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Prevention of postoperative peritonitis and its complications

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Abstract

Purpose: to develop a new method of lavage of the abdominal cavity in the experimental conditions.

Materials and methods. We treated 456 patients with postoperative peritonitis who were on treatment in the surgery department of the municipal non-profit enterprise Regional Clinical Hospital of Ivano-Frankivsk Regional Council in the period from 2000 to 2021. Patients are divided into 2 groups. The retrospective group consisted of 212 patients, prospective - 244 patients.

Research results and their discussion. The method of lavage of postoperative peritonitis was carried out as follows: during relaparotomy, after mechanical cleaning of the abdominal cavity from fecal masses, bile, blood clots, fibrin layers, the abdominal cavity washed twice with 2-3 l of 0.02% solution of decamethoxine at a temperature of 30-35 ° C. After removing the drug residues from the abdominal cavity, pour 2 liters of solution for peritoneal dialysis Extranil at a temperature of 37°C, the active substance of which is icodextrin, not glucose, ie it is not a nutrient medium for microorganisms, but has antimicrobial action due to hyperosmolarity and exposure to hyperosmolarity and increases its adsorption properties. This is followed by drainage of the abdominal cavity from four points with polyvinyl chloride tubes, which are intimately fixed to the skin and blocked for 6 hours.

Key words: Postoperative peritonitis; lavage of the abdominal cavity.

Problem statement and analysis of recent research and publications. The main cause of death in patients with postoperative peritonitis is the syndrome of multiple organ dysfunction [2]. The reason for high mortality is the lack of standardized modern treatment tactics. The introduction of the latest technologies of surgical interventions and new drugs can significantly improve the results of treatment of these patients [4, 8]. Ideally, the elimination of the source of peritonitis should be radical, ie it is necessary to seek to completely eliminate the source of infection of the abdominal cavity in the postoperative period [3, 6]. If it is not radically removed (parenchymal abscesses, intestinal ulcers, infected pancreatic necrosis with melting of the parietal peritoneum, failure of the esophageal anastomosis, failure of the sutures or stumps of the duodenum), the necessary measures to ensure the most reliable localization and cavities in the postoperative period [7, 11]. Antibacterial therapy, intensive infusion-transfusion and immunocorrective therapy, enterosorption, hemofiltration, lymphosorption, plasmapheresis, hyperbaric oxygenation play a very important but still supporting role. Radical elimination of the source of infection includes removal of the inflamed organ (appendectomy, cholecystectomy), tight suturing of perforations and fresh penetrating wounds of the hollow organs of the abdomen, resection of the affected areas of the intestine, etc. [10]. No less important is the problem of reliability of radical removal of the source and isolation (control) of the source of peritonitis in the postoperative period [9]. The principle of radical surgical treatment is based on the complete adequate and early elimination or delimitation of all major, additional and potential sources of endogenous intoxication of both microbial and dysmetabolic origin [8]. At the next stage of surgery, the implementation of peritoneal lavage of the abdominal cavity provides, however, not in all situations, a sufficient decontamination and detoxification effect. Treatment of residual and prevention of re-infection of the abdominal cavity is achieved by a reasonable choice of programmed revision and lavage of the abdominal cavity [5], which need further improvement.

Purpose: to develop methods for the prevention of postoperative peritonitis by introducing a new method of lavage of the abdominal cavity.

Materials and methods. We treated 456 patients with postoperative peritonitis who were on treatment in the surgery department of the municipal non-profit enterprise Regional Clinical Hospital of Ivano-Frankivsk Regional Council in the period from 2000 to 2021. Patients are divided into 2 groups. The retrospective group consisted of 212 patients, prospective - 244 patients. In the prospective group, male patients slightly prevailed - 138 (56.6%). The age of patients was in the range of 18-88 years (median - 61 years). According to the severity of the condition, most patients (147 people (60.2%)) - in 1-4 days after surgery

(median - 2 days) were in the intensive care unit. Postoperative peritonitis was localized in 125 (51.2%) and generalized - in 119 (58.8%) patients. Postoperative complications developed in 74 cases (30.3%) and were purulent-septic in 75%. Postoperative peritonitis was fatal in 45 (18.4%) patients. General clinical and biochemical studies were conducted in the laboratory of the Department of Biological and Medical Chemistry of Ivano-Frankivsk National Medical University.

Research results and their discussion. In the clinic for patients with postoperative peritonitis, the most effective and basic method of treatment is surgery (emergency surgery), which includes lavage of the abdominal cavity. If we note the physiological features of the peritoneum (its area is more than 2 square meters, the construction of the mesothelium, there are "blind" pockets, the presence of propulsive activity of the intestine, the possibility of fibrin and junction), fully absorb both intestinal and abdominal contents always succeeds.

The reasons that significantly influence the implementation of protective mechanisms at the local and systemic level are the time of postoperative peritonitis, the applied treatment, the volume and bacteriological content of peritoneal exudate and the location of the inflammatory focus. We see the main success of prevention of postoperative peritonitis in an adequate approach to treatment. Therefore, in our opinion, the decisive influence on the prevention of postoperative peritonitis have:

1. adequate volume of the operation depending on the cause of postoperative peritonitis;
2. manual separation of a healthy peritoneum from the cause of postoperative peritonitis;
3. evacuation of pathological contents by an electric suction pump;
4. thorough peritoneal lavage;
5. careful handling of abdominal organs (prevention and diagnosis of deserosing during operations, meticulous removal of fibrinous plaque);
6. intraoperative assessment of wall viability;
7. careful inspection of sutures on superimposed anastomoses, drainage of their places;
8. careful examination of the detached parts of the abdominal cavity for the content of pathological exudate;
9. sufficient drainage of parts of the abdominal cavity, where there is pathological content;
10. during suturing of the surgical wound adequate control over vascular bleeding;
11. analysis/establishment of indications for RLT;
12. minimization of duration and number of RLT;
13. intestinal intubation.

We are convinced that during each relaparotomy should be performed lavage of abdominal cavity and additional postoperative wound treatment with antiseptics.

14. minimally invasive technologies for diagnosis of an infectious source (under the control of ultrasound drainage with a stylet catheter, laparoscopy).

Approaches to methods of surgical prevention of PP are rare today, due to the fact that in most cases the basic rules of asepsis and antiseptics and appropriate therapy are followed.

Complete removal of pathological contents from the abdominal cavity is a main stage of surgery for postoperative peritonitis and one of the key factors to prevent postoperative complications in the postoperative period such as septic shock and multiple organ failure. Methods of abdominal lavage should be based on the physiology of the peritoneum, antimicrobial ability of antiseptic solutions and the effect on the release of toxins by pathogenic microorganisms, etc. Based on information from the analysis of the literature, as well as our own observations, we have developed a method of lavage of the abdominal cavity, which affects various pathogenetic factors in postoperative peritonitis. There are methods of lavage of the abdominal cavity in diffuse peritonitis, which include washing the abdominal cavity with various solutions of antiseptics, namely: 0.02% solution of chlorhexidine, furacillin, dioxidine (Shalimov AA, Saenko VF / Surgery of the digestive tract. Kiev, "Health", P. 544), decasan (Boyko VV, Logachev VD, Remneva NA and others). Experimental justification for the choice of drug for lavage of the abdominal cavity in acute diffuse peritonitis. Ukrainian Journal of Surgery, 2011, № 3 - P. 174-178).

The closest analogue is a method of rehabilitation of the abdominal cavity, which includes washing the abdominal cavity with a solution of decasan (Boyko VV, Logachev VD, Remneva NA, etc.). Experimental justification for the choice of drug for lavage of the abdominal cavity in acute diffuse peritonitis. Ukrainian Journal of Surgery, 2011, № 3 - P. 174-178).

The disadvantage of the known methods of abdominal lavage is short-term and limited antimicrobial action of decasan only on the peritoneal surface due to rapid leaching from the abdominal cavity, short time of abdominal rehabilitation and rapid inactivation by peritoneal exudate, which increases the number of postoperative complications and duration of treatment. The method of lavage of postoperative peritonitis was carried out as follows: during relaparotomy, after mechanical cleaning of the abdominal cavity from fecal masses, bile, blood clots, fibrin layers, the abdominal cavity is washed twice with 2-3 l of 0.02% solution of decamethoxine at a temperature of 30-35 ° C . After removing the drug residues from the abdominal cavity, pour 2 liters of solution for peritoneal dialysis Extranil at a

temperature of 37°C, the active substance of which is icodextrin, not glucose, ie it is not a nutrient medium for microorganisms, but has antimicrobial action due to hyperosmolarity and increases its adsorption properties. This is followed by drainage of the abdominal cavity from four points with polyvinyl chloride tubes, which are intimately fixed to the skin and blocked for 6 hours.

Therefore, the use of the proposed method allowed to increase the efficiency of lavage of the abdominal cavity, significantly reduce its bacterial contamination and the possibility of recurrence in the postoperative period. The dynamics of endogenous intoxication with different treatments is shown in table. 1.

Table 1 – Dynamics of endogenous intoxication with different treatments

Method of treatment	Number of patients	The level of medium molecules in the blood (CU)			Leukocyte index of intoxication		
		1 day	2 day	3 day	1 day	2 day	3 day
Known method	26	0,560±0,01	0,460±0,01	0,300±0,01	10,3±0,2	4,9±0,3	2,43±4,1
The proposed method	22	0,650±0,01*	0,560±0,01*	0,409±0,01*	10,7±0,3	7,2±0,4*	4,3±0,5*

*- the difference is significant (p<0,05).

Example:

Patient M, 67 years old, medical history № 400417, was admitted to the clinic on 01.03.2017 in serious condition 26 hours after the onset of the disease with the clinic of pinched umbilical hernia, urgently performed surgery - laparotomy, resection of the small intestine, drainage of the abdominal cavity. In the postoperative period, the patient's condition remained severe, on the 4th day after surgery there were sharp pains in the abdomen, intestinal discharge through drainage. After preoperative preparation, the patient underwent surgery - relaparotomy, resection of the small intestine with an anastomosis, lavage and drainage of the abdominal cavity according to the method described above. During the operation were revealed insufficient anastomotic sutures, diffuse fibrinous-purulent peritonitis. After 6 hours, the drains were opened and 2 l of Extranil solution was re-injected into the abdominal cavity. This procedure is done three times. The postoperative wound

healed with primary tension, the patient was discharged on the 13th day after relaparotomy in satisfactory condition.

The nature and regularity of biochemical changes in the body of a patient with PP with AS with the development of purulent-septic surgery made it possible to better understand and predict the course and treatment of this pathology. Indicators of each of the involved systems are very variable depending on the initial condition of the patient and are usually difficult to correlate with each other.

The picture of the typical course of AS shows a balance of levels of C-reactive protein and procalcitonin depending on the nature and stage of PP. The duration and success of treatment of PP with AS is the phasing of the predominance of pro-inflammatory, and then - anti-inflammatory, in overcoming the infectious process. However, such an inverse proportion is not always observed. Currently, such approaches continue to change, but their results are currently not only unconvincing but also unpredictable. Among the factors of this are significant changes in norms, even within the boundaries of the population under study.

The leading component in PP is MOF, so we offer the earliest possible diagnosis and treatment of organ deficiencies, which is crucial in preventing the development of AS. The decisive effect is not only the treatment aimed at eliminating the cause of AS, but also the correction of disorders of the respiratory system and disorders of water-electrolyte balance, which are characteristic of patients with AS. Replenishment of blood loss and full intravenous infusion therapy are significant in the treatment of patients with AS.

The choice of antibacterial drugs for the prevention and treatment of postoperative peritonitis should be clearly individualized. In the presence of postoperative peritonitis with abdominal sepsis and multiorgan failure, we prefer carbapenems. In patients with postoperative peritonitis without signs of multiorgan failure, treatment begins with cephalosporins IV generation or fluoroquinolones in combination with antianaerobic agents. The use of aminoglycosides (amikacin, tobramycin, gentamicin) in the prevention and treatment of postoperative peritonitis is justified only in the presence of sensitivity of the microorganism. Studies of the sensitivity of microorganisms to antibiotics were taken into account in the treatment of certain forms of postoperative peritonitis, which noted the predominance of certain groups of microorganisms characteristic of limited or common forms of postoperative peritonitis.

For the choice of antibacterial therapy to prevent the development of AS should be used initial de-escalation treatment, according to the literature - carbapenems. Such treatment should be included in the treatment protocols of patients with multiple organ failure.

Prophylactic antifungals should be used depending on the indications, according to the patient's condition. For the most positive effect of treatment it is necessary to develop these treatment schemes on the basis of constantly updated microbiological passports of departments of surgery, resuscitation and operating rooms.

Conclusion. Thus, the results of research show that the use of our proposed new method of lavage of the abdominal cavity caused both a positive therapeutic effect and contributed to the prevention of formation of exudate in the abdominal cavity, against the background of normalization of endotoxemia, which led to a reduction in mortality from 31.6% to 18.4%.

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