Intestinal stomas in pediatric coloproctology

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ABSTRACT

For 10 years of work in the Department of Neonatal and General Surgery No. 2 of the SamMI clinic, 223 children - carriers of intestinal stomas with pathology of the colon and perineum were treated. All patients underwent a comprehensive examination, including the study of complaints and anamnesis of the disease, clinical examination, laboratory diagnostics, ultrasound examination of the abdominal cavity organs, kidneys and small pelvis, X-ray examination of the intestines.

**Keywords:** children, intestinal stomas

Materials and methods of research

For 10 years of work in the Department of Neonatal and General Surgery No. 2 of the SamMI clinic, 223 children - carriers of intestinal stomas with pathology of the colon and perineum were treated. All patients underwent a comprehensive examination, including the study of complaints and anamnesis of the disease, clinical examination, laboratory diagnostics, ultrasound examination of the abdominal cavity organs, kidneys and small pelvis, X-ray examination of the intestines.

**Types of intestinal stomas.** The term "stoma" (ostomy - Greek) means a surgically created opening that connects the lumen of an internal organ with the surface of the body. The most common types of intestinal stomas (so-called anus praeter-naturalis) in coloproctology are ileostomy (connects the lumen of the ileum to the skin surface) and colostomy (connects the large intestine to the skin). Depending on the section of the large intestine, on which the stoma is imposed, sigmo- and transverse-stoma, ascendo- and descendo-stoma, cecostomy and appendicostomy are distinguished. According to the method of formation of the intestinal fistula, stools are divided into double-barreled and single-barreled - T-shaped and terminal. In turn, double-barreled stomas can be divided into parietal, “spur” stomas, if the mesenteric edge of the excreted intestine is preserved, and separate stomas, when a skin “bridge” is formed between the efferent and adducting sections of the intestine.

In addition, in relation to the level of the skin, there are flat stomas, when the intestinal mucosa is at the level of the skin or recessed below, and “columnar” stomas that rise above the level of the skin, thereby ensuring a good tightness of the colostomy bag. The choice of localization and method of stoma placement is determined, firstly, by the nosology to be treated, and secondly, by the planned tactics of correcting this pathology. There is no unequivocal universal solution when choosing a method of forming an intestinal stoma. Many factors matter, among which the experience and preference of the operating surgeon play an important role. When it comes to the technique of stoma placement, it is optimal to rely primarily on the goals and objectives of ostomy, taking into account the subsequent stages of surgical treatment.

Among the advantages of the formation of a single-barrel stoma, one can note the complete exclusion of intestinal contents from entering the discharge section of the intestine, which in some cases is an indispensable condition for the effective treatment of the patient. The need for early restoration of the natural passage through the intestine determines the advisability of imposing a double-barreled colostomy, the closure of which is associated with less technical difficulties than in the case of a single-barreled stoma. It should also be remembered that in the distal part of the intestine, the so-called "disconnected colitis" develops - diversion colitis. However, there is evidence that the severity of histological changes in children with diversion colitis does not directly depend on the duration of carriage and the type of intestinal stoma, but depends more on the blood supply to the distal intestine carrying the stoma and the severity of antigenic stimulation by the microflora of the peristomal skin of the mucous membrane disconnected intestine. Among
tactical mistakes, two points should be highlighted: firstly, the imposition of a parietal colostomy, when there is a reflux of the intestinal discharge into the distal part of the intestine; secondly, an inadequately chosen level of stoma placement. So, for example, in Hirschsprung's disease, in the case of a stoma on the transition zone or in the agangliosis zone, the child develops chronic partial low intestinal obstruction, which requires unscheduled surgical intervention or daily cleansing enemas through the stoma. In the case of stoma imposition in children with anorectal atresia, it is necessary to take into account the feasibility of carrying out further radical proctoplasty with lowering of the intestine distal to the stoma - "under the cover" of the stoma [2, 3].

Indications for the imposition of a stoma. In pediatric coloproctology, the most common indications for stoma formation are anorectal malformations and Hirschsprung's disease. With atresia of the anus and rectum, in the absence of emptying (a fistless form of anorectal atresia) or inadequate bowel emptying (for example, rectal atresia with a fistula into the urinary system), a colostomy is applied in the first days of the child's life, if early defect correction. With anorectal atresia with a recto-vestibular or perineal fistula, even with sufficient bowel emptying through the fistula, a preventive colostomy is often required - this is the first stage of reconstructive intervention on the perineum.

The second, rather frequent intestinal pathology, requiring colostomy imposition, is colon decompensation in Hirschsprung's disease or various types of hypogangliosis (neurointestinal dysplasia of the colon). As a rule, the formation of a colostomy is the first stage in the treatment of Hirschsprung's disease (if it is impossible to carry out a radical operation), and the level of excretion of the intestinal fistula is chosen at a distance of 1.5-2 cm proximal to the transition of the agangliosis zone to the suprastenotic expansion. With total agangliosis of the colon or Sulzer-Wilson syndrome, an ileostomy is applied. In addition, a significant part of the pathology in which stoma is indicated is represented by postoperative complications obtained during the treatment of the above defects. Stenoses of the anus and rectum are in the lead among them - more than 30% of the total number of complications. In addition to congenital malformations, the formation of an intestinal stoma may be necessary in severe inflammatory bowel diseases (ulcerative colitis, Crohn's disease), diffuse colon polyposis with the development of intestinal obstruction, pronounced purulent-inflammatory processes in the perineal region (phlegmon of the pelvis, pararectal fistulas) and in the abdominal cavity (perforation of a hollow organ with peritonitis), as well as with injuries of the perineum and intestines. In these cases, the intestinal stoma is imposed preventively in order to stop the passage of the contents through the distal parts of the intestine, which have undergone resection or reconstruction and are carrying intestinal anastomoses.

Thus, in the overwhelming majority of cases, the formation of an intestinal stoma in pediatric practice is temporary and implies the subsequent restoration of intestinal patency, which is of decisive importance when choosing the type of intestinal stoma and the technique of its formation. Peristomal complications. A properly formed stoma should perform its functions, without aggravating, but facilitating the condition of a sick child. However, seemingly simple at first glance, the operation - the imposition of an intestinal stoma - can be accompanied by various technical errors and errors, which leads to a wide range of complications - from minimal to severe, with a threat to the patient's life. Peristomal complications can be classified into early and late, associated or independent of the stoma technique, as well as complications requiring surgical correction, and those that can be stopped by conservative therapy.

Early complications. Bleeding in the early postoperative period. Minor bleeding from the edges of the cut and sutured to the skin of the intestine usually stops spontaneously or requires the imposition of a pressure bandage. If this is ineffective, a hemostatic sponge, a bandage with a solution of aminocaproic acid or Tachocomb plasta, are used topically, hemostatic therapy is carried out parenterally. It should be remembered that local application of hydrogen peroxide can cause burns to the mucous membrane of the excreted intestine.

More massive bleeding from the vessels of the mesentery may be. In these cases, vascular ligation or electrocoagulation is required. In patients with hematological diseases and various types of coagulopathies, it is necessary to correct hemocoagulation using the entire arsenal of therapy (transfusion of...
blood preparations, coagulation factors, etc.), given the high risk of developing DIC even with small blood loss. **Intestinal eventration.** Small bowel loops may fall out through a postoperative wound adjacent to an excreted intestinal stoma. This complication develops when the sutures in the stoma area are insolvent, or if a too wide canal is formed in the abdominal wall during stoma imposition and the intestinal wall is not properly sutured. In this situation, an emergency operation is required with the elimination of intestinal eventration and reconstruction of the stoma. In this case, the predisposing factors are an increase in intra-abdominal pressure against the background of postoperative intestinal paresis, a change in the regenerative abilities of tissues during peritonitis or the exhausted state of the patient (with hypotrophy, hypoproteinemia), as well as against the background of high-dose therapy with glucocorticoid hormones.

**Bowel necrosis.** This is one of the most severe complications associated with a number of reasons: removal of the intestine with poor blood supply, without the presence of well-pulsating mesenteric vessels; removal of the intestine with tension of its mesentery; compression of the intestine in a too narrow wound channel; twisting of the intestine and mesentery around its axis; thrombosis of the mesenteric vessels (in children it is extremely rare). **Necrosis** can affect the terminal section of the excreted intestine, but it can also be extended. More often, this type of complication is observed with the formation of single-barreled stomas. With the development of necrosis, the mucous membrane of the removed intestine becomes dark maroon, dull, and then darkens. If the necrosis is not extended and the viable intestine is slightly below the level of the edges of the postoperative wound, this leads to failure of the mucocutaneous sutures of the stoma with the development of purulent-inflammatory processes in the peristomal tissues, and subsequently - to retraction, scarring and stenosis of the stoma opening. If the intestine is necrotic over a large extent, then there is a threat of peritonitis, which requires urgent surgical intervention with resection of the altered area and reconstruction of the stoma. Retraction of the stoma with immersion of the intestinal mucosa below the skin level occurs in the following cases: when the intestine is pulled during surgery; with improper fixation of the intestinal wall; with an unformed "spur" of a two-barreled stoma or a prematurely removed fixator, passed through the mesentery of the intestine; due to a violation of the healing of a stoma wound. Often, stoma retraction does not allow the colostomy bag to be well fixed, which contributes to the development of peristomal dermatitis.

**Evagination of the stoma.** The prolapse of the intestine through the stoma is associated with the leaving in the abdominal cavity of a large free prestomal section of the intestine, which is very mobile and can "turn inside out" through the colostomy opening. The following reasons predispose to this: increased intra-abdominal pressure on the background of intestinal paresis, the use of foods that increase peristalsis and contribute to bloating. To prevent this complication, it is necessary, when placing a stoma, to carefully fix the intestinal wall to the muscles and aponeurosis of the anterior abdominal wall in layers, to form a stoma wound according to the diameter of the bowel being removed. When imposing a double-barreled stoma, performing 2-3 serous interrupted sutures along the mesenteric edge, bringing together the adducting and abducting sections of the stoma, allows you to create a "spur", which prevents intestinal evagination. With insignificant loss, conservative measures are possible - correction of nutrition and the use of a cotton-gauze pad (pelot), pressing the surface of the colostomy. With significant bowel prolapse, especially with its infringement in the stoma opening, surgical treatment is indicated - stoma reconstruction.

**Paracolostomy inflammatory complications,** hematomas, abscesses and fistulas. Inflammation in the mucocutaneous junction of the intestinal tract is a frequent complication in the early postoperative period due to infection of the edges of the postoperative wound with intestinal discharge. This complication, as a rule, is stopped by the methods of conservative therapy (the use of local antiseptics, careful selection of colostomy bags using ostomy care products - paste, protective creams and films). However, in the future, the transferred inflammation of the wound can become the cause of the formation of a rough scar and stenosis of the colostomy opening.

The cause of hematomas is insufficiently thorough hemostasis in combination with a too wide wound channel around the excreted intestine. If the bleeding is stopped, and the intestine completely fills the channel in the abdominal wall, then the hematoma will not form. Paracolostomy abscesses are a fairly
frequent consequence of a hematoma, followed by its inflammation. Further, a chain of complications
inevitably leads to the formation of fistulas, stenoses, hernias, etc. These complications are associated with
infection of the paracolostomy space and, which is especially important, suturing of the intestinal wall deep
in the wound canal to the aponeurosis with end-to-end sutures made of non-absorbable threads. In this case,
multiple microabscesses and fistulas occur, which, existing for a long time, lead to strictures.

**Late peristomal complications.** Stoma stenosis. This is the most common complication of a
malformed colostomy. The narrowing can be located in the final section of the intestine, at the level of the
skin, or at a depth - at the level of the dissected aponeurosis. Reasons for the formation of stoma stenosis: the
final section of the colon is removed with tension, which leads to its retraction into the wound canal, scarring
of the edges of the skin wound and the occurrence of stricture at the skin level; the removed section of the
intestine has poor blood supply, which leads to its necrosis, scarring of the edges of the skin wound and the
intestinal wall, while there is no cuff from the everted intestinal mucosa; a too narrow opening is created in
the musculo-aponeurotic layer and there is a compression of the intestine followed by its stenosis, while at
the skin level there seems to be a completely normal colostomy; too wide canal is formed around the
intestine in combination with insufficient hemostasis; as mentioned above, this leads to the formation of
hematomas and abscesses with further scarring of the tissues of interest; the wall of the excreted intestine is
fixed in the depth of the wound channel with circular sutures made of non-absorbable suture materials (silk,
nylon, lavsan) to the edges of the aponeurosis - this leads to the appearance of a ring of granulomas with
subsequent severe cicatricial stenosis at the indicated level; twisting the removed segment of the intestine
along the axis; if this defect in technique does not appear in the first days after the operation with intestinal
obstruction, then in the future, violations of the stool passage may occur; wrong choice of the colostomy site
- near the navel, near the iliac crest or in the area of the "old" postoperative scar; the withdrawn intestine can
be deformed by dense tissues in these areas.

A long-standing stricture leads to a suprastenotic expansion of the overlying sections with the
development of irreversible processes in the intestinal wall, in the future this may complicate reconstructive
and restorative operations on the intestine. Stenosis of the discharge bowel is not clinically significant, but it
can complicate surgical procedures.

All of the above complications are mainly due to non-compliance with the technique and methods of
imposing intestinal stomas.

**Paracolostomy hernia.** An infrequent complication in pediatric patients associated with the
presence of a hernial protrusion during the formation of a pocket between the intestine and the abdominal
wall. The reasons for this complication: too wide a channel is created in the musculo-aponeurotic layer, there
is space next to the excreted colon; there is atrophy of the muscles of the abdominal wall due to the
intersection of nerves and tissue injury; there is paracolostomy inflammation, described in detail above. For
large hernias, combined with a violation of bowel emptying, surgical treatment is performed - plastic
aponeurosis or its strengthening with special synthetic meshes. More voluminous interventions are also
possible - reconstruction with moving the stoma to another part of the abdominal wall.

Inflammatory changes in the skin of the peristomal region (so-called peristomal dermatitis).
Hyperemia, maceration of the peristomal region and erosive and ulcerative skin lesions around the stoma in
most cases are caused by improper care and are caused by the irritating effect of intestinal contents with
infection of damaged skin. Only a properly formed intestinal stoma makes it possible to correctly and easily
use modern kalo-receivers and care products that effectively collect intestinal contents and protect the skin of
the peristomal area. Bleeding from the mucous membrane of the stoma. Most often it is caused by trauma to
the mucous membrane of the stoma and is minimal in volume, therefore it stops on its own or when a dry
gauze napkin is applied. Intestinal stoma care. It is very important from the point of view of social adaptation
of patients - carriers of an intestinal stoma, in addition to preventing peristomal complications, proper care of
the stoma. It is important to use a colostomy bag from the first day of stoma placement, especially in the case
of a large amount of liquid intestinal discharge, which will not only facilitate patient care in the early
postoperative period, but also avoid a number of complications.
Modern ostomy care products provide the most comfortable conditions for the child, allowing him to lead the usual active lifestyle. Manufacturing firms - "Coloplast" and "KonvaTek" - produce pediatric plates and bags of various sizes, so colostomy bags can be used from the neonatal period.

**Closure of intestinal stomas.** The timing of closure of the intestinal stoma is individual and depends on the results of treatment of the underlying disease. In the absence of complications after reconstructive surgery on the intestines and perineum, it is advisable to close the stoma 2-3 months after the healing of postoperative wounds. For the prevention of colitis in the disconnected intestine, especially in the presence of a single-barreled stoma, it is not recommended to leave it longer than 6 months after reconstructive surgery on the intestine. The entire period from radical intervention to closure of the stoma, it is necessary, in addition to bougienage of rectal or anal anastomosis, to carry out preventive treatment of diversionary colitis, including local anti-inflammatory therapy (medicinal enemas with antiseptics, decoctions of herbs - chamomile, string) and skin care around the stoma to prevent pyo-inflammatory peristomal complications.

**Findings:** Adequate imposition of a preventive or unloading intestinal stoma is an important stage in the correction of malformations of the colon and perineum. Almost half of patients with coloproctological pathology require colostomy. Unfortunately, we often deal with patients for whom a colostomy was imposed tactically and technically incorrectly, accompanied by various complications, which subsequently makes it difficult to carry out a radical operation.

Multi-stage correction of colon and perineal pathology is a serious surgical problem, associated with high financial costs, long rehabilitation period, which leads to disruption of social adaptation and deterioration of the child's quality of life. An important task is the organization of specialized centers of stomatotherapy on the basis of specialized departments of pediatric surgery to provide qualified assistance to disabled children, train parents and patients to care for intestinal stoma. In addition, it is necessary to conduct a thematic improvement of doctors - pediatric surgeons in specialized clinics in order to improve the work of institutions in the regions. This will allow avoiding a number of complications, tactical and technical errors when imposing unloading and preventive intestinal fistulas, and timely socially adapt patients-carriers of stomas.

**References**