

Chemotherapy Safety Insurance Using Extracorporeal Detoxification Methods

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Abstract

High-dose chemotherapy for malignant tumors is accompanied by severe endotoxemia with damage to various organs and systems. This often forces to interrupt the course of treatment, which discounts its results. Conventional infusion therapy is not able to remove high molecular weight endotoxins, the kidneys do not remove them and the liver does not destroy them either. Extracorporeal detoxification using plasmapheresis and hemosorption helps eliminate these complications, which opens the possibility of using higher doses of chemotherapy and improve the treatment outcomes. The article describes the clinical observation in a patient with inoperable ovarian cancer, when using this treatment it was possible to extend life from half a year to four years.

Keywords: Cancer Chemotherapy; Endotoxemia; Extracorporeal Detoxification; Plasmapheresis; Hemosorption

Introduction

The consequences of chemotherapy are the accumulation of cytostatic drugs that are toxic not only to tumor cells, but also to other tissue structures of the body. Endotoxemia is also aggravated by a more enhanced decay of the tumor mass itself, which is accompanied by accumulation of degraded proteins, lipoproteins, oligopeptides, and leads to additional asthenization and tumor cachexia. High-dose chemotherapy can lead to interstitial pneumonia with development of fatal respiratory distress syndrome [1]. After chemotherapy, neurological disorders are possible, such as encephalopathy, cerebellar syndrome, myelopathy, peripheral neuropathy [2]. Secondary metabolic disorders, including leukopenia (below $2.0 \times 10^9/l$), anemia (hemoglobin below 60 g / l), thrombocytopenia (below $50 \times 10^9/l$), create the prerequisites for hemorrhagic and infectious complications with the complex multiple organ disorders. This often serves as an obstacle to the timely continuation of chemotherapy and cancels its results. Conventional infusion therapy is not able to remove high molecular weight endotoxins. The kidneys do not excrete them, and the compromised liver does not destroy

them. This is especially dangerous in elderly patients, which often leads to interruption of chemotherapy courses [3].

In particular, mitamycin C is capable of causing thrombotic microangiopathy with the kidney damage [4]. And only with help of plasma exchange was it possible to eliminate such consequences and further to continue treatment of patients [5,6]. Plasmapheresis also helped to eliminate the toxic effects of high doses of cisplatin [7,8]. Using plasmapheresis, it is possible to eliminate the severe consequences of the tumor cells destruction caused by chemotherapeutic agents [9]. Plasmapheresis helped eliminate hemolytic uremic syndrome with signs of thrombotic microangiopathy with acute renal failure after high-dose chemotherapy [10]. Plasmapheresis is widely used to eliminate other severe consequences of chemotherapy [11-13].

Often the condition severity of patients does not even make it possible to start chemotherapy. In such cases, preventive extracorporeal detoxification stabilizes the condition and allows

to start a course of chemotherapy. This also applies to the current course of chemotherapy, when before the next session the patient has not recovered enough from the previous one and the same operation of preventive detoxification is required [14]. Since the half-life of almost any chemotherapy does not exceed 6-12 hours, the very next day the effectiveness of their antitumor effects is negligible, and the degree of endotoxemia is increasing, it is justified to conduct an apheresis therapy.

When conducting a course of chemotherapy with introduction of drugs at intervals of 3 - 4 weeks, plasmapheresis is possible even 1 - 2 days after the chemotherapy session with removal of up to 0.3 CPP and compensation with crystalloid solutions only; and in hypoproteinemia, colloid and protein substitutes can be used for these purposes. If endotoxemia continues plasmapheresis may be repeated in 1 - 2 days. Repeated plasmapheresis procedures are performed after regular chemotherapy sessions. With excessive hypoproteinemia (total protein level less than 5 g / l) and the possibility of conducting only a single detoxification procedure, hemosorption in amount of one volume of circulating blood is more appropriate. If there is a risk of bleeding, sodium citrate (ACD-A) is used instead of heparin as an anticoagulant [15].

In total, 220 patients with various tumor diseases who underwent extracorporeal detoxification were treated in our practice. The following observation can be cited as an example.

A female patient NN, 49 years old presented with inoperable ovarian tumor was diagnosed too late, already on the background of advanced ascites. Only cytoreductive operations had been performed twice. With this advanced stage of the disease, the projected life expectancy did not exceed 6 months. Nevertheless, for four years, almost every month chemotherapy sessions were carried out with a variety of drugs (cisplatin, cardioplatin, taxol, gemzar, oxaliplatin), after which extracorporeal detoxification was performed - a total of 33 plasmapheresis and 16 hemosorption sessions. During this period, there was a decrease in leukocyte levels to $0.7 \times 10^9/L$, platelets to $50 \times 10^9/L$, of erythrocytes to $2.1 \times 10^{12} / L$, but using these detoxification methods, by the next session, it was possible to increase these indicators to an acceptable level. The manifestations of peripheral neuropathy were also stopped. At the same time, a relatively satisfactory quality of life and even working capacity were maintained, although it was required to periodically remove the accumulating ascitic fluid.

Conclusion

Thus, using methods of extracorporeal detoxification, it is possible to provide safer conditions for chemotherapy. Moreover, it becomes possible to use higher doses of chemotherapy, which will increase the overall effectiveness of the treatment of tumor diseases. This is also confirmed in the world practice. Naturally, resorting to such treatment is advisable preventively, without waiting for the appearance of various toxic complications.

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