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Experience in Managing Patients with Adhesive Intestinal Obstruction (Adhesion Disease) in Children

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Abstract The most common causes and treatment tactics for children with adhesive intestinal obstruction, and methods for timely diagnosis are discussed. Analysis of the treatment results showed that laparoscopic adhesiolysis in combination with anti-adhesive therapy not only minimizes complications in the postoperative period, shortens the patient's hospital stay, and provides a good cosmetic result, but also verifies the nature and extent of the adhesive process, and exclude other diseases of the abdominal organs.

Keywords Adhesive disease, Laparoscopy, Adhesiolysis, Children

1. Relevance

Adhesive disease of the abdominal cavity remains a challenging task in abdominal surgery. The clinical picture of the pathological process is varied, the treatment of patients is not effective enough, and the decision on the choice of treatment methods is controversial, especially when choosing a surgical procedure [4-5,11]. There is no uniform approach regarding diagnostic and therapeutic measures for conservative treatment. Only when the course of the disease becomes complicated do surgeons begin to treat patients [1].

Currently, in both pediatric and adult abdominal surgery, the problem of ischemic intestinal damage and postoperative adhesions after interventions on the abdominal organs requires solving. For adhesive intestinal obstruction, 3.3% of emergency interventions from the total number of laparotomy operations are performed. Conservative treatment of peritoneal adhesive disease is ineffective, and relapses are 32-71%. In 7-10% of cases, the adhesive process in the abdominal cavity is characterized by malignancy and leads to recurrent intestinal obstruction [3,8,14].

An analysis of the epidemiology of adhesive disease showed that after operations on the anterior abdominal wall, the frequency of re-hospitalization for adhesive disease and adhesive intestinal obstruction did not differ from that after surgical interventions performed directly on the small intestine (5.7%). Moreover, the frequency of re-hospitalizations for diseases directly related to adhesions was 5.1 per 100 previously performed operations [11]. Adhesive intestinal obstruction (AIO) — serious postoperative complication. The prevalence of this form of pathology in children ranges from 1.1 to 6% [1,7,11]. Up to 40% of cases of intestinal obstruction are caused by acute (AIO). It is the cause of up to 60% of repeat laparotomies, 90% of which are performed in the first year after previous surgical interventions [2,6,12]. Adhesive intestinal obstruction develops mainly in children over 3 years of age and is extremely rare in younger children [13]. The main cause of the development of acute Adhesive intestinal obstruction remains acute appendicitis [3,9,12]. The extent of the adhesive process depends on the location of the appendix, the severity of the inflammatory process in it, and, as a consequence, the use of longer and "rougher" surgical techniques associated with isolating the appendix and performing appendectomy [14]. Frequent causes of adhesions in the abdominal cavity are tissue injury during open laparotomy, the presence of an infectious process in the abdominal cavity, and prolonged intestinal paresis after surgery [1]. The clinical picture of acute adhesive intestinal obstruction is dominated by pain in the abdominal area, which is the reason for visiting a doctor. The pain is often cramping in nature and can be constant and localized in the area of the postoperative scar. Important clinical symptoms are also vomiting, stool retention, and non-passage of flatus. Against this background, the child's general condition worsens due to increasing metabolic disorders, fluid loss, and endotoxicosis. Laboratory diagnostics reveal changes characteristic of the acute phase of inflammation [5,10,12].

In the diagnosis of early adhesive intestinal obstruction, X-ray, ultrasound (ultrasound), and endoscopic research methods are widely used [8,13]. Mechanical intestinal obstruction in most cases is confirmed by the results of an X-ray examination [2]. X-ray films reveal signs of multiple

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fluid levels, overstretched loops of the small intestine, and the absence of gas in the underlying sections of the intestine located after strangulation. When assessing only clinical manifestations and plain radiograph data, the diagnosis of early adhesive intestinal obstruction is confirmed only in 8-10% of patients [12]. To control the passage through the intestines, a dynamic X-ray contrast study with barium is performed [6,8,11]. Confirming the diagnosis of acute adhesive intestinal obstruction in the shortest possible time allows laparoscopy [14], which allows you to visualize the level of obstruction, determine the cause of its occurrence, assess the volume and localization of the adhesive process, and the degree of intestinal damage. After assessing the condition of the intestine, laparoscopy allows for endoscopic adhesiolysis (dissection of adhesions) [3]. The accuracy of laparoscopic intervention reaches 100% [11]. However, the use of laparoscopy for acute (AIO) can lead to iatrogenic damage to the intestine [9]. Repeated laparotomy in most cases is accompanied by an increase in the scale of the adhesive process, which in turn can lead to a relapse of adhesive intestinal obstruction [7].

The purpose of our study — is to analyze the results of the treatment of children with AIO after surgical interventions by laparotomy and laparoscopy.

2. Materials and Research Methods

In 2018-2023, in the clinic of the Fergana branch of the Republican Scientific Center for Emergency Medical Care of the Ministry of Health of the Republic of Uzbekistan and a multidisciplinary clinic, 231 patients with SB aged over 3 months were treated. up to 18 years old. There were 93 girls (40.7%), and 138 boys (59.3%). Adhesive intestinal obstruction (AIO) was divided into early and late. Early adhesive intestinal obstruction develops within up to 3 weeks. after surgery: in our observations - in 56 (24.2%) children. Late - more than 3 weeks later - in 175 (75.8%) children. In the analyzed cases, the clinical picture of adhesive intestinal obstruction developed within a period of 48 hours to 15 years after surgery. All children admitted to the clinic with suspected adhesive intestinal obstruction underwent the following clinical diagnostic procedures: collection of anamnesis of the disease, examination, general clinical blood and urine tests, plain radiograph, and ultrasound examination of the abdominal cavity.

Ultrasound of the abdominal cavity in all cases revealed pendulum-like movement of intestinal contents, dilation of intestinal loops with reduced peristalsis, and sequestration of fluid in their lumen. By the European consensus on adhesive obstruction, we identified two groups of patients. The first group included children with signs of peritonitis and strangulation of intestinal loops who required emergency surgical intervention. The second group included patients who received conservative treatment for 72 hours. Treatment began with a set of conservative measures: gastric decompression (nasogastric tube), correction of water and electrolyte disturbances, stimulation of intestinal motility, and cleansing of the lower gastrointestinal tract using cleansing enemas. When treating children with acute adhesive intestinal obstruction, it is important to control the duration of conservative measures. In 133 (57.6%) children, conservative therapy was effective. In 98 (42.4%) - ineffective, this required the use of surgical treatment - adhesiolysis.

3. Results and Discussion

All children had a history of previous surgical intervention on the abdominal organs. 133 children underwent successful conservative treatment, which consisted of decompression of the gastrointestinal tract (installation of a probe in the stomach and a gas outlet tube in the rectum) and intestinal stimulation (introduction of hypertonic sodium chloride solution intravenously, proserin intramuscularly and a cleansing enema after 30 minutes). 98 children underwent surgical intervention: access - median laparotomy, and adhesiolysis.

Considering that adhesive disease is an independent, polycyclic, progressive disease, which is based on a generalized, hyperallergic reaction of connective tissue to external stimuli (dieting disorders, inflammatory processes, colds, exacerbation of chronic diseases), our scheme of conservative therapy at the initial stage of adhesive The disease consisted of the following fundamental points. Any disturbance of intestinal motility directly depends on the tone of smooth muscle muscles and the content of K+ ions in the circulating fluid, adequate blood supply to the intestinal tube. We consider it fundamentally important to restore the volume of circulating blood with the indispensable inclusion in the volume of infusion therapy of a 10% solution of potassium chloride at the rate of 1 mEq/kg of body weight. Intestinal intubation was not required in any case. The operations were performed after short-term preoperative preparation on an emergency basis. In 10 (10.2%) children, a relapse was noted in the immediate postoperative period (3–5 days), and therefore a relaparotomy was performed. Deep abdominal massage under sedation in the immediate postoperative period (1-3 days) is performed if a recurrence of adhesive intestinal obstruction is suspected.

We try to avoid surgical intervention outside of an attack of acute adhesive obstruction. This is because, during surgical intervention during an attack of adhesive intestinal obstruction (AIO), it is impossible to assess which of the adhesions is problematic, which does not allow for establishing the volume of adhesiolysis in a widespread adhesive process. Based on our own experience of treatment for acute adhesive intestinal obstruction, we can distinguish two main stages:

- in cases where adhesiolysis required open surgical intervention, the volume of necessary surgical intervention is many times smaller compared to surgical access;
- when the development of laparoscopic technology made it possible to begin a new stage of surgical treatment of adhesive intestinal obstruction (AIO).

Laparoscopy was performed in 29 patients. In 27.6% of cases, the operation began with a laparoscopic approach, then switched to laparotomy due to unsuccessful dissection of adhesions and elimination of intestinal obstruction.

During video surgery, a 5-mm trocar with a blunt-ended style was used openly and the creation of a carboxyperitoneum under a pressure of 10 mm Hg. 1 or 2 working 5-mm trocars were installed in the iliac regions. Despite the advantages of laparoscopic adhesiolysis over traditional laparotomy access, it is necessary to follow clear methods for its implementation: determining the site of insertion of the first trocar, safe technique for entering the abdominal cavity, searching for the causative adhesions, determining the volume of adhesiolysis. We determined the site for insertion of the first trocar by the location of postoperative scars. When entering the abdominal cavity, we did not use a Veress needle but did it under visual control. After the insertion of the first trocar, the intraoperative situation was assessed and, by strangulation, the position of no more than three "working" trocars was determined.

During the revision of the abdominal cavity, collapsed loops of the intestine were first identified. The examination was carried out retrogradely: from the ileocecal angle to the ligament of Treitz. This is how it is possible to detect problematic adhesions and identify the cause of intestinal obstruction. The intersection of the adhesions that caused intestinal obstruction was performed mainly with "cold" scissors. In the case of a widespread adhesive process, only the problematic adhesion was crossed. Laparoscopy revealed the following variants: Adhesive intestinal obstruction in children. Angulation (steep bend, "double-barreled gun") and torsion (twisting of the intestine around its axis) were more common in children with stage II adhesive intestinal obstruction. Contriction (narrowing of the intestinal lumen due to strangulation cord) was detected in children with stage I of the disease.

After laparotomy surgical interventions, infusion (0.9% NaCl solution, 5% glucose solution IV drip), antibacterial (ceftriaxone, cefotaxime IV and/or IM, gentamicin IM), and analgesics were prescribed without fail. (50% analgin solution, ketorolac, baralgin intramuscularly, perfalgan orally for pain) therapy. Physiotherapy was subsequently added (ultra-high-frequency therapy on the area of postoperative scar).

The main way to prevent the formation of intra-abdominal adhesions is to minimize surgical trauma. In all abdominal surgical procedures, principles similar to those of W.S. Halsted, the first surgeon to recognize the extreme importance of preventive measures, should be followed. Necessary conditions for prevention are: careful handling of tissues, hemostasis, continuous irrigation to avoid drying out; efficient use of instruments, minimizing sutures, and tissue compression. Использование тонких атравматичных игл и неопудренных перчаток также способствует профилактике спайкоо бразования. However, modern research proves that foreign bodies rarely cause the formation of adhesions in the absence of damage to the peritoneal mesothelium.

4. Conclusions

Adhesive intestinal obstruction is one of the important problems of modern pediatric surgery. Based on experience, an algorithm for managing patients with this pathology has been developed. We believe that laparoscopic adhesiolysis and drug therapy are effective in resolving adhesive intestinal obstruction. The effect of conservative treatment was 57.6%.

In most patients, adhesive intestinal obstruction formed after previous surgical interventions. This indicates the need to develop the most effective method for preventing adhesions both during surgery and in the postoperative period.

Laparoscopy allows you to clarify the degree and extent of the adhesive process and exclude other pathologies in the abdominal cavity. Laparoscopic adhesiolysis minimizes the development of complications in the postoperative period, shortens the patient's hospital stay, and provides a good cosmetic result.

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