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Short Communication

Treatment of the Purulent-Inflammatory Diseases in Obstetrical and Gynecological Practice: A New Approach

Ostapiuk L[1,2]*

[1]*Department of Obstetrics and Gynaecology, Vinnytsia National Medical University of the Ministry of Health of Ukraine, Ukraine*

[2]*Pulmonary Health Centre, Lviv, Ukraine*

***Corresponding Author:** Ostapiuk L, Department of Obstetrics and Gynaecology, Vinnytsia National Medical University of the Ministry of Health of Ukraine, Ukraine.

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The issue of the early diagnosis and treatment of sepsis is one of the priority problems of modern medicine. This will ensure faster recovery and survival of patients. The early diagnosis is the key element in reducing the treatment costs, it is a rational and economical approach from the point of view of medical practice and health care management. A significant number of scientific developments are currently aimed at solving this issue. However, it still remains unresolved.

Albumin makes up almost half of the total number of proteins in blood plasma, it is very important in various physiological processes [1,2]. Albumin not only regulates acid-base balance and fluid distribution in the body, but also serves as a transporter for many substances, including drugs and hormones [3,4]. A number of manuscripts have investigated the relationship between albumin level and clinical outcomes of many diseases, including malignant tumors [5], liver pathology [6], pancreatitis [7], infectious diseases [8] and COVID-19 [9].

Currently, the study of the role of albumin for patients with purulent-inflammatory diseases and sepsis is also particularly relevant. An important aspect is to evaluate the relationship between albumin levels and short-term and long-term disease outcomes for patients with sepsis in order to improve the individual patient treatment plans. In recent years, various mechanisms of explaining changes of albumin in patients with septic conditions have been described in the scientific literature. Sepsis causes a significant increase of systemic inflammatory factors, which can disrupt the function of the vascular endothelium and increase the permeability of capillary vessels. After that, albumin can leak out through the vessels, which leads to the decrease of the level of albumin in plasma and increases significantly the risk of adverse outcomes [10]. In addition, the increase of the level of cytokines can affect gene expression and catabolism of albumin and also reduces the concentration of albumin in plasma [11]. Secondly, physiologically, albumin is synthesized in the liver, and liver function may be impaired in patient with sepsis, which leads to a deficiency of albumin synthesis [12]. Thirdly, as a result of the inflammatory process, kidney function is damaged, which leads to proteinuria due to increased glomerular infiltration and causes albumin leakage [12,13]. Besides, in patient with sepsis, the function of the gastrointestinal tract is usually partially impaired, which affects the absorption of nutrients and causes a state of insufficient nutrition [14]. In general, serum albumin level in patients with sepsis may be the indicator of the inflammatory response, and capillary leakage and organ dysfunction are associated with the prognostic value of plasma albumin in patients with sepsis. However, there is generally insufficient information in the scientific literature regarding the role of albumin in the treatment of patients with sepsis. The results of the conducted research were somewhat contradictory, and the issue was debatable.

At the same time, my co-authors and I have been deeply engaged in the problem of diagnosing of purulent-inflammatory diseases in the practice of obstetrician-gynecologists, surgeons, and burn injury specialists for the past twenty years. Our research was based on the clear understanding of the pathogenesis of these pathological conditions in order to develop the effective pathogenetic treatment.

In this regard, the information about the mechanisms of origin and course of purulent-septic complications is fundamentally important for finding the effective ways of their diagnosis. In the blood of patients with the diseases, accompanied by endogenous intoxication, the part of the albumin molecules in the blood of patients are blocked by toxins. Thus, two types of albumin molecules are present in their blood: normal (concentration X) and blocked by toxins (pathological) (concentration 1-X). The pathological albumin molecules lose their ability to perform their main functions (transport and detoxification). We have proposed a modified concept of the diagnostic and therapeutic approach to the purulent-inflammatory diseases and sepsis. It consists of establishing X – the extremely minimal concentration of normal albumin in the blood of patients with sepsis.

The diagnostic value of the method of fluorescence spectroscopy (MFS) in the study of the fluorescence spectra of blood serum in the clinical practice for the patients with purulent-inflammatory diseases and sepsis has been demonstrated during the last twenty years [15-18]. The main characteristics that were investigated within the framework of MFS were the intensity I (X) and the position of the maximum of the fluorescence band λ_{max} (X) of the patients' blood serum. Taking into account the pathological changes of albumin molecules in diseases accompanied by endogenous intoxication, an important component of pathogenetic treatment is the use of infusions with albumin solutions, as well as monitoring of the condition of patients, including using MFS. If it is not possible to use MFS to monitor the condition of patients, it is advisable to use other available diagnostic methods.

Conclusions

The significant improvement of the results of diagnosing of purulent-inflammatory diseases and sepsis is still a fundamental problem of medicine. Basic research during the last decades has demonstrated that MFS is the most versatile method of biological spectroscopy.

The special attention within the framework of the MFS was paid to the study of spectral-fluorescence characteristics of blood serum of the patients with postpartum purulent-inflammatory diseases. At the same time, in order to overcome endogenous intoxication in patients with a severe course of diseases, the effectiveness of the treatment of infusions with solutions of donor albumin was proven. An important condition for the effectiveness of the treatment process is the constant monitoring within the framework of the MFS until its completion. A modern approach for the diagnosis and effective control of treatment within the framework of MFS and biomarkers using infusions of donor albumin solutions is proposed.

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