

THE USE OF PHYSIOTHERAPY PROCEDURES IN THE EARLY REHABILITATION PERIOD IN WOMEN AFTER LAPAROTOMY OPERATIONS ON THE ORGANS OF THE ABDOMINAL CAVITY AND PELVIS

Mafinat Djarohovna Ibraimova*; **Tynchtynbek Bakytbekovich Uzakov****;
Aziza Siezdbekovna Seitova***; **Aijan Maratbekovna Murzalieva******;
Georgiy Vasilevich Belov*****

*Co-Researcher of the Kyrgyz-Russian Slavic University,
Kyrgyz Republic, Bishkek, KYRGYZSTAN

**Graduate Student,
Kyrgyz republic medical institute of the professional development Kyrgyz Republic,
Bishkek KYRGYZSTAN

***Graduate Student of International Medical Faculty,
Osh State University, Kyrgyz Republic, Osh
KYRGYZSTAN

****Graduate Student of International Medical Faculty,
Osh State University, Kyrgyz Republic, Osh,
KYRGYZSTAN

***** Professor, Doctor of Medical Sciences,
Head of the Department of Pathology of the International School of Medicine of the International
University of Kyrgyzstan, Kyrgyz Republic, Bishkek,
KYRGYZSTAN

DOI: 10.5958/2249-7137.2021.02513.1

ABSTRACT

The aim of the work is to provide a scientific justification of the rehabilitation complex for the early rehabilitation treatment of women after laparotomic operations on the organs of the abdominal cavity and pelvis, to evaluate its effectiveness in comparison with conventional treatment. Research design. A randomized, placebo-controlled, comparative, blinded clinical trial of 85 women who underwent laparotomy operations was conducted. The rehabilitation complex included, in addition to surgical wound care, regimen and diet (similar to the comparison group), laser irradiation of the surgical wound, exposure to pulsed low-frequency electrostatic fields (PLFEF), reflex therapy with extremely high frequency electromagnetic fields (EHF puncture).

KEYWORDS: *Electrostatic, Low-Frequency, Justification, Conventional*

INTRODUCTION

Changes in the motor function of the intestine in the early recovery period after major abdominal operations are of a phase nature and occur with varying degrees of severity in a significant proportion of patients. These changes can be quantified and evaluated in a timely manner using a computer PEG. The dynamics of surgical wound healing is associated with increased intra-abdominal pressure, immunity, and the process requires early rehabilitation with the use of physical methods of treatment.

Relevance One of the main trends of modern physiotherapy is its use at all stages of rehabilitation, including at the inpatient (early recovery) stage [1, 2, 3, 4, 2, 6, 12]. There are a number of works on the use of physiotherapy procedures in the early recovery period after abdominal, gynecological operations performed from the standpoint of evidence-based medicine [5, 6].

In the arsenal of rehabilitologists in recent decades, effective portable devices have appeared that can be used at the patient's bedside in the early stages of rehabilitation, including in surgical hospitals in the first days after surgery. Physiotherapy procedures are used, which are not stressful, but have an analgesic, regenerative, anti-inflammatory effect, contribute to the normalization of hemocoalogy and vascular tone [7, 8, 9].

In laparotomy operations, a common complication is postoperative intestinal paresis (PIP). The pathogenetic basis for the development of complications is the severity of the underlying disease, the presence of background diseases, operational stress, the effect of anesthesia, functional insufficiency of the operated organ and system, especially during elective operations [10]. Diagnosis, prevention and treatment of PIP in the early recovery period require further study, in particular scientific substantiation of the possibility of using physiotherapy procedures during this period.

Currently, in restorative medicine, when using a rehabilitation complex consisting of several procedures, special importance is attached to methods of monitoring the effectiveness of treatment.

Evaluation of the effectiveness of surgical treatment of gastroenterological and gynecological patients in the early recovery period is not simple. The search for reliable methods of studying the motor function of the intestine continues, well-known methods are being modified [11]. Recently, due to the development of methods of computer analysis of audio signals, there has been renewed interest in phonoenterography (FEG) [12, 13, 14].

The purpose of this work is the scientific substantiation of the rehabilitation complex for the early rehabilitation treatment of women after laparotomic operations on the organs of the abdominal cavity and pelvis, evaluation of its effectiveness in comparison with conventional treatment.

Research design A randomized, placebo-controlled, comparative, blinded clinical study of 85 women who underwent laparotomy operations in the gynecological department of the National Surgical Center and in the city maternity hospital No. 4 in Bishkek was conducted. The age of the women was from 20 to 60 years, on average - 36.3 ± 1.6 years. The weight ranged from 40 to 95 kg, on average - 56.0 ± 1.2 kg.

The reasons for laparotomy operations were large uterine fibroids, ovarian cysts, pyosalpinx, ectopic pregnancy, intestinal obstruction, ventral hernias, termination of pregnancy with pathology of the uterus and fetus. The predominant pathology was uterine fibroids and ovarian cysts. In 4 out of 19 cases, ovarian cysts were bilateral. In 5 cases, a combination of uterine fibroids with an ovarian cyst was observed. In two cases, tubal pregnancy was combined with an ovarian cyst. In total, simultaneous operations amounted to 22 %.

The study included laparotomies with an incision length of more than 8 cm, most often according to Joel-Cohen, Pfanneschtal. With laparotomy of less than 8 cm in uncomplicated cases, when discharged for 3-4 days, the rehabilitation complex continued on an outpatient basis, which is the subject of a separate study.

By random sampling, the patients were divided into 2 randomized groups, comparable in age, body weight, severity of the disease, and a similar distribution of pathology. The main group consisted of 53 women who received the proposed rehabilitation complex in full or reduced volume. In comparison group B (n – 32 women), physiotherapy procedures were carried out using the placebo method with the toggle switch turned off or reduced to zero intensity, which was sealed with a Band-Aid during the procedure. Neither the doctor nor the patient knew which category the device belonged to, which made it possible to evaluate the work as meeting the requirements of a double-blind placebo-controlled study.

The rehabilitation complex included, in addition to surgical wound care, regimen and diet (similar to the comparison group), laser irradiation of the surgical wound, exposure to pulsed low-frequency electrostatic fields (PLFEF), reflexotherapy with extremely high frequency electromagnetic fields (EHF puncture). Portable physiotherapy devices "MILTA F-8-01", "Khivamat-200", "Nickel-1" were used, which can be used for physiotherapy at the patient's bedside in the intensive care unit, dressing room or in a regular ward.

The order of the rehabilitation complex was as follows: 1. Drug therapy: painkillers, sedatives, anti-inflammatory drugs as needed. 2. Every day, starting from the second day after the operation, in the morning, during the dressing, a 5-minute laser irradiation of the surgical field was performed with a MILTA-F-8-01 device with a power of 50 MW, the pulse duration of laser radiation was 150 ns, the frequency of repetition of laser pulses was 80 Hz. The course consists of 10 procedures.

3. Then, after 1-1.5 hours, massage of the anterior and lateral surfaces of the abdominal wall of the INCHESMP was performed from the "Khivamat-200" device with a power of 8 watts with a frequency of 100 Hz for 15 minutes with special gloves. The massage was started in remote fields, gradually approaching the surgical wound. In the first three days they did not reach the surgical sutures, finishing the massage with a 2 cm margin, on the 4th and 5th day gloves were gently applied to the surgical sutures. The course consists of 10 procedures.

4. In the afternoon, EHF puncturing with a wavelength of 7.1 mm from the Nickel-1 apparatus was performed on 8 biologically active points. The course consists of 10 procedures. 5. Mode: 1 day - bed rest. Walking around the ward from 2 days. 6. Earlier meals.

Research methods The subjective and objective condition of the patients was assessed before the operation (only planned), the day after the operation, and in the following days after the 1st, 3rd and 10th procedures. To assess the condition of patients and the effectiveness of rehabilitation,

the following methods were used: subjective assessment – a feeling of bloating, difficulty in passing gases and stools, nausea, vomiting, etc., objective assessment - phonoenterographic examination and planimetric assessment of the dynamics of wound healing.

The planimetric assessment of the dynamics of wound healing was carried out according to its own methodology, implemented as an innovation proposal in the department of purulent surgery. To do this, a large-scale grid is applied to the plastic film with an inkjet printer. The film is applied to the surgical wound during dressing and photographed preferably at a right angle using a conventional mobile phone. Then digital photos taken every other day are analyzed in an image editor. The area is determined by the initial area of the wound, the maximum area in cm² with the development of inflammation, the healing rate in cm² / day, and the time of complete healing in days.

The FEG technique and the sound decryption algorithm have been filed for patenting in as an invention. Sounds are recorded by a microphone for 1 minute with free breathing and with a 10-second breath delay at four points of the anterior abdominal wall, digital signals are amplified and recorded on a computer. The resulting recording is statistically analyzed using a sound editor.

High-amplitude, medium-amplitude and low-amplitude sounds can be determined on the phonoenterogram. High-amplitude sounds (belching, gas discharge, intestinal rumbling with certain food and drinking certain drinks) can be heard from a distance.

Medium amplitude sounds are picked up by the patient himself and the doctor during abdominal auscultation. Medium amplitude sounds are unstable. Normally, doctors do not always hear them. They are determined on an empty stomach with a frequency of 1-3 per minute, last 0.5-2 seconds. Their other parameters are not very constant.

Low-amplitude sounds are not audible to the human ear, but they are constant, have a certain shape and can be quantified using a computer FEG.

The frequency of low-amplitude sounds coincides with the frequency of signals of the nervous system causing smooth muscle contraction, recorded electroenterographically.

To assess the motor function of the gastrointestinal tract, the following parameters of low-amplitude sounds are used: peak amplitude (PA) and average amplitude (AA) in decibels when entering the computer (a conditional value depending on the parameters of the amplifier), signal duration in milliseconds (SD) and sound frequency (SF) in hertz.

FEG norm does not exist yet. We filmed the FEG from 20 student volunteers. The indicators of FEG in healthy people and in patients in the preoperative period were very variable and were characterized by an uneven distribution. Therefore, we took the FEG twice on an empty stomach and 20 minutes after taking 100 ml of carbonated mineral water (Borjomi or its analogues). YamaguchiK., 2006 [15] uses a trial breakfast for this. Mineral water stimulates peristalsis, but to varying degrees. Normally, the PA and AA values of low-amplitude sounds increase by 30-40%.

Statistical processing of the results was carried out using the application programs "Statistical 6.0" and SPSS 13.

The results obtained and their discussion on the first day after the operation, the condition of the patients corresponded to the severity of the operation. The patients did not refuse the procedures. Blood pressure and heart rate are corrected to normal values.

The average wound area in the main group was 13.22 ± 2.7 cm², and in the control group it had almost the same value. The initial area of the wound was calculated from the calculation of the length of the incision x the average indentation from the edge of the wound to the injection of the needle x 2. In this way, the sutured wound had swelling, slight hyperemia, soreness. Within these boundaries were graduates and drainers (if available). On the third day, the swelling and soreness of the suture decreased in most of the operated women. The average area of the wound decreased to 7.4 ± 2.3 cm².

But 3 women of the main group (5.6% of those operated on) and 3 women of the control group had hyperemia and swelling in certain parts of the wound on day 5, and serous discharge appeared from the wound. The area of wound inflammation on day 7 in these 6 patients averaged 14.12 ± 3.0 cm², which is significantly less than in the control group (Table 1). Clinically, a slight deterioration in the general condition was noted, leukocytosis appeared in the blood.

TABLE 1 - DYNAMICS OF WOUND HEALING IN PATIENTS OF THE MAIN AND CONTROL GROUPS

Group	Cut Length	Wound area			Healing time
		3 days	7 days	14 days	
Main n – 53	13,2 $\pm 2,7$	13,1 $\pm 2,5$	5,5 * $\pm 1,6$	0,0 * $\pm 0,0$	7,3 * $\pm 1,1$
control n – 32	13,1 $\pm 2,6$	15,8 $\pm 2,8$	11,3 $\pm 2,3$	3,2 $\pm 1,0$	11,4 $\pm 1,2$

Note: * - the difference with the control group is significant, $p < 0,05$

Complaints of intestinal paresis symptoms on the first day after surgery were absent in 63.5% of patients in the main group and 64.3% in the comparison group. 30% of patients in the main group and 33.3% of patients in the comparison group complained of abdominal pain. Also, approximately equally, about a third of patients in both groups noted moderate bloating and impaired gas production.

Computer FEG in the preoperative period in planned patients did not reveal significant differences with healthy people.

On the 1st day after operations on abdominal organs, both groups registered a significant increase in the frequency of medium-amplitude sounds and a decrease in the amplitude of low-amplitude sound signals compared to the preoperative period by 12-15% ($p < 0.05$). The intestines reacted to the sample with mineral water with significantly smaller shifts in PA, AA, SF, which we regard as a manifestation of intestinal paresis. On day 3 in group A patients, the changes in FEG were more diverse. In 7 patients, signs of intestinal paresis were clinically noted, their FEG indicators dropped below the baseline level. In some patients, the indicators of FEG were higher than on the 1st day after surgery. On average, the shift in FEG indicators turned out to be even greater than the 1st day after surgery. In our opinion, some patients had unexpressed intestinal paresis, which did not manifest clinically.

In patients of the main group who received in the early postoperative period a course of exposure to electromagnetic fields of extremely high frequency and pulsed electrostatic low-frequency fields, significant positive changes in FEG were noted.

On day 3, the frequency and amplitude of peristaltic waves increased by more than 30%, significantly differing from the initial indicators, while significantly lower indicators were noted in the comparison group.

On day 10 in the main group, the FEG indicators were 12-20% higher than the control level, significantly differing from the comparison group ($p < 0.05$). Samples with mineral water gave a significant increase in the frequency of medium- and low-amplitude sounds, and an increase in PA, AA and SF by 40-50%, which indicates normalization and even stimulation of peristalsis

A year later, signs of adhesive disease were noted in 3 patients of the main group and 7 patients of the comparison group. Postoperative hernia was formed in 3 patients (comparison group).

Visually, the postoperative scars were mostly soft, not protruding above the surface of the abdominal wall. However, in 3 patients of group B who did not receive physiotherapy in the early recovery period, rough dense scars later formed, both deeply sinking and rising above the surface of the skin.

Abdominal pain a year after surgery was observed in 5% of patients in the main group and 17% of patients in the comparison group. The same difference is characteristic of pain during palpation of the abdominal organs (in 13% of the main group and in 23% of the comparison group).

CONCLUSION

Changes in the motor function of the intestine in the early recovery period after major abdominal operations are of a phase nature and occur with varying degrees of severity in a significant part of patients. These changes can be quantified and evaluated in a timely manner using a computer FEG. The dynamics of surgical wound healing is associated with increased intra-abdominal pressure, immunity, and the process requires early rehabilitation with the use of physical methods of treatment.

In the early recovery period, it is possible to use sparing physiotherapeutic procedures, taking into account the pathophysiological and sanogenetic mechanisms of their therapeutic effect, released by portable devices at the patient's bedside or in the dressing room without additional transportation of the patient. Laser irradiation of postoperative sutures and nearby fields has an anti-inflammatory effect, helps to reduce edema, improve microcirculation and regeneration of the skin and underlying tissues, wound healing by primary tension, and earlier removal of sutures.

Massage of the abdominal wall using INCHESMP with course use reduces the symptoms of intestinal paresis: bloating, abdominal pain, stimulates intestinal peristalsis, gas discharge and bowel emptying. EHF puncture on biologically active points affecting the intestines reduces abdominal pain, normalizes intestinal peristalsis. This all increases the effectiveness of rehabilitation.

LIST OF LITERATURE:

1. Belov G.V., Tyulyueva A.K. Physiological and pathophysiological bases of application of physiotherapeutic techniques in the early rehabilitation period // *Medicine of Kyrgyzstan*. - 2010. - No. 5.- pp. 29-30.
2. Kovalenko Z.A. The concept of early rehabilitation ("fasttrack") in abdominal surgery // *Questions of balneology, physiotherapy and therapeutic physical culture*. 2013. Vol. 90. No. 4. pp. 53-56.
3. Lyadov K.V., Shapovalenko T.V., Romashin O.V. Methodological and organizational foundations of early rehabilitation of patients in a multidisciplinary hospital // *Issues of balneology, physiotherapy and therapeutic physical culture*. - 2013. - No. 4.- pp. 4-8.
4. Kehlet H. Principles of fast track surgery. Multimodal perioperative therapyprogramme // *Chirurg*. - 2009.-Vol. 80, № 8. - P. 687-689.
5. Moldasarina R.S. Rehabilitation of women after conservative and surgical treatment / R.S. Moldasarina, G.K. Manabayeva, Zh.E. Akylzhanova, A.M. Rashidova // *Bulletin of the medical Institute "REAVIZ": rehabilitation, doctor and health*. 2021. No. 5 (53). pp. 92-104.
6. Ponomarenko G.N., Silantieva E.S., Kondrina E.F. Physiotherapy in reproductive gynecology. - SPB: VMA, 2008. 192 p.
7. Korchazhkina N.B., Mikhailova A.A., Kolgaeva D.I., Kovalev S.A., Rzhovsky V.S. Substantiation of the inclusion of pulsed low-frequency electrostatic massage in complex therapeutic and rehabilitation programs // *Physiotherapy, balneology and rehabilitation*. 2019. Vol. 18. No. 3. pp. 191-194.
8. Portnov V.V. Modern technologies of physiotherapy // *The role of modern physiotherapy and phytotherapy in complex treatment programs*. - Bishkek. 2007. - pp. 6-32.
9. The use of therapeutic and diagnostic magneto-IR laser devices "Milta-F-8-01" in medical practice: a manual for doctors / *Comp.*: V.A. Builin, A.K. Polonsky, Yu.V. Alekseev et al. M.: 2005. p. 188.
10. Safronov B.G. Mokryakov I.A., Tsarkov M.V., Polyatykina O.V. Physical substantiation of the method of computer phonoenterography // *Physical Medicine*. - 2005. - Vol. 15, No. 1. - pp. 41-44.
11. Banz V.M. Improving outcome after major surgery: pathophysiological considerations. /V.M. Banz, S.M. Jakob, D. Inderbitzin // *Anesth. Analg.*2010. - Vol. 08, № 24.
12. Mackay M.R., Ellis E., Johnston C. Randomised clinical trial of physiotherapy after open abdominal surgery in high risk patients // *Aust J Physiother*. - 2005.-Vol. 51, № 3. - P. 151-9.
13. Belov G.V., Akhunbaev S.M., Uzakov T.B., Bekov T.A. Medical rehabilitation of patients who underwent laparotomy operations. Guidelines. Bishkek, 2021, 36 p.
14. Gräfe G. Is phonoenterography suitable for determining postoperative intestinal motility? // *Zentral.bl. Chir.* 1984; 109(4):245-53.

15. Santamaría JI., Sugrue M., Redfern M. Computerized phonoenterography: the clinical investigation of a new system / M. Sugrue, // J. Clin.Gastroenterol.1994 Mar; 18(2):139-44.
16. Yamaguchi K., Yamaguchi T., Odaka T., Saisho H. Evaluation of gastrointestinal motility by computerized analysis of abdominal auscultation findings // J. Gastroenterol. Hepatol. 2006 Mar; 21(3)