Review

Rehabilitation and sequellae of complications in oncological surgery

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ABSTRACT

The approach to malignant diseases re-emphasizes the need for a team, multidisciplinary approach to patients with cancer. Knowledge of the basic surgical principles of potentially curative resection, with all its technical details and anatomical and pathophysiological features, is therefore crucial in the treatment of these patients. Primarily, such multidisciplinary cooperation comes to the fore when planning radical and palliative procedures for advanced cancer. In addition, postoperative follow-up of operated patients requires the knowledge of some important elements of surgery on other organs to timely detect possible complications and the most successful postoperative treatment in general.

KEYWORDS: surgery; complications; occupational medicine; rehabilitation

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INTRODUCTION

Malignant gynecological tumors (carcinoma of the trunk and cervix and ovarian cancer) can spread and infiltrate certain segments of the small and large intestine. Such infiltration, of course, represents the penetration of a malignant process into another anatomical system, and requires compliance with all oncological and surgical principles of treatment of tumors in the anatomical region. Thus, for example, when spreading gynecological tumors to the rectum due to the principle of "en block" resection, potentially curative procedures must resect the affected segment of the intestine to a healthy, but at the same time respecting the lymphadenectomy of the infiltrated area, whenever possible.

This approach to malignant diseases re-emphasizes the need for a team, multidisciplinary approach to patients with gynecological cancer. Knowledge of the basic surgical principles of resection of the colon and rectum, with all its technical details and anatomical and pathophysiological features is therefore crucial in the treatment of these patients. Primarily, such multidisciplinary cooperation comes to the fore when planning radical and palliative procedures due to advanced gynecological cancer. In addition, postoperative follow-up of operated patients requires knowledge of some important elements of surgery on other organs to timely detect possible complications and the most successful postoperative treatment in general.

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INTESTINAL ANASTOMOSIS

After resection of parts of the intestine due to tumor infiltration, the ends of the intestine can be joined by anastomosis, which can be created manually or, in low tumors of the hindgut, using automatic sutures (staplers) which greatly facilitate anastomosis.

Exceptionally, in cases when due to poor blood circulation or tension, the healing of the intestinal joint - anastomosis - is endangered, it is created on the anterior abdominal wall, the so-called a temporary, protective ileostomy i.e., a curvature of the terminal ileum is performed on the skin like a bipolar stoma. In this way, the passage of intestinal contents into the large intestine is prevented, which protects the anastomosis. In the second act, the ends of the small intestine (re-anastomosis) are surgically reconnected.

Unfortunately, in extremely low-lying tumors of the hindgut, it is sometimes necessary, to achieve oncological radicalism, to remove the entire hindgut together with the anus, and create a definite anus on the anterior abdominal wall.

Intestinal anastomoses must heal "per primam". Healing ability depends on general and local factors. Malnutrition, hypoalbuminemia, diabetes, radiation, shock, increased blood loss, and unprepared or poorly prepared bowel are risk factors for anastomotic dehiscence. It is necessary to maintain an adequate blood supply to the ends of the intestine by preserving the arcade of blood vessels and avoiding excessive removal of tissue from the edges of the intestine (it is not recommended to strip the intestine more than 7-8 millimeters from the resection edge). Column anastomoses can be created manually or using automatic sutures. In distal, colorectal or coloanal anastomoses, the use of circular automatic sutures (CEEA) has significantly facilitated the creation of anastomoses. Nevertheless, there are reports of complications in terms of impaired anal function with decreased anal pressure at rest and at maximal voluntary contraction after the use of automatic sutures in sigmoid colon resections and colorectal anastomoses, i.e., without nerve damage. Ileal reservoirs are also easier to create using GIA automatic stitches.

Anatomical dehiscence is a major problem in colorectal surgery. Of particular importance is the colorectal anastomosis. The incidence of dehiscence anastomosis according to some studies is around 14% for those under 70 and 16% in the older age group (1). According to Wheler's study, 16.2% of patients had radiologically verified anastomotic insufficiency, and 4.9% of patients had clinical signs of dehiscence (2). The use of transrectal decompression has been shown to be effective in elective colon resections and colorectal anastomoses. According to the conducted research, none of the patients with dehiscence of colorectal anastomosis died from the consequences of dehiscence. The use of such transrectal decompression can avoid the need to create an ileostomy or colostomy, and thus all dental complications, as well as the need for reoperation due to re-anastomosis. In cases of emergency surgery with peritonitis present, there is, of course, no indication for transrectal decompression (3).

Adequate blood supply to the edges of the anastomosis is clearly necessary for successful healing. Another possible cause of dehiscence of the anastomosis is the possibility of the formation of microthrombi, which interfere with the normal healing of the anastomosis. Patients with anastomotic dehiscence have been shown to have coagulation disorders with signs of systemic coagulation activation prior to anastomotic dehiscence. Also, although the duration of surgery and blood loss were approximately the same in patients with and without consequent dehiscence, the incidence of anastomotic dehiscence was higher in patients who received perioperative blood transfusions (4).

It is also unusually important to avoid any tension of the anastomosis. For this purpose, it is necessary to mobilize the left flexure of the colon during resections of the sigmoid colon with colorectal anastomosis to achieve adequate bowel length and avoid any tension. On that occasion, injury to the spleen is possible, either by tearing the capsule on the lower pole due to the withdrawal of the omentum or by damaging the structures of the hilus. Spleen injury occurs in 0.8% of colorectal surgeries. Bleeding from the spleen needs to be stopped, which usually succeeds with a collagen mesh. Splenectomy should be performed only when bleeding cannot be stopped otherwise, and then it is possible to perform partial splenectomy by selective ligation of appropriate blood vessels (for the upper pole, or branches for the lower pole of the spleen). It has been shown in animal models that the preservation of at least 50% of spleen tissue is necessary to maintain the immune role of the spleen, without which the incidence of bacterial sepsis caused by pneumococcus, Hemophilus, meningococcus, streptococcus or staphylococcus (5).

Dehiscence of the anastomosis is cited as a prognostic factor for the development of recurrence of colorectal cancer. Patients with dehiscence anastomosis have a significantly higher rate of local

recurrence (17.2%) than patients without dehiscence anastomosis (8.6%). However, no statistically significant effect of anastomotic dehiscence on overall colorectal cancer survival rate has been demonstrated (6).

Early detection of anastomotic dehiscence is crucial for adequate intervention in terms of preventing the development of peritonitis. Studies have shown that the concentration of endotoxin in the contents of the drain, and the total daily secretion of endotoxin is higher in patients who will develop dehiscence anastomosis. While clinical indications of anastomotic dehiscence occur around the seventh day after surgery, elevated endotoxin levels were measured as early as the third postoperative day (7).

The recommended treatment for clinically evident anastomotic dehiscence must be directed toward dissection of the anastomosis, with the proximal end as a colostomy or ileostomy, and the distal end as a mucosal fistula. In situations where a strong inflammatory reaction does not allow safe manipulation of the anastomosis, a proximal ileostomy may be performed with drainage placed next to the anastomosis. It is by no means advisable to repair an anastomosis or perform re-anastomosis in such situations (8).

URETHRAL INJURY

Urethral injury is possible especially in cases with extensive adhesions, inflammatory changes, or radiation exposure. Only about 20% - 30% of ureteral injuries are found during surgery, and shoulder detection of ureteral injuries and adequate reconstruction is crucial for normal healing and avoidance of consequent deterioration of the associated kidney. In colon surgery, left ureter injury is somewhat more common. Situations in which ureteral injury is possible are ligation of the inferior mesenteric artery, promontory procedures, excision of the lateral mesorectum during proctocolectomy, and retroperitonealization. If ureteral injury is suspected, methylene blue may be administered intravenously, and a blue color will indicate the site of injury. It is best to introduce ureteral catheters ("double J") in cases where the presence of large malignant processes, the presence of inflammatory processes or radiation has been determined preoperatively, which enables easier identification of the ureter during surgery. If ureteral injury occurs and is recognized during surgery, ureteral reconstruction should be performed with thin resorbable sutures. In all cases where the ureter is completely cut, and in most partial ureteral incisions, a ureteral catheter ("double-J") should be placed. Ureteral reimplantation is often the best solution. The site of injury should be drained retroperitoneally. If the injury is recognized after a few days, or it is impossible to perform reconstruction immediately due to the patient's poor condition, proximal urinary stoma should be performed, which is easiest to do percutaneously by introducing an ultrasound-controlled nephrostomy catheter (5).

POSTOPERATIVE ILEUS OF THE SMALL INTESTINE

Postoperative ileus is most pronounced in the left colon. The time and order of restoration of bowel function does not depend on the size and duration of surgery. Postoperative ileus lasting more than a week can be the result of too deep anesthesia, fluid and electrolyte imbalance, intra-abdominal abscesses and peritonitis, and mechanical obstruction of the small intestine. Mechanical obstruction of the small intestine can occur after each opening of the abdominal cavity, especially in operations in the area below the transverse mesocolon. The causes of postoperative small bowel obstruction are adhesions in 61%, phlegmon in 31%, abscess in 4% and intussusception in 4% of patients. The incidence of postoperative small bowel obstruction occurring within 30 days of surgery (early obstruction) according to some authors is 1.5% after right hemicolectomy and 3% after left hemicolectomy. Almost 90% of small bowel obstruction manifests itself two weeks after surgery.

Distinguishing between postoperative small bowel obstruction and functional postoperative ileus can be very difficult. A patient with small bowel obstruction cannot tolerate the removal of the nasogastric tube, or bloating, nausea, and vomiting occur after an established oral liquid or porridge diet, which, along with abdominal pain, are typical symptoms of obstruction. X-ray processing reveals meteoric meanders of the small intestine with or without levels and a proportionally smaller amount of air in the large intestine depending on the degree of obstruction. Barium contrast tests give an accurate diagnosis in only 73% of patients. Treatment of postoperative small bowel obstruction consists of placing a nasogastric tube and fluid and electrolyte replacement. Regular X-ray control of the abdomen and monitoring of clinical and laboratory parameters is required. According to Pickleman and Lee, nasogastric suction is a safe way to treat small bowel obstruction in about 77% of patients. Of the total number of patients cured by nasogastric

suction, cure occurred in 70% of patients in the first week of treatment (5).

Surgical treatment of postoperative small bowel obstruction is indicated based on clinical indicators of lack of improvement on conservative therapy and if bowel strangulation is suspected. Several clinical parameters can be used to assess the need for surgical intervention due to suspected strangulation. These are continuous abdominal pain, localization of pain, blood in the stool, duration of symptoms, time elapsed since the last stool, fever, leukocytosis above 10,000 and tachycardia, and the presence of intestinal mesentery distension. According to the findings of a prospective study by Sarr et al., None of these parameters showed a sensitivity greater than 52%, either alone or in combination with other parameters. Laboratory indicators of acidosis and CPK increase had a predictive value of 75% in that study. It can be concluded that the diagnosis of strangulation as a cause of postoperative small bowel obstruction is difficult. According to Sarr et al., Even experienced clinicians make an accurate diagnosis in only 48% of cases.

POSTOPERATIVE INTESTINAL PARESIS

Postoperative intestinal paresis is a major problem after abdominal and especially colorectal surgery and significantly prolongs the patient's recovery, duration of hospitalization and risk of complications, primarily pneumonia, atelectasis and thromboembolic incidents caused by prolonged lying down, reduced mobility and impaired breathing due to abdominal distension.

Postoperative ileus is defined as the absence or disturbance of gastrointestinal motility after surgery and is characterized by abdominal distension, absence of audible peristalsis, accumulation of fluid and gases in the intestine and delayed onset of defecation after surgery.

Postoperative bowel paresis is considered unavoidable after laparotomy or other surgical procedures in the abdomen. In addition to the above, prolonged postoperative intestinal paresis delays the onset of oral (enteral) diet, which has been shown to strengthen the function of the immune system and reduce the risk of infectious complications.

Postoperative paresis affects all parts of the digestive tract. Normal activity of certain parts of the digestive tract is established at different times after surgery. The function of the small intestine recovers at the earliest, as early as 4 to 8 hours after the procedure. Gastric function is established 24 to 48 hours after surgery while the posterior colon recovers its function with the establishment of normal peristalsis 48 to 72 hours after surgery (5).

Nervous reflexes mediated by the sympathetic nervous system are thought to be one of the major factors responsible for postoperative intestinal paresis. Efferent nerve impulses from sympathetic centers in the spinal cord result in inhibition of coordinated propulsive bowel contractility. Furthermore, surgical trauma to release several inflammatory mediators (cytokines) that also negatively affect the contractile ability of the intestine. Finally, opiate administration in the postoperative course also causes intestinal paresis, with an increase in the amplitude of tonic contractions of the colon and a decrease in the amplitudes of propulsive contractions. In this way, the use of opiates supports postoperative intestinal paresis, which is at least partly conditioned by the secretion of endogenous opiates from the central nervous system because of surgical trauma.

Therefore, an important factor in the treatment of postoperative intestinal paresis is the use of non-steroidal analgesics instead of opiate analgesics, and the use of epidural (peridural) anesthesia. The use of epidural anesthesia not only eliminates painful stimuli that activate the sympathetic nervous system to support intestinal paresis, but by blocking sympathetic centers in the spinal cord reduce (eliminate) the impact of the sympathetic nervous system on the intestine, and the effect on the vascular system a prerequisite for good healing of the anastomosis and reduction of the risk of dehiscence.

Early mobilization of patients also accelerates the establishment of normal digestive tract function. In contrast, nasogastric suction has no significant effect on the rate of restoration of normal digestive tract function and is thought to be able to even support intestinal paresis. The results of a large meta-study with over 30 studies suggest that nasogastric suction has no place as a routine method of preventing postoperative intestinal paresis. With the reduction of operative trauma, and the consequent reduced secretion of proinflammatory cytokines, minimally invasive techniques (laparoscopic resections) are associated with faster recovery of digestive function. Also, early enteral nutrition promotes faster establishment of normal functioning of the digestive tract, through local reflexes caused by intestinal wall distension leading to relaxation of the intestinal segment distal to the food bolus with simultaneous peristatic

contraction of the proximal segment leading to food bolus compression.

LAPAROTOMY WOUND INFECTION

The incidence of abdominal wound infections was significantly reduced by the introduction of preoperative bowel cleansing and prophylactic administration of antibiotics. Without preoperative administration of antibiotics, the incidence of surgical wound infections is 30% - 60%. Using antibiotic prophylaxis, the incidence of infection was reduced to 9% - 18%. Keighley et al investigated the benefits of parenteral over oral administration of antibiotics. According to their findings, the incidence of infection is 36% after oral administration and 6.5% after parenteral antibiotics. However, these findings have not been confirmed in all studies, and according to some authors there are no differences in the incidence of surgical wound infection with respect to the route of antibiotic administration. Playforth et al found a significantly lower incidence of infections after combined oral and parenteral antibiotics (14%) than after parenteral administration alone (28%). A study by Solle and Rothenberger among colorectal surgeons in the United States and Canada found that in 88% of cases, a mechanical bowel preparation technique was used with a combination of oral and parenteral antibiotics.

Quality surgical technique is also an important factor in reducing the incidence of surgical wound infections. The risk of wound infection depends on the amount and type of bacterial contamination, the condition of the surgical wound at the end of the operation, the patient's ability to control the infection and the use of antimicrobial drugs.

The incidence of clean wound infections (after operations without opening the intestinal lumen) ranges from 1% to 3% and is mostly due to external contamination by gram-positive organisms, especially staphylococci. The percentage of infection is significantly higher for contaminated and unclean wounds and ranges from 3% to 16% and is the result of endogenous aerobic-anaerobic flora. Subcutaneous application of catheters for rinsing with antibiotic solutions has been shown to be somewhat useful only in unclean wounds, where there are signs of infection. Therefore, it is still valid to leave such wounds open.

Special efforts must be made in the prevention of nosocomial infections as the main cause of surgical wound infections. Therefore, in all elective surgeries, it is necessary to first cure existing infections, if they are not the reason for surgery. Malnourished patients need to improve their nutritional status by oral or parenteral hyperalimentation. The preoperative stay should be as short as possible, and the preparation of the operating field should include washing the patient the day before surgery, shaving should be done immediately before surgery, only if access to the operating field is obstructed. Adequate ventilation and air quality over the operating field must be standardized.

LAPAROTOMY WOUND DEHISCENCE

The incidence of surgical wound dehiscence has been reduced in part due to better suture materials, better technique, and the use of anti-inflammatory antibiotics. The incidence of laparotomy wound dehiscence ranges from 0% - 4%, and the incidence of postoperative hernias from 3% - 21%. One clinical study showed that in 88% of patients with laparotomy wound dehiscence, sutures are intact, and that dehiscence is due to incision of the fascia by sutures. Therefore, it is necessary to sew at least 1.5 cm from the edge when sewing the fascia. Ellis and Heddle reported only 0.4% dehiscence of the laparotomy wound after single-layer tension-free closure and 2.5% after double-layer closure (9). The incidence of postoperative hernia during the six-month follow-up was higher after single-layer closure (3%).

A prospective randomized study showed a higher incidence of laparotomy dehiscence after tight suture tightening than if the wound edges were only approximated. Experimental studies in experimental animals have shown that tightly tightened sutures lead to tissue overlap while less tightly sutured sutures lead to greater proliferative activity at the wound edges. A study of 3135 patients showed that the incidence of laparotomy dehiscence was 1.6% if an extension suture was used to close the laparotomy, and 2% in the group where single sutures were used. A statistically higher incidence of laparotomy dehiscence was found when using single sutures in contaminated wounds (5).

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