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Features of rehabilitation of children after surgery for Hirschsprung's disease

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Summary

Currently, the evaluation of the effectiveness of surgical treatment for malformations of the colon, in particular, Hirschsprung's disease, is becoming increasingly important. According to various authors, in approximately 25–30% of patients, despite a technically flawless operation, residual functional disorders are detected, mainly episodic constipation and fecal incontinence. In this regard, the task of objectifying the essence and nature of functional deviations and the development of restorative therapeutic measures arises.

The aim of this work: The purpose of this work is to evaluate the effectiveness of the developed methods of rehabilitation of Hirschsprung's disease in children.

Materials and methods. In the period from 2007 to 2022, 54 patients with Hirschsprung's disease were operated on using the Sauve-Lyonyushkin technique. Depending on the amount of rehabilitation treatment, patients were divided into two groups. Group 1 consisted of 19 patients operated on from 2007 to 2015, group 2 included 35 children operated on from 2016 to 2022.

EDN: OXFHGP

Keywords: Hirschsprung's disease, rehabilitation, hyperkinetic, constipation, malformation, sphincter

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Особенности реабилитации детей после операций по поводу болезни Гиршпрунга

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Резюме

В настоящее время оценка эффективности хирургического лечения пороков развития толстой кишки, в частности болезни Гиршпрунга, приобретает все большее значение. По данным разных авторов, примерно у 25–30% пациентов, несмотря на технически безупречную операцию, выявляются остаточные функциональные нарушения, в основном эпизодические запоры и недержание кала. В связи с этим возникает задача объективизации сущности и характера функциональных отклонений и разработки восстановительных терапевтических мероприятий.

Цель данной работы: Целью данной работы является оценка эффективности разработанных методов реабилитации при болезни Гиршпрунга у детей.

Материалы и методы. В период с 2007 по 2022 год 54 пациента с болезнью Гиршпрунга были прооперированы по методике Сове-Ленюшкина. В зависимости от объема восстановительного лечения пациенты были разделены на две группы. В 1-ю группу вошли 19 пациентов, прооперированных с 2007 по 2015 год, во 2-ю группу вошли 35 детей, прооперированных с 2016 по 2022 год.

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

Конфликт интересов. Авторы заявляют об отсутствии конфликта интересов.

Studying the results of surgical intervention in dynamics, we evaluated them according to a four-point system: excellent, good, satisfactory, unsatisfactory. The result was considered excellent in children who are no different from their peers, who have normal regular independent stools that hold feces of any consistency and gases, good – when, against the background of general good development and regular independent stools, episodically, 2–4 times a year, constipation occurred or was noted involuntary slight discharge of feces and gases; satisfactory – in the presence of stable fecal incontinence of any consistency, as well as persistent constipation, requiring benefits in the form of cleansing enemas, the use of laxatives; unsatisfactory – considered a recurrence of the disease or the consequences of severe postoperative complications, causing persistent constipation or complete fecal incontinence. We note immediately that there were no unsatisfactory results.

Our attention was focused on those patients who, to one degree or another, had functional disorders in the form of partial fecal incontinence and episodic constipation. We would like to emphasize that we are talking about patients in whom the operation was performed flawlessly in technical terms, the postoperative period proceeded smoothly.

To determine the amount of postoperative restorative treatment, we conducted a functional study of the rectoanal zone in 20 children with residual manifestations after surgery at different times.

The studies were carried out on the apparatus Disa-2100 (Denmark) according to the method of N. Anam accepted in the clinic [1], 30–40 minutes after the cleansing enema, without the use of analgesics and narcotic substances in the lithotomy position. Data was recorded on a thermal recorder. The continuous profile of rectoanal pressure, the motor function of the newly created rectum, and the threshold parameters of the rectoanal reflex were determined.

The data of continuous profilometry showed that in patients with partial fecal incontinence, the average

Table 1. Indicators of maximum pressure (see water column) in the anal canal in children before and after rehabilitation

Study period	At rest see		With arbitrary contraction, cm	
	1	2	1	2
Fine	51.43 ± 4.42	0.53 ± 0.52	66.09 ± 2.20	0.72 ± 0.05
Before rehabilitation	48.85 ± 1.12	0.45 ± 0.04	59.05 ± 1.57	0.66 ± 0.02
After rehabilitation	52.70 ± 1.15	0.57 ± 0.04	63.35 ± 1.52	0.72 ± 0.03

Table 2. Indicators of the rectoanal reflex in operated children before and after rehabilitation

Note. 1-balloon volume (ml); 2- relaxation amplitude (cm water column); 3 – relaxation time (s) of the rectoanal reflex.

Parameters under study	Study period and indicators		
	Fine	Before rehabilitation	After rehabilitation
1	20.11 ± 0.68	22.50 ± 0.99	20.30 ± 0.57
PFC 2	17.18 ± 0.70	15.35 ± 1.04	18.55 ± 1.21
3	16.55 ± 0.90	12.45 ± 0.55	16.10 ± 0.73
1	23.06 ± 1.11	37.75 ± 1.56	33.50 ± 1.05
PSCH 2	19.17 ± 0.76	16.35 ± 0.94	18.15 ± 0.73
3	18.44 ± 0.91	19.25 ± 0.63	25.05 ± 0.89
1	56.11 ± 1.88	60.50 ± 4.0	56.00 ± 4.50
PPD 2	27.3 ± 0.90	23.15 ± 1.04	24.95 ± 0.90
3	25.53 ± 1.42	19.25 ± 0.63	25.1 ± 0.91
1	70.68 ± 3.09	80.50 ± 3.66	71.0 ± 3.07
PPRVS 2	30.32 ± 1.24	21.25 ± 1.26	27.6 ± 1.16
3	27.66 ± 1.30	22.50 ± 0.61	27.15 ± 0.77
1	125.0 ± 3.76	113.50 ± 4.94	96.50 ± 4.25
Mon 2	33.43 ± 1.09	25.20 ± 0.84	28.60 ± 1.19
3	39.78 ± 2.0	26.20 ± 0.90	36.50 ± 1.04

value of rectal pressure is above the norm and is (12.25±0.53) cm aq. Art. (with a norm of 11.25+±0.25). The pressure in the anal canal was also determined and it was used to judge the tone of the external sphincter at rest and the contractile force during voluntary contraction. It is known that a decrease in anal pressure plays an important role in the pathogenesis of fecal incontinence: the sealing of the anal canal is disturbed, the pressure gradient changes, there is a decrease in the resistance to intrarectal pressure and an increase in the latter due to the accumulation of fecal masses, the ability to retain which is lost. Studies have shown that in the examined patients, the pressure in the anal canal at rest and during voluntary contraction is significantly lower than normal, which to some extent explains the mechanism of fecal incontinence (Table 1).

When studying the motor function of the newly created rectum, 3 types of contractile movements were revealed: hyperkinetic (in 50%), normokinetic (in 25%) and hypokinetic (in 25%). The hyperkinetic type was mainly observed in children who underwent left-sided hemicolectomy or had moderate stenosis in the anastomotic area. The hypokinetic type was more common with a sharp suprastenotic expansion of the large intestine; subsequently, the reduced intestine was slowly reduced to normal sizes.

Valuable data on the state of the reflex activity of the rectoanal zone were obtained by studying the threshold parameters

We found that in patients with residual phenomena after radical surgery for Hirschsprung's disease, the following values were increased in volume: reflex sensitivity threshold (PRS) – by 11.9%, subjective sensitivity threshold (PSCh) – by 13.7%, urge to defecate threshold (PPD) – by 7.8%, the internal sphincter (PPRS) – by the threshold of full disclosure of 12.5%, the threshold of intolerance (IT), on the contrary, was reduced by 10.1%. At the same time, most of the examined patients had an unformed or poorly formed rectal ampulla (Table 2).

Analysis of the results of special functional studies suggests that the mechanism of fecal incontinence in the long term after technically correctly performed radical operations is due to a violation of the neuroreflex connections of the newly created rectum with the sphincter apparatus. This circumstance necessitates additional conservative treatment for all patients, without exception, operated on for Hirschsprung's disease.

Postoperative rehabilitation of patients until 2016 was carried out immediately after the operation, only during the stay in the hospital and was reduced to the appointment of microclysters, warm baths on the perineum with a solution of potassium permanganate. In this group of patients, residual functional abnormalities (fecal incontinence, constipation or their alternation) were noted in 27% of cases.

In the scientific literature, the recovery postoperative period is called the period from 2 months. up to 2 years (3–5), and sometimes even before puberty (6.7) when there may be frequent stools up to 5–6 times a day, occasional constipation, partial fecal incontinence, lack of an imperative urge to defecate. As the child grows and the compensatory mechanisms develop, these phenomena sometimes disappear on their own, which is usually expected.

In order to shorten the time for the normalization of colon function, we decided to actively influence the course of the recovery period and developed a scheme for postoperative rehabilitation for Hirschsprung's disease. Naturally, the volume, duration and direction of therapeutic measures are variable and are selected taking into account the characteristics of the pathology in a particular patient.

Immediately after the operation, the first stage of rehabilitation treatment follows, which is aimed at

accelerating the processes of readaptation of the body in general and the function of the reconstructed rectum and its retaining apparatus, in particular, with the help of general and local therapeutic measures. General measures include: therapeutic nutrition, vitamin therapy, the appointment of enzyme and bacterial preparations, stimulation of the body's defenses. Therapeutic measures of a local nature were carried out to develop a normal urge to defecate, to train the newly formed rectum and its obturator apparatus. The development of a defecation reflex was started after the anastomosis phenomena ceased, the consequences of the surgical injury disappeared, and the anastomosis became stronger. Here, therapeutic and training enemas play a leading role. In order to prevent stenosis in the area of the anastomosis, control and therapeutic bougienage was performed. The duration of the first stage was 2–6 months.

The second stage provides for rehabilitation in the truest sense of the word. Some of the activities were carried out in parallel with the activities of the first period, others – after it and continued for 1–2 years. At this stage, the main task is to finally consolidate the skills of independent defecation, normalize the function of the large intestine and the retaining apparatus of the rectum. An important role is played by medical and educational activities that create an emotional background. One of the central places is occupied by electrical stimulation of the rectum, anal sphincter and perineal muscles. For this purpose, we used an electrode of the original design, its feature is the possibility of individual selection of the location of the stimulating electrodes and optimal stimulation parameters. In addition, in the process of stimulation, it is possible to determine the length of the anal canal and its functional state. Consolidation of the positive results of rehabilitation contributes to sanatorium treatment. Our observations have shown that functional disorders are longer in children with a sharp suprastenotic expansion of the colon, and the adaptation process is slowed down due to the functional inferiority of the part of the colon remaining after resection. These patients are in particular need of rehabilitation treatment. Compensatory processes are also unstable in patients with concomitant diseases from the CNS of other organs and systems. Under the influence of unfavorable factors (infectious disease, mental trauma, eating disorders, etc.), they easily experience "breakdowns", and children do not retain feces. In these patients, rehabilitation was carried out with the participation of a specialist of the appropriate profile.

A functional study of the same 20 children after rehabilitation revealed an increase in pressure in the anal canal by 79% (P>0.05), and with an arbitrary contraction – by 7.3% (p>0.05), which indicates an increase in sphincter tone and contractility of the muscles of the obturator apparatus, restoration of the tightness of the anal canal (see Table 1).

The positive dynamics of the threshold parameters of the rectoanal reflex is perceptible. There was a decrease in the volume of PHR by 108%, PSCH – by 12.7%, PPRVS – by 13.4%, PN – by 17.6%. The volume has not changed. On the contrary, there was an increase in the relaxation time of the PFR by 29.2%, PSCH – by 30.1%, PPD – by 30.4%, PPPBC – by 20.7%, PN – by 39.3% and amplitude; PFR – by 20.8%, PSCH – by 11%, PPRVS – by 29.9% (see Table 2).

Thus, a decrease in volume and an increase in the amplitude and relaxation time of the reflex indicates an improvement in the function of the muscle fibers of the internal sphincter and the tone of the rectum.

In total, rehabilitation treatment was carried out in 33 patients. Out of 54 patients operated on according to the Soave-Lenyushkin method, after the rehabilitation treatment, excellent results were obtained in 30 children (55.5%), good – in 22 (40.7%), satisfactory – in 2 (3.8%).

The treatment data presented by us clearly illustrate the effectiveness of the developed rehabilitation scheme. At the same time, I would like to emphasize a certain conventionality of the stages and terms of rehabilitation treatment, because there is no sharp line between them.

It is more important to strictly adhere to the defining provisions of postoperative rehabilitation, which can be formulated as follows: a) the rehabilitation process should be carried out continuously until the maximum recovery of health, normalization of bowel function and defecation is achieved in the shortest possible time; b) the rehabilitation program and the means used should be implemented taking into account the individual characteristics of the child's personality and the uniqueness of clinical, morphological and functional changes.

At the same time, it is important not to be limited only to a certain anatomical region, local status, but to consider the body as a whole. Of great practical importance is the dispensary observation of patients after surgery, the terms of which should be lengthened.

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