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RESEARCH ARTICLE

INNOVATIVE APPROACHES TO THE PREVENTION OF ABDOMINAL ADHESIONS

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Abstract: It is known that modern surgery of adhesions should combine minimally invasive technologies, the use of agents that create a protective layer on the damaged areas of the peritoneum, the use of drug forms that activate the processes of mesothelial repair. This is already a mandatory attribute of operations and the will of today's requirements. In this report, we tried to reflect the technical issues of the use of the anti-adhesion membrane as a prophylactic agent in patients in abdominal surgery. We used this innovative drug in 18 patients with adhesive intestinal obstruction and with the possibility of its use in traditional and laparoscopic surgery.

Key words: Abdominal surgery, adhesive intestinal obstruction, anti-adhesion membrane agents.

INTRODUCTION

In modern abdominal surgery, the problem of the formation of postoperative adhesions of the abdominal cavity does not lose its relevance [1].

Despite the intensive development of minimally invasive technologies, starting from the second half of the 20th century, which marked the beginning of a new era of abdominal surgery, when with the help of high-tech equipment it was possible to significantly reduce the trauma of surgical interventions, the number of immediate and long-term complications caused by the adhesion process does not decrease [2].

About 1% of all hospitalizations in surgical hospitals and 3% of laparotomies are caused by abdominal adhesions and its complications [3].

The incidence of adhesions varies from 67 to 93% after abdominal surgery and is almost 97% after open gynecological interventions [4].

The proportion of acute adhesive intestinal obstruction is 87.6% in the structure of ileus, which is explained by the constantly growing number of surgical interventions on the abdominal organs. At the same time, surgical diseases and complications caused by adhesions can occur in the immediate postoperative period [5].

According to summary data, the incidence of early adhesive intestinal obstruction varies widely - from 12% to 27% [6].

Adhesive intestinal obstruction prevails in pediatric practice, 8% of newborns who have undergone intervention on the abdominal organs subsequently undergo

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laparotomies for adhesive intestinal obstruction [7].

The average hospital stay of patients after adhesiolysis performed by laparotomy access is an average of 20 days. The mortality rate reaches 7.0-18.0%, and in the early form of postoperative adhesive obstruction - 19.5-50.0%. The problem of adhesive intestinal obstruction worsens with increasing age of patients, depending on the number and type of laparotomies undertaken. At the same time, the number of episodes of acute adhesive intestinal obstruction correlates with the risk of recurrence [8].

More than 440,000 surgical interventions for abdominal adhesions are performed annually in the United States, the cost of staying in the hospital for this category of patients exceeds $ 1.2 billion [9].

Performing operations in patients who have previously undergone laparotomy is accompanied by a high risk of iatrogenia. Adhesiolysis increases the time of surgery, anesthesia, and is also associated with greater blood loss, damage to hollow organs, which can lead to the formation of external fistulas, or to resection of the damaged area of the intestine [10].

The mortality rate of patients with adhesive intestinal obstruction accompanied by strangulation and gangrene ranges from 6% to 8% after various surgical interventions [11].

Prevention and treatment of postoperative adhesions is a very difficult task, which is primarily due to the lack of optimal methods for their prevention. Until now, there is a tendency to adhere to conservative tactics for the treatment of adhesions. With conservative relief of the phenomena of acute adhesive obstruction, most patients are discharged, and planned surgical treatment is considered unpromising. This is due to the fact that the operation brings a temporary effect and does not save the patient from the next formation of adhesions and the possibility of developing intestinal obstruction [12].

Minimally invasive technologies for the surgical treatment of various forms of adhesions of the abdominal cavity are in themselves pathogenetically substantiated ways to prevent the recurrence of adhesions. A radical reduction in the peritoneal injury area leads to a decrease in the qualitative and quantitative indicators of the adhesive process [13].

In laparoscopic adhesiolysis of the few adhesions that form the adhesion process of I-II degrees, performed to provide access for the purpose of the main intervention, for example, laparoscopic cholecystectomy, as a rule, there is no need to use barrier agents and other anti-adhesion measures [14].

However, extensive defects on the parietal peritoneum, formed after dissection of any planar or membranous viscero-parietal adhesions that form an adhesion process of III-IV degree, act as a favorable zone for the recurrence of the disease. In some situations, it is necessary to separate the loop of the small intestine from the anterior abdominal wall along with a section of the parietal peritoneum in order to avoid opening its lumen [15].

Therefore, modern surgery of adhesions should combine minimally invasive technologies, the use of agents that create a protective layer on the damaged areas of the peritoneum, the use of drug forms that activate the processes of mesothelium repair.

METHODS

For the physical separation of the visceral and parietal sheets of the peritoneum during reperitonization, we used

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«Interceed» (TC7) in 18 patients with adhesive intestinal obstruction.

The material used is a sterile absorbable colorless synthetic mesh made by controlled oxidation of regenerated cellulose.

ETHICON, the manufacturer of «Interceed», has developed this adhesive barrier agent for the prevention of adhesions in operative gynecology. Its high efficacy and safety have been confirmed by numerous studies by scientists from the world's leading gynecological clinics.

RESULTS AND DISCUSSION

«Interceed» is available in two sizes: 3.8 x 5.1 cm and 7.6 x 10.2 cm in sterile foil packages. After thorough hemostasis, the barrier agent in a dry state is applied to the injured serous surfaces of the pelvic organs. After 8 hours, the mesh becomes jelly-like, after 24 hours it is not identified. If the implantation rules are followed, «Interceed» is absorbed from the implantation site within 4 weeks. The absorption rate is directly dependent on the amount of material used and the size of the implantation site.

Despite the fact that «Interceed» does not increase the growth of bacteria, in the presence of a pronounced bacterial contamination of the abdominal cavity, its use is contraindicated. In situations where complete hemostasis is not achieved, the application of an adhesive barrier agent is also not allowed.

Only one layer of «Interceed» should be used, as multilayering does not improve its performance and can affect the absorption rate. To optimize the effect of the anti-adhesion barrier agent, it is necessary to use high-precision microsurgical instruments and high-quality suture materials, minimize the contact of the mesh with the tissues before application, prevent dehydration of the peritoneum and the ingress of foreign bodies.

Since «Interceed» adheres well to the serous membranes, its additional fixation is not required, and moisturizing the mesh after application ensures reliable contact with the application area. In any situation, it is necessary to keep «Interceed» until guaranteed fixation to the defect of the serous membrane. In order to avoid displacement of the barrier agent, all manipulations with it are carried out immediately before closing the wound.

When performing the laparoscopic application «Interceed», we faced a number of technical problems related to both the features of the surgical method and its morphometric properties.

The first problem was the introduction of material into the abdominal cavity. At the same time, the «Interceed» was supposed to remain dry and retain its structure. After considering several options, we came to the following method. After opening the sterile package, having previously changed the gloves, the mesh was taken by the corner with an endoscopic clamp with a working part diameter of 5 millimeters and wound it around the instrument with crimping movements.

After drying the inner surface of the trocar with a working diameter of 10 millimeters, without an adapter, with the valve open, the clamp with «Interceed» was inserted into the abdominal cavity.

The second problem was the return of the barrier means to an expanded form. Attempts to hold the free edge of the mesh with another clamp and the rotating movements of the first clamp to unfold the material sometimes led to its traction breaks. Therefore, in some cases, we had to fix the free edge of «Interceed» to the parietal peritoneum with clips in 2-3 places,

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simultaneously pressing it with an additional manipulator.

The third problem was that during the «Interceed» application, the unfolding movements of the clamp dislocated the barrier agent in the horizontal plane, which was caused by angular rotation. It was necessary to hold the central part of the mesh with an additional manipulator, which in some situations led to its partial perforation.

The fourth problem was related to the removal of endoscopic instruments from the surface of the «Interceed» fixed to the parietal peritoneum. The high hygroscopicity of the adhesive barrier agent led to rapid impregnation with peritoneal fluid and moderate adhesion to the working part of the manipulators, which was sufficient to displace part of the material from the serous cover when the instruments were removed. The return of a part of the dislocated mesh was carried out by sliding movements of endoscopic clamps in the horizontal plane.

All manipulations in solving the problems that arose caused significant difficulties associated with the directions of endoscopic movements: from bottom to top and along the curve of the anterior abdominal wall formed by the pneumoperitoneum. During the operation, we had to repeatedly change the position of the monitor and assistants, and the operating surgeon himself, as well as the position of the operating table, which adversely affected the implementation of the «Interceed» application process.

Even minimal movements of endoscopic instruments holding the adhesive barrier agent led to partial violations of its fixation to the parietal peritoneum and, accordingly, forced repeated manipulations. In some situations, we had to install up to 2 additional trocars to prevent the «Interceed» from being soaked in blood. All this affected the increase in the time of the operation, the area of the injured peritoneum, which questioned the compliance of the performed manipulations with the necessary level of prevention of adhesions.

Subsequently, with the «Interceed» application, a special manipulator is used to solve the above problems.

The use of this laparoscopic manipulator made it possible to eliminate the following technical problems: injection of «Interceed» into the abdominal cavity in a dry state; return of the mesh to an expanded, ready-to-use state; Bringing the adhesive barrier agent to the application area with one tool.

In the presence of extensive defects on the parietal peritoneum, up to four «Interceed» membranes were used, while attachment to the abdominal wall was carried out using a laparoscopic herniostapler.

The obvious disadvantage of «Interceed», first of all, is the limited area of the separated surfaces, i.e. the zone of anti-adhesion action is equal to the area of the membrane used.

With the advent of liquid and gel-like anti-adhesive barrier agents on the pharmaceutical market, the indications for further use of «Interceed» in abdominal surgery have significantly narrowed [16].

Recently, many scientists have been inclined to the advantage of using viscous bioinert barrier agents due to the ability of the gel to separate deserosial surfaces for the time required for remezetoilization. In addition, the following advantages of gel-like agents are noted: a significantly longer exposure time compared to colloidal and crystalloid solutions, as well as the absence of a local tissue reaction like a reaction to a foreign body at the site of implantation of a solid anti-adhesive barrier agent.

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Analysis of the data of domestic and foreign literature allows us to conclude that the problem of diagnosis, surgical treatment, and most importantly - prevention of adhesions of the abdominal cavity remains relevant. Some tactical and technical issues of preoperative diagnostics of the degree of severity of the adhesion process have not been finally resolved; Issues of combining methods of traditional and minimally invasive surgery in the treatment of adhesions of the abdominal cavity, taking into account the use of anti-adhesion barrier agents [6-18].

There are also no data in the literature on staged combined laparotomy and laparoscopic surgical treatment of abdominal adhesions with the use of anti-adhesion barrier agents.

Modern pathogenetic approaches to the surgical treatment of adhesions require not only various surgical interventions, but also the use of reasonable methods to prevent the recurrence of interorgan adhesions, in accordance with which there is a need to continue scientific and practical developments in this direction.

CONCLUSION

The use of the anti-adhesive barrier agent «Interceed» in laparoscopic adhesiolysis is associated with a number of technical problems, which leads to an increase in the anesthesia time and duration of the intervention. The use of a special manipulator, which is not included in the manufacturer's delivery set, increases the cost of the procedure.

Ethics approval and consent to participate - All patients gave written informed consent to participate in the study.

Consent for publication - The study is valid, and recognition by the organization is not required. The author agrees to open publication

Availability of data and material - Available

Competing interests - No

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Conflict of interests-The authors declare that there is no conflict of interest.

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