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EARLY DIAGNOSIS OF POSTOPERATIVE INTRAPERITONEAL PURULENT COMPLICATIONS IN PERITONITIS IN CHILDREN

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ABSTRACT

Early diagnosis of postoperative complications leads to timely surgical interventions, on which the outcome of the disease depends. This also applies to postoperative intra-abdominal complications, especially in childhood, when the progression of peritonitis is fleeting, and many defense mechanisms are immature and depressed. Timely evacuation of pus from the abdominal cavity leads to a decrease in endotoxicosis, the main component in the pathogenesis of the toxic-septic process, and to a significant improvement in the results of treatment of the disease.

KEYWORDS: *Postoperative Complications, Diagnosis, Peritonitis, Children*

INTRODUCTION

Endogenous intoxication accompanies most acute surgical diseases of the abdominal organs in children, including common forms of appendicular peritonitis [1,2].

The study of the severity of endotoxemia in children with common forms of appendicular peritonitis is of no small importance, since it allows predicting the direction of the pathological process and conducting adequate detoxification therapy[3, 4].

Objective: to study early diagnostic methods of postoperative intraperitoneal purulent complications in peritonitis in children.

Materials and methods: To compare the information content of various methods, along with studying the dynamics of the leukocyte formula, we used the determination of the toxicity of patients' blood serum in the culture of paramecia and the leukocyte intoxication index (LII). All studies were performed on the 1st, 3rd and 5th day after surgery.

LIIis calculated according to the method proposed by Y.Y.Kalf-Kalif [5]:

$$LII = \frac{(S+2R+3Y+4My) \times (Pl+1)}{(M+Ly) \times (E+1)}$$,where

LII-leukocyte intoxication index; S-segmented neutrophils;R-rod-shaped; Y-young; My-myelocytes; Pl-plasma cells; M-monocytes; Ly-lymphocytes; E-eosinophils.

All indicators are entered as a percentage, with the exception of plasma cells and eosinophils, which are taken in absolute quantities.

The absolute number of eosinophils is calculated by the formula:

$$Eabs.\ num. = \frac{L \times E\%}{100\%}$$, where

L-leukocyte; E-eosinophils.

Normally, the LII in children was1.1 ± 0.04 (n=45).

To detect toxemia in children in the postoperative period, we used the method [6]. A biological object was used to register toxemia in children. The principle of the method is to determine the period of death of paramecium (Paramecium caudatum) belonging to eukaryotes placed in the test serum. The more toxic the environment, the sooner the paramecia die. The time of death of paramecia was noted during the period of their mass death, that is, the death of 50% of those taken in the experiment was taken into account. As a control of the sensitivity of the infusoria to toxic substances, we used a 2% solution of calcium chloride. Such control is necessary due to fluctuations in the sensitivity of paramecia to toxic substances.A drop of culture medium with infusoria is placed on slides with 6 wells and their number is calculated under a binocular microscope (magnification by 16 times). The optimal number of infusoria in the well is 24-26 individuals. Then the test serum is instilled into the wells with paramecia, thoroughly mixed with an eye pipette and the time of death of 50% of individuals is determined. 6 samples are carried out with one serum. Serum toxicity was calculated by the formula:

$$T = \frac{t_1 - t_2}{t_1} \times 100$$, where

T – toxicity of the test serum, ED;

t_1 – the time of death of 50% of infusoria in a control 2% solution of calcium chloride, sec.;

t_2 – time of death of 50% of serum infusoria, sec.

The time to perform one analysis is 6-10 minutes; the volume of serum used is up to 0.3 ml. The standard indicator of PTC was 28.0□ 0.5.

Results and their discussions

The leukocyte formula in the observed patients was characterized by a neutrophil-eosinopenic tone, manifested by pronounced leukocytosis, neutrophilosis with a shift to the left, lymphocytopenia and monocytopenia, hypo- or aneosinophilia. 82% of children with an unfavorable course of the postoperative period had leukocytosis (12-25x109 / l) with a shift of the leukoformula to the left and a neutrophil ratio: leukocytes from 5 to 12, acceleration of ESR (30-50 mm / h), in half of patients - toxigenic neutrophil granularity (30% or more). However, in every fifth patient, the blood reaction to inflammation was absent or even decreased, which is probably due to the inhibition of hematopoiesis under the influence of intoxication.

The dynamics of the indicators of LII and paramecium test indicates that all patients with common forms of peritonitis have sharply increased serum toxicity. The initial indicator of blood toxicity (PTC) in patients with peritonitis was 55.39±1.88 units. In the postoperative period, with a favorable course of the underlying disease without the development of intra-abdominal purulent complications, PTC gradually decreased and approached the norm. In cases where peritonitis in the postoperative period was complicated by an intra-abdominal abscess or ongoing peritonitis, PTC was at the initial level and had no tendency to decrease, being an unfavorable sign.And only after intensive therapeutic measures, elimination of intra-abdominal abscess or relaparotomy, gradually decreased and approached the norm. Thus, with an unfavorable course of peritonitis on 1-2 days after surgery, the PTC was 43.45±1.95 units, on 3-4 days it again tended to increase to 46.21±1.94 units, on 5-6 days it continued to increase to 51.4±1.91 units.

The same pattern was noted when analyzing the leukocyte intoxication index. In the study of LII in patients with peritonitis before surgery, an increase in the indicator (4.58±0.33) was noted with high reliability ($p<0.001$) compared to the norm (1.1±0.04). LII in the postoperative period with a favorable course of peritonitis without intraperitoneal purulent complications decreased to 3.21± 0.31 on 1-2 days, and to 3-4 days – to 2.22 ± 0.17, on 5-6 days – up to 1.88 ± 0.11, and before discharge it was almost approaching normal values – 1.34 ± 0.09. If in the postoperative period the underlying disease was complicated by an intra–abdominal purulent process, the LII was at the initial level - 4.93 ± 0.61, had no tendency to decrease.

The data show that in acute peritonitis, PTC is significantly higher than normal ($p< 0.001$), then, with a favorable course, it normalizes. With the development of a postoperative complication, PTC steadily tends to increase.

From the data presented, reflecting the degree of EI, it can be concluded that, despite the simplicity of determining these indicators, their value is very high for controlling the course of the postoperative period. It should be noted that PTC is the most highly sensitive and reliable method in the diagnosis of postoperative intraperitoneal purulent complications, which makes it possible to suspect ABP as early as 3-4 days after the initial operation.

The results of the studies show that the dynamics of the indicators of the leukoformula, LII and the paramecium test of serum toxicity can be used as objective criteria for the intensity of toxemia and the course of the inflammatory process in the abdominal cavity, and the latter is the most informative.

CONCLUSIONS

Consequently, the examination complex used, along with clinical and instrumental data, allows monitoring the dynamics of endotoxicosis and, based on it, predicting the course of the postoperative period with respect to intra-abdominal purulent complications.

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