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Experience of Using a Protephage in the Treatment of Liver Abscess by the Method of Minimally Invasive Drainage

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Abstract Liver abscess is a critical emergency condition in abdominal surgery, significantly worsening the course of the underlying disease and the patients' condition. **Objective:** To analyze the clinical, laboratory, instrumental, and microbiological data of patients diagnosed with liver abscesses, and to evaluate the efficacy of minimally invasive abscess cavity drainage combined with debridement of the purulent cavity using "Proteofag-polivalent." **Materials and Methods:** A scientific study was conducted involving 19 patients (aged 29–63 years; 57.9% women, 42.1% men) with liver abscesses, treated in the Department of Purulent Surgery and Surgical Complications of Diabetes at the Multidisciplinary Clinic of Tashkent State Medical University in 2025–2026. All patients underwent minimally invasive drainage of liver abscesses with debridement of the cavity using polyvalent proteases and antiseptics. **Results:** All patients were comprehensively evaluated. A minimally invasive drainage of liver abscesses under ultrasound guidance was performed. Against the background of , comprehensive therapy—including antibacterial and anti-inflammatory treatment and daily abscess cavity debridement—showed positive dynamics. All patients were discharged to an outpatient follow-up phase in stable, satisfactory condition with drains removed after 5–7 days, under the supervision of polyclinic physicians. **Conclusion:** Minimally invasive drainage with active irrigation using protephagic and antiseptic solutions is an effective method for rapid abscess cavity cleansing and allowed avoidance of traumatic surgical intervention.

Keywords Protephage

1. Introduction

According to pooled data, the incidence of liver abscesses ranges from 8 to 15 cases per 100,000 inhabitants per year, and mortality fluctuates between 5 and 26%. The formation of purulent foci in the liver is accompanied by severe complications such as liver failure and cholangiogenic sepsis [4,8,9]. According to some authors, multiple large bilobar liver abscesses with intraluminous sequestra are an indication for open, including resective, surgical interventions [9,12,14]. On the other hand, in recent years there has been an increase in publications attesting to the advantages of minimally invasive percutaneous puncture-drainage techniques under ultrasound or CT control, which are the primary method of treatment [9,15]. The advantages of this method include minimal invasiveness, relative safety, better tolerance in debilitated patients, and the absence of the need for anesthesia. The use of minimally invasive technologies reduces the risk of peritoneal infection, postoperative wound abscesses, the development of postoperative hernias, and adhesions [2,7,13]. For intra-organ abscesses in the liver, "Pigtail" ("pig's tail") drains are used. The "Pigtail" device is a sterile, thin, long catheter that, upon final placement, forms the shape of a pig's tail, hence the device's name [3,5,10,11]. When draining the abscess cavity, it is irrigated daily with antiseptic and antibiotic solutions, followed by daily ultrasound monitoring to assess the degree of reduction. Normalization of body temperature and clinical blood tests, absence of discharge through the drain, and reduction of the abscess cavity are criteria for drain removal [1,4,10]. The average duration of drainage is (15.1±5.4) days [3,6,11].

The aim of our study was to analyze the clinical, laboratory, instrumental, and microbiological data of patients diagnosed with liver abscesses, and to evaluate the efficacy of minimally invasive abscess cavity drainage combined with debridement of the purulent cavity with "Proteophage-Polivalent."

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2. Materials and Methods

The basis of this work is the examination and treatment results of 19 patients with liver abscesses who were hospitalized in the Department of Purulent Surgery and Surgical Complications of Diabetes at the Multidisciplinary Clinic of Tashkent State Medical University in 2025–2026.

All patients underwent minimally invasive drainage of the liver abscess cavity, followed by irrigation with antiseptics and exposure to "Proteophage-polivalent."

Patients were divided into two groups based on the type of agent used to decontaminate the liver abscess cavity. The first group (comparison) included 10 (52.6%) patients treated in 2025, who received traditional antiseptics (1% dioxidine, levofloxacin) for decontamination. The second group included 9 (47.3%) patients, who constituted the main group and were treated in 2026. The surgical strategy for this group was applied regardless of the nature, severity, and localization of the liver abscess. These patients underwent abscess cavity debridement using "Proteophage-polivalent."

All patients underwent multidetector computed tomography (MDCT) prior to admission, which is an objective and informative method for assessing liver tissue status and the localization of the purulent focus. This was used for topographic diagnosis and establishing the clinical diagnosis. An additional diagnostic method, as well as a method for monitoring the disease course, was ultrasound examination (US). This diagnostic method was also performed in all cases to confirm the CT scan findings and assess the condition of the liver tissue. Upon admission, patients received detoxification, infusion, and symptomatic therapy, with simultaneous placement of a drain in the abscess cavity.

In the control group, patients received empirical antibacterial therapy during the treatment period, and the abscess cavity was decontaminated with antibiotics (1% dioxidine, levofloxacin, metronidazole), whereas in the main group, "Proteofagum-polivalent" was used instead of antibiotics. (30 ml orally three times a day), and 20 ml of "Proteofagum-polivalent" was used to sanitize the abscess cavity. It was first dissolved in physiological saline in a 1:1 ratio and introduced into the abscess cavity via the drainage tube for 20–30 minutes, four times every six hours.

Antibacterial therapy was based on an empirical approach, with subsequent transition to targeted therapy based on the results of bacteriological examination of the material taken during drainage. The effectiveness of the therapeutic measures was evaluated based on the results of bacteriological examinations of the wound exudate at days 1, 3, and 7, and on the progression of the clinical picture.

Table 1. Results of Bacteriological Studies

Timelines for bacteriological testing	Number of patients									
	Klebsiella pneumoniae		E. coli		Enterococcus faecalis		Staphylococcus spp.		Pseudomonas aeruginosa	
	main	cont	main	cont	main	cont	main	cont	main	cont
Day 1	3	2	2	2	2	1	1	2	2	2
Day 3	1	2	1	2	1	0	0	1	1	1
Day 7	0	0	0	1	0			1	1	0

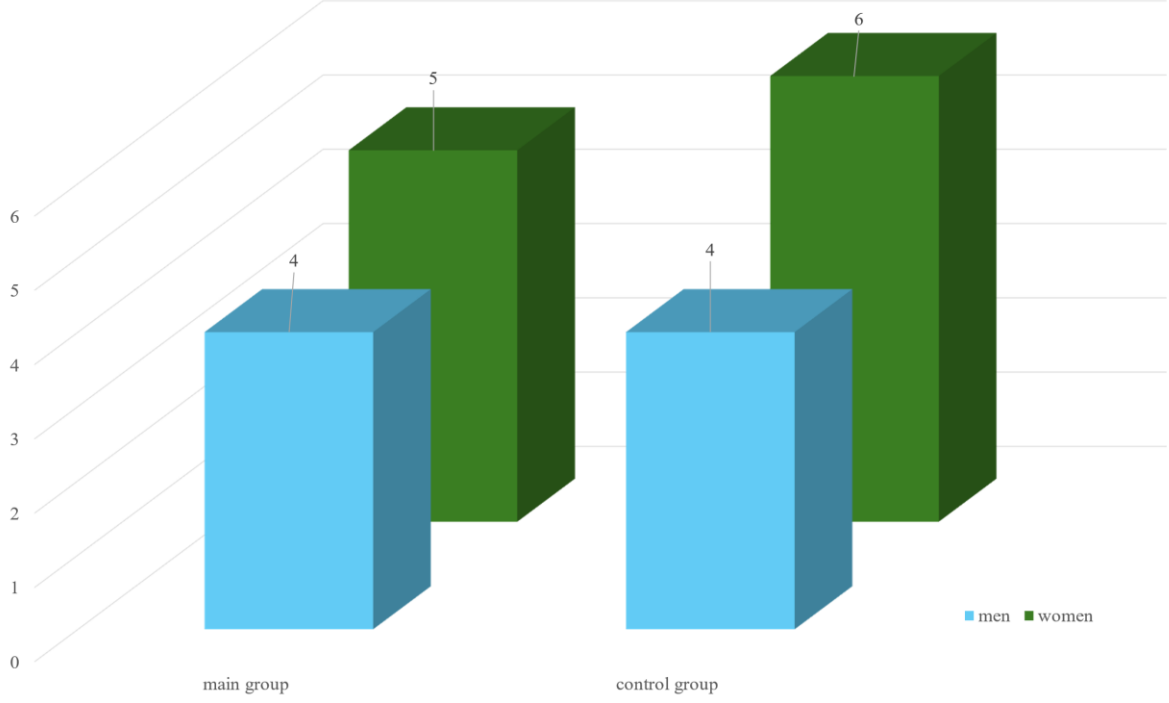

Figure 1. Distribution of patients by gender in the main and control groups: men — 4 patients in each group; women — 5 patients in the main group and 6 patients in the control group

3. Results

The analysis of the bacteriological examination results of the exudate showed that on day 1, all observations revealed pronounced microbial contamination dominated by conditionally pathogenic flora. By day 3, a significant decrease in the number of detectable microorganisms was noted, especially in the main group. The most pronounced positive dynamic was observed for Klebsiella pneumoniae, Escherichia coli, and Enterococcus faecalis. By the 7th day, the growth of the aforementioned microorganisms was virtually absent. However, Staphylococcus spp. and Pseudomonas aeruginosa persisted in isolated cases, which may indicate their relative resistance to the therapy administered.

Comparative analysis showed that in the main group, the reduction in microbial contamination occurred more intensively compared to the control group, confirming the effectiveness of the applied " Proteofaga-polivalent ."

All patients show a significant improvement in their clinical condition on days 3-5 after minimally invasive drainage and abscess cavity debridement, manifested by normalization of body temperature and stabilization of laboratory parameters, such as a decrease in leukocytosis and normalization of the leukocyte formula, along with the simultaneous clearing of the exudate of impurities and flakes. Dynamic monitoring was conducted using ultrasound and contrast-enhanced computed tomography (CT), which showed a reduction in the size of the pathological focus at an equal rate in patients in both the main and control groups. By day 5-7, all patients were discharged home in improved condition with a functioning drain.

Based on all clinical and functional parameters, this complex of therapeutic measures met our expectations, demonstrating high efficacy regardless of the abscess's location in the liver.

Thus, the rapid development of modern surgery has led to the resolution of numerous problems in many areas with the emergence of new minimally invasive surgical techniques and the debridement of purulent cavities with various medications. One such agent is "Proteophage-polivalent," which is a universal tool in the fight against various types of bacterial infections. Its broad spectrum of action, efficacy, and ability to prevent infection make it an important tool in modern medicine. In conclusion, based on the analysis of immediate laboratory results and clinical effects, this approach accelerates the recovery of liver dysfunction parameters, promotes faster elimination of the residual cavity and sanitation of the infectious focus, allows for a reduction in the duration of systemic antibacterial therapy, and shortens the patients' hospital stay.

4. Conclusions

Minimally invasive drainage of a liver abscess and decontamination of its cavity using "Proteophage-Polivalent" is an effective and alternative treatment method for liver abscesses, which can be applied regardless of the abscess's size and location.

Active use and debridement of the hepatic cavity with "Proteophaga-polivalent" solutions allows for increased effectiveness of minimally invasive drainage of a liver abscess and accelerates the recovery of liver dysfunction parameters, promoting faster debridement of the purulent cavity and reducing the duration of systemic antibiotic therapy, as well as shortening patients' hospital stays.

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