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SOME ASPECTS OF SURGICAL TREATMENT OF DIFFUSE PERITONITIS

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ABSTRACT — The purpose of the study was to analyze the characteristics of the course and outcome in patients with diffuse peritonitis, depending on the methods of repeated sanitation and drainage of the abdominal cavity and ultrasound monitoring. The authors carried out a retro-spective analysis of the results of treatment of 102 patients. All patients were divided into 2 groups depending on the method of treatment, with randomization by extent and phase of peritonitis. In the group 1, a semi-open method of treatment was used: sanitation and drainage of the abdominal cavity with continuous peritoneal lavage, and staged relaparotomy according to indications. In the group 2, video laparoscopic sanitation and drainage of the abdominal cavity on demand were applied. In this group, with the Mannheim Peritonitis Index below 15 points, drainage was not performed. With the Mannheim index below 20 points, 1–2 drains were installed, when above 25 points — 3–4 drains. Postoperative complications in patients of the group 1 were found in 40.9%. In the group 2, there were fewer complications compared the group 1. This was due not only to fewer local complications, but also intra-abdominal complications, which were almost 2 times fewer. Thus, video laparoscopic sanitation is the method of choice for planned repeated sanitation of the abdominal cavity. Relaparotomy should be performed only with strict indications in the event of intra-abdominal complications and if video laparoscopic sanitation cannot be performed. Ultrasound monitoring in the post-operative period makes it possible to timely identify postoperative complications, differentiate their nature and exact localization.

KEYWORDS — diffuse peritonitis, video laparoscopic sanitation, intra-abdominal complications, relaparotomy, relaparoscopy.

INTRODUCTION

Despite the progress achieved in early diagnosis and modern methods of treating surgical diseases, the problem of treating peritonitis and its complications remains unresolved. The introduction in hospitals of ultrasound examination (US), computed tomography, methods of endoscopic and laparoscopic surgery, robot-assisted operations, precision surgery techniques, as well as new methods of anesthesiology, intensive therapy and detoxification did not lead to a significant decrease in complications, and hence to a progress in the treatment of diffuse peritonitis [1, 2].

Pathophysiological changes in diffuse peritonitis are characterized by excessive release of inflammatory mediators into the bloodstream, which is accompanied by widespread and long-term impairment of tissue perfusion in all organs and tissues and the formation of multiple organ dysfunction syndrome [3, 4]. According to a number of authors, one of the leading factors in DP is the formation of an enteric insufficiency syndrome with subsequent portal bacterial translocation and the formation of abdominal sepsis [5, 6, 7].

This is evidenced by the unsatisfactory results of diffuse peritonitis treatment. So, according to the literature, mortality in diffuse peritonitis ranges from 30 to 45% and increases with its purulent form up to 80% in the case of the development of abdominal septic shock and multiple organ failure syndrome. The incidence of postoperative complications, in particular, abdominal abscess is from 25 to 90%, of pneumonia — 15–32%, of external intestinal fistula — 5–13% [8, 9].

The priority in the complex treatment of diffuse peritonitis is the sanitation and drainage of the abdominal cavity. The severity of the pathological process and the need for repeated sanitation of the abdominal cavity directly depend on the quality of the primary sanitation and drainage. The surgeons'views about the choice of the least traumatic and technically simple way to eliminate the source of peritonitis are also contradictory [10, 11].

Purpose of the study:

To analyze the features of the course and outcome in patients with diffuse peritonitis, depending on the methods of repeated sanitation and drainage of the abdominal cavity and ultrasound monitoring.

MATERIALS AND METHODS

The study included 102 patients aged from 53 to 81 years with diagnosed with diffuse peritonitis. There were 64 (62.7%) women and 38 (37.3%) men. All patients were divided into 2 groups depending on the method of treatment with randomization according to the extent and phase of peritonitis (sepsis, severe sepsis, infectious toxic (septic) shock), as well as the characteristics of the exudate in the abdominal cavity.

The group 1 included 44 patients who underwent a semi-open method of treatment — sanitation and Petrov'sdrainage of the abdominal cavity with continuous peritoneal lavage, and staged relaparotomy (RL) according to indications. A solution of Chlorhexedine, Ringer and Novocaine was used for the abdominal cavitylavage. In this group, the causes of peritonitis had been: acute appendicitis in 18 (40.9%) patients, acute cholecystitis in 17 (38.6%), perforated gastric and / or duodenal ulcer in 6 (13.6%), acute colonic obstruction in 2 (4.6%), abdominal trauma with damage to the colon in 1 patient (2.3%). Serous-fibrinous exudate was detected in 31 (70.5%) patients, fibrinous-purulent and purulent — in 19 (29.5%) patients, respectively.

Group 2 included 58 patients who underwent video laparoscopic sanitation and drainage of the abdominal cavity on demand. The differentiated approach to the number of drains depended on the source of peritonitis and the calculation of the Mannheim Peritonitis Index.

In 7 (12%) patients with the Mannheim Peritonitis Index below 15 points, during the primary operation after thorough sanitation of the abdominal cavity, no drainage was performed. In this subgroup of patients, the cause of peritonitis had been acute cholecystitis or perforated gastric and / or duodenal ulcer. The exudate revealed during the operation was serous-fibrinous. If the Mannheim index was below 20 points, 1–2 drainages were installed, when above 25 points — 3–4 drainages, especially with purulent exudate. Early enteral nutrition was started on days 2–3 of the postoperative period with the appearance of peristalsis, intestinal noise, and decreased discharge from the intestinal tube. The mixtures used for enteral nutrition (Nutritek, NutrienOsteo, Nutrien Immune) were administered through a naso-jejunal tube inserted along the Treitz ligament during the surgery.

In the group 2, the causes of peritonitis were acute appendicitis in 21 (36.2%), acute cholecystitis in 16 (27.6%), perforated gastric or duodenal ulcer in 9 (15.5%), abdominal trauma with damage to the large intestines in 7 (12%) and acute intestinal obstruction in 5 (8.7%) patients. The serous-fibrinous exudate was detected in 34 (58.6%), and fibrinous-purulent and purulent in 24 (41.4%) patients, respectively.

More than half of the patients sought help after 24 hours from the onset of the disease — 59 (57.8%). Within a period from 12 to 24 hours from the moment of the disease, 28 (27.5%) were hospitalized, the remaining 15 (14.7%) patients came to the hospital within 6 after the onset of the disease.

Among concomitant diseases, diseases of the cardiovascular system were in the lead, in particular, hypertension and ischemic heart disease in 68 patients (66.7%). Chronic non-specific lung diseasesranked second: chronic obstructive pulmonary disease and bronchial asthma in 18 (17.7%). Diseases of the genitourinary system (chronic pyelonephritis, prostate adenoma, urolithiasis) had been diagnosed in 12 (11.8%) patients. Diabetes mellitus, obesity, diffuse toxic goiter had been detected in 15 (14.7%) patients. Gynecological diseases had been detected in every fifth patient among all 64 women, most often being detected uterine fibroids, genital prolapse, chronic inflammatory diseases of the pelvic organs.

All patients were assessed for the functional state of organs and systems using the SO-FA scale. The assessment of the severity of the patient's condition, as well as the prognosis, was assessed by the Mannheim Peritonitis Index. The Mannheim Peritonitis Index in group 1 averaged 25.2 points, in group 2 — 24.9 points.

All patients were examined according to protocols using standard laboratory biochemical methods. The fundamental methods in the diagnosis of peritonitis were: plain radiography and ultrasound of the abdominal organs. For differential diagnosis, esophagogastroduodenoscopy and laparoscopy were also used.

Preoperative preparation included correction of volemic disorders, imbalance of protein-electrolyte deficiency, therapy of concomitant diseases. All patients underwent emergency surgery according to the standard principles of peritonitis treatment.

In the postoperative period, ultrasound of the abdominal organs was performed in order to identify possible local purulent-septic complications. Monitoring was performed on days 1, 3 and 5 of the postoperative period.

The effectiveness of therapy was assessed by the normalization of clinical and biochemical parameters, protein, lipid, water-electrolyte and carbohydrate metabolism, the level of medium molecular weight peptides, leukocytic index of intoxication (LII) and improve-ment of the patient's condition.

Statistical data processing was carried out using Statistica 8.0 software packages. The statistical significance of the differences was determined using the Student's test. The critical level of significance when testing statistical hypotheses was taken equal to $p < 0.05$

RESULTS AND DISCUSSION

Upon admission to the hospital, patients complained of acute or dull abdominal pain, nausea and vomiting that did not bring relief, and a slight increase in body temperature. Patients hospitalized later than 24 hours from the moment of the disease onset also

reported complaints of stool and gas retention. When the cause of peritonitis was a perforated gastric and / or duodenal ulcer, complaints characteristic of peptic ulcer disease were detected anam-nestically. Patients with abdominal trauma indicated when asked about a blow to the abdomen on the eve of hospitalization. The tension of the anterior abdominal wall with positive symptoms of peritoneal irritation was objectively determined in all observed patients.

The calculation of the Mannheim Peritonitis Index showed that both in groups 1 and 2 peritonitis of the 2nd degree of severity prevailed (20–30 points).

Abdominal sepsis was detected in 8 (18.2%) patients in group 1 and in 13 (22.4%)patients in group 2. Septic shock was diagnosed in 5 (11.3%) patients in group 1 and 7 (12.1%)patients in group 2. Multiple organ failure according to the SOFA scale was found in the majority of patients.

A comparative analysis of indicators of endogenous intoxication in patients of group 1 and group 2 is presented in Table 1.

As you can see from the presented table, the level of medium molecular weight peptides in the groups did not differ significantly on the day of hospitalization and on the day 5. LII in patients of both groups slightly increased after surgery, but by the end of the first week it did not differ from the normal values.

In patients with the third degree peritonitis by the Mannheim index (above 30 points), an increase in triglycerides was noted, however, by the end of the second week after surgery, the values of the latter approached the norm.

An ultrasound of the abdominal organs upon admission made it possible to determine not only the presence of free fluid in the abdominal cavity, but also the thickening of the intestinal wall, expansion of the small intestine (diameter and thickness). Thus, the diameter of the small intestine varied from 28.5±3.6 to 57.3 ± 4.4 mm, the thickness — from 3.7±0.4 to 6.3±0.5 mm. The wall of the small intestine was layered and inhomogeneous. After elimination of the focus of peritonitis and sanitation of the abdominal cavity, the changes described above disappeared by the end of the first week.

In the case of diffuse peritonitis progression, in addition to free fluid in the abdominal cavity, anechoic areas in 2 or more anatomical areas were also determined. After 48–72 hours, anechoic areas were determined already in all parts of the abdominal cavity. Inflammatory infiltration was defined as foci of increased echogenicity without a fluid component; if abscesses were formed, anechoic or heterogeneous non-pulsating fluid formations were visualized. In such cases, sanitation of the abdominal cavity is indicated.

Postoperative complications of both groups are presented in Table 2.

Analyzing the incidence of postoperative complications in patients of the group 1, we found that 18 (40.9%) patients with intra-abdominal complications required relaparotomy. Moreover, in 11 of them, relaparotomy was performed once, in 5 patients — twice, in 2 — three times. The need for sanitation was confirmed by abdominal ultrasound. A favorable picture of abdominal ultrasound (a decrease in the thickness of the intestinal wall, an increase in its echogenicity, restoration of intestinal motility) indicated that there was no need for subsequent sanitation.

10 (17.2%) patients of the group 2 with intra-abdominal complications underwent video laparoscopic sanitation by the flow-aspiration method. Sanitation and drainage of subhepatic and subphrenic abscesses was performed in 5 cases. In the remaining patients, sanitation was the final method in the progression of peritonitis. In 4 cases, the formation of an adhesive process and intestinal paresis (significant expansion) required a conversion and a relaparotomy.

In the group 2, there were fewer complications compared to the group 1. This was due not only to less local complications of 12 (27.3%) wound suppurations in the group 1 versus 10 (17.3%) in the group 2, but also intra-abdominal complications, which were almost 2 times less in the group 2. Among 7 patients of the group 2, who did not have drainage, only 2 got postoperative wound suppuration. However, due to

Table 1. *Indicators of endogenous intoxication*

Indicator	Group 1	Group 2	p
Medium molecular weight peptides on the day of hospitalization (ODU)	0,495 ± 0,023	0,509 ± 0,013	p>0,05
Medium molecular weight peptides on the day 5 (ODU)	0,398 ± 0,023	0,339 ± 0,029	p<0,05
LII on the day of hospitalization	8,79 ± 0,81	8,25 ± 0,66	p>0,05
LII on the day 5	8,81 ± 0,63	8,79 ± 0,62	p>0,05

Table 2. Postoperative complications

Complication	Quantity in absolute values	
	Group 1	Group 2
Suppuration of the wound	12	10
Anastomotic leakage	4	3
Abdominal abscess (intrafilar, subphrenic, subhepatic)	6	5
External intestinal fistula	2	-
Eventration	2	1
Early adhesive intestinal obstruction	3	1
Small intestine stress ulcers	5	7
Pulmonary thromboembolism	4	5
Myocardial infarction	3	2
Acute cardiopulmonary failure	8	4
Total	49	38

the low frequency of observations, it is not possible to draw conclusions regarding the possible refusal of drainage during the operation.

The high incidence of common complications in both groups once again confirms the literature data on unresolved issues in the treatment of peritonitis [12, 13]. Thus, the progression of cardiopulmonary failure occurred both after planned sanitation and after relaparotomy. In the early postoperative period, 21 people died: 13 (29.5%) people from the group 1 and 8 (13.8%) people from the group 2. In all cases, the causes of death were progression of multiple organ failure syndrome, myocardial infarction, and pulmonary thromboembolism.

CONCLUSION

1) Video laparoscopic sanitation is the method of choice for planned repeated sanitation of the abdominal cavity. Relaparotomy for diffuse peritonitis should be performed only with strict indications in the event of intra-abdominal complications and if it is impossible to perform video laparoscopic sanitation.

2) Ultrasound monitoring in the postoperative period makes it possible to timely identify postoperative complications, differentiate their nature and exact localization.

3) The proposed complex of therapeutic and prophylactic measures helped to reduce complications and mortality in patients with diffuse peritonitis.

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