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Pathomorphological Examination of the Sigmoid Intestine Wall in Patient Children with Dolychosigma

Kamalova Malika Ilkhomovna
Samarkand, Uzbekistan, Samarkand State Medical University

Israilov Mahamadsodiq Solievich
Fergana Institute of Public Health, Fergana, Uzbekistan

Annotation: Dolichosigma is one of the most common developmental anomalies of the colon, characterized by the pathological elongation of the sigmoid colon and its mesentery. According to various authors, the frequency of dolichosigma occurrence in the child population ranges from 15% to 25%, making this pathology a pressing problem in modern pediatrics and pediatric surgery. Despite the congenital nature of the anomaly, the clinical manifestations of dolichosigma can manifest at different age periods, which is associated with the peculiarities of growth and development of the gastrointestinal tract in children. The leading symptom of the disease is chronic constipation, resistant to conservative therapy, which can be accompanied by pain syndrome, meteorism, and disruption of the child's general condition.

Keywords: dolichosigma, sigmoid colon, morphology, histology, children, intestinal wall, intramural innervation, muscular membrane, congenital intestinal anomalies, chronic constipation, pediatric surgery.

Introduction. Dolichosigma is one of the most common congenital anomalies of the colon, characterized by the pathological elongation of the sigmoid colon and its mesentery [1]. In pediatric practice, this pathology occurs in 15-25% of patients and is a pressing issue in modern pediatric surgery and gastroenterology [2]. The clinical manifestations of dolichosigma in children range from functional constipation to severe forms of intestinal obstruction, which is due to varying degrees of morphofunctional disorders in the wall of the sigmoid colon [3]. Understanding the pathogenetic mechanisms of disease development is directly related to studying structural changes in various layers of the intestinal wall [4].

Modern morphological research methods, including light microscopy, histochemical and immunohistochemical methods, allow for a detailed study of the architectonics of the muscular, submucosal, and mucosal layers of the intestinal wall in dolichosigma. Special attention is paid to the state of the intramural nervous system, the changes in which can explain disorders in the motor function of the sigmoid colon [5].

Analysis of literature data shows that morphological changes in dolichosigma are heterogeneous and can vary depending on the age of patients, the severity of clinical manifestations, and the localization of the pathological process. However, systematized data on complex morphological changes in the sigmoid colon wall in children of different age groups remain limited. Histological studies conducted by various authors indicate the presence of dystrophic changes in the muscular layer, impaired organization of the connective tissue framework, and changes in the intramural innervation system [6]. At the same time, there is no unified morphological classification of changes, which makes it difficult to compare the results of various studies and develop unified diagnostic criteria [7].

Studying the morphological features of the sigmoid colon wall in dolichosigma has not only theoretical but also practical significance for determining indications for surgical treatment, choosing the optimal volume of surgery, and predicting postoperative outcomes [8].

Purpose of the study: to study the morphological changes in various layers of the sigmoid colon wall in children with dolichosigma to determine the structural basis of the disease's pathogenesis and optimize treatment tactics.

Materials and methods of research. To study the goals and objectives of the dissertation topic in patients with dolichosigma, 143 patients (85 boys, 58 girls) aged 0 to 18 years were examined in the surgical department of the Fergana Regional Children's Multidisciplinary Medical Center (FVBKTTM) in 2022-2025, who were divided into two groups using the above methods.

The first group included 113 sick children (a total of 79%), in whom pathomorphological changes in the sigmoid colon mucosa were identified (68 boys and 45 girls).

In these patients, practically no changes were detected in the mucous membrane of the sigmoid colon (17 boys and 13 girls).

To increase reliability, the obtained results were analyzed taking into account the course of the disease in patients of both groups.

In patients with dolichosigma with a disease duration of less than one year (up to 1 year), in whom pathomorphological changes in the sigmoid colon mucosa were revealed, pallor was observed in 7 (50%), loss of appetite in 5 (35.7%), signs of rapid fatigue during physical and psycho-emotional stress in 8 (57%), dyspeptic symptoms (clearing, liquid stool 3-4 times, abdominal distension, discomfort in the epigastric region) in 9 (64%). Secondary encopresis was observed in one patient (7%) and manifested as signs of incontinence of small amounts of fecal masses, subsequently these patients developed a desire to immediately empty their intestines. In 12 patients (85.7%), the constipation lasted no more than 3 days, and in 4 patients (28.5%) - from 3 to 5 days. One patient (7%) had a history of tearfulness and capriciousness.

In children with a disease duration of less than three years (up to 1-3 years), pathomorphological changes in the sigmoid colon mucosa were observed: paleness of the skin and mucous membranes in 27 patients (81.8%), as well as mild petechiae and superficial hematomas, decreased appetite in 31 patients (93.9%), signs of rapid fatigue during physical and psycho-emotional stress in 26 patients (78.7%), constipation, bloating, periodic gas expulsion with an unpleasant odor, belching, discomfort in the epigastric region in 32 patients (96.9%). Secondary encopresis was observed in 10 patients (30.3%) and manifested as signs of incontinence of a small amount of stool (stripings with pieces of stool on underwear), then immediately a desire to empty the intestines arose. In 12 patients (36%), constipation lasted no more than 3 days, and in 24 patients (72.7%) - from 3 to 5 days. Crybaby and capriciousness were observed in 23 patients (66.9%). In 29 (87.8%) patients, dull pain was observed, radiating from the proximal colon (mainly descending and sigmoid colon), intensifying especially before defecation.

Research results. As a result of the study, the biopsy obtained from the mucous membrane of the "C"-intestine is fixed using special fixatives (carnois, neutral formalin, and 70 C-alcohol). Then, the biopsy from this fixation is passed through special conductors and soaked in paraffin. It is placed in special blocks and cut on microtomes with a thickness of 5-7 mm to prepare the preparation. The preparations were stained with hematoxylin-eosin, SHIC reactions, alkaline phosphatase, and lactase, and examined and photographed under a light-optical microscope. The studies were conducted in the laboratory of the Fergana Regional Branch of the Pathoanatomical Bureau.

In dolichosigma disease, non-specific hemodynamic disorders (congestion in blood vessels) in the "C" intestinal mucosa result in dilation (Figure 1), stasis, and the secretion of blood elements into individual areas of the mucosa (lymphocytes and monocytes), i.e., the presence of infiltration in the stroma of the mucosa, secretions in the membranes covering the surface of epithelial cells (Figure 2) and a rupture state (Figure 3).

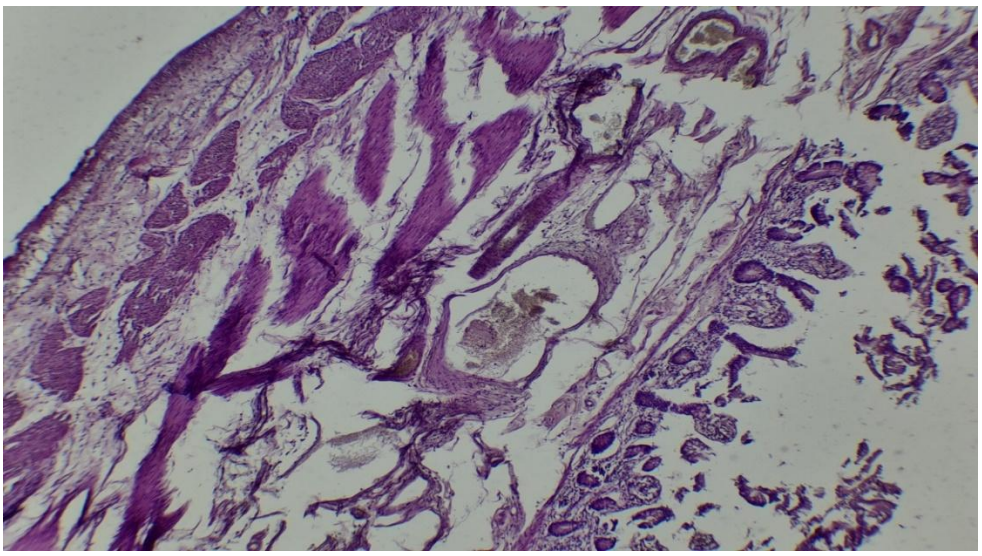

Figure 1 Patient D. is a 4-year-old girl. "S" - dilation in the intestinal mucosa as a result of nonspecific hemodynamic disorders (congestion in blood vessels). H-h. Magnification 10x40.

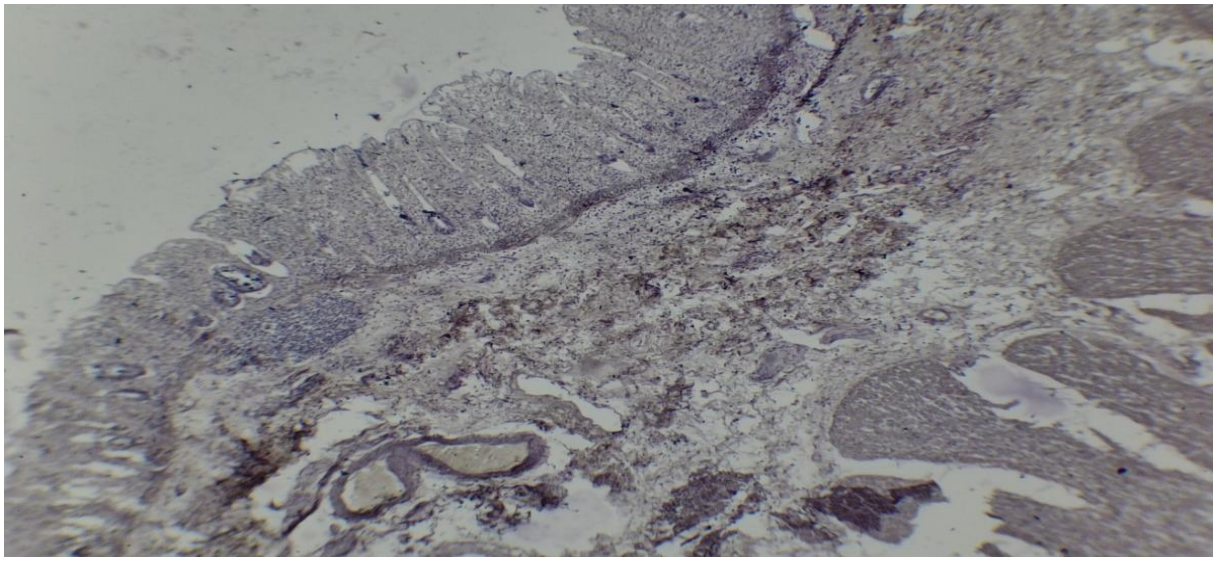

Figure 2 Patient A is a 3-year-old boy. "S"- inflammatory infiltration of the intestinal mucosa and submucosa, the secretion of epithelial cells in the membranes covering the surface, blood elements in the submucosa. 10x18 cl.

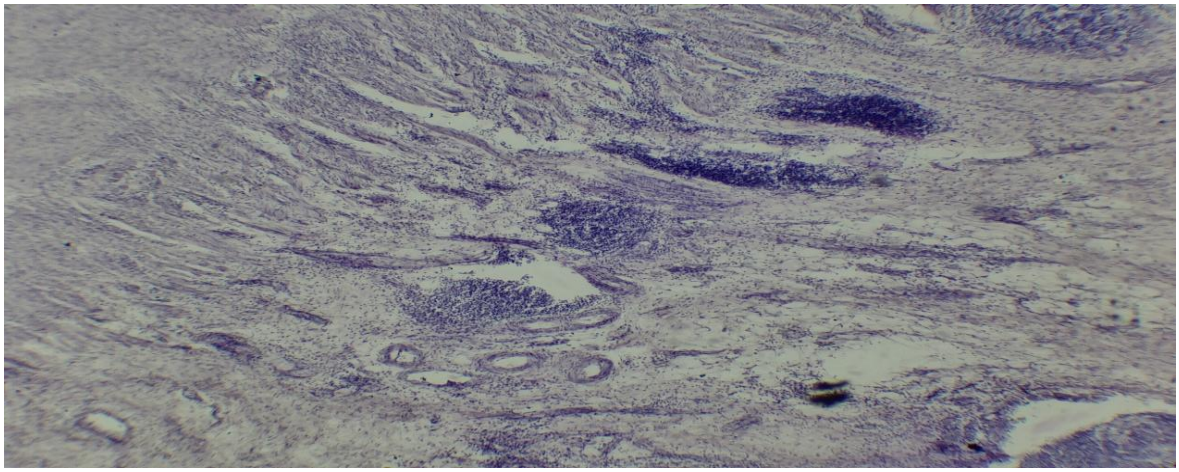

Fig. 3. Patient A is a 3-year-old boy. Focal lymphocytic infiltration of the sigmoid colon muscle layer. D-E. Increase by 10x40

It was observed that the decrease in the number of epithelial cells on the surface of the colon mucosa in patients with long-term dolichosigma is compensated by a functional unit of reserve cells due to an increase in the structural and functional activity of the mucous membrane. It has been established that in the compensation stage of the dolichosigma, the mucous membrane of the large intestine undergoes hypertrophy. As a result, a material substrate is formed that ensures the degree of restoration of morphofunctional activity. The increase in the number of epithelial cells in the crypts, in our opinion, is associated with the hypertrophy and hyperplasia of epithelial cells, the thickening of coarse edges on their surface, and the increase in the number of intracellular stromal elements, which indicates the swelling of the mucous membrane.

In the subcompensation stage of the dolichosigma, the deepening and shortening of the S-shaped intestine's mucosal crypts reaches its maximum. At this stage, as a result of conservative treatment, some children's general condition improves. It has been established that structural and functional changes in the mucous membrane of the S-shaped intestine normalize.

In some patients, the transition from the subcompensation stage to the decompensation stage was observed as a result of the severe course of dolichosigma. During the histomorphological and histochemical examination of biopsies obtained from these patients, a decrease in the barrier protective function of the mucous membrane was observed. As a result, the migration of lymphocytes and mast cells in the thick intestinal mucosa towards the epithelial layer accelerated, and the number of loose connective fibers in the stroma increased, forming various cell clusters. This is a sign of the dystrophic and atrophic processes occurring in the mucous and submucous membranes. Thus, using histomorphological and histochemical methods for examining S-shaped intestinal mucosa biopsies in dolichosigma, it was established that morphofunctional changes in the mucosa proceed in three stages (compensation, subcompensation, and decompensation). During the compensation and subcompensation stages, there was an increase in the number of epithelial cells, thickening of basement membranes, increased migration of lymphocytes and mast cells, as well as an increase in the number of epithelial and goblet cells in the crypts, which led to mucosal hypertrophy.

According to the research results, histostructural nonspecific pathological changes in the mucosa of the S-shaped intestine were observed, namely: thinning of the lamina propria of the mucosa (basal membrane), decrease in the number of crypts, goblet-shaped epitheliocytes, and columnar cells. In the mucous membrane of the S-shaped intestine, coarse folds persisted everywhere, its lamina propria was sharply edematous and infiltrated with monocytic and lymphocytic elements, histiocytes, and a significant number of eosinophilic cells.

When conducting colonoscopic studies in sick children with a disease duration of 1-3 years, biopsies taken from the mucous membrane were studied using histomorphological and histochemical methods. During this process, pathomorphological changes in the mucous membrane were identified: the lamina propria of the mucous membrane (basal membrane) was thinned, and the number of goblet-shaped epithelial cells and columnar epithelial cells in the crypts decreased. Also, in sick children with a disease duration of more than 3 years, the following pathomorphological and morphostructural changes were identified: the lamina propria of the mucous membrane of the S-shaped intestine (basal membrane) is thinned, the number of goblet cells and columnar epithelial cells in the crypts is reduced. In addition, a decrease in the number of crypts, their shortening, a decrease in the depth between crypts, and destructive and dystrophic changes in their stroma and connective fibers of the submucosal basement membrane were observed.

Decompensation was detected in 6 of the examined patients. In these 6 patients, a sharp decrease in the number and shrinkage of epitheliocytes in the crypts of the S-shaped intestine mucosa, a decrease in the size and sharp decrease in the number of goblet cells, thickening of the rough plate on the apical surface of the crypts, weakening of the alkaline phosphatase staining, shortening of the crypts and widening of the gaps between them, a decrease in connective tissue fibers in the submucosal layer, a sharp decrease in smooth muscle fibers, as well as a deepening of destructive-dystrophic processes were revealed. The presence of such pathomorphological changes indicates signs of intestinal mucosa

and submucosa atrophy, which we consider as a decompensation stage, the third stage of dolichosigma. Despite the conservative treatment, some patients at this stage (these 6 patients) were recommended surgical intervention.

In modern literature, the issues of a comprehensive analysis of morphofunctional changes in the sigmoid colon at different age periods, especially in terms of a comparative characteristic of normal development and pathological conditions, such as dolichosigma, are insufficiently covered. There is no unified approach to assessing the degree of morphological changes and their correlation with functional disorders.

Studying this issue has not only theoretical but also practical significance, as it allows optimizing diagnostic algorithms, improving approaches to conservative therapy, and determining indications for surgical treatment of children with dolichosigma. Furthermore, understanding the normal and pathological processes of sigmoid colon development contributes to the development of preventive measures aimed at preventing the development of intestinal functional disorders in childhood.

Conclusions: Thus, a comprehensive study of the morphofunctional features of the development of the sigmoid colon in normal and dolichosigmatic conditions in children of different age groups presents as a highly relevant and promising area in modern pediatrics, pediatric surgery, and gastroenterology.

References

1. Abduraimov A.B., Karimov Z.A. Treatment of constipation in children with dolichosigma // American Journal of Biomedical Science and Practice. - 2023. - Vol. 3, No. - P. 45-52.
2. Smirnova E.A., Petrov I.V. Morphological features of the enteral nervous system in childhood dolichosigma // Pediatric Surgery. - 2024. - No. - P. 23-29.
3. Ivanov P.S., Kozlova M.A. Histopathological analysis of the sigmoid colon wall in congenital developmental anomalies in children // Pathology Archive. - 2023. - Vol. 85, No. 4. - P. 15-22.
4. Johnson M.R., Smith K.L., Brown A.C. Enteric nervous system abnormalities in pediatric dolichosigma: histological analysis // Journal of Pediatric Gastroenterology and Nutrition. - 2024. - Vol. 78 No. - P. 112-119.
5. Volkov A.I., Sidorova O.P. Morphofunctional changes in the muscular layer of the sigmoid colon in childhood dolichosigma // Children's Surgery. - 2023. - No. - P. 34-40.
6. Martinez C.D., Garcia R.F. Histological assessment of the structure of the colon wall in pediatric functional constipation with dolichosigma // World Journal of Gastroenterology. - 2024. - Vol. 30, No. 8. - P. 892-901.
7. Popov V.M., Nikitina L.S. Features of the structure of intramural ganglia in childhood dolichosigma // Morphology. - 2022. - Vol. 162, No 6. - P. 88-94.
8. Kim J.H., Lee S.Y., Park H.J. Morphological changes in the wall of the sigmoid colon in children with functional bowel disorders // Pediatric Surgery International. - 2023. - Vol. 39, No. - P. 156-163.