

Modern Approaches to the Diagnosis and Treatment of Intestinal Obstruction in Children

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Abstract: Intestinal obstruction in children is a disorder of faecal obstruction in the GI tract caused by mechanical obstruction, innervation disorders or a combination of these factors. The disease manifests with severe pain syndrome, indomitable vomiting, and delayed defecation and gas retention. Diagnostic search includes physical examination of the child, the use of instrumental methods - review radiography of the abdominal cavity, sonography, laparoscopy. Treatment consists of intestinal decompression and prescription of medications, in case of ineffectiveness of which surgical intervention is performed.

Key words: Intestinal obstruction, children, surgery.

Introduction. Intestinal obstruction is a pathology in which there is a disturbance in the progression of previously eaten food in the GI tract with complete or partial obstruction of the stool exit pathway[1]. The disease is more often congenital, but sometimes has an acquired character. Intestinal obstruction in children in 25% of cases can occur intrauterine. It represents 1.5-9% of all diseases localised in the abdominal cavity, and 3-5% of cases of referrals to surgical wards. If intestinal obstruction in children is considered, the classification takes into account many points[9]. Depending on the mechanism of development there are: - Dynamic intestinal obstruction in children occurs if the regulation of motility is disturbed, it can be: spastic (spasm of the intestine occurs) and paralytic (peristalsis completely disappears).

Intestinal intussusception is the most common type of acquired intestinal obstruction in children, with the absolute majority of cases occurring in infants [3]. Intestinal intussusception refers to a mixed form of mechanical obstruction (a combination of obstruction and strangulation). This pathology is caused by discoordination of intestinal peristalsis with the formation of areas of spasm, which favours the invasion of one part of the intestine into another, and more often the invasion occurs along the course of peristalsis. In infants, this pathology develops against the background of anatomico-physiological features, which include mobility of the ileum and cecum, immaturity of the Bauginia flap [2, 4]. It is with these features that intussusception in children under a year of age most often develops in the area of the ileocecal angle. In addition, age-related physiological immaturity of the intestinal enzymatic apparatus contributes to the development of this pathology. A significant role in the occurrence of intussusception belongs to the violation of the child's feeding regime and factors contributing to changes in intestinal peristalsis - intestinal infections [5]. Intestinal intussusception can also be caused by various organic causes: intestinal polyps, tumours, doubling of various intestinal compartments, etc. In the diagnosis of intestinal intussusception, in addition to clinical examination, ultrasound examination is of great importance, which detects this pathology in almost 100% of cases [6]. Treatment of intussusception in most patients can be performed by conservative methods[7]. Indications for

surgery: presence of peritonitis, small-intestinal intussusception and failure of conservative treatment [8].

The aim of the study was to analyse the results of diagnostics and treatment of intestinal intussusception in children.

Material and methods of the study: The basis of the work is the analysis of observations of 193 children with intestinal intussusception aged from 4 months to 7 years inclusive, treated in the Department of Paediatric Surgery of the Andijan branch of RSCEMP from 2019-2023. There were 125 boys and 68 girls (Table 1). Most often intussusception developed in children under 1 year of age (112 persons, 58.0%).

Table 1. Distribution of observed patients by sex and age

Gender	Age			Total
	4 months-1 year	1-3 years	4-7 years	
Boys	72	45	8	125
Girls	40	24	4	68
Total:	112	69	12	193

The timing of hospitalisation of our patients in the surgical hospital varied considerably. In the first 6 hours from the onset of the disease only 6 (2.8%) patients were hospitalised, from 6 to 12 hours - 51 (26.4%) children, from 12 to 24 hours - 68 (35.8%) children, from 24 to 48 hours 48(24.9%) children, and later than 72 hours 3 (1.6%) patients remained without surgical care. All patients were clinically examined, laboratory, radiological and ultrasound methods of investigation were used.

RESULTS: Collection of anamnesis revealed the presence of nutritional errors in 24 children (12.4%). In 12 (6%) observations intussusception developed against the background of acute respiratory infection, in 14 (7.5%) patients - against the background of intestinal infection. Clinical manifestations of intestinal intussusception in almost all observations were pronounced.

Attack-like abdominal pain, which was expressed by periodic restlessness, was noted in 192(99%) patients. The attacks of pain lasted from 5 to 15 minutes. Time intervals between attacks were equal to 10-20 minutes. In 162 (83%) patients recurrent vomiting was observed, at the beginning of the disease - with gastric contents, then - with admixture of bile, in 5 patients there was vomiting of stagnant contents. In 43 observations (22%) there was an increase in body temperature to subfebrile values. In 23 (12%) patients there was a discharge of blood from the anus, most of them in the form of "crimson jelly". On admission to the paediatric surgical department, the condition of 22 children (11.7%) was assessed as satisfactory, and that of 153 (79.0%) as moderately severe. 20 (10.1%) patients were admitted to the hospital in a serious condition. Severe condition was noted in children admitted to hospital more than 48 hours after the onset of the disease.

Abdominal bloating was detected in 58 children (29.8%). The intussusception was palpated as a tumour-like mobile, cylindrical shape, moderately painful mass in 111 observations (57.8%). The presence of Duns' symptom was noted in the medical history of 45 children (23%). In 175 (90.6%) patients the abdomen was soft on palpation, in 18 (9.4%) children tension of the muscles of the anterior abdominal wall was detected.

In the general blood count in 83 children the number of leukocytes did not exceed $10.0 \times 10^9/l$, in 6 patients leukocytosis from 12.0 to $15.0 \times 10^9/l$ was observed, in 9 observations - from 16.0 to $25.0 \times 10^9/l$ (these children were admitted to the hospital later than 48 hours from the onset of the disease, with 2 of them being admitted later than 72 hours).

All observed children underwent ultrasound examination of abdominal cavity organs. In 156 patients (81%), ultrasound examination was supplemented with radiological examination by irrigography. Figures 1 and 2 show the ultrasound picture of intestinal intussusception.



Figure 1. The "target" symptom



Figure 2. The "pseudo-bulb" symptom

Figures 3 and 4 show the picture of intestinal intussusception on radiological examination.



Figure 3. Irrigogram with tight filling with barium sulphate suspension - "cancer claw" symptom

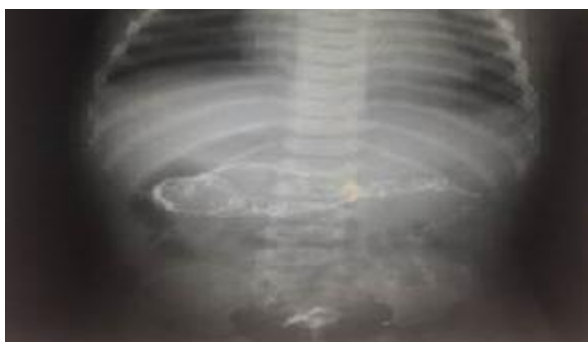


Figure 4. Irrigogram after emptying the colon - "cockade" symptom

TREATMENT. In 156 patients (80.8%) intestinal intussusception was eliminated conservatively, in 1 patient (0.5%) intussusception resolved spontaneously. 36 children (18.7%) underwent surgery. The indications for surgical treatment were as follows:

- clinical signs of peritonitis;
- small-intestinal intussusception (diagnosed by ultrasound);
- unsuccessful conservative treatment.

In 46 children disinvagination occurred during irrigography.

In 62 observations intussusception was eliminated by injecting air into the colon with control of the pressure created. We use this method in children of any age. To inject air into the rectum, we use an intubation tube (a tube for tracheal intubation), the size of which is selected depending on the age of the child. The tube is connected to the manometer and the Richardson balloon by means of an adapter. The advantage of this device is the presence of a cuff, which allows you to create a hermetic seal when injecting air into the colon.

Conservative disinvagination is carried out in the operating theatre under general anaesthesia. Before manipulation, it is necessary to perform palpation of the abdomen to determine the invagination. An intubation tube is then inserted into the patient's rectum, after which the cuff is inflated in order to create a hermetic seal during the injection of air into the colon. With the help of the Richardson balloon, air injection is started, and the air flow into the colon is monitored: at the beginning, asymmetry of the abdomen is observed when the air passes to the intussusception, at further air injection, provided the intussusception is straightened, the abdomen becomes symmetrical due to the passage of air to the proximal parts of the intestine. At this time, the invagination is no longer palpatorily detected. The Richardson balloon is then disconnected from the tube to remove excess air from the intestine. The child is placed in the ward. After the patient fully awakens, a review radiography of the abdominal cavity is performed, which shows the presence of gas in both the large and small intestine. Conservative disinvagination was unsuccessful in 13 observations. These children were operated on. Recurrence of intussusception was noted in 8 children after pneumodesinvagination and in 12 patients after disinvagination by irrigography. These children were operated on. A total of 36 patients underwent surgical treatment (Table 2).

Table 2

Type of surgical intervention	Abs. number	%
Laparoscopic disinvagination	10	26,4
Laparoscopic disinvagination with appendectomy	14	40,3
Diagnostic laparoscopy, conversion, disinvagination	2	4,2
Laparotomy Wolkowicka-Diakonow access, disinvagination	2	5,6
Laparotomy Volkovichka-Dyakonova access, disinvagination, appendectomy	5	15,3
Laparotomy access Volkovichka-Dyakonova, disinvagination, wedge resection of the small intestine with Meckel's diverticulum.	1	2,8
Laparoscopic disinvagination, conversion to midline laparotomy, ileum resection with end-to-end anastomosis.	2	5,6

Disinvagination from laparoscopic access was performed in 24 observations: disinvagination alone was performed in 10, and in 15 children disinvagination was combined with appendectomy. In these patients, the worm was involved in the intussusception.

In 2 cases it was not possible to perform disinvagination from laparoscopic access due to the extent of the intussusception and marked intestinal oedema. These patients underwent laparotomy with subsequent disinvagination. 7 children were operated using laparotomic access

(Volkovich-Dyakonov access). Disinvagination and appendectomy were performed in 6 patients, and disinvagination was performed in 2 patients.

2 children who were admitted more than 72 hours from the onset of the disease in severe condition were operated from laparoscopic access after preoperative preparation. An iliacobiliac intussusception was detected. After disinvagination, necrosis of the ileum was diagnosed. Conversion to midline laparotomy, ileum resection with end-to-end anastomosis was performed.

After disinvagination from the Volkovich-Dyakonov incision in two patients, it was found that the cause of pathology was Meckel's diverticulum. The diverticulum was removed by wedge resection of the ileum with anastomosis. There were no fatal outcomes in intestinal intussusception. No complications were noted in the postoperative period. All children were discharged in satisfactory condition.

Conclusions: Thus, intestinal obstruction is treated only surgically. If the patient has no symptoms of spillage peritonitis, the treatment of intestinal obstruction consists primarily of cleansing enemas. When the gases and faces have passed, the bloating of the intestines has disappeared and the pain has subsided, the patient can undergo surgery. Also during the operation, the patient intravenously administered glucose solution and blood transfusion. Surgery for intestinal obstruction is performed under general anesthesia. In the postoperative period during the first 24 hours, the patient is carried out aspiration of intestinal and gastric contents. Subsequently, measures are taken to promote the restoration of intestinal motility.

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