LABORATORY CRITERIA FOR ASSESSING THE SEVERITY OF CONDITION OF PATIENTS WITH PERITONITIS

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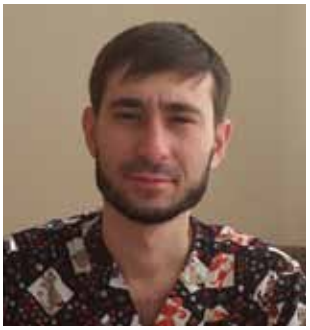

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ABSTRACT — Until recently, peritonitis has been one of the severest complications in abdominal surgery.
It is known, that occurrence of any acute inflammatory process is followed by body acute phase response. Acute phase response is a complex of focal and systemic reactions mediated by various mediators — cytokines, prostaglandins, kinins, hormones. The amplitude and nature of the response depends on the process activity.

KEYWORDS — peritonitis, C-reactive protein (CRP), inflammatory proteins.

INTRODUCTION

One of the actual and yet unsolved problems of urgent abdominal surgery is the optimization of post-surgery intensive therapy methods for diffuse peritonitis. The overall mortality for this pathology even in large, well-equipped clinics is no less than 24–35%; it reaches 60–70% with the progression of toxic shock syndrome and 80–90% if multiple organ failure (MOF) is added [3,4,5], the rate of mortality is even higher with postoperative peritonitis. Herewith progressive multiple organ failure is the leading cause of death [2].

Difficulties in treatment of this severe disease depend to wide extent on processes in the immune system of patient. Massive antibacterial therapy, severe endogenous intoxication, multiple organ failure, gross metabolic shifts, use of medicines (for therapeutic purposes) with immunodepressive effect contribute to the development of evident immune alterations of secondary genesis in patient's body. Given that, immune alterations when peritonitis is in progress are very frequent and significant. Inadequate selection of material for research. In a number of cases, analysis

of material obtained from affected organ (or peritoneal exudate in case of peritonitis) may reflect the true state of immune system largely than analysis of peripheral blood, and, correspondingly provides more detailed information for disease immunodiagnostics and therapeutic decision. It is known, that occurrence of any acute inflammatory process is followed by body acute phase response. Acute phase response is a complex of focal and systemic reactions mediated by various mediators — cytokines, prostaglandins, kinins, hormones. The amplitude and nature of the response depends on the process activity [1]. It is showed that acute phase response is followed by increase of level of certain blood proteins group (proteins of acute phase (PAP), which concentration changes in response to inflammation, trauma and other pathological impact [5, 6, 7]. Advanced study of peritonitis' pathogenesis requires the search of new assessment methods of homeostasis change.

MATERIALS AND METHODS

86 children with acute diffuse peritonitis aged from 3 to 14 years, who were on treatment in surgery of Astrakhan Oblast Children's Clinical Hospital named after Silischeva, were examined. The causes of peritonitis were: acute destructive appendicitis, intestinal obstruction, perforation of bowel wall by foreign objects. The patients were divided into groups: patients with diffuse serous peritonitis, patients with diffuse serous fibrinous peritonitis, and patients with diffuse fibrinous purulent peritonitis. Course of peritonitis was assessed based on clinical symptoms and objective indexes of endointoxication. The complex of clinical research included: general blood test, common urine examination, biochemical analysis (rest nitrogen and blood urea, aminotransferase, creatinine, alkaline phosphatase, hemodiastase and urina amylase, water and electrolytic composition), determined by standard methods.

The concentration of C-reactive protein (CRP) in patients' blood serum was analyzed by method of immunodiffusion analysis (mg/l) on admission, on the day of surgery and again in 3–5 days after the surgery.

The findings of analyses were processed with the statistical analysis software Statistica 6, SPSS V 10.0.05, software "STATLAND", "EXCEL-97", "Basic Statistic" with due consideration for standard methods of variation statistics, including Student's t-test to estimate statistical significance.

RESULTS AND FINDINGS

The results of C-reactive protein immunochemical analysis are compared with the data of general clinical analysis and are presented in Table 1.

Increase of CRP concentration in blood serum and peritoneal exudate correlates with the disease severity. At that, the highest protein concentration is observed in purulent peritonitis forms.

Table 1. *Concentracion of CRP in blood serum and peritoneal exudate of patients with peritonitis*

Protein-reactant Immunodiffusion analysis (mg/l)	The results of proteins of acute phase concentration in peritonitise		
	diffuse serous peritonitis (n=42)	diffuse serous fibrinous peritonitis (n=30)	diffuse fibrinous purulent peritonitis (n=16)
SRP cerum	47,7±15,45	84,6±16,4	148,5±27,63
SRP exudate	45±17,64	78,2±24,3	97,2±22,96

CONCLUSION

Assay of proteins of acute phase for children in grave condition besides its clinical diagnostic relevance allows to determine the adequacy and effectiveness of ongoing therapy, as well as to predict possible complications without undue delay.

Modern standards of acute diffuse peritonitis treatment require effective therapy from the time of admission and division of patients pursuant to forms of progressive and retrogressive acute diffuse peritonitis.

We think that studied proteins of acute phase can serve as indicators of therapy effectiveness for patients with acute diffuse peritonitis. Increase of these indexes in 1,5–3 times may be a criterion of weakly effective therapy.

REFERENCES

1. **Aleshkin V.A., Novikova L.I., Lyutov G.A.** "Proteins of acute phase and their clinical relevance", Clin. Med. – 1998 – #8 – P. 39–48.
2. **Gostischev V.K., Sazhin V.P., Avdovenko A.L.** "Peritonitis". – M.: Meditsina", 1992. – 224 p.
3. **Gelfand B.R., Gologorsky V.A., Burnevich S.Z.** "Sepsis of abdominal origin: modern look at ageless problem / Strategy and tactics of treatment" Bulletin of intensive therapy – 1997 – #1 – P. 10–16.
4. **Zhidovinov A.A., Permyakov P.E., Zurnadzhyants V.A., Chuprov P.I., Ukhanov B.Yu.** "Pathogenic aspects of ischemia reperfusion injury in progressing of systematic inflammation and endotoxemia at intestinal obstruction" Bulletin of Volgograd State Medical University. 2010. #3. P. 13–16.
5. **Zurnadzhyants V.A., Kchibekov E.A., Serdyukov M.A., Bondarev V.A.** "Ferritin and lactoferin in assessing the severity condition of patients with peritonitis". Infections in surgery. 2014. V. 12. #2. P. 26–28.
6. **Ramazanov M.V., Butyirina E.V., Kchibekov E.A.** "Analysis of ferroprotein correlation in the diagnostics of diffuse peritonitis". Astrakhan Medical Journal. 2011. V. 6. #1. P. 98-101.
7. **Chuprov P.I., Krasilov V.L., Ukhanov B.Yu., Zhidovinov A.A., Permyakov P.E.** "Diagnostics of endotoxic syndrome of children with purulent surgical infection". Astrakhan Medical Journal. 2008. V. 3. #1. C. 24–30.