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# THE USE OF OXYGENATED WATER AND LYMPHATIC THERAPY IN THE TREATMENT OF POST-INJECTION PURULENT COMPLICATIONS IN DRUG ADDICTS

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**ABSTRACT** — We compared the results of treatment and multifunctional examination of 78 patients (study group) with parenteral drug addiction and post-injection purulent lesions of the soft tissues and vessels of the lower limbs. In the study group (47), we used oxygenated drugs (OxyEnergya) and indirect lymphotropic administration of drugs. Systemic oxidative therapy was carried out by oral administration of OxyEnergya 15ml twice a day. In the comparison group (31), patients received conventional treatment. In the study group, the proposed complex treatment algorithm provides a relatively earlier (3–7 days) onset of the clinical effect of treatment.

**KEYWORDS** — drug addiction, phlegmon, phlebitis, oxygenated water, lymphatic therapy.

## INTRODUCTION

In recent years, the contingent of patients with parenteral drug addiction has changed, which is associated with the intravenous administration of synthetic drug substitutes [1]. After short-term or 1-2-fold intravenous drug administration, postinjection phlebitis develops, which is often combined with paravascular purulent-inflammatory infiltrates or phlegmon [2]. In most cases, purulent foci are localized in a functionally dangerous zone — the ileo-inguinal region and are characterized by extensive lesions and a tendency to spread along the great vessels [3]. Local post-injection complications are often accompanied by the development of gross changes in the homeostasis system. The success of treatment will be determined by the effectiveness of the antimicrobial and local treatment of purulent wounds, elimination of dysfunction of regulatory and effector systems organs [3].

The aim of the study is to prove the appropriateness of using oxygenated water and indirect lymphotropic combined drug therapy in the treatment of modern drug addicts with post-injection purulent-inflammatory complications.

## MATERIALS AND METHODS

In 2017–2019, 78 patients were treated with parenteral drug addiction with purulent-inflammatory post-injection lesions of the soft tissues and veins of the upper third of the right (55) and left (23) thighs. There were 49 men and 29 women, aged 18 to 44 years, who injected surrogates of synthetic drugs (analogue of amphetamine) into the veins of the inguinal region. To determine the nature of post-injection complications, ultrasound of soft tissues and ultrasound Doppler scanning of the main veins of the lower limbs were performed. To improve the blood rheological properties and regional blood flow, low molecular weight dextrans (rheopolyglucin, reftan) were introduced. Purulent foci were opened under intravenous anesthesia. The lower limb was dressed in Bellersplints.

In the study group (35), we carried out indirect lymphotropic administration of drugs. In the first interdigital space of the foot, ceftriaxone 1.0 diluted in 4 ml of a 2% lidocaine solution + 32 edlidase was injected strictly subcutaneously with the needle pointing to the dorsum of the foot, and after 5 minutes, 50 mg of imunofan diluted in 5ml of isotonic solution of sodium chloride; fraxiparine in a dose of 0.6 ml was injected more proximally. This manipulation was carried out 1 time per day with 48 hour intervals. Management of purulent wounds with oxygenated medicinal compositions (*extempore*: Levomekol ointment was mixed in 1:1 combination with OxyEnergya). Systemic oxidative therapy was carried out by oral administration of OxyEnergya by 15 ml twice a day. OxyEnergya is a highly purified water enriched with oxygen molecules in an amount of 250,000 ppm/l. OxyEnergya was given in the morning and evening *per os* in a volume of 30 ml.

In the comparison group (33), persons comparable by gender and age, had similar drugs administered by the traditional, intramuscular method, and their wounds were treated by dressings with Levomekol ointment.

The treatment results were evaluated clinically, by studying biochemical and laboratory blood parameters, bacteriological monitoring, including determination of microbial colonization of the wound wall, studying the cytokines profile, cytograms of wound contact preparation, pH measurement of wound

exudate. The studies were performed upon admission of patients, then on the 3–5<sup>th</sup>, 7–9<sup>th</sup> and 11–13<sup>th</sup> days from the start of treatment. The data obtained were subjected to statistical processing by the STATISTICA 6.0 application software package. Indicators were considered reliable at  $p < 0.05$  and  $p < 0.01$ .

## RESULTS, DISCUSSION

In 61 (78.2%) patients, phlebitis was accompanied by the formation of paravasal phlegmon, in 17 (21.8%) — femoral soft tissue infiltration. Inflammation was characterized by severe clinical course, hyperthermia (up to 39° C), leukocytosis (from 12.7 to 21.8·10<sup>9</sup>/L), blood LII up to 5.6. The presence of abscess was confirmed by ultrasound examination. Ultrasound scanning of the veins revealed parietal inflammation without valve insufficiency of the veins of the lower extremity. Ultrasound scanning of the veins revealed parietal inflammation without valve insufficiency of the veins of the lower limbs. At inoculation for flora, a mixt infection was detected: *Staphylococcus aureus* in combination with gram-negative flora. In the first group of patients, the general condition normalized at the 5–7<sup>th</sup> day, the purulent process was localized within the damaged tissues. By the end of 7–9 days from the start of treatment, the cytological picture prevailed in the wound contact preparations, corresponding to the transition of the wound process to the phase of regeneration. By this period of treatment, the imbalance between pro- and anti-inflammatory cytokines was eliminated. On days 11–13, 17 patients had early secondary sutures; 5 had edges of their wound reduced with adhesive bandage strips. 13 patients had wound hiatus longer than 20 cm and it was closed in stages, starting from its corners (1–2 sutures) and so on for 3–5 days until the complete elimination of a wound defect. By the end of treatment, indicators of laboratory and biochemical blood tests were approaching the upper limit; LII was 1.8±0.2 ( $p < 0.01$ ). The average hospital stay was 17.8±2.2 inpatient days. In the comparison group, the research results were significantly different, and the duration of treatment exceeded the one of the first group by 5–8 days.

In the study group, of the use of OxyEnergya and saturation of powerful collector of the inguinal lymphatic system with the antibiotic and immunomodulator contributes to a more rapid relief of local and general symptoms of purulent inflammation. Lymphatic therapy in combination with wound dressings saturated with oxygenated drug compositions allows targeted delivery of drugs to the lesion site [3, 4].

As a result, the terms of normalization of the general condition and of elimination of homeostasis disorders are reduced by 1.5–2 times, the symptoms

of thrombophlebitis are more quickly relieved, the purulent process is localized within the damaged tissues, and wound microbial flora activity is suppressed [5]. As a result, the conditions are optimized for the passage of the purulent wound process into the regeneration phase, and the inpatient treatment time is reduced by 5.2 ± 1.4 inpatient days.

## CONCLUSIONS

1. Post-injection purulent complications caused by synthetic surrogate drugs in modern patients with parenteral drug addiction are characterized by extensive damage of soft tissue. It proceeds according to the hyperergic type of inflammatory reaction with the development of an imbalance of pro- and anti-inflammatory cytokines.
2. Local and general use of OxyEnergya in combination with indirect lymphatic therapy improves the quality of care for this group of patients, and reduces the duration of inpatient treatment by an average of 5–7 days.

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