



New approaches to the diagnosis and tactics of surgical treatment of intestinal intussusception in children

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* Illustrations 3–6 to the article are on the colored inset of the Journal (p. I).

Summary

Intestinal intussusception (IR) is an urgent problem of pediatric surgery. The relevance is high due to the incidence of the disease, which ranges from 1.5 to 4 per 1000 children and tends to increase cases over the past 10 years, as well as diagnostic difficulties and a high frequency of relapses of the disease. The frequency of diagnostic mistakes reaches 75–85%, and the mortality rate for intussusception ranges from 0.5 to 1%, reaching from 6 to 14.5% in complicated forms.

The aim of the study is to improve the results of treatment of intestinal intussusception in children by optimizing approaches to diagnosis and tactics of surgical treatment.

Materials and methods. Over the past 20 years, 237 children aged 3 months to 12 years were hospitalized in the Department of Emergency Surgery, Specialized Pediatric Surgical Clinic of Samarkand State Medical University, with a diagnosis of intestinal intussusception, of which 116 were confirmed during a clinical examination. Depending on the applied therapeutic and tactical approaches, all examined patients with intestinal intussusception are divided into 2 groups. Group 1 (comparison group) consisted of 43 patients treated in the period from 2000 to 2013. In this group, the diagnosis was based on plain radiography and pneumo-irrigoscopy. Group 2 (main group) consisted of 73 patients treated for the period from 2014 to the present. In this group, diagnosis and conservative treatment was based on the method of hydroechocolonographic disinvagination under ultrasound control.

Keywords: intestinal intussusception, hydroechocolonography, Cramping pains, children

Conflict of interests. The authors declare no conflict of interest.

EDN: DNDUWP





Новые подходы к диагностике и тактике хирургического лечения инвагинации кишечника у детей

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* **Иллюстрации**
 3–6 —
 на цветной
 вклейке в журнал
 (стр. I).

Резюме

Инвагинация кишечника (ИК) является актуальной проблемой педиатрической хирургии. Актуальность обусловлена высокой частотой заболевания, которая составляет от 1,5 до 4 на 1000 детей и имеет тенденцию к росту случаев заболевания за последние 10 лет, а также трудностями диагностики и высокой частотой рецидивов заболевания. Частота диагностических ошибок достигает 75–85%, а летальность при инвагинации колеблется в пределах от 0,5 до 1%, достигая при осложненных формах от 6 до 14,5%.

Цель данной работы: улучшение результатов лечения инвагинации кишечника у детей путём оптимизации подходов к диагностике и тактике хирургического лечения.

Материалы и методы. За последние 20 лет в отделение экстренной хирургии, Специализированной детской хирургической клиники СамГМУ, были госпитализированы 237 детей в возрасте от 3х мес до 12 лет с диагнозом «инвагинация кишечника», из них в процессе клинического обследования данный диагноз подтвержден у 116. В зависимости от примененных лечебно-тактических подходов все обследованные больные с инвагинацией кишечника разделены на 2 группы. 1 группу (группа сравнения) составили 43 больных, лечившиеся в период с 2000 по 2013 гг. В данной группе диагностика основывалась на обзорной рентгенографии и пневмоирригоскопии. 2 группу (основная группа) составили 73 пациента, пролеченные за период с 2014 по настоящее время. В данной группе диагностика и консервативное основывалась на методике гидрозоколонографической дезинвагинации под УЗИ-контролем.

Ключевые слова: болезнь Гиршпрунга, реабилитация, гиперкинез, запор, порок развития, сфинктер

Конфликт интересов. Авторы заявляют об отсутствии конфликта интересов.

Relevance

Intestinal intussusception (IR) is an urgent problem of pediatric surgery. The relevance is high due to the incidence of the disease, which ranges from 1.5 to 4 per 1000 children and tends to increase cases over the past 10 years, as well as diagnostic difficulties and a high frequency of relapses of the disease (V.V. Podkamenev et al., 2020). The frequency of diagnostic mistakes reaches 75–85%, and the mortality rate for intussusception ranges from 0.5 to 1%, reaching from 6 to 14.5% in complicated forms. (Shamsiev J.A. et al., 2022).

The difficulties of diagnosing and treating intestinal intussusception are associated with the inconsistency of anamnestic data, the presence of concomitant diseases, the limited possibilities of traditional X-ray diagnostics, as well as the lack of a single generally accepted opinion regarding the tactics of surgical treatment of the disease.

The aim of the study is to improve the results of treatment of intestinal intussusception in children by optimizing approaches to diagnosis and tactics of surgical treatment.

Figure 1.
Distribution
of children
with IR by age

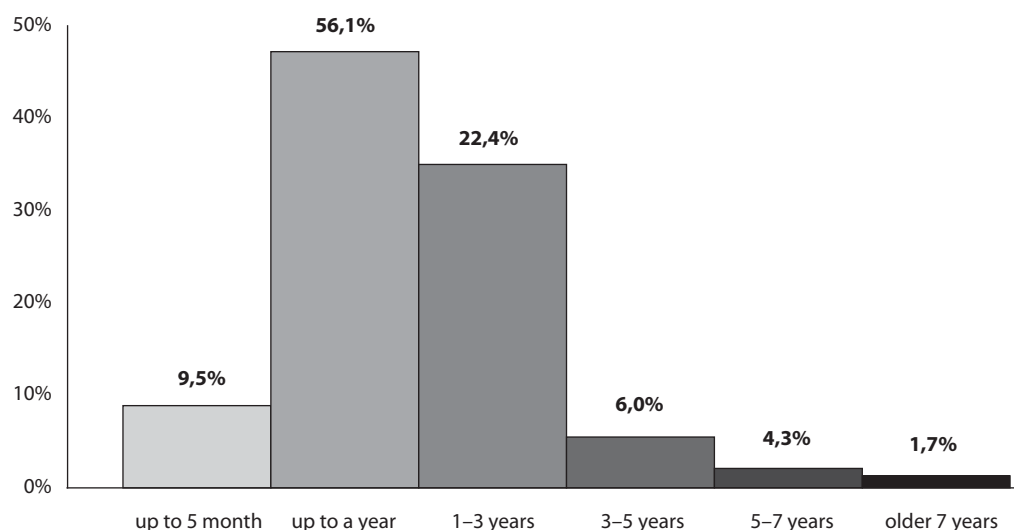


Table 1.
Timing of patients'
admission
to hospital

Length of hospitalization (hours)	Number of patients	
	abs	%
up to 12	33	28.4%
12-24	28	24.1%
24-48	thirty	25.9%
48 or more	25	21.6%
Total	116	100%

Materials and research methods

The basis of this study consisted of 116 children with intussusception, aged 3 months and older, up to 12 years old, who were treated at the Specialized Children's Surgical Clinic of SamSMU over the past 20 years. There were 76 (65.5%) children under 1 year of age, 26 (22.4%) under 3 years of age, and 14 (12.1%) over 3 years of age. There were 2.7 times more boys — 85 (73.3%) than girls — 31 (26.7%). The most common occurrence of intussusception was in children aged 6 months to 1 year — 76 people (65.5%) (Fig. 1).

As a result of the analysis of anamnestic data, it was found that in the first 12 hours from the onset of the disease, 33 (28.4%) patients came to the clinic, in the period from 12 to 24 hours — 28 (24.1%), 25 — 48 hours — 30 (25.9%) and more than 48 hours later — 25 (21.6%) children (Table 1).

It is alarming that 55 (47.5%) patients came to the clinic a day or more after the onset of the disease.

The children underwent a comprehensive examination, including medical history, examination, palpation of the abdomen under medicinal sleep, digital rectal examination, laboratory examination, radiography, pneumo-irrigoscopy and ultrasound examination.

All 116 patients, depending on the treatment and diagnostic tactics, were divided into 2 groups. The control group consisted of 43 patients treated from 2008 to 2013. In this group, traditional treatment and diagnostic tactics were followed, which were based on survey R-graphy and pneumo-irrigoscopy under fluoroscopy. Since 2014, in the diagnosis and conservative treatment of IH (the main group — 73 children), the clinically developed method of hydroechocolonographic disinvagination (HES) with 1.5% sodium chloride solution under ultrasound control in real time has been used.

Research results and discussion

When studying the causative factors, it was revealed that in 36 (31%) cases IH was preceded by intestinal disorders, in 31 (26.7%) new foods were introduced into the child's diet, errors in nutrition were made in 28 (24.1%) children. In 4 (3.4%) IC developed against the background of a respiratory infection.

When studying the clinical manifestations, it was revealed that the main ones were the appearance in the child of sudden attacks of anxiety with "light intervals"

due to ischemic cramping pain in the abdomen, bloody discharge from the anus in the form of raspberry jelly, a palpable formation in the abdominal cavity, i.e. called the classical Mondor triad. Cramping abdominal pain was observed in 103 (88.8%), vomiting in 97 (83.6%) and a palpable mass in the abdominal cavity in 85 (73.3%) patients (Table 2).

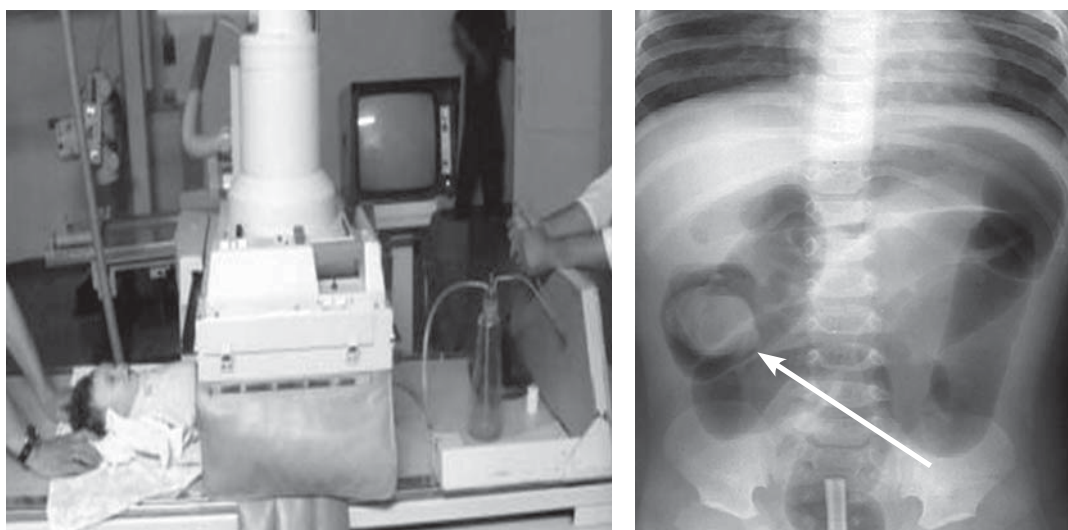
Clinical signs of a complicated course of IR were observed in patients with an admission period of more

Table 2.
Frequency of symptoms during cardiopulmonary bypass in the studied patients

Symptoms	Number of patients (%)	
	abs	%
Abdominal pain of a paroxysmal nature with light intervals	103 (88.8%)	88.8
Vomit	97	83.6
Palpable mass in the abdominal cavity	85	73.3
Symptom of the "Obukhov Hospital" and "raspberry jelly"	86	74.1
Retention of stool and gas	47	40.5

Table 3.
Clinical signs of complicated course of IR

Symptoms	Number of patients	
	abs	%
Hyperthermia over 380C	48	41.4
Vomit	97	83.6
Hypovolemic shock	36	31.0
Peritoneal symptoms	41	35.3
"Birth" of intussusception	2	1.7

Figure 2.
Pneumoirrigoscopy

than 3 days. Hyperthermia over 380C upon admission was observed in 41.4% of patients, vomiting in 83.6%. Peritoneal symptoms were detected in 49% of children. In 2 (1.7%) patients upon admission, the phenomenon of "birth" of intussusception from the anus was observed, very similar to rectal prolapse (Table 3).

As a result of a comprehensive examination and intraoperative data, ileocecal intussusception was identified in 109 (94.0%), small-small intestinal in 6 (5.2%) and large-colon in 1 (0.8%).

In the control group, when diagnosing IR, the main research method was pneumoirrigoscopy under X-ray control. The intussusception was visualized as a homogeneous oval-shaped shadow with smooth contours — the head of the intussusception (Fig. 2).

In the main group, ultrasonography was used to diagnose IR. Ultrasound revealed classic echosymptoms — the "target" and "pseudorenal" symptoms, which are the gold standard for ultrasound diagnostics of IR (Fig. 3).

Late ultrasound signs: localization of the head in the left half of the abdominal cavity, accumulation of fluid between the layers and in the head of the intussusception, absence of peristalsis, presence of enlarged lymph nodes. A study in the color Doppler

mapping (CDC) mode makes it possible to assess the degree of intestinal viability (Fig. 4).

In addition, additional symptoms of IR can be identified. The "forceps" symptom is visualization of the head of the intussusception during longitudinal scanning (Fig. 5).

A symptom of "excessive intestinal folding" is folding of the wall of the outer cylinder of the intussusception (Fig. 6).

Table 4 shows the frequency of detection of echographic symptoms of IR. The greatest diagnostic information content was characterized by the symptoms of "target" — 100% and "pseudo-kidney" — 97%. Thus, the use of ultrasound in the diagnosis of intussusception as a screening method makes it possible to bring the effectiveness of a comprehensive diagnosis of IC disease closer to 100%.

Depending on the applied treatment and tactical approaches, all examined patients with IR were divided into 2 groups.

In the control group, out of 43 patients, an attempt at pneumatic disinvagination under fluoroscopic control for the purpose of conservative straightening of the intussusception was performed in 25 (58.1%) patients, which was successful in 21 (48.8%). 4 (9.3%)

Table 4.
Frequency of echo signs during IR

Echosigns of IR	Number of patients (n=73)	
	Abs.	%
Target symptom	73	100.0
Symptom of «pseudo-kidney»	71	97.2
Symptom of «forceps»	51	69.6
Symptom of “excessive bowel folding”	45	61.6

children, after an unsuccessful attempt at pneumatic disinvagination, as well as 18 (41.9%) patients with a complicated course of IH and with a long duration of the disease, underwent surgical intervention.

In the main group of 73 patients, 52 (71.2%) underwent hydroechocolonographic disinvagination (HES) with 1.5% sodium chloride solution under ultrasound control using the clinical method. We begin treatment using this method for all admitted

children after ultrasound confirmation of the presence of intussusception, regardless of the duration of the disease and the age of the child in the absence of peritoneal phenomena, shock and echo signs of small intestinal intussusception. Conservative disinvagination was successful in 39 (53.4%) patients, including in 7 (9.6%) patients with disease duration of more than 24 hours. Surgical interventions in the main group were performed in 34 (46.6%) patients.

Results

Analysis of the results of IR treatment in the control and main groups showed that the use of hydroechocolonographic disinvagination under ultrasound control significantly improved treatment

results. At the same time, the number of conservatively treated patients has increased, the average length of stay of a patient in hospital has decreased, and radiation exposure has been reduced to zero.

Conclusions

- 1. Ultrasonography is the main and safe method for diagnosing IC, which makes it possible to bring the effectiveness of complex diagnostics closer to 100% and is important in choosing treatment tactics.
- 2. Methodhydroechocolonography (HEC) under ultrasound control allows you to successfully

perform disinvagination, sharply reduce the number of X-ray examinations and, thereby, reduce the overall radiation dose to the patient and staff, and also significantly increases the percentage of conservatively treated patients.

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К статье

Новые подходы к диагностике и тактике хирургического лечения инвагинации кишечника у детей (стр. 62–66)

To article

New approaches to the diagnosis and tactics of surgical treatment of intestinal intussusception in children (p. 62–66)

Figure 3. Visualization of the intussusception on ultrasound

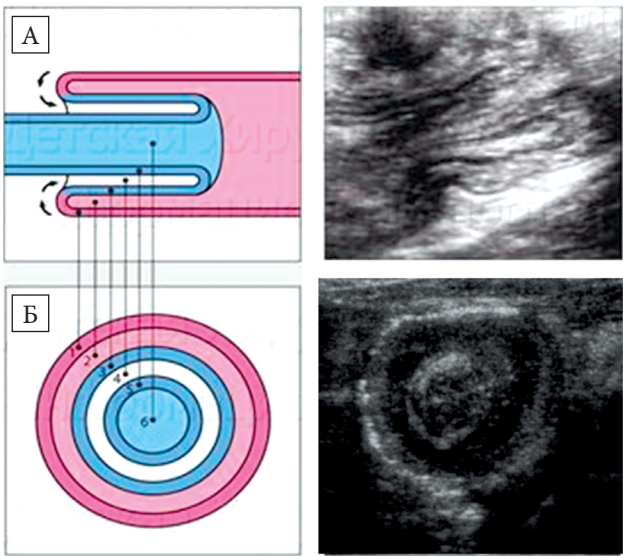


Figure 4. Visualization of intussusception on the CDC

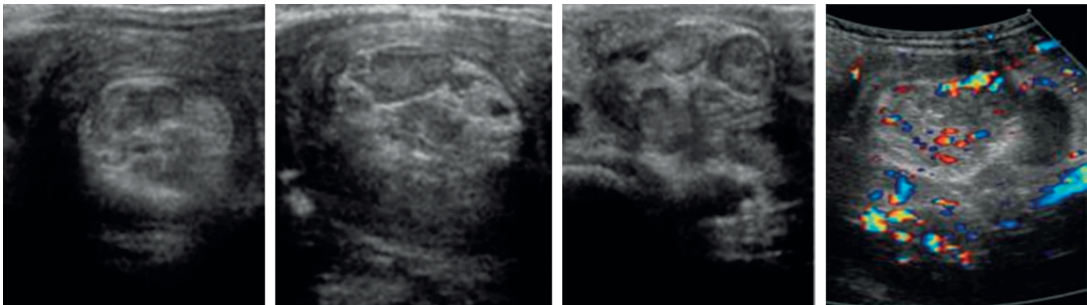


Figure 5. Scheme and ultrasound image with the “forceps” symptom during IR

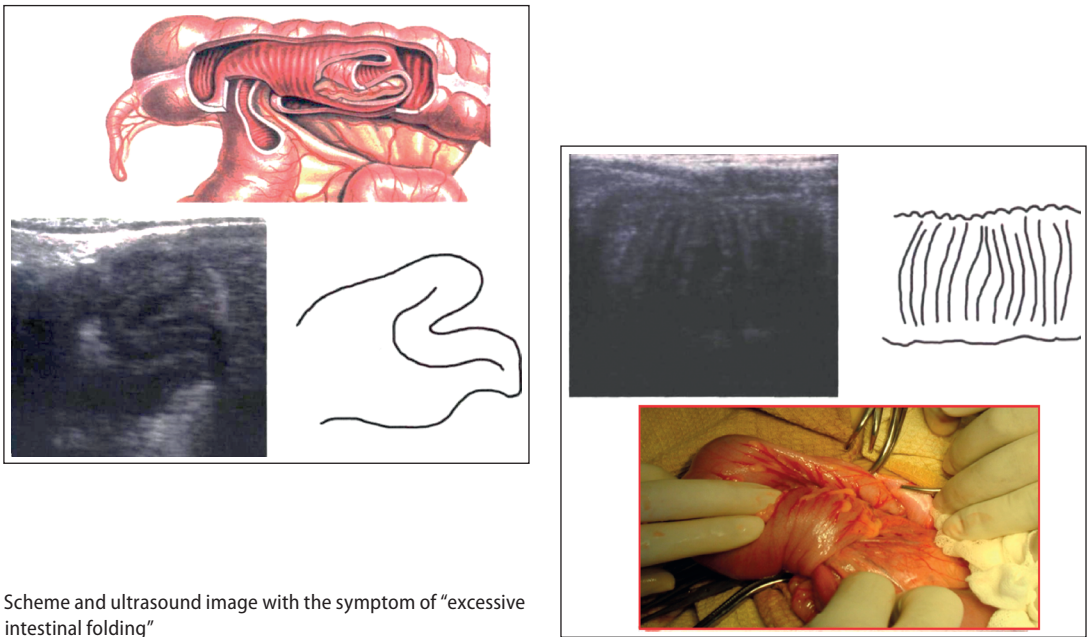


Figure 6. Scheme and ultrasound image with the symptom of “excessive intestinal folding”