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Influence of Endogenous Intoxication on the State of Immunological Reactivity in Children with Intestinal Obstruction

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Abstract Intestinal obstruction in children is a very urgent problem already because of its wide prevalence. And the noted systemic and local immunological changes can be qualified as a secondary immunodeficiency state.

Keywords Intestinal obstruction, Children, Immunological reactivity

1. Introduction

According to WHO, intestinal obstruction in children occurs in 10% of cases in the structure of acute abdominal diseases. The mortality rate is up to 30%, and if intestinal obstruction developed in the postoperative period, it is up to 60%. The issues of diagnostics and treatment of intestinal obstruction (IO) in children are one of the highest priority tasks of pediatric surgery [1]. Despite the fact that there is a fairly long history of studying IO in children, such issues as the effectiveness of various methods of conservative treatment, the level of created intraintestinal pressure, the number and duration of attempts at disinvagination, control of intussusception straightening remain debatable [2,3]. The features of anesthetic care and postoperative management in laparoscopic operations for intestinal obstruction are insufficiently covered [5,7]. From this point of view, the development of all these issues is very relevant and has important scientific and practical significance, which served as the basis for this work [4,6].

2. Results and Discussion

There is increasing evidence that the increased incidence and severity of IO in children depend on the child's reactivity, and changes in the specific and nonspecific reactivity of the homeostatic defense systems are the first and main conditions for the development of the infectious process. In this regard, our next task was to study the effect of endogenous intoxication on the immunological reactivity of young children with IO.

Table 1 presents the results of studies of the immune system depending on the degree of intoxication in young children. When analyzing immunological parameters, it was found that in children during the peak of the disease, a significant decrease in the content of leukocytes, the absolute number of lymphocytes, T-lymphocytes, T-helpers is detected ($P < 0.05$ - < 0.001) and a significant increase in the indicators of T-suppressors (CD8) and T-killers (CD16), compared to the healthy group ($P < 0.001$).

The imbalance in the subpopulation composition of T-lymphocytes, namely a decrease in CD4 and an increase in CD8 indicate a sharp decrease in immunological reactivity and a direct dependence on the degree of endogenous intoxication. One of the levels of anti-infective protection of children with IO is the phagocytic system. In healthy children, the phagocytic activity of neutrophils (PAN) was within 55.2 ± 1.6%. In the acute period of the disease, it was noted that the PAN indicator in children with IO was lower than in healthy children ($P < 0.001$) at all degrees of endogenous intoxication. Another important peripheral population in children is B-lymphocytes. In healthy children, an average of 27.5 ± 1.4% of B-lymphocytes circulate in the peripheral blood. In IO, the relative and absolute number of B-lymphocytes during the peak period significantly differs from their number in healthy children ($P<0.05$ - <0.001) towards a decrease.

In children with IO, dysimmunoglobulinemia was observed during the acute period of the disease. Immunoglobulin IgG, IgA and IgM were significantly reduced, at all degrees of intoxication ($P<0.001$), in direct dependence on the severity of the clinical picture.

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Table 1. Immune system indicators depending on the degree of endogenous intoxication in children with IO

Indicators	Degree of intoxication						Healthy
	I degree (n=8)	P_{I-II}	II degree (n=45)	P_{I-III}	III degree (n=18)	P_{II-III}	
Leukocytes	7100±415	>0,05	6600±350*	>0,05	6300±610*	>0,05	7800±315
lymphocytes %	37,8±2,4	>0,05	38,0±2,8	>0,05	38,8±3,5	>0,05	40,5±1,7
lymphocytes абс.	2638,4±238,7*	>0,05	2500±240**	>0,05	2442±248**	>0,05	3276±102
T- lymphocytes. %	51,6±1,9	<0,01	45,1±1,5***	<0,001	43,0±1,2***	>0,05	57,5±2,3
T-lymph.абс.	1316,4±100,5**	<0,05	1027,5±98,5***	<0,05	1020±101***	>0,05	1900±185,1
T-х. СД4 %	27,5±1,6	>0,05	24,0±1,3*	3,63	21,3±0,6**	>0,05	29,9±2,6
СД4 абс.	354±37***	>0,05	362±41***	>0,05	317,3±42***	>0,05	982,3±86,7
T-sup. СД8%	21±1,4***	>0,05	21,5±1,1***	>0,05	24,0±0,6***	<0,05	14,8±0,7
СД8 абс.	255±42***	>0,05	277,5±31,6***	>0,05	316±32**	>0,05	491,3±52,1
СД16%	17,3±0,4***	>0,05	16±1,1***	>0,05	16,5±1,4***	>0,05	8,5±0,7
СД16 абс	341±32	>0,05	302±28	>0,05	310±30	>0,05	287,0±34
B-lymph. %	22,5±1,7*	>0,05	20,9±1,25***	>0,05	19±0,7***	>0,05	27,5±1,4
B-lymph.абс.	539,6±65**	>0,05	502,5±36,9***	>0,05	436,9±46***	>0,05	911,5±87,3
Ig G мг%	840±56,5**	>0,05	813,8±61,2**	<0,001	540±15,1***	<0,01	1170±90,6
IgA мг%	80±6,8***	>0,05	86,4±5,5***	>0,05	116,8±17,8	>0,05	130±8,6
IgM мг%	108±7,2	<0,05	87±5,4**	<0,01	81,0±3,3***	>0,05	115,2±8,2
FAN	42,9±0,9***	<0,001	32,4±0,4***	<0,001	30,5±0,9***	>0,05	55,2±1,6

Note: * - the differences relative to the healthy group data are significant (* - P<0,05, ** - P<0,01, *** - P<0,001)

Thus, during the peak period, at I and II degrees of intoxication, IgG production was 1.4 times, and at III degree it was 2.2 times reduced, compared to healthy children. The concentration of serum IgA in patients was significantly reduced compared to the data in the healthy group with intoxication degrees I and II (P<0.001), and with intoxication degree III it was 116.8±17.8 mg% versus 130±8.6 mg% (P>0.05). The concentration of IgM in patients was significantly reduced compared to the data in the healthy group with intoxication degrees II and III by 1.3 to 1.4 times (P<0.001), and with intoxication degree I it was 108±7.2 mg% versus 115.2±8.2 mg% (P>0.05). These indicators indicate reduced antimicrobial immunity and a decrease in the antitoxic properties of the body. Thus, the observed sample can be characterized as a sample with significant metabolic and immune status disorders, the pronounced fluctuation ranges of the studied parameters (Table 1) allowed us to expect the achievement of the set goal during further analysis.

We conducted a correlation analysis of immunological parameters in sick children depending on the severity of the process, during the period of clinical recovery.

The conducted studies showed an inversely proportional dependence of the overwhelming majority of immunological parameters (T-lymphocytes r = -0.88 (P < 0.01), and their subpopulations; T-helpers - r = -0.24; (P < 0.05), IgG r = -0.66 (P < 0.01) on the severity of the degree of endogenous intoxication in children with early-age IO.

3. Conclusions

The immunological studies conducted at the height of IO in children indicate the development of immunological deficiency of both cellular and humoral links. An inversely proportional dependence of the indicators on the degree of endogenous intoxication was revealed.

Summarizing the presented data, it should be noted that IO is a very urgent problem already due to its wide prevalence. And the noted systemic and local immunological changes can be qualified as a secondary immunodeficiency state.

REFERENCES

[1] Pediatric surgery: textbook \ ed. Academician of the Russian Academy of Sciences Yu.F., Isakov, prof. - M.: "GEOTAR - Media", 2015. - 1036 p.

[2] Musakhodzhaeva D.A., Karimov R.K., Rasulova S.Kh. Immunological indicators of complications of surgical bowel diseases in children // Medical Immunology. – 2023. – Vol. 25(4). – P. 907-912. https://doi.org/10.15789/1563-0625-IIO-2859.

[3] Zafranskaya A.Yu., Adamovich A.V., Vorobey A.M., Starostin D.B. Phenotypic profile of peripheral blood lymphoid cells in patients with inflammatory bowel diseases // Medical Immunology. - 2020. - Vol. 22, No.6. - P.1131-1140.

[4] Souza H.S.P. de Immunopathogenesis of IBD: current state of the art / H. S. P. de Souza, C. Fiocchi // Nat. Rev. Gastroenterol. Hepatol. - 2015. - V.13, No.1 P. 13–27.

[5] Torina A., Guggino G., Pio M., Manna L., Sireci G. The Janus face of NKT cell function in autoimmunity and infectious diseases // Int. J. Mol. Sci. - 2018. - Vol.19, No. 440. - P. 1–10. doi: 10.3390/ijms19020440.

[6] la Scaleia R., Stoppacciaro A., Oliva S., Morrone S., di Nardo G., Santoni A., Cucchiara S., Palmieri G. NKG2D/ligand dysregulation and functional alteration of innate immunity cell populations in pediatric IBD // Inflamm. Bowel Dis, 2012. - Vol. 18. - P. 1910-1922.

[7] Schönrich G., Raftery M.J. CD1-restricted T cells during persistent virus infections: “sympathy for the devil” // Front Immunol. - 2018. - vol. 9. - P. 1–16. doi: 10.3389/fimmu.2018. 00545.