# PLASMAPHERESIS IN RESPIRATORY DISTRESS SYNDROME

In respiratory distress syndrome (RDS) underlies toxic edema of the lungs due to endotoxiosis, complicating the course of acute pneumonia and infectious destructions of the lungs and pleura, acute inflammatory diseases of the organ of abdominal cavity (acute pancreatitis, peritonitis), developing under septic, burn and anaphylactic shock.

RDS of severe degree, as a rule, is accompanied by affections also of other vitally important organ with phenomena of polyorgan insufficiency and runs on the background of immunodepression.

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<tr>
<th>INDICATIONS</th>
<th>CONTRAINDICATIONS</th>
<th>CRITERIA OF EFFICIENCY</th>
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<tbody>
<tr>
<td>Plasmapheresis (PA) is justified already on an early stage of development of RDS at appearance of radiologic signs of interstitial edema of the lungs and respiratory insufficiency (shortness of breath &gt; 20 per minute, PaCO2&lt; 35 mms Hg column) in order to prevent progression of RDS</td>
<td>Irreversible damages of the organs of vital importance and non-arrested bleeding</td>
<td>✔ Reduction of the degree and area of shadowing of the lungs at radiologic checking</td>
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<td>The need for PA increases else more in case of developing a severe RDS with pronounced overflow shadowing of pulmonary fields on X-rays, shortness of breath &gt; 30 per minute or already after passing to AVL, signs of polyorgan insufficiency (increase of the levels of transaminases and creatinine)</td>
<td></td>
<td>✔ Improvement of the factors PaO2 and PaCO2</td>
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<td>✔ Restitution of the gas exchange function of the lungs</td>
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<td>✔ Normalization of the functions of other vitally important organs</td>
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PLASMAPHERESIS IN SEPTIC STATES

Quite often acute inflammatory diseases of the organs of thoracic and abdominal cavities acquire a severe progressing course on the background of preceded immunodepression as a result of the diseases suffered earlier, chronic intoxications (alcohol, drugs etc.), harmful ecological and social factors.

Besides, after primary activation of humoral immunity and phagocytosis comes their exhaustion, and the developing endotoxicosis contribute else more to immunosuppression. All this creates vicious circles, which aggravate septic complications.

Performing of only medicamentous immunostimulating therapy without removing “toxic press” from the immune system can only provide a provisional effect, so emphasizing the need for performing efferent therapy. In so doing, it is possible not only to reduce the “toxic press” on the immune system, but also to provide its “prosthetics” – to replenish the level of immunoglobulins (antibodies) and of complement (opsonins).

In this case donor’s antibodies (immunoglobulins) will begin again to block the antigens of the agents, and the complement, through restitution of the opsonization of the macrophages, will promote activation of their phagocytary activity. Thereby, normalization of the humoral immunity will promote restitution of the cellular immunity as well.

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<tr>
<td>➢ Progression of septic complications on the background of adequate</td>
<td>➢ Irreversible damages of vitally important organs</td>
<td>✓ Reduction of intensity of the inflammatory processes</td>
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<td>treatment with antibiotics taking into account the sensitivity of pathogenic</td>
<td></td>
<td>✓ Cessation of bacteriemia</td>
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<td>microflora to them, especially in the presence of bacteriemia</td>
<td></td>
<td>✓ Normalization of the immunogram (of the level of</td>
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<td></td>
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<td>immunoglobulins, complement, phagocytary activity)</td>
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<tr>
<td>➢ Signs of immunodepression (reduction of activity of phagocytosis, of the</td>
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<td>levels of immunoglobulins and complement, leucolymphopenia)</td>
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<tr>
<td>➢ Progression of the main disease with joining of polyorgan insufficiency</td>
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Severe endotoxicosis in acute inflammatory diseases of the organs of abdominal and thoracic cavities, severe traumas and infectious diseases, burn and septic shocks, eclampsia quite often leads to affection of vitally important organs with development of polyorgan failure.

### Indications

- Toxic encephalopathy: soporose condition or coma
- Toxic myocardopathy: AP < 100 mms Hg column., CCF > 100 beats per minute
- Respiratory distress syndrome: shortness of breath > 30 breathings per minute, PaO2 < 70 mms Hg column with FiO2 > 0.4, PaCO2 < 30 mms Hg column
- Toxic nephropathy: olygo-anuria (diuresis < 30 ml/hour)
- Toxic hepatopathy (increase of the levels of bilirubin and transaminases)
- The level of medium molecules (MM) > 300 conv. units, leucocytosis with toxic granularity of the leukocytes or leuco-lymphopenia

### Contraindications

- Irreversible affections of vitally important organs

### Criteria of Efficiency

- Improvement or recovery of consciousness
- Stabilization of hemodynamics
- Restitution of the gas exchange function of the lungs
- Normalization of diuresis
- Reduction of the level of bilirubin and transaminases
- Reduction of the degree of endotoxicosis (CM < 300 conv.units)
- Restitution of immunoreactivity

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PLASMAPHERESIS IN THE TREATMENT OF ACUTE DVS-SYNDROME

The DVS syndrome is characterized by coagulopathy of consumption, breach of rheological properties of blood, microcirculation and leads to development of polyorgan insufficiency.

Plasmapheresis (PA) is performed in order to:

- remove from the circulatory bed products of degradation of fibrinogen, soluble fibrin-monomeric complexes, tissular thromboplastin etc.
- replenish the factors of the coagulating and anticoagulating systems of blood
- prevent the development of the syndrome of polyorgan insufficiency

### INDICATIONS

- The stage of hypocoagulation of the DVS-syndrome if medicamentous and infusion-transfusion therapy is inefficient

### CONTRAINDICATIONS

- Agonal condition of the patient
- Presence of a source of surgery bleeding
- Pronounced hypo- and hypervolemia
- Formed respiratory distress syndrome of adults
- Acute renal failure

### CRITERIA OF EFFICIENCY

- Normalization of hemocoagulation indicators (including increase of the amount of thrombocytes in peripheral blood), absence of diffuse bleedings
- Absence of formation of polyorgan insufficiency for 3 days after performing PA

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**PLASMAPHERESIS IN QUINCKE’S EDEMA**

This syndrome is characterized by accumulation in blood of secondary reactionary-active metabolites, including interleukins IL-3, IL-4, IL-5, IL-15.

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| ➢ Quincke’s edema | ➢ Common for efferent therapy | ✓ Disappearance of edema  
 ✓ Normalization of immunological indicators (IgE, CIC), of the amount of eosinophiles |

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EXTRACORPOREAL MEMBRANE OXYGENATION AND DETOXICATION IN EXTREMELY SEVERE RESPIRATORY DISTRESS SYNDROME WITH ACUTE PARENCHYMATOUS RESPIRATORY INSUFFICIENCY

In extremely severe RDS with nearly complete “liverinization” of the lungs, when the aeriality of the pulmonary parenchyma is saved only in the zone of apexes of the lungs, acute respiratory insufficiency of the parenchymatous type is not arrested by artificial ventilation of the lungs, even with usage of positive pressure at the end of the expiration (PPEE).

Since the main cause of such acute affection of the lungs is endotoxicosis, the treatment is only possible by means of detoxication on the background of extracorporeal membrane oxygenation (ECMO).

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<tr>
<td>➢ PaO2 below 40 mms Hg column with FiO2 1.0</td>
<td>➢ Irreversible damages of vitally important organs</td>
<td>✔ Restitution of gas exchange at the level of PaO2 over 60 mms Hg column with FiO2 of 0.4</td>
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<td>➢ Total or subtotal intensive shadowing of the pulmonary fields</td>
<td>➢ Unsuppressed bleeding</td>
<td>✔ Reduction of the degree and area of shadowing of the lungs on X-rays</td>
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<tr>
<td>➢ Concomitant polyorgan insufficiency</td>
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<td>✔ Recovering of the functions of the liver, kidneys, cerebrum</td>
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<td>✔ Reduction of the length of stay in the resuscitation unit</td>
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