Therapeutic apheresis in veterinary

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A. By types of animals on the basis of anatomical and physiological characteristics of the structure of the most popular guess to use the device in the treatment of dogs and horses, to a lesser extent cats, and others small animals, taking into account the blood volume, the size of the peripheral veins, the commercial value of the procedure and the animal.

B. On the etiology of diseases: infectious and parasitic diseases (piroplasmosis, hemobartonelles, parvovirus enteritis) It needs to reduce toxicity with products of inflammation, drugs, immune complexes, to increase acceleration and percent recovery.

Internal no infectious diseases: often arising in connection with the not right content and feeding the animals (various kinds of allergic dermatitis, atopy, chronic and acute disorders of the liver and kidneys in dogs; breed, genetically transmitted disease, "Shar-Pei Fever" porto-caval shunt of Yorkshire Terriers, rheumatoid lesions hooves and chronic obstructive pulmonary disease in horses).

Surgical diseases (decrease intoxication caused by the underlying diseases and anesthesia, reducing the risk of postoperative acute renal failure, pyometra, volvulus of the stomach, bowel obstruction).

C. On demand: the last 3-4 years in veterinary medicine "seen" a clear demand for improving the quality and efficiency of service, become more and more popular methods of diagnostic imaging and investigations (ultrasound, ECG, X-ray, biochemical studies, cytology, histology, and so on.

D. Since the introduction of these qualitative changes in veterinary plasmapheresis is timely and up to date!
### The choice of methods of therapeutic apheresis, depending on the nature of the disorder

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<th>Character disorders</th>
<th>Treatment options</th>
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| 1 | Infectious and parasitic diseases (piroplasmosis, hemo-bartonellosis parvovirus enteritis, etc.) | Intoxications, both the infection and inflammation products, and drugs. | 1. **Hemosorption** – detoxification with the "capture" of circulating pathogens.  
2. **Plasma exchange** - Detoxification and immune stimulation.  
| 2 | Acute and chronic liver and kidney disease ("Shar pei fever", portocaval shunt Yorkshire terriers) | Intoxication caused by hepatic-renal failure on the basis of a genetic predisposition or toxic effects of drugs, toxic substances. | 1. **Plasmapheresis** 30% CPV with reimbursement only solutions.  
2. **Plasma exchange** 70-100% CPV in acute lesions of the liver and kidneys of reimbursement "donated" plasma.  
3. **Hemosorption**.  
4. **Laser irradiation** of blood |
| 3 | Internal diseases caused by improper maintenance, feeding, allergies. | Allergic dermatitis, atopy. | 1. **Plasmapheresis** 30% CPV.  
2. **Hemosorption**.  
3. **Laser** irradiation of blood |
<p>| 4 | Rheumatic diseases of the joints (the horses' hooves) | Swelling in the joints, their deformation | 1. <strong>Plasmapheresis</strong> 30% CPV. |</p>
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<td><strong>5</strong></td>
<td>Obstructive pulmonary disease in horses</td>
<td>Lesions of bronchopulmonary system.</td>
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<td>Postoperative complications</td>
<td>Intoxication and septic complications caused by both the underlying disease and anesthesia with acute renal and hepatic failure, intestinal paresis, endometritis, osteomyelitis)</td>
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<td>Poisoning caused by the &quot;rat poison&quot;, etc.</td>
<td>Severe intoxication, multiple organ failure</td>
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**Modern technologies in veterinary medicine.**

**Which diseases requires the use of therapeutic apheresis?**

Most diseases accompanied by the accumulation of toxic products in the body that appear natural "treatment facilities" of the body – liver, kidneys. Any condition in which the natural detoxification mechanisms fail (hepato-renal failure) or the concentration of toxic substances prohibitively high (poisoning, acute inflammation, allergies, etc.) require the use of methods of therapeutic apheresis, particularly plasmapheresis.

Some methods of therapeutic apheresis in veterinary and medical practice used since ancient times: the use enterosorvents, appointment of the emetic, laxative, choleretic and sweatshops drugs and also perform of bloodletting, but now, with the development of scientific and technological progress, it includes methods for blood purification by sorption or filtering methods remove some of the plasma from the circulation, followed by reduction of the blood volume (plasmapheresis).

The process of accumulation of pathological ingredients long, it takes weeks and months. Therefore, if not eliminated etiological factors disease, repeated courses of
plasmapheresis, for example twice a year, it is possible to keep patients in remission sufficiently controlled.

**Infectious diseases.**

In all cases, after a viral infection (plague, parvovirus enteritis, viral hepatitis, adenovirus et al.) in the body for a long time delayed toxic pathological products. Plasmapheresis allows us to derive toxic purged from the body and to maximize the recovery of the function of the affected organs and systems. The result of plasmapheresis is a reduction of bilirubin, ALT, AST, creatinine, alkaline phosphatase, immune complexes.

**Babesiosis of dogs.**

Babesiosis (piroplasmosis) of dogs is accompanied by extensive hemolysis and accumulation of toxic products in the blood. Even after the elimination of the pathogen it is necessary to correct homeostasis of the internal environment. In the pathogenesis of toxic effects of the disease plays an important role intensification of free radical peroxidation of the cell membranes components also. Damaged cell proteins become antigenic properties and provoke an autoimmune reaction. As a result of the processes affected tissue of the liver, kidney, spleen and pancreas.

In addition, a direct toxic effect of the high concentration of bilirubin in the blood leads to the development of encephalopathy, and free hemoglobin from the destroyed red blood cells blocks the filtration function of the kidneys. The emerging state of endotoxemia is an indication for urgent application of plasmapheresis as a method of detoxification therapy. It was appointed to the background of the medical treatment.

Plasmapheresis reduces bilirubin and free hemoglobin in the blood, normalizes ALT, AST, and other biochemical parameters of blood, improves the general condition of the animal.

For the prevention of persistent lesions of vital organs is advisable to dogs who have had piroplasmosis, perform plasmapheresis 2 times a year during the first two years after the removal of the causative agent.

**Diseases of the skin.**

This group includes a variety of diseases associated with impaired skin. These include autoimmune dermatitis, contact dermatitis, dermatitis of varying etiology,
dermatomyositis, demodicosis. Disease may be caused by different reasons – autoimmune, allergic and infectious, but they all share a violation of the internal environment of the body.

Plasmapheresis is used in these diseases as the pathogenetic mechanism of treatment because it promotes the excretion of accumulated toxic products in the blood.

**Diseases of the gastrointestinal tract.**

Ulcerative colitis, peptic ulcer, gastritis, malabsorption, cholecystitis, pancreatitis, autoimmune origin accompanied by increased levels of circulating immune complexes and can be subjected to plasmapheresis.

**Allergies.**

Typically, conventional therapeutic measures in various manifestations of allergy are symptomatic. Nevertheless, the present treatment is a pathogenic therapeutic apheresis aimed at removing from the body allergens, blocking receptor antibodies, inhibitors, tissue degradation products, inflammatory mediators, leukotrienes and immune complexes.

Plasmapheresis stimulates the release into the circulation of fresh ingredients and helps to normalize the metabolism, especially lipid peroxidation with increased activity of the antioxidant system. Reduction of biologically active substances normalizes exchange membrane phospholipids. All this leads to the elimination of immunoallergic inflammatory. Action of therapeutic apheresis continues in the longer period.

**Note.**

**Plasma exchange.**

Plasma exchange is required to use a donor plasma. At least – for dog - this problem is solved very simply. In dogs, almost no blood groups, and plasma may be harvested or immediately before surgery, or before long it and stored in frozen form, from any of the mongrel dog.