

## Patient Rehabilitation after Gynecological Surgery

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### ABSTRACT

Reproductive impairments occurred as a result of diseases that require surgical treatment are the topical issues of the present-day medicine. The most serious threat to the health and lives of women is posed by the acute gynecological disorders requiring immediate operative therapy: diseases accompanied by intra-abdominal bleeding (tubal pregnancy, ovarian apoplexy), suppurative pelvic inflammatory diseases and diseases associated with impaired circulation in internal genital organs. The incidence rate of acute gynecological disorders varies widely and ranges from 1 to 26 % of the total number of female patients in the gynecological hospital. The structure of acute gynecological disorders, according to the authors' data, has been presented as follows: ectopic pregnancy - 47 %, acute inflammatory disorders of uterine appendages - 24 %, ovarian apoplexy - 17 %, ovarian tumor torsion (rapture) - 7 %. The incidence of ovarian tumors tends to increase and over the last years it has increased from 6-11 % to 19-25 % in the structure of lesions of female genital organs. Moreover, the incidence of recurrent disease is also great: as to the authors' data 11 % of patients from between 2 to 6 years had the relapse of the cyst or ovarian cystoma. The risk factors for such pathology in the eyes of many authors are also the increase in incidence of inflammatory diseases of uterine appendages, hormone imbalance, the high number of past extragenital disease and interventions causing the ovarian microcirculatory disorders. To date, more than 90 % of all gynecological operations in the world are laparoscopically performed. The advantages of laparoscopic surgery are obvious: much less trauma, absence of the post-operative abdominal scars - cosmetic effect, much less post-operative pains, the shorter hospital stay and the shorter recovery time. Most of gynecological interventions except for the extensive (hysterectomy, myomectomy) are performed by three trocar punctures. 10 mm trocar for laparoscope is inserted through the belly button and 5 mm trocars is pushed to permit other instruments (scissors, clamps, biopsy forceps, needle holder etc.) to enter the lower abdomen. The instruments help to perform the required manipulations, that are the control of bleeding, resection of the organ part, paraplasm removal and the stitching.

### KEYWORDS

Laparoscopy, ovarian cyst, gynecological intervention, female patients, puncture (incision), operation, complications, in-patient hospital, instrument, rehabilitation

### ARTICLE HISTORY

Received 20 April 2016  
Revised 28 April 2016  
Accepted 9 May 2016

## Introduction

Laparoscopic surgeries are often much less traumatic in relation to the anterior abdominal wall. As a result, there is a possibility of early mobilization and patients'

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food intake on the 2nd day of the post-operative period. However, in addition to operative access, the extent and principle of intervention remain the same – the removal of the affected organ. The other feature is the creation of the tensed carboxyperitoneum, the side effects of which remain during the postoperative period as well. So that, the basic hemodynamic parameters, external respiration and blood gas normalize in 1-2 hours after deflation.

To provide better visualization of organs during operation the female body to be laid in one or other position on the operating table. The position of the patient lying on the operating table – Trendelenburg position (head lower than feet) originally was described in 1860. The Trendelenburg position was used as a treatment for shock in World War 1. Over the years, a plenty of modifications of this position has been described. In laparoscopic surgery the Trendelenburg position allows better visualization of pelvic organs. It was believed for ages that the patient's position with the head down improves the blood circulation and with the head elevated – the respiration. Today some researchers cast doubt on this position. The body position with the head placed down at 15 degrees of healthy people with the standard circulatory volume (CV) leads to the displacement of only 1.8 % of blood. This slight change fails to cause the major changes in hemodynamics. In practice, the functional stability of cardiovascular system in the Trendelenburg position can be conditioned upon baroreflexes. In normotensive as well as hypotensive female patients with acute heart diseases or sepsis, the beneficial effects of Trendelenburg position with the body inclined at 30 degrees was not observed. At the same time, the central venous pressure and wedge pressure increase, and the cardiac output decreases. The mean arterial pressure (AP) does not undergo any major changes. In hypotensive female patients having peripheral vasodilation, the Trendelenburg position would slightly decrease the mean AP. At that, the heart rate is not changed and the CP is changed insignificantly. The decrease of AP in the vessels of abdominal cavity organs may elevate the risk of air embolism.

The Trendelenburg position in which the table inclined at 15° increases the venous return to the heart that considerably compensate for negative influence on cardiac output. Thus, numerous studies dedicated to the study of the position's influence on cardiac output, in the whole, showed its insignificant decrease. The reason for this is that the studies have been performed during gynecological interventions (pelvioscopy), which in most cases are performed in the Trendelenburg position.

### ***Restorative physical therapy***

Today, the approach to the restorative physical therapy as an important component of the integrated program on patient rehabilitation after gynecological surgery may be considered as generally recognized.

The strategy and tactics of restorative physical therapy built on long-term experience define the indications, contraindications and optimal conditions for its administration. However, the development of scientific and technological progress, mainstreaming of high-tech treatment methods into practical medicine, the base of physiotherapeutic equipment and medical agents that grows rapidly over recent years, allow to enlarge the rehabilitative measures with new alternatives aimed at the realization of the wide range tasks.

Many authors (Imme et al., 2002) point out the beneficial effect of physical factors in postoperative period. The basis for this effect on biological tissue is provided by the regulation of the blood and lymph circulation in abnormal focus, modulation of immune

homeostasis, local anesthetic action preventing the adhesive process in the abdominal cavity.

It is necessary to include anti-inflammatory, dissolving therapy, early kymographic perturbations as well as physiotherapy and ultra violet irradiation (UVI) of blood into the complex of rehabilitative measures.

It was proposed, in female patients having chronic inflammatory diseases of pelvic organs, to administer physical therapy (low voltage electrical stimulation, magnetic-laser therapy) along with medicamentous therapy. The application, after the laparoscopic tubotomy and removal of gestational sac, of therapeutic plasmapheresis sessions, as to the authors' opinion, allowed to improve the postoperative course, to stabilize the adaptive responses and to recover reproductive function.

According to some authors (Godinjak et al., 2005; 2011; Imme et al., 2002; Lupascu et al., 2001; Manassiev, 1996), in the treatment of females having surgical pathology, another effective method for rehabilitation of reproductive function is the application of therapeutic plasmapheresis in early post operative period in combination with endovascular laser irradiation of blood.

The outcome of preserving and radical operative interventions in patients with benign ovarian tumors (BOT) is of special medical and social significance (Godinjak, Bilalovic & Idrizbegovic, 2011).

According to the data of some investigators (Akkoyun & Gulen, 2012; Ferrari et al., 2003), the multiple application of hyperbaric oxygenation therapy (HOT) and antioxidant therapy in female patients followed by surgical intervention regarding BOT with the use of laser and electrical energy of different types is considered to be an effective therapeutic factor and have positive effect upon main components of pathogeny of metabolic disorders occurring in the result of thermal influence and organ tissue ischemia. The application of HOT and appropriate treatment of hypoxia promoted the significant increase of local and regional blood flow in the ovarian and uterine arteries in this patient population.

In the authors' view (Saks & Deckardt, 1994), the diagnostic and treatment laparoscopy accompanied in postoperative rehabilitation by physical factors (intraorgan electrophoresis), HOT and hormonal adjustment promotes the reduction of pain syndrome and the recovering of menstrual cycle in 88 % of cases.

The combination treatment of female patients having complicated forms of acute inflammatory diseases of uterine appendages with the application of plasmapheresis and extracorporeal pharmacotherapy, as to the authors (Imme et al., 2002), allows shortening the hospital stay by one-half, to reduce the duration of treatment, dosage and the frequency of antibiotic use.

The combination of rehabilitation actions concluding the physical therapy, periodic vitaminotherapy, gynecological massage and pelotherapy with early endosurgery treatment by HOT promotes the recovery of menstrual cycle for up to two years in 68,5 % of female patients, preservation of tubal patency – in 34 %, onset of pregnancy – in 10 % of women earlier having infertility problems, in the complete absence of disease recurrence.

The extension of early restorative treatment after reconstructive gynecological operations by electro-impulse actions aimed at the optimization of the functional state of surgically operated organs allows improving the results of surgical intervention and shortening the postoperative recovery time of women of childbearing age. The application of electro-impulse therapy in female patients operated laparoscopically regarding the tubal pregnancy, syndrome of pelvic peritoneal adhesions, tubo-



peritoneal infertility promoted the restoration of functional activity of ovaries, tubal patency, the absence of adhesive structures defined by palpation at the gynecological examination, the onset of uterine pregnancy in 44 % of female patients during the two-year follow-up care (Fromholt Larsen, Due Pedersen & Gregersen, 1986).

The comprehensive rehabilitation therapy of female patients by HOT, including anti-inflammatory therapy, plasmapheresis, ozone therapy and laser allowed by 1,5-2,0 times (as compared to control group) to increase the frequency of occurrence of spontaneous pregnancy in women with distinct anatomic changes, but the standard approach to managing these patients has not been developed so far.

### **Adhesions**

The problem of adhesive disease is relevant up to date. Pending are the aspects of pathogenesis, prevention and treatment of adhesions. These issues are especially important in gynecology, namely in women of reproductive age that is associated with the high frequency of tubo-peritoneal infertility.

The main factors that lead to the formation of adhesions in the pelvis are abdominal and pelvic organs surgical operations (laparotomy, laparoscopy), inflammatory diseases of the uterus appendages and external genital endometriosis. The incidence of intra-abdominal adhesions is ranged from 67 to 93% after general surgical abdominal operations and is almost 97% after open gynecologic operations. According to the pathology and clinical studies, incidence of intra-abdominal adhesions after laparotomy is 70-90%.

Postoperative adhesions violate the patients' quality of life, cause difficulty during repeated accesses, intestinal obstruction, chronic abdominal and pelvic pain and female infertility.

Gynecological and obstetric operations are the main causes of intra-abdominal adhesions. There are reports that abdominal hysterectomy is one of the operations, which causes intestinal obstruction due to adhesions. Myomectomy is accompanied by a high frequency of formation of uterine appendages adhesions.

One of the most frequent causes of pelvic pain and infertility is endometriosis accompanied by the formation of adhesions. Fibrous adhesions are often formed in response to the chronic irritation of the surface of the omentum by endometriotic implants and by the products of their secretion.

Chronic pelvic pain is observed in the presence of intra-abdominal adhesions. It is believed that this is due to the limitation of mobility, increasing tension and offset the pelvic organs that stimulates pain receptors of the peritoneum. Pelvic pain in female patients with endometriosis is caused by the formations of adhesions that cause the compression of nerves, the destruction of tissue and scarring. The relationship between adhesions and the pain is well illustrated by the reduction of pain after adhesiolysis in 60-90%.

Prevention and treatment of adhesive disease remain an intricate task that is primarily associated with the lack of best practices for its prevention. Particularly relevant is the search of new pathogenetic mechanisms that lead to the formation of adhesions, and inventions on the basis of criteria achieved, predictions for adhesive process that will improve the tactics of managing such patients and the quality of treatment. In clinical practice, the search for methods of prevention of peritoneal adhesions with the latest technologies and developments continues.

There are numerous studies (Imme et al., 2002; Lupascu et al., 2001; Manassiev, 1996; Mantovani et al., 2001; Milingos et al., 2004) devoted to the study of the

mechanisms of the formation of adhesions in the abdominal cavity and peritoneum response to various pathogenic factors. On the basis of the results, the various hypotheses with regard to the involvement of vascular responses, all kinds of protein substrates and cellular components as well as tissue hormones in the formation of adhesions have been substantiated. However, the cases of lack of adhesions in 37% of patients who have suffered acute salpingitis and received the same treatment as the patients, in which adhesive process evolved (63%) so far are not fully explored.

The reasons for the formation of adhesions are of all sorts, indicating the multifactorial etiology of the process. During surgery, manipulations on the abdominal and pelvic organs, the peritoneum experiences numerous effects. Trauma causes inflammatory and destructive changes of peritoneum with the launch of the mechanism that leads to the occurrence of adhesions.

The research of the author (Bulletti et al., 1996) shows that in response to the wounding, the transudation of the block-shaped hemorrhagic fluid starts, and coagulates in 3 hours. As a consequence, intra-peritoneal organs are adhered together due to fibrous adhesions. In the normal process of healing, the fibrous adhesions shall be subject to lysis due to the response of fibrinolytic system. Inhibition activity of fibrinolytic system leads to the infiltration of fibrous adhesions by the proliferating fibroblasts that causes neovascularity, cell growth and the formation of adhesions.

Thus, the leading element, which defines the shape of the healing of the peritoneum (the norm or with the formation of adhesions), is a balance between the fibrin deposits and its degradation. If there is a complete degradation of fibrin, peritoneum will be healed without the formation of adhesions.

The main factors that affect the fibrinolytic system are tissue ischemia and the presence of blood in the abdominal cavity. According to the current researches, the pathobiochemical basis for the formation of adhesions appears to be the body's response to ischemia. At this, the adhesions serve as the vascular graft, the main purpose of formation of which is to support the vital activity of ischemic locus due to the activation of intracellular receptors to oxygen. It is this hypothesis explains the formation of adhesions after surgical interventions.

Researches (Fasolino et al., 2003) are devoted to the study of hypoxia and angiogenesis processes violations as the leading pathogenetic cause of formation of adhesions. This aspect of adhesions in the pelvis is regarded as the protective reaction of peritoneum to hypoxia (Fromholt Larsen, Due Pedersen & Gregersen, 1986).

The peritoneal form of the moderate-to-severe genital endometriosis leads to the formation of adhesions in 100% of cases. Not only the clinical signs of adhesions (infertility, chronic pelvic pain, etc.) appear to be the problem, but the relapses of adhesions after laparoscopic adhesiolysis, and the impossibility to predict it. There is also an evidence that the peritoneum, that covers pelvic organs, is significantly less vascularized in comparison with mesothelium that covers the upper sections of the abdominal cavity. Probably, because of this, it is more receptive to foreign tissue grafting and vascular ingrowth specifically in the lower sections of the abdominal cavity.

One of the reasons of the increased tendency to the formation of adhesions appears to be not only the organism activity; and the injuries of the peritoneum, surgery and inflammation can be considered as a nonspecific trigger mechanism of excessive biosynthesis of the cell-surface connective tissue component. Adhesive perivisceritis of abdominal organs is genetically deterministic constitutional disease, and a leading role in the anomalous development of the connective tissue in the



abdominal cavity is owned by the enzyme N-acetyltransferase (Bruhat et al., 1991; Burmucic et al., 1983).

As to the clinical course, the adhesive disease is divided into acute, chronic and harassing. The acute form is characterized by the development of pain syndrome, enhanced intestinal peristalsis, vomiting and the rise in temperature. With the constant form of adhesions the pain, dyspepsia and constipation periodically may occur. The chronic form of adhesive disease is manifested by nagging pain in the abdomen, constipation, decreased body weight and recurrent bouts of acute intestinal obstruction.

The diagnosis of adhesive disease is based on case history, clinical findings, results of laboratory and instrumental methodology. During the pelvic examination the probability to diagnose adhesions is 75%. Ultrasound scanning, hysterosalpingography and the nuclear magnetic resonance method are used with the purpose of diagnosis.

The treatment of adhesive disease is carried out by conservative or operative methods. Indications for surgery are an acute attack of adhesive intestinal obstruction and the recurrent attacks of adhesive disease. In gynecology, the main surgical method for the treatment of adhesive disease is laparoscopic adhesiolysis.

Currently, many techniques and drugs are proposed that prevent the formation of postoperative adhesions. The main approaches to prevention of adhesive disease are in the appropriate surgical technique constraining the trauma of intra-abdominal structures and use of tools that reduce the formation of adhesions.

During the surgical procedure it is required to adhere to the common non-traumatic principles, gentle and bloodless manipulations, as in open and laparoscopic surgeries, minimum use of clips, retractors, tongs on tissues that are not removable. The special attention is paid to the careful hemostasis, irrigation with the saline solution to reduce the drying of serous membrane, prevention of intra-abdominal infections. The researchers emphasize the need for anatomical preparation to reduce ischemia of the peritoneum, the use of minimally invasive technology, thin nonreactive suture material, minimization of the risk of leaving of foreign objects (tampons, powder from gloves) and contamination of abdominal cavity by gastrointestinal contents (Burmucic et al., 1983).

### *Suppurative processes*

Out of the total number of complications in the early postoperative period, according to the authors, a greater number is purulent-septic, which accounted for from 52,4 to 73,9 % of cases, being in 68,285,7% the main reason for repeated surgeries. Currently, mortality in the cases of septic-purulent postoperative complications amounts to 55-69%, reaching 76-87% in the development of abdominal sepsis (AS) according to the Multiple Breakthrough Organ Score (MODS).

According to the modern views, the AS is a systemic inflammatory response of the body to the development of purulonecrotic process. Possible consequence of such universal response as to the intra-abdominal infection is the formation of multiple organ failure of varying degrees of symptoms and septic shock.

In the beginning of 90s of XX century the classification was offered based on the compliance of contractual characteristics to the best practices of SCCM Consensus and allows to standardize the definitions used to describe conditions associated with sepsis. It is descriptive and defines the following syndromes: stroke, sepsis, severe sepsis, septic shock. The course of AS is characterized by the presence of at least two clinical-



laboratory signs of stroke, presence of infection center and the development of endotoxiosis.

Currently, many researchers (Fasolino et al., 2003; Saviano et al., 1996) confirmed that the objective integral and quantitative assessment of the severity of the condition of patients being in critical condition, including in the extensive purulent-inflammatory processes with AS, cannot be made without the use of objective scale systems for the assessment of functional disorders (for example, APACHE II scale) and assessment of the degree of organ dysfunction (MODS, SOFA scales) (Muzii et al., 1996).

The majority of researchers (Chapron & Dubuisson, 1996; Lupascu et al., 2001; Muzii et al., 1996; Shi et al., 2011) distinguish three types of infections, the nature of which is characterized by a certain versatility and regularity of biological mechanisms of the inflammatory response of the body to the development of PSC of advanced processes (destruction of the organ and its perforation, as well as acute intestinal obstruction); postoperative diffuse peritonitis due to the abscess formation and its breakthrough into the free abdominal cavity and the formation of immature intestinal fistulas as a result of incompetent saturation area and anastomotic dehiscence, or perforation of the previously intact wall and the development of retroperitoneal septic phlegmon.

Among the causative agents of postoperative PSC in modern clinic, staphylococcus still takes the lead (Mantovani et al., 2001; Muzii et al., 1996; Saks & Deckardt, 1994). Together with it and another positive flora, the role of gram-negative microflora rises. Currently, there is a significant increase in diseases caused by gram-negative bacteria. If 30 years ago per 1000 patients one patient had sepsis, by the mid 90s of XX century only in the United States the cases of this disease were discovered in 500k people and the lethal outcome occurred with 175k patients (Blanc et al., 1995; Burmucic et al., 1983).

More than 80% of abdominal infections and up to 40% of bacteraemia with high level of fatality are caused by gram-negative microorganisms, among which the pathogenic strains of *Escherichia coli* dominate. *Pseudomonas aeruginosa*, *Proteus*, *Klebsiella*, *Enterobacter*, *Bacteroides* and some other among these pathogens are of special significance (El Hajoui et al., 2003; Verspyck & Sergeant, 2006).

The complication of purulent-septic nature and the most common cause of relaparotomia (RL) often appear to be the pelvioperitonitis of various genesis. The number of PSC accounts for 57-60%, and operated repeatedly - 65.8% and more. According to the authors, the reason of emergency in 70% was the suture disruption with fatality ranging from 50 to 86% because of the difficulty of diagnosis of this complication. The number of repetitive operations performed with regard to the residual abdominal abscess, that is a local form of purulent processes, are not reduced.

### ***Thromboembolic complications (TEC)***

In the case of development of uterine leiomyoma and endometriosis, the thromboplastic activity of its tissues will increase due to the low concentration of plasminogen activator.

According to the authors (Garzarelli & Mazzuca, 1994), during the examination of patients with uterine leiomyoma the reduction of AT-III mean activity by 10.5% is detected, in patients with endometrial cancer this marker is reduced by 15.8%. In the same groups the increase in the number of platelets was identified by 35.1 and 33.8% respectively.



The above mentioned factors are of high relevance for female patients with adenomyosis, considering that the uterine leiomyoma accompanies this pathology in 80% of cases.

The risk of TEC in female patients with adenomyosis increases also due to the high incidence rate of endometrial disease. Endometrial extracts have thromboplastic activity, which considerably exceeds the same in myometrial extracts. Hemocoagulation endometrial features are very pronounced in child-bearing age. Thromboplastic activity of the uterine lining in women of 20-40 years continues before the cultivation of extracts in 100-250k times, in women of 45 - 47 years – in the cultivation in 100k times. The endometrium has less plasminogen activator than myometrium. At the same time fibrinolytic potential of endometrium of the women of childbearing age is by 5 times higher than in women older than 45 years.

The patients with diabetes mellitus, atherosclerosis, coronary heart disease, liver diseases, malignant tumors have problems with fibrinolysis.

The use of hormone and steroid drugs to prevent pregnancy, treat dysmenorrhea and menorrhagia, including adenomyositis, increases the risk of development of TEC, especially of veins. Numerous studies have shown that in women who constantly taking hormonal contraceptives, thrombosis may occur 4-8 times more likely, the deadly thromboembolia of pulmonary artery (PATE) –7-8 times, heart infarction two or more times, and the apoplexy 3-5 times more likely than women of the same age, but those who did not take hormonal contraceptives. The development of thrombophilia in connection with the use of hormonal drugs may be explained by the estrogen impact on blood coagulation as well as the high doses of Aethinyloestradiolum. Under their influence the development of AT-III, protein C and S is inhibited, coagulative potential is activated, the concentration of VI, VII, VIII, IX and X factors, fibrinogen increases, the tendency of platelets to aggregation and adhesion increases and the fibrinolytic activity reduces (Tsikouras et al., 2008).

The risk of PATE increases three times if the use of hormonal drugs coincides with smoking. Smokers are marked with changes of hemostasis in the form of lowered prothrombin time, increased level of fibrinogen and plasminogen, reduced AT-III. In women who smoke, thrombophilia caused by these drugs will be amplified by the decrease of I and II prostaglandin development, as a result of the toxic effects of nicotine on venous endothelium and subendotheliale structure. The risk of TEC increases significantly during the the use of hormonal drugs and in the presence of other risk factors, including the age older than 40 years, obesity, cases of surgery, smoking, varicose veins of lower limbs suffered from thrombosis and embolism in the last years. Critical thrombophilia is developed in patients who took hormones and suffered from congenital coagulation violations, hereditary deficiency of AT-III, protein C and S, APC-resistance, etc.

Medroxyprogesterone is able to sometimes lead to the reduction of AT-III level, however, it does not promote the increase of risk of venous thrombosis and PATE. At the same time, this risk is high during the use of medroxyprogesterone for the patients being primarily at thrombosis and cancer risk (Verspyck & Sargent, 2006).

The factors that cause structural or functional injury of vascular walls include:

1. Trauma and surgical interventions. All tissues of the human body have a strong, snap-acting activity of tissue thromboplastin as well as plasma-generating activity. During gynecological operations, traumatic methods of research and infectious complications the massive wound of fine blood vessels, tissue injury, microcirculation failure with a significant release of tissue factors of blood coagulation (tissue tromboplastin) into the bloodstream are observed.



Intravascular activation of the blood coagulation and prothrombinase on external and internal ways of blood sedimentation form thrombophilia status and cause the deposition of fibrin. Hyperfibrinogenemia causes metabolic, hormonal and hemodynamic responses.

Death-causing embolism due to PATE after vaginal operations is diagnosed in 0.18% of cases.

In patients with diabetes the risk of injuring the vessels of the microcirculatory bloodstream is 2-3 times higher than in healthy people. In the case of diabetes, thrombogenic potential of the blood is high, antithrombogenic activity of vascular walls is reduced and the oppression of the total fibrinolytic blood activity is observed. These changes lead to the disorders of homeostatic homeostasis, increase of adhesion and aggregation of platelets to the wall of the vessels, that may become the basis for the emergence of intravascular thrombus and atheromatosis plaque (Seckin et al., 2001).

Thus, the analysis of literature data showed that the patients with extragenital pathology have many factors that significantly increase the risk of TEC of gynecological patients. The risk of TEC increases with women age, namely after 35-40 years. In this age, women are already burdened with gynecological, obstetric and somatic anamnesis. Early diagnosis, adequate and timely treatment of inflammatory processes of uterine appendages can be the measures to prevent the complications of this disease, that affect the reproductive function of women. Prevention algorithm involves the determination of the degree of risk, taking into account the patient's state and the extent of the forthcoming operation, and then carrying out prevention activities of appropriate risk level. In addition, regardless of the estimated risk in all patients it is necessary to carry out non-specific preventive measures.

## Conclusion

Analyzing the data from the literature, it should be noted that, over the past decade, many national and foreign researchers, from practical experience, proved the high surgical activity and the need for rehabilitation activities, which can be used both independently and in conjunction with the "traditional" operations. In this regard, it is quite rightly discussed the issues on training of professionals, the knowledge and skills of which should cover the operational surgery and gynecology to enable the high-quality performance of techniques in the presence of concomitant surgical and gynecological pathology.

In addition, despite the availability of data in domestic and in foreign literature on vast experience of application of various forms of rehabilitation actions after operative interventions on the pelvic organs, no single algorithm for the management of women after surgical treatment of acute gynecological pathology has been developed. The use of these or other rehabilitation measures is not always justified by high efficiency in relation to the early rehabilitation after operations and fertility preservation. Having studied the problem, it turned out that there are no unified integrated approach that would be aimed at the stimulation of compensatory possibilities of reproductive field following the surgical stage of treatment. The common, well-known, but those did not find theoretical and practical confirmation of the provisions on rehabilitation after gynecological operations. The algorithms of the patient management after gynecologic diseases are based on initiation of common regulatory mechanisms, while piecemeal examination of patients after surgery allows more targeted approach to selecting of rehabilitation measures defining the success of interventions made. The need to shorten the rehabilitation time after gynecological diseases, preservation of women reproductive function, and the birth of healthy children at the present stage appear to



be one of the priorities, especially in the presence of comorbidity. Despite the large number of publications, the problems on systematic inclusion of high-tech physiotherapeutic rehabilitation activities into the complex of postoperative management of patients after surgical treatment of acute gynecological diseases are under debates and disassociated. In this context, the development and application of new integrated activities on rehabilitation of patients after operations on the pelvic organs will improve the treatment outcomes and long-term consequences of surgery. We have chosen the development of prevention methods and the study of their effectiveness in women with gynecological laparoscopic operations as the aim of our further work.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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