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## SOME MORPHOLOGICAL ASPECTS OF OPTIMIZATION OF COLON RESECTION IN CHILDREN

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### ABSTRACT

In pediatric coloproctology the percentage of postoperative complications do not tend to decrease. For a deeper study of the possible causes of complications, there is a need for a morphological and histological study of the colon wall of white laboratory rats as an alternative.

### KEYWORDS

White laboratory rats, resection, large intestine.

### INTRODUCTION

Modern advances in science and technology have made it possible to develop and implement many of the latest technologies in medicine, which has improved the diagnosis and treatment of various pathologies of the body, including surgical diseases of the colon in children [1,4,13,19]. The study of the latest

literature data devoted to the study of the issues of timely diagnosis and radical treatment of congenital and acquired pathologies of the large intestine in children showed that there are many different methods of surgical treatment of these pathologies, despite this, it remains an urgent problem [2,7,14,18].

It should be noted that among intestinal diseases in children, the pathology of the colon occupies a significant part, in the treatment of which surgical correction is used to varying degrees, including partial removal and restoration of the continuity of the intestinal tube [2,6,9,17]. Resection of the colon in children are forced operations. It is performed for congenital and acquired pathologies of the colon, including Hirschsprung disease, some forms of anorectal malformation, ulcerative necrotic enterocolitis of newborns, familial diffuse polyposis, etc. [2,10,12].

The application of scientific achievements in the field of medicine has contributed to the improvement of the diagnosis of childhood diseases, including colon pathologies. As a result, the number of diagnosed and operated patients increased, including the number of postoperative complications [1,6,11,13]. In this regard, it is of great practical importance to study the consequences of such operations and to prevent possible disorders that develop in the postoperative period in children [4,7]. However, a detailed study of the functional results of the same type of radical and reconstructive operations often indicates the inadequacy of the same results obtained, which indirectly indicates the presence of possible unaccounted for anatomical and physiological features of the colon and the body as a whole [3,15,16].

In our opinion, the main issues that need to be addressed when determining the effectiveness of primary surgical intervention in these situations are: a comprehensive assessment of the anatomical and functional state of the colon, including structural features of the mesenteric vessels, innervation, physiological curves, functional segments, the state of the sphincters of the colon intestines, etc. [6,9,12].

According to some authors [5,8,16], white laboratory rats are often used in experimental scientific work to study the structural foundations of the body, to study the functional and morphological changes in the body under the influence of various factors.

**Purpose of the study:** determination of the morphological and functional features of the colon of experimental animals in dynamics, taking into account the results obtained in the practice of surgical treatment of colon pathologies in children.

## MATERIAL AND METHODS

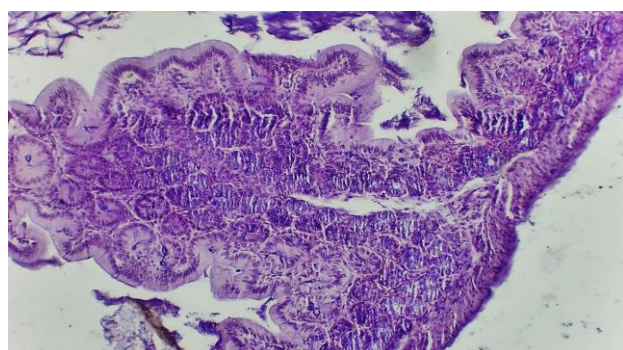
The material for histomorphological study was fresh samples (fragments) of the colon of white laboratory rats, in the early postnatal period of life - on the 1st, 7th, 14th and 21st days of life, and also in late postnatal ontogenesis - at the age of 1st, 3rd, 6th and at 9 months. To study the abdominal organs of the BLK, euthanasia was performed by an overdose of a narcotic substance. For staining microsections obtained from prepared histological materials, the staining method was used - staining with hematoxylin and eosin, for staining connective tissue and muscle tissue according to the Van Gieson method.

In the early period of postnatal ontogenesis in newborn rat pups, the thickness of the inner circular muscle layer of the ascending colon in the area of the sphincter is on average  $14.9 \pm 3.5 \mu\text{m}$ , and on the 21st day of life it averaged  $26.4 \pm 9.7 \mu\text{m}$ . The thickness of the outer longitudinal muscle layer averages  $10.2 \pm 4.91 \mu\text{m}$ , by the age of 21 days it averaged  $22.5 \pm 4.83 \mu\text{m}$ . The total thickness of the muscle layer averages  $30.2 \pm 6.04 \mu\text{m}$ , by the 21st day it averaged  $54.6 \pm 10.37 \mu\text{m}$ . (see fig. 1).

In the early period of postnatal ontogenesis, the thickness of the collagen bundles of the outer layer of

the ascending colon in newborn rat pups in the area of the sphincter is on average -  $3.8 \pm 2.04 \mu\text{m}$ , by the 21st day, the thickness of the collagen bundles of the submucosal layer averaged -  $5.5 \pm 1.47 \mu\text{m}$ . On the 21st

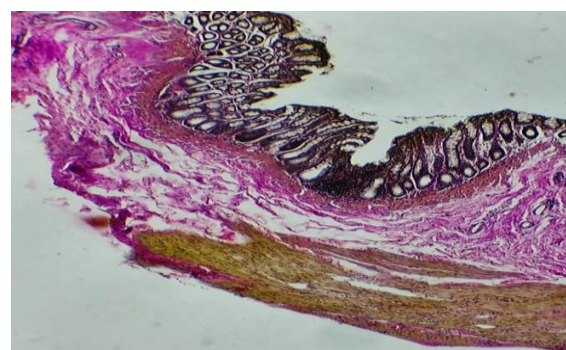
day of life, the thickness of the collagen bundles of the outer layer averaged  $8.0 \pm 1.48 \mu\text{m}$ , the thickness of the collagen bundles of the submucosal layer averaged  $10.7 \pm 2.2 \mu\text{m}$ . (see fig. 2).



**Fig.1. Structures of the walls of the transverse colon in 3-month-old rats. Hematoxylin-eosin staining. Ob.10 x Ok.10.**

In late postnatal ontogenesis in rats of one month of age, the thickness of the inner circular muscle layer of the ascending part of the colon in the area of the sphincter is on average  $30.2 \pm 13.64 \mu\text{m}$ . On the 9th month, it averaged  $49.2 \pm 15.02 \mu\text{m}$ . The thickness of the outer longitudinal muscle layer, the ascending part of the colon in the area of the sphincter in one-month-old white laboratory rats averages  $21.8 \pm 4.12 \mu\text{m}$ . By the age of 9 months, it averaged  $33.0 \pm 10.65 \mu\text{m}$ . The total thickness of the muscle layer of the ascending colon averaged  $59.0 \pm 17.75 \mu\text{m}$ , and at the 9th month the total thickness averaged  $87.3 \pm 22.91 \mu\text{m}$ .

In late postnatal ontogenesis, the thickness of the collagen bundles of the outer layer of the ascending colon in monthly BLK in the sphincter area averaged  $8.6 \pm 2.25 \mu\text{m}$ , the thickness of the collagen bundles of the outer layer of the ascending colon in monthly white



**Rice. 2. Structures of the walls of the transverse colon in 3-month-old rats. Van Gieson coloring. Ob.10 x Ok.7.**

laboratory rats of the submucosal layer was average -  $13.9 \pm 3.15 \mu\text{m}$ . At the 9th month of life of white laboratory rats, the thickness of the collagen bundles of the outer layer of the ascending part of the colon averaged  $13.0 \pm 1.55 \mu\text{m}$ , the thickness of the collagen bundles of the submucosal layer averaged  $25.4 \pm 6.43 \mu\text{m}$ .

## CONCLUSIONS

Connective tissue - collagen, elastic and reticular fibers make up the submucosal basis of the walls of the colon in the sphincter area. This basis repeats the relief of the mucous membrane, penetrating in some places into the depth and serves as a skeleton - the support of the crypts, on the other hand, these fibers penetrate deep into the muscle layer, consisting of circular and longitudinal muscle fibers, reach the adventitia,



forming the "retaining apparatus" of the intestine. There is an increase in the muscular layer of the colon in the area of the sphincter, which serves as the anatomical basis of the sphincter formation.

Thus, when choosing the optimal level of resection or colostomy, it is necessary to take into account the anatomical and physiological characteristics of the colon in children, including the localization of the colon sphincters.

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