

AN EXPERIMENTAL EVALUATION OF THE EFFECTIVENESS OF DISSOCIATIVE ANTI-ADHESIVE PRODUCTS

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Abstract: A randomized parallel-group controlled study experimentally indicates the benefits of using a Levomecol multi-agent ointment in preventing intraoperative adhesive processes in the abdominal cavity. The experimental study was carried out on 60 rats of Vistar line. For comparison purposes, two control groups were given either a Zhenchevsky mixture or physiological (0.9% NaCl) saline. The study demonstrates the Levomecol ointment's high level of effectiveness in the intraoperative prevention of adhesive processes in the abdominal cavity.

Keywords: Levomecol, adhesive disease of the abdominal cavity

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Introduction. Pharmaceutical drugs for the prevention and treatment of peritoneal adhesions must: have properties of simultaneous multi-directional action (dissociative, anti-inflammatory, sorbing, etc.); be convenient for surgical use; not require suture fixation; possess physical properties necessary for optimal application to serosal surfaces; and be effective in the presence of blood and exudates [2,4,5]. Such drugs must also have adsorption properties that facilitate the removal of inflammatory exudate from the abdominal cavity [3].

The purpose of our study was to experimentally evaluate the effectiveness of a Levomecol multi-agent ointment's anti-adhesive properties in preventing abdominal adhesions.

Materials and Methods. Under the conditions of this experiment, we carried out a randomized parallel-group controlled study to comprehensively evaluate the effectiveness of anti-adhesive properties of a Zhenchevsky mixture, NaCl solution, and the Levomecol ointment.

The experimental groups were formed using Vistar line rats of both sexes with $180 \pm 15,8$ g of body mass and 70 ± 14 days of age. Each of the three experimental groups had 25 rodents.

Experimental Group I was treated with a Zhenchevsky anti-adhesive mixture containing 1,000-2,000 IU of fibrinolysin, 20-30mg of trypsin, and 60mg of prednisolone diluted in 400ml of hemodez. Experimental Group II was given a sodium chloride (0.9% NaCl) solution recommended by H. Reich in 1996 as an effective anti-adhesive measure. Experimental Group III was treated with the Levomecol ointment containing levomycetin (chloramphenicol); trimecaine, a local anesthetic; and methyluracil [1,2]. The Polyethylene oxide gel used as base of the ointment. This gel dissolves hydrophilic and hydrophobic substances; effectively adsorbs wound exudate; easily applies to serosal surfaces; and avoids interfering with the physiological functions of adhesions by spreading evenly.

On the fourteenth day after surgery, the rats from all three groups were euthanized with an overdose of ketamine (80mg/100g of the body mass).

Results and Discussion. An autopsy of the rats from Experimental Group I (the Zhenchevsky anti-adhesive mixture) revealed peritoneal adhesions in 19 rodents (84% of cases). During the autopsy of the rats from Experimental Group II (NaCl solution), adhesive processes were discovered in 23 rodents (92% of cases). As for the rats from Experimental Group III (the Levomecol ointment), adhesive processes were found in only 10 rodents (40% of cases) (Table 1).

The histological pattern of adhesions in all groups corresponded to the time frame of the connective tissue maturation. An examination of the internal organs of rats from all three groups revealed no pathological changes.

Table 1 – Evaluation of adhesive processes in the abdominal cavity in experimental rodents (M±m)

№	Evaluation criteria	Group I	Group II	Group III	P
1	Prevalence of adhesive processes in the abdominal cavity	2,12±0,21 (1,69-2,55)	2,84±0,21 (2,41-3,27)	0,72±0,1 (0,51-0,93)	$P_1 \geq 0,05$; $P_2 \leq 0,05$; $P_3 \leq 0,05$
2	Changes of intestine	1,64±0,1 (1,94-2,36)	2,52±0,1 (2,31-2,73)	0,4±0,052 (0,3-0,45)	$P_1 \geq 0,05$; $P_2 \leq 0,05$; $P_3 \leq 0,05$
3	Number of adhesions	3,08±0,21 (2,87-3,29)	3,88±0,1 (3,67-4,09)	0,56±0,2 (0,35-0,77)	$P_1 \leq 0,05$; $P_2 \leq 0,05$; $P_3 \leq 0,05$
4	Morphology of adhesions	24,2±2,91 (18,2-30,2)	25,76±2,08 (21,48-30,0)	5,44±0,9 (3,6-9,04)	$P_1 \geq 0,05$; $P_2 \leq 0,05$; $P_3 \leq 0,05$
Σ	M±m	31,04±3,41 (27,14-34,94)	35±4,02 (32,5-37,5)	7,12±1,17 (6,23-8,01)	$P_1 \geq 0,05$; $P_2 \leq 0,05$; $P_3 \leq 0,05$
<p>P_1 – certainty between I and II experimental groups; P_2 – certainty between I and III experimental groups; P_3 – certainty between II and III experimental groups;</p>					

Hence, the analysis of the results of the experimental randomized parallel-group controlled study indicates that application of the Zhenchevsky mixture, isotonic (0.9% NaCl) solution, and Levomecol ointment to prevent abdominal adhesions had a positive effect to varying degrees. However, mathematical analysis of the prevalence of abdominal adhesions, the changes of intestine, number of adhesions, and morphology of adhesions statistically demonstrates with a higher degree of certainty that the Levomecol multi-agent ointment has a greater anti-adhesive effect due to its dissociative, anti-inflammatory, wound-healing, sorbing, and anti-bacterial properties.