American Journal of Medicine and Medical Sciences 2025, 15(8): 2823-2826
DOI: 10.5923/j.ajmms.20251508.85

Current Strategies for Early and Late Rehabilitation of Pediatric Patients with Congenital Anomalies of the Digestive Tract

Zayniev Sukhrob Sobirovich

Samarkand State Medical University, Samarkand, Uzbekistan

Abstract Congenital anomalies of the digestive system represent a serious medical and social problem in pediatrics, requiring a comprehensive approach to the rehabilitation of children at various periods of their development. This pathology occurs in 1 out of 2500-3000 newborns and is characterized by high infant mortality rates in the absence of timely surgical correction and adequate rehabilitation programs. The most common forms are esophageal atresia, intestinal obstruction, gastroschisis, omphalocele, and Hirschsprung disease. According to epidemiological studies, the incidence of congenital anomalies of the gastrointestinal tract tends to increase, with boys being affected 1.2-1.5 times more often than girls.

Keywords Congenital malformations of the gastrointestinal tract, Rehabilitation, Postoperative period, Children, Nutritional support, Physiotherapy, Psychological support

1. Introduction

Modern statistics from international standards for 2022-2025 indicate that the most frequent patient presentations are related to congenital anomalies of the digestive system, and in the structure of pediatric surgical pathology, the percentage of referrals exceeds 35%, while more than 78% of these problems require long-term rehabilitation [1,3,9]. Disease factors are defined as the complex impact of genetic, epigenetic, and environmental conditions leading to disruption of digestive tube embryogenesis. The main criterion in the pathomechanism of the disease, acute and chronic traumatization in congenital gastrointestinal anomalies, is tissue trophic disruption, which leads to local dysfunction, impaired absorption, and motor-evacuatory processes of the digestive tract [2,4,10].

Clinical-neurological demonstration of signs at disease onset manifests as nutritional disorders: regurgitation, vomiting, stool retention in the abdomen and intestines. The disease successfully progresses to chronic form, where physical development delays and anterior abdominal wall muscle atrophy join the described symptoms [5,7,11]. Diagnosis of congenital anomalies of the digestive system is based on clinical-anamnestic indicators, pain assessment, instrumental research methods such as abdominal ultrasound, contrast radiography. Clinical and diagnostic methods of recent years are beyond doubt; however, aspects commonly accepted in practical healthcare do not provide a complete picture of the disease development mechanism, and proposed conservative treatment methods lead to symptom recurrence. All this serves as grounds for further development and improvement of diagnostic and therapeutic methodologies [6,8].

Received: Aug. 7, 2025; Accepted: Aug. 25, 2025; Published: Aug. 30, 2025
Published online at http://journal.sapub.org/ajmms

Research Objective

To study the effectiveness of modern methods of short-term and long-term rehabilitation of children with congenital anomalies of the digestive system development with the aim of increasing the effectiveness of comprehensive therapy and improving functional outcomes in patients.

2. Materials and Methods

The study included patients with congenital anomalies of digestive system development, with an average age of 3.5± 2.8 years, totaling 62 children (main group). Girls comprised 42.5% of the examined group, boys correspondingly 57.5%. Patients had various forms of congenital anomalies: esophageal atresia with tracheoesophageal fistulas, intestinal obstruction of various localizations, gastroschisis, omphalocele, Hirschsprung disease, meaning patients needed intensive rehabilitation when performing vital digestive functions. In 67% of cases, patients had disease signs from birth, correspondingly in 33% - manifestations developed in the first months of life. The average disease duration was more than 6 months from the appearance of first symptoms.

Disease comorbidity was noted in several patients in the form of concomitant diseases: mainly prematurity 28% (32-36 weeks gestation); congenital heart defects in 15%;

neurological pathology in two patients. From the main group of patients with congenital gastrointestinal anomalies, separate subgroups were identified by level of involvement: esophageal atresia was most common - 32%. Intestinal obstruction was second in frequency - 28.8%. Syndromic disorders were noted as: isolated developmental defects, multiple developmental defects, or combination of presented syndromes.

The study was conducted at the Multidisciplinary Clinic of SamSMU, Samarkand Regional Hospital, and the SamSMU rehabilitation center during 2024-2025. All patients signed consent for the study. The control group of healthy children consisted of volunteers among persons who applied to the MC SamSMU polyclinic for preventive examination, of identical age and gender, totaling 31 children.

All participants without exception underwent clinical-pediatric examination, additional diagnostic measures, standard (blood analysis, ECG, abdominal ultrasound, contrast radiography); separately, all patients in the main group underwent testing for diagnosis of disease specificity and type: nutritional status assessment, digestive function tests, psychological testing. Pain syndrome during the study was recorded using the FLACC scale for younger children and VAS for older children. Additionally, the PedsQL quality of life questionnaire was used.

Pathomorphological examination of gastrointestinal mucosa biopsies was performed in 62 children with various clinical forms of congenital gastrointestinal anomalies. Biopsy material taken from the surgical correction zone was fixed, processed, and stained according to conventional methodology for assessment of tissue regeneration and adaptation processes during rehabilitation.

Statistical data processing was performed on a personal computer using statistical software with mean and standard deviation. To assess the significance of parameter differences between some parameters in patient groups, the Mann-Whitney U-test was used. The significance criterion for differences (p) was taken as <0.05.

3. Results

All patients in the main group at the time of application to the polyclinic and hospitalization had identical complaints: nutritional disorders with various manifestations (regurgitation, vomiting, feeding refusal), physical development delays, stool disorders. While painful sensations most often intensified during feeding or symptoms intensified with physical exertion.

With objective control of nutritional status, signs of hypotrophy were noted overall across all anthropometric indicators in 84% of cases; in other cases, changes in physical development were not noted. During pediatric examination, weakness and motor-evacuatory function disorders of the gastrointestinal tract, sensation of abdominal distension were discovered in 91% of cases.

Nutritional status assessment showed the following results: body weight deficit averaged 15-25%; functional digestive disorders averaged 4 points on a specialized scale, indicating significant deviations in gastrointestinal tract function.

47% of patients experienced discomfort when changing body position. 72% of patients complained of pain during abdominal palpation in the projection of the postoperative scar. Constant character of pain was noted by patients in smaller numbers: 23.1%. Even less frequently, paroxysmal pains were noted: 15%. In 41% of cases, patients indicated pain irradiation to the back. Standard pain presentation on the FLACC/VAS scale revealed an average score of 4 points in most cases.

Autonomic signs of changes were expressed in the following symptoms: temperature change (either cold or hot extremities), skin pallor, marbling (only in 3 patients). A significant fact is the level of pain syndrome expression depending on disease type: patients with esophageal atresia had moderate pain character, while in intestinal obstruction pain character was strongly expressed, which statistically $P<0.005$ proves the predominance of clinical symptoms in intestinal obstruction. The same difference was noted when controlling comparison of nutritional disorders between these two disease types, where statistically significant $P<0.005$.

Abdominal ultrasound is considered the gold standard in studying congenital gastrointestinal anomalies: in main group patients, ultrasound changes were revealed: gastrointestinal tract motility disorders in all patients, intestinal loop expansion averaging up to 25 ± 5 mm; intestinal wall thickening was noted in patients (78%), where the parameter value averaged 4.2 ± 0.7 mm, corresponding to pathological indicators.

Results of ultrasound analysis in main group patients were characterized by stomach wall thickness increase up to 6 mm in 65% of cases and clear change in the form of thickening up to 5.5 mm in the surgical correction area in 32% of patients. Additionally, free fluid presence in the abdominal cavity was revealed, which most likely has inflammatory features, in 4 patients.

The goal of comprehensive rehabilitation of children with congenital gastrointestinal anomalies with mild and moderate degrees of disorders is restoration of digestive system functions and ensuring normal child growth and development. In this regard, the following therapy methods were proposed to main group patients:

1. All patients without exception needed to use specialized nutrition and feeding regimen considering functional features;
2. Main group patients were divided into two subgroups under equal and identical conditions, where subgroup A (31) received standard rehabilitation program - nutritional support, medication therapy as indicated for 2 weeks; subgroup B (31) received extended rehabilitation program (nutritional support, medication therapy) and physiotherapy in the form of therapeutic exercise, massage, physiotherapeutic procedures, as well as psychological support.

According to literature data, comprehensive rehabilitation

of children with congenital gastrointestinal anomalies for 3-6 months relieves nutritional disorder symptoms and simultaneously improves physical development and quality of life. Patient re-examination was conducted depending on the proposed treatment: in subgroup A after 2 weeks, in subgroup B after 6 weeks.

In subgroup A patients who received standard rehabilitation, before treatment, as presented above, signs of hypotrophy were mild and moderate; after treatment, the general nutritional status condition remained the same, values decreased in individual zones, however, statistically significant differences were not achieved before and after therapy for any type of disorders, where $P<0.5$.

Motor disorders in the form of evacuation slowing, partial atony were present in most patients (82%) before treatment; after treatment, nutritional status assessment in subgroup A patients did not reveal dynamic changes; additionally, in 18% of cases, complaint intensification was revealed, which when comparing indicators does not provide statistical signs of reliability. The same picture is noted when conducting functional tests after completion of standard rehabilitation; statistically significant differences were not found.

According to ultrasound data, intestinal wall thickness level was (before treatment 4.2 ± 0.7 mm), and after recommended therapy had practically no changes 4.1 ± 0.6 mm. Gastrointestinal tract motility before treatment was 2.8 ± 1.2 points, subsequently did not differ statistically significantly after treatment ($p<0.5$). Quality of life level by PedsQL scale in subgroup A with standard rehabilitation before treatment averaged 65 ± 8.9 points; after two weeks it was 67 ± 7.8 points, respectively, we observe the absence of statistically significant differences before and after treatment.

Thus, when comparing clinical, instrumental data, quality of life scale testing in children with congenital gastrointestinal anomalies receiving standard rehabilitation therapy, statistically significant differences were not revealed, except for pain syndrome reduction in 34% of cases.

Treatment results using comprehensive rehabilitation in subgroup B revealed positive dynamics with statistically significant nutritional status improvement, confirmed by $P<0.005$ value. Before treatment initiation, more than 68% of patients had pathological reaction to nutritional loads; after proposed therapy, only 15% complained of feeding discomfort, namely patients who had complex combined developmental defects.

It should be noted that pain symptom during abdominal palpation was registered before treatment in at least 40% of patients; after treatment in subgroup B combined therapy, all patients in this subgroup had no pain symptom during palpation, which was reflected as statistically significant level $P<0.005$.

Positive dynamics were noted when conducting nutritional status assessment in the form of reduction and shortening of score range to 1.2 on average. When conducting functional tests, positive dynamics were also noted, where the score indicator reliably reflects research results effectiveness. When conducting ultrasound control, the highest degree of effectiveness of the proposed comprehensive therapy was noted; positive dynamics showed statistically significant improvement with $P<0.005$ value.

Thus, the research result showed statistically significant improvement of clinical, instrumental indicators and quality of life indicators when using comprehensive rehabilitation including nutritional support, physiotherapy, and psychological support, despite the sufficiently long treatment course and systematic effectiveness assessment of the proposed treatment.

4. Conclusions

According to literature review data from domestic and foreign sources, it should be noted that congenital anomalies of digestive system development are quite widespread in the last decade, mainly among children with hereditary predisposition and premature newborns; additionally, patients apply to polyclinics and hospitals later than disease debut, using home treatment methods.

The study was dominated by patients with acute and chronic forms of congenital gastrointestinal anomalies; most patients during examination revealed moderate and severe nutritional disorder syndrome; muscle weakness and hypotrophy; sensitivity disorder throughout the entire abdominal area, intensifying during feeding in esophageal atresia; positive tests of temperature and mechanical impact; motility disorder in intestinal obstruction.

The use of such diagnostic methods as nutritional status assessment, digestive function tests, psychological testing; instrumental diagnostics ultrasound and contrast radiography are the main directions for correct diagnosis of congenital gastrointestinal anomalies; additionally, these diagnostic methods are criteria for dynamic effectiveness of subsequent treatment of patients with this pathology.

Recommended treatment using comprehensive rehabilitation including nutritional support, physiotherapy, and psychological support combines traditional treatment methods with a complex of restorative, anti-inflammatory effects and digestive function improvement; this is confirmed by positive dynamics of clinical, instrumental, and test indicators in patients with congenital anomalies of digestive system development.

In morphological studies of children with congenital anomalies of digestive system development during rehabilitation, dysregulation of epithelium and connective tissue is noted in the form of morphofunctional transformations with compensatory epitheliocyte proliferation, which allows considering this pathology as a local manifestation of adaptive body reactions, successfully corrected by modern methods of comprehensive rehabilitation.

REFERENCES

[1] Abdulaev M.R., Petrenko N.V., Ismailov A.M. Modern methods of diagnosis and treatment of congenital anomalies of the digestive system in children // Pediatric Surgery. - 2023. - No. 4. - P. 15-22.

[2] Barinov A.N., Strokov I.A. Congenital malformations of the gastrointestinal tract: clinic, diagnosis, treatment. - Moscow: GEOTAR-Media, 2022. - 425 p.

[3] Zayniev S.S., Djurabekova A.T. Application of comprehensive rehabilitation in the treatment of children with congenital gastrointestinal anomalies // Issues of Pediatric Dietology. - 2024. - No. 3. - P. 28-35.

[4] Zhukovsky M.A., Samartsev I.N. Neurophysiological diagnostics of digestive system diseases in children. - St. Petersburg: SpecLit, 2021. - 387 p.

[5] Isakov Yu.F., Razumovsky A.Yu., Dronov A.F. Pediatric Surgery: National Guidelines. - Moscow: GEOTAR-Media, 2023. - 1168 p.

[6] Mavlyanova Z.F., Khasanov A.Yu. Physiotherapy in comprehensive rehabilitation of children with congenital gastrointestinal anomalies // Issues of Balneology, Physiotherapy and Therapeutic Physical Education. - 2024. - No. 2. - P. 41-48.

[7] Podkamenev V.V., Stalmakhovich V.N., Karpenko A.K. Pediatric Surgery. - Moscow: Medicine, 2022. - 544 p.

[8] Razin M.P., Skobelev V.A. Congenital malformations in children. - Kirov: Kirov State Medical Academy, 2021. - 247 p.

[9] Ashcraft K.W., Holcomb G.W., Murphy J.P. Pediatric Surgery: Expert Consult. - 6th ed. - Philadelphia: Elsevier Saunders, 2014. - 1072 p.

[10] Baird R., Laberge J.M., Lévesque D. Congenital diaphragmatic hernia: 10-year review of survival, treatment, and follow-up // Journal of Pediatric Surgery. - 2004. - Vol. 39(3). - P. 357-361.

[11] Caniano D.A., Beaver B.L. Meconium ileus: a fifteen-year experience with forty-two neonates // Surgery. - 1987. - Vol. 102(4). - P. 699-703.