

UDC 616.34-007.44-053.2-08



SPAKHI O.V., LIATURYNSKA O.V., PAKHOLCHUK O.P.
Zaporizhzhia State Medical University, Zaporizhzhia, Ukraine

DIAGNOSIS AND TREATMENT OF INTUSSUSCEPTION IN CHILDREN

Summary. Intussusception is the most common form of acquired gastrointestinal obstruction in children. **The aim** is to study the features of the clinical course and strategy for intussusception treatment in children and to analyze limitations of diagnostic, clinical and special examination techniques. **Materials and methods.** We have analyzed outcomes in 272 children treated in pediatric surgery clinic from 2004 to 2015. Objective criteria were developed to evaluate the stages of intussusception that correlate with the degree of endotoxemia, changes in respiratory function and circulation, disorders of gut motility, as well as findings of ultrasound examination of the abdominal organs. **Results and discussion.** In patients with intussusception stage I (233 children), we found no signs of endotoxemia or they were of low-grade. 10 children underwent surgery, in 4 cases — using laparoscopic technique. Of 32 patients with stage II, in 8 cases intussusception was straightened conservatively on the first try. We don't make a second attempt in children. Operational straightening was performed in 24 patients. The third stage of intussusception in children (7 patients) has signs of endotoxemia degree III. All patients with the third stage of intussusception underwent median laparotomy. In 5 cases, we have detected intussusceptum necrosis, and in these children we performed bowel resection followed by the imposition of final ileostomy and intubation of the small intestine. In the rest (2) patients, we were able to straighten intussusceptum, and the gut was recognized as viable. Applying primary anastomosis after bowel resection in peritonitis is unacceptable. **Conclusions.** Comprehensive survey of children using laboratory and instrumental methods became the basis for the allocation of 3 stages of intussusception, which correlated with the degree of endotoxemia and impaired bowel function: stage I — compensated; stage II — subcompensated; stage III — decompensated. Objective evaluation of intussusception stages allows us to differentiate the extent of measures on the stages of treatment depending on the disease state, which greatly simplifies the solution of tactical problems facing the surgeon and anesthesiologist before, during and after disinvagination.

Key words: intussusception, children, endotoxemia.

Адреси для листування з авторами:
Спахі Олег Володимирович
Кафедра дитячої хірургії та анестезіології Запорізького
державного медичного університету, Запорізька обласна
клінічна дитяча лікарня
69063, Україна, м. Запоріжжя, пр. Леніна, 70
E-mail: spakhi@mail.ru

© Spakhi O.V., Liaturynska O.V., Pakholchuk O.P., 2016
© «Pediatric Surgery in Ukrainian», 2016
© Zaslavsky O.Yu., 2016

Introduction

Intussusception of the intestines is the most common form of acquired obstruction of the gastrointestinal tract in children. The frequency of reaches 70–80 % of all species of intestinal obstruction. It is a mixed variant of acquired obstruction — obstruction and strangulation. Intussusception occurs most frequently in the first year of life (80 %), mainly in children aged 5–10 months, confirming the importance of anatomical and physiological features of early childhood in the etiopathogenesis of this disease.

However, in practice, despite the progress of pediatric surgery in recent years, diagnosis of intussusception of the intestines is often too late. Underdeveloped stages objective diagnosis of intussusception in children. So, the aim is to study the clinical course and treatment strategy intussusception in children and analysis capabilities of diagnostic, clinical and special methods.

Materials and methods

The study is based on the analysis of results of treatment of 272 child who were in the pediatric surgery clinic from 2004 to 2015. Developed objective criteria for evaluation stages of intussusception that correlate with the degree of endotoxemia in the body of a sick child, changes in respiratory function and circulatory disorders of gut motility, and ultrasound of the abdomen.

The degree of endotoxemia judged by the blood levels of the average molecular weight, circulating immune complexes, leukocyte index of intoxication, transaminase levels.

Changes in respiratory function was evaluated by the following parameters: respiratory rate, tidal volume, oxygen consumption of tissues, acid-base status, blood gas partial pressure in the artery and vein, the hemoglobin oxygen saturation in the artery and vein.

We determined the parameters of hemodynamics and oxygen transport in children with intussusception, heart rate, mean arterial pressure, cardiac index, stroke index, oxygen delivery to tissues, arterio-venous difference, central venous pressure.

Ultrasonography of the abdomen in a child with intussusception possible to not only locate intussusceptum, but rather to identify specific changes that are characteristic of each stage. X-ray examination made vertically necessary to determine signs of intestinal obstruction. Radiography colon with air contrast was used mostly as a conservative method of straightening intussusceptum. Given the almost 100 % of the value of diagnostic ultrasound, if the question of surgery solved by X-ray can be waived.

Objective diagnosis of intussusception stages when receiving a child to the clinic helped differentiate volume measures on the stages of treatment and improve their results.

Results and discussion

In 233 child diagnosed with stage I and intussusception. Disease duration is usually no more than a day. The function of vital organs is not broken Plain radiographs of the abdomen signs of intestinal obstruction available. Sonographic picture of the 1st stage of intussusception helped identify ehopozytyvne formation of round or cylindrical.

How transverse and longitudinal scan determines concentric echogenic areas interspersed. In patients with the I stage of intussusception signs of endotoxemia not detected or found vaguely. There is increasing leukocyte index of intoxication by 30–40 %.

Respiratory disorders are on the level of compensatory changes, breathlessness provides adequate ventilation, keeping the partial pressure of the gas in the blood and hemoglobin oxygen saturation at the appropriate level. Oxygen consumption with the tissues increases significantly.

Indicators of hemodynamics and oxygen transport in children with I stage of intussusception in accordance not changed. Characteristic changes in motor activity in patients with bowel I stage. Registered increase in the frequency and amplitude of peristaltic waves.

The first stage of intussusception in children, including hospital, minimal signs of endotoxemia, ultrasound data and the results of additional research methods, we denote as — compensated stage.

Treatment of children with the I stage of intussusception is usually conservative. Conservative intussusceptum on straightening technique used was effective in 223 children (95 %). In 198 children — the first attempt. In 10 (5 %) children had unsuccessful conservative disinvagination, these children performed surgical straightening intussusceptum after a brief preoperative preparation. In 4 cases laparoscopic.

Diagnosis and treatment of 2nd stage of intussusception. Clinical manifestations of intussusception in 32 patients with 2nd stage of the disease is more significant. Disease duration is usually 1 to 2 days. Manifestuyuchyy symptom that was reason for seeking medical help parents, is bleeding from the rectum, the so-called «Raspberry jelly». Therefore it is always necessary to carry out differential diagnosis of intussusception with intestinal infection that was the basis for the designation of the 2nd stage of intussusception as «pseudododyzenteriyana stage».

These abdominal ultrasound, indicators of endotoxemia, function parameters respiration and circulation can more objectively diagnosis 2nd stage of intussusception in children.

The second stage of intussusception we have labeled — subcompensated stage.

Treatment of patients with 2nd stage of intussusception (32 children), given signs of endotoxemia, must include short-term training to disinvagination, lasting no more than 2 hours. It involves setting a nasogastric tube, central vein catheterization, detoxification therapy of infusion rate of 20–30 ml/kg body weight.

Of the 32 children in 8 children intussusception straightened conservatively on the first try. Second attempt in children with 2nd stage will not do. Operational straightening carried 24 patients, 20 — with access to the right side of the abdomen, and 4 — laparoskopichno. In all cases, bowel operational disinvagination proved viable.

Intussusception 3rd stage corresponds clinic severe peritonitis, the diagnosis of which is not disputed (7 children), which determines its clinical name, like — «stage of peritonitis». Disease duration in all patients was more than 2 days.

In the 3rd stage of intussusception sonographic picture differs polymorphism. In 4 patients intussusceptum through

bloating, was not determined. No concentricity layer on its periphery. Determined by swelling and thickening of the walls of the intestinal tube.

The most objective information to diagnose the third stage of intussusception treated in laboratory examination of children. Endotoxemia in children from the third stage of intussusception endotoxemicosis classified as grade 3.

The children of the third stage of intussusception decompensation of respiratory disorders resulted in significant metabolic changes — registered metabolic acidosis. Recorded significant tachycardia (up to 150 % of the normal range). Thus, the third stage of intussusception in children clinically similar to severe peritonitis, which has signs of endotoxemia 3rd degree with significant impairment of respiratory and cardiovascular systems, which show metabolic acidosis, tissue hypoxia and hypodynamic type of circulation, we designated as — decompensated stage.

Treatment of children with 3rd stage of intussusception (7 patients) started in the intensive care unit. The duration of preoperative preparation 4, maximum — 6 hours. Stabilization of the child and improvement homeostasis can solve the issue in favor of surgery.

All patients of the third stage of intussusception midline laparotomy performed under endotracheal anesthesia with controlled breathing. Intussusceptum evaluated the viability and necrosis during its manufacture resection of intestine within the healthy tissue of intussusceptum, without attempts to straightening. So, with 7 of our patients with the third stage of intussusception occurred U5 necrosis intussusceptum these children and made bowel resection followed by the imposition of final ileostomy and intubation of the small intestine. The rest (2) patients intussusceptum managed to straighten and gut recognized viable after the introduction of novocaine ripples and warming for 30 minutes. Imposing primary anastomosis after resection of the bowel in conditions of peritonitis, we consider unacceptable.

Conclusions

1. Comprehensive survey of children using laboratory and instrumental methods became the basis for the allocation of 3 stages of intussusception, which correlated with the degree of impairment of endotoxemia and gut: I stage — offset (bright stage clinical manifestations); II stage — subcompensated (pseudodyzenteryna); III stage — decompensated (stage peritonitis).

2. Objective assessment allows us to differentiate stages of intussusception volume measures on the stages of treatment depending on the stage of the disease, which greatly simplifies the solution of tactical problems facing the surgeon and anesthesiologist before, during and after disinvagination.

References

1. Belyaev M.K. *The decision of the Russian Symposium of Pediatric Surgeons with international participation «Acquired intestinal obstruction in children» // Detskaya hirurgiya. — 2011. — 2. — 53-54.*
2. Degtyar V.A. *Minimally invasive treatment of intussusception in children // Hirurgiya detskogo vozrasta. — 1. — 52-53.*
3. Morozov D.A. *Duration allocation of blood from the rectum — the main criterion for choosing a method of treatment of intussusceptions // Detskaya hirurgiya. — 2010. — 6. — 29-32.*
4. Podkamenov V.V. *The new concept of the pathogenesis of intussusception intestines in infants // Detskaya hirurgiya. — 2011. — 1. — 45-47.*
5. Safronov B.G., Baklanov V.V. *Surgical treatment of severe forms of intussusception in children // Detskaya hirurgiya. — 3. — 12-14.*
6. Solovyov A.E., Nikifirov O.A. *Stages of intussusception in children // Aktualnie pitannya farmazevtichnoyi i medichnoyi nauki i praktiki. — 2011. — 6. — 273-275.*
7. Solovyov A.E. *Stages of intussusception in children // Hirurgiya detskogo vozrasta. — 2009. — 1. — 41-43.*
8. Sushko V.I. *Hirurgiya detskogo vozrasta. — Kiev: Zdorovya, 2002. — 214-225.*
9. Urin O.M., Ribalchenko V.F. *Intestinal intussusception in older children // Hirurgiya detskogo vozrasta. — 2006. — 1. — 37-45.*
10. Gupta R.K. *Intussusception in adults: institutional review // Int. J. Surg. — 2011. — 9. — 91-95.*
11. Tate J.E. *WHO-coordinated Global Rotavirus Surveillance Network. 2008 estimate of worldwide rotavirus-associated mortality in children younger than 5 years before the introduction of universal rotavirus vaccination programmes: a systematic review and meta-analysis // Lancet Infect. Dis. — 2012. — 12. — 136-141.*
12. Wang. N. *Adults intussusception: a retrospective review of 41 cases // World J. Gastroenterol. — 2009. — 14. — 3303-3308.*

Received 03.01.16 ■

Спахі О.В., Лятуринська О.В., Пахольчук О.П.

Запорізький державний медичний університет, м. Запоріжжя, Україна

ДІАГНОСТИКА ТА ЛІКУВАННЯ ІНВАГІНАЦІЇ КИШЕЧНИКА В ДІТЕЙ

Резюме. Інвагінація кишків є найчастішою формою набуті непрохідності шлунково-кишкового тракту в дітей. **Мета** роботи — вивчення особливостей клінічного перебігу та тактики лікування інвагінації кишківника в дітей та проведення аналізу можливості діагностичних, клінічних та спеціальних методів обстеження. **Матеріали та методи дослідження.** Проведено аналіз результатів лікування 272 дітей у клініці дитячої хірургії з 2004 по 2015 рік. Розроблено об'єктивні критерії

оцінки стадій інвагінації, що корелюють зі ступенем ендотоксикозу, змінами функції дихання та кровообігу, порушеннями перистальтики кишківника, а також даними ультразвукової діагностики органів черевної порожнини. **Результати та обговорення.** У хворих з 1-ю стадією інвагінації (233 дитини) ознаки ендотоксикозу не виявлені або слабо виражені. У 10 дітей здійснено оперативне лікування, з яких у 4 випадках лапароскопічно. З 32 пацієнтів з 2-ю стадією в 8 випадках інвагінація

розпрямлена консервативно з першої спроби. Другої спроби в дітей із 2-ю стадією не робимо. Оперативне розпрямлення здійснене 24 хворим. 3-тя стадія інвагінації кишечника в дітей (7 хворих) має прояви ендотоксикозу 3-го ступеня. Усім хворим із 3-ю стадією інвагінації виконана серединна лапаротомія. У 5 випадках — некроз інвагинату, і цим дітям виконана резекція кишки з подальшим накладенням кінцевої ілеостомі та інтубацією тонкої кишки. У решти (2) хворих інвагинат вдалося розпрямити і кишка визнана життєздатною. Накладення первинного анастомозу після резекції кишки в умовах перитоніту вважаємо недопустимим. **Висновки.** Комплексне

обстеження дітей із використанням лабораторних і інструментальних методів стало підставою для виділення 3 стадій інвагінації кишечника, що корелювали зі ступенем ендотоксикозу та порушеннями функції кишечника: I стадія — компенсована; II стадія — субкомпенсована; III стадія — декомпенсована. Об'єктивна оцінка стадій інвагінації дозволяє диференціювати обсяг заходів на етапах лікування залежно від стадії захворювання, що значно спрощує рішення тактичних завдань, що стоять перед хірургом та анестезіологом до, під час і після дезінвагінації.

Ключові слова: кишкова інвагінація, діти, ендотоксикоз.

Саха О.В., Лятуриная О.В., Пахольчук А.П.

Запорожский государственный медицинский университет, г. Запорожье, Украина

ДИАГНОСТИКА И ЛЕЧЕНИЕ ИНВАГИНАЦИИ КИШЕЧНИКА У ДЕТЕЙ

Резюме. Инвагинация кишок является наиболее частой формой приобретенной непроходимости желудочно-кишечного тракта у детей. **Целью** работы является изучение особенностей клинического течения и тактики лечения инвагинации кишечника у детей и проведение анализа возможности диагностических, клинических и специальных методов обследования. **Материалы и методы исследования.** Проведен анализ результатов лечения 272 детей в клинике детской хирургии с 2004 по 2015 год. Разработаны объективные критерии оценки стадий инвагинации, которые коррелируют со степенью эндотоксикоза, изменениями функции дыхания и кровообращения, нарушениями перистальтики кишечника, а также данным ультразвуковой диагностики органов брюшной полости. **Результаты и обсуждение.** У больных с 1-й стадией инвагинации (233 ребенка) признаки эндотоксикоза не обнаружены или слабо выраженные. У 10 детей проведено оперативное лечение, из которых в 4 случаях лапароскопически. Из 32 пациентов со 2-й стадией в 8 случаях инвагинация распрямлена консервативно с первой попытки. Второй попытки у детей со 2-й стадией не делаем. Оперативное распрямление осуществлено 24 больным. Третья стадия инвагинации кишечника у детей (7

больных) имеет проявления эндотоксикоза 3-й степени. Всем больным с третьей стадией инвагинации выполнена срединная лапаротомия. В 5 случаях — некроз инвагината, и этим детям выполнена резекция кишки с последующим наложением конечной илеостомы и интубацией тонкой кишки. У остальных (2) больных инвагинат удалось расправить и кишка признана жизнеспособной. Наложение первичного анастомоза после резекции кишки в условиях перитонита считаем недопустимым. **Выводы.** Комплексное обследование детей с использованием лабораторных и инструментальных методов стало основанием для выделения 3 стадий инвагинации кишечника, которые коррелировали со степенью эндотоксикоза и нарушениями функции кишечника: I стадия — компенсированная; II стадия — субкомпенсированная; III стадия — декомпенсированная. Объективная оценка стадий инвагинации позволяет дифференцировать объем мероприятий на этапах лечения в зависимости от стадии заболевания, что значительно упрощает решение тактических задач, стоящих перед хирургом и анестезиологом до, во время и после дезинвагинации.

Ключевые слова: кишечная инвагинация, дети, эндотоксикоз.