COMPLICATIONS IN PLASMOSORPTION AND THEIR PREVENTION

Abstraction

On the basis of practical experience in the development and practical application of intensive treatment with plasmosorption technique, possible complications and their prevention have been summarized.

Key words: endotoxicosis, detoxication, plasmosorption, complication, prevention.
The problem of effective intensive treatment of severe endotoxicosis with different genesis is far from being resolved. A doctor efferentologist, getting to direct active detoxication (hemosorption, plasmosorption, dialysis, etc.), has often to balance between the urgent need for its carrying out and a compliance with safety and comfort of the patient. The authors are inclined to this view in respect of seriously ill patients under intensive care and resuscitation. As we know, these patients undergo a combination of existing pathophysiological shifts with those that occur after the procedure of active surgical detoxication. The accumulation of a "critical mass" of pathophysiological responses challenges the practitioner with new problems again. Therefore, it would be premature to talk about a complete safety of the known sorption methods of detoxication, including plasmosorption (PS) [1].

The authors developed and specified the PS method in their prior study [2]; it was conducted by means of a routine discrete (fractional) technique. It was tested and applied in 95 patients (161 sessions) in those with severe endotoxicosis with signs of hepatic, renal and hepatic-renal failure. The fourth group consisted of 20 patients (36 sessions), who did not have any liver or kidney disorders. Authors were primarily interested in the reaction to the procedure in hepatic, renal and hepatic and renal insufficiency or in their absence. We singled out the following stages while carrying out PS: a) preparation of hemosorbent system (using charcoal ranks "SKN-4M", "SKN-1K," HSHD "); b) patient’s preparation for the procedure (a puncture of two subclavian veins, an advance, if needed, water stress within 200-500 ml); c) sampling the first portion of blood in plastic containers such as "Hemakon 500/300" or in 500 ml glass bottles; d) centrifuging the blood (centrifuge "MS-06" operation mode settings: 2 thous.rot. / min for 15 min); d) separating plasma from the globular part (plasmoeextractor "ПЕ-01" or specially prepared systems for separating plasma out of glass bottles); e) reinfusion of the treated plasma
and globular part to the patient (aseptic conditions, temperature); g) repeated sampling of subsequent blood portions; g) end of the PS session.

During the procedure of PS there were some subjective and objective changes in the patient. All these changes were recorded and analyzed. As a result, any adverse changes that occurred in the body during PS were divided into reactions and complications. Reactions usually occur at the beginning of the PS procedure, and they are rapid. They do not significantly alter the patient’s condition, ending without somebody’s correction. Their intensity may be so low that they do not influence the patient’s subjective feelings. In some cases, when we deal with the patients having a particularly pronounced emotional component, there is a need for psychotherapeutic influence by the physician or a minor correction by means of symptomatic medications. In their turn, all reactions are divided into two groups: a) during blood sampling: easy fatigue, dizziness, hemodynamic response by hypotonic type (reduced APsyst. by 10-20 mmHg), nausea, rarely vomiting, a slight tingling in the heart, pain or discomfort in the area of the subclavian catheter or venipuncture;

b) when returning purified plasma and formed elements: feeling the heat and rush to the head, redness of the face, the neck and the front surface of the chest, cold extremities, paresthesia of the lower extremities, cyanotic color of the finger nail plates, squeezing in the chest, throbbing headache, hemodynamic response by hypertensive type (increased APsyst. by 10-20 mm Hg), mild tachycardia.

All complications that can occur in a patient during PS theoretically and practically, were divided into the following groups:

1. Complications arising from insufficient preparation of the patient and underestimation of their condition:

   a) collapse;
b) shock;

c) decompensation of the cardiovascular and respiratory systems;

d) aggravation of intoxication syndrome.

2. Complications arising due to a poor preparation of PS session:

a) pyrogenic reactions such as chills;

b) formation of blood clots and precipitates in a plastic container;

c) formation of precipitates in the hemosorbent dispenser.

3. Complications arising directly during PS:

a) collaptoïd condition;

b) irregular heartbeat (ventricular extrasystole (VES));

c) hypocalcemia (excessive administration of sodium citrate);

d) the suction of the subclavian vein wall to the catheter lumen during the sampling;

e) catheter hampering to the subclavian vein wall while returning plasma and formed elements.

4. Late complications that arise after the PS procedure:

a) chill 1-2 hours later;

b) subclavian catheter site infection;

c) phlebitis of the subcutaneous veins.

To avoid adverse changes in the condition of the patient at PS by a discrete option, you must:
1. To perform a thorough examination of the patient in order to determine the structure and the underlying cause of intoxication.

2. To carry out the surgical treatment in the presence of puruloseptic focus.

3. To ground the feasibility of surgical detoxification of PS, considering the general state of the patient.

4. To conduct a psychotherapeutic preparation of the patient to PS with a focus aimed at cleaning the plasma.

5. In patients with severe endotoxicosis we must first carry out an urgent corrective therapy: progressive hypotension (APsyst. <90 mm Hg), hypovolemia with different genesis (CVP - or <0), hypoproteinemia (total blood protein <50 g / L) internal bleeding that lasts (hemoglobin <70 g / l), pyrexia> 39 ° C) multiple allergy, significant disorders in coagulation system of the blood (disseminated intravascular coagulation (DIC), hypofibrinogenemia) decompensation of cardiovascular system of the III-IV degree, respiratory failure of the III degree, pulmonary edema, pre-agonal or agonal state. With the stabilization of the organs and system to analyze the possibility to perform PS. To consider these conditions as contraindications for the surgical detoxification if there is no progress.

6. To prepare the session of PS thoroughly: adherence to sterilization of system units for PS, using leading arteries only once, compliance to shelf life of plastic containers with a stabilizing solution such as "Hemakon", to assemble properly and prepare the system with the dispenser, to use mostly an adsorbent such as "СКН", to carry out the puncture and catheterization of the subclavian veins following all the rules of
septic and antiseptic, to determine the sensitivity of patients to drugs that can be used in PS.

7. If necessary, to perform premedication by using: promedol 2% solution - 1 ml / m dimedrol solution of 1% - 2 ml / m provided stable hemodynamics and respiration.

8. While performing a session of PS itself: to adjust the performance of mechanical means for blood sampling under the control of the general condition and hemodynamic of the patient, to avoid hypothermia of the blood components outside the body, to control the state of organs and systems in order to identify early precursors of complications. In the event of the latter to suspend the session and to carry out a medication in order to stabilize.

9. Periodic introduction of calcium chloride 10% solution - 5 ml i/v every 40-50 minutes to prevent hypocalcemia.

10. After finishing the session, continue monitoring the patient.

11. Thereafter, treating the area of subclavian catheters replacing the aseptic dressings should be performed. To avoid phlebitis of the peripheral veins prefer a catheterization of the central veins.

12. Further continuing the combined therapy with correction of the changes that occur in the body, poison control to determine the degree of endotoxicosis and the subsequent tactics for extracorporeal detoxification.

Further study showed that in order to avoid some reactions and complications of PS, it is necessary to raise the technological level of the procedure. The main ways are introducing a closed regime [3] and the inclusion of modern technologies of processing the biological fluids of the body[4]. The practice of intensive care shows that high-tech methods of active detoxification ensure, firstly, the safety of the patient and, secondly, the feedback between the
patient’s body and the doctor through a system of preventive measures. Manageability of the process and predictability of pathophysiological changes in the body during a session of active intervention will certainly contribute to more effective treatment that becomes a practical reality.

References:

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