in a less pronounced form when using the "Levomekol" ointment. In table Figure 2 presents the results of the analysis of microbial flora from wounds in the study and control groups.

When analyzing the microbial flora from the wound in the groups of patients "Timogel" and "Levomekol", microorganisms were identified with a slight difference in percentage: staphylococcus - 84 and 85%; Pseudomonas aeruginosa - 9 and 7%; streptococcus - 7 and 8%, respectively. During treatment, after 3 days in the Timogel group, microorganisms were not sown in the wounds, while in the Levomekol group, Pseudomonas aeruginosa was detected in the wounds - 3% and staphylococcus - 2%, which indicates the greater effectiveness of Timogel

Table 2. Analysis of wound microflora during treatment with Timogel and Levomekol

Microflora before treatment 1 day	Microflora during treatment of 3 days
Analysis -----	-----
Timogel levomekol	Timogel levomekol
Bacteria - Staphylococcus - 84% Synagnosis palochka — 9% Streptococcus - 7%	Microflora not detected – Staphylococcus – 2% Within 3 days Synagnosis palochka — 3% Streptococcus - 6%



It was shown that when treated with Timogel, 29 patients had good tolerability - 97.7%; 1 patient had slight redness that did not require discontinuation of the drug. Patients in the Levomekol group (22 people) tolerated the drug well—73.3% of patients. In 8 patients, a local allergic reaction was noted that did not require discontinuation of the drug.

During the study, there were no reasons for stopping the use of thymogel related to the occurrence of side effects or due to the lack of clinical effect.

CONCLUSION

The data obtained indicate that the drug “Timogel” accelerates the course of the wound process, promotes wound cleansing, the appearance of granulation and epithelization of the wound surface, is highly effective and can be recommended in a complex of measures for the treatment of wounds against the background of the main basic therapy in patients with diabetes mellitus.

REFERENCES

1. Атажанов Т.Ш. Бабаджанов Б.Д., Матмуротов К.Ж., Саттаров И.С. Анализ эффективности малоинвазивных методов в лечении диабетической гангрены нижних конечностей. Раны и раневые инфекции. 4-международный конгресс. 2018/11. С. 20-21.
2. Бабаджанов Б.Д., Матмуротов К.Ж., Саттаров И.С., Атаджанов Т.Ш., Саитов Д.Н. Реконструктивные операции на стопе после баллонной ангиопластики артерий нижних конечностей на фоне синдрома диабетической стопы
3. Б.Д.Бабаджанов, А.Р.Бобабеков, А.О.Охунов, И.С.Саттаров. Оптимизации методов диагностики и лечения острых абсцессов и гангрены легких у больных сахарным диабетом. Журнал Врач-аспирант. № 2.3. Том 51., Стр. 484-489.
4. Б.Д.Бабаджанов, К.Ж.Матмуротов, А.Т.Моминов, А.Р.Бабабеков, С.С.Атаков, Т.Ш.Атажанов. Эффективность внутриартериального введения флуконазола при лечении осложненных форм диабетической стопы. ООО «Махлиyo-shifo» & V. 2014. Том 25. Стр 28-30.
5. А. В. Филатова, Исследование ранозаживляющих свойств гидрофильного геля, № 3, 4 - 36, Универсум, Москва (2020); doi: 10.32743/UniChem.2020.69.3 - 1.



6. Н. П. Чеснокова, Воспаление: этиология, патогенез, пато-генетическое обоснование принципов терапии, Саратовский медицинский университет, Саратов (2008). Ф. Е. Шин, Московский хирург. ж., № 5, 51 - 54 (2011).
7. Матмуротов К.Ж., Саттаров И.С., Қўчқоров А.А.Рузметов Н.А.Влияние микобактериальных ассоциаций на кратность повторных операций при диабетической гангрене нижних конечностей. «Вестник» ТМА, №6, 2021. Стр.106-111.
8. Матмуротов К. Ж., Саттаров И.С., Атажонов Т.Ш., Сайтов Д.Н.. Характер и частота поражения артериальных бассейнов при синдроме диабетической стопы. «Вестник» ТМА, №1, 2022. Стр.128-131.
9. Матмуратов К.Ж., Исмаилов У.С., Атажонов Т.Ш., Якубов И.Ю. Разработка методов лечения нейроишемической формы диабетической остеоартропатии при синдроме диабетической стопы. Проблемы биологии и медицины 2023, №5 (148).
10. K.J.Matmurotov, S.S.Atafov, I.S.Sattarov, J.H.Otajonov. T.Sh.Atajanov. Bone resection features in leg amputation in patients with gangrene of lower extremities on the background of diabetes mellitus. American Journal of Medicine and Medical Sciences 2019, 9(7): 249-254
11. B. D. Babajanov, K. J. Matmurotov, T. Sh. Atajonov. The effectiveness of selective intra-arterial catheter therapy in the treatment of diabetic gangrene of the lower extremities. Web of scientist: international. Scientific research journal. sn: 2776-0979, Volume 4, Issue 11, November. 2023.