

Resolution of Teleconference «Infusion Therapy School» March 25, 2021 Kyiv, Ukraine

Almost 10 000 health care specialists have registered to participate in the Teleconference “Infusion Therapy School”.

Teleconference agenda consisted of several topical units of reports: POST-COVID: response to the challenges of modernity, intoxication syndrome in the practice of internal medicine doctor, infusion therapy in the practice of neurologist and cardiologist.

The leading experts of the country have shared their practical experience within the framework of the event. Interdisciplinary format of the Teleconference was ensured by involvement of speakers from different special fields, such as: anesthesiologists, neurologists, cardiologists, infectious disease specialists, nephrologists, and family doctors.

Ten main reports were offered to the participants for review and discussion and they were dealing with the following issues:

- **specific features and capabilities of infusion therapy in case of separate pathological conditions:**
 - post-COVID conditions and response to the challenges of modernity;
 - intoxication syndrome in Pulmonology, Nephrology and Gastroenterology;
 - rational infusion therapy in Neurology, Cardiology, and Endocrinology.
- **complicated and important things in simple words:**
 - selection of infusion solution type in different clinical cases;
 - intravenous fluids with special action;
 - calculation of the amount of infusion therapy.

Conclusions and decisions based on discussion of reports:

1. Endotheliitis and system background inflammation as resonance of cytokine storm and oxidative stress during the outbreak of the disease have a great importance for pathogenesis of post-COVID changes. That is why monitoring of respiratory function, cardiac symptoms, state of nervous system and psychological functions is obligatory after acute symptoms of COVID-19, as well as pathogenic and syndromic approach to rehabilitation of patients focused on suppression of system background inflammation, improvement of endothelial function and decrease of asthenia signs.
2. Pathogenic and syndromic approach is important for relief of general state and improvement of quality of life of a patient with post-COVID syndrome. It is possible thanks to infusion therapy with edaravone, L-arginine and L-carnitine, and electrolyte solution in combination with xylitol having marked energy action.
3. Asthenic syndrome is associated with deterioration of main disease condition which is characterized by low energy availability and metabolic disorders requiring adequate fluid resuscitation. Xylitol based solutions are sources of energy with insulin independent metabolism and they provide efficient energy support.

4. The patients with diabetes mellitus, particularly type 2, have troubles with insulin resistance, accelerated atherosclerotic processes, high levels of blood glucose quite hard to keep down. Xylitol based infusion solution solves both those problems: thanks to xylitol contained it provides insulin independent energy metabolism instead of glucose and stimulates adiponectin synthesis decreasing visceral fat level and protecting against atherosclerosis signs.
5. Taking into account potentially dangerous results of progressing intoxication, detoxification was and still is one of the principal directions of modern infusion therapy. Hemodilution and improvement of microcirculatory flow providing for parenteral water load of crystalloids are compulsory for treatment of exo- and endotoxiosis.
6. Balanced crystalloid intravenous fluids are preferred for pathogenic treatment of pneumonia. Reosorbilact® composition has essential advantages for patients with respiratory infections. According to the results of open RheoSTAT research, intravenous infusion of Reosorbilact® to patients having pneumonia at a dose of 200-400 ml/day significantly improves clinical state, decreases signs of (multi-) organ failure and endogenous intoxication. Such administration has a favorable safety profile: it doesn't cause fluid overload, pulmonary edema, pleural fluid or other serious adverse effects and doesn't cause clinically significant increase of endogenous lactate in blood.
7. Pyelonephritis and chronic kidney disease require fluid resuscitation and further detoxification therapy. Reosorbilact® is the only choice for detoxification of people with kidney damage by administration of a dose 200-400 ml/day. Compound infusion product Reosorbilact® has a positive impact on progress of chronic pyelonephritis due to its detoxification and diuretic action. Use of Reosorbilact® as part of combined therapy for patients with chronic pyelonephritis results in decrease of the amount of urea and creatinine in the blood, increase of glomerular filtrate rate, so it is possible to use this product for patients with chronic kidney disease.
8. In gastroenterology toxic syndrome is one of confounding factors of main disease or marker of acute condition of a chronic one. As it stands today composition and effect of Reosorbilact® absolutely meet requirements to modern detoxifying agent and can be widely used by internal medicine doctors as an important component of detoxification therapy in case of acute and chronic diseases of organs of hepatobiliary system and gastro-intestinal tract. Reosorbilact® has a multi-agent impact on fundamental units of pathogenesis of both exogenic and endogenous toxicosis: decrease in concentration of toxin in blood and tissues; activation of toxin withdrawal through the kidney, intestine, bilis; increased metabolism in the liver, as a principal detoxification organ; correction of metabolic acidosis and electrolyte disorders. Application of Reosorbilact® results in fast improvement of general condition, restoration of damaged functions of organs and decrease in the incidence of intoxication syndrome.
9. Detoxification therapy is characterized by graded approach which consists of the complex of intravenous infusion therapy and oral detoxification. It has to do with the fact that clinical signs of intoxication are the tip of the iceberg. Recovery of biochemical indicators depends on absorbing of toxins in the gastrointestinal tract. Well-balanced salt and water composition of Water ReO® assures as quick as possible absorption of water and electrolytes. It eliminates dehydration symptoms (fatigue, headache, dry skin and mucosae), prevents dehydration, normalizes urine output and decreases intoxication. That is why it is important to follow graded detoxification therapy which shall not be less than 7-10 days and must include oral fluid resuscitation with Water ReO®.
10. In case of acute cerebrovascular accident infusion therapy has the following target directions: retention and optimization of cerebral perfusion - normovolemia and normotension; brain swelling prevention; insurance of delivery of necessary substances. Finished pharma product of balanced solution of electrolytes and citicoline is a volemic support and double modulation of neurotransmission. The lactate contained in the solution is able to increase brain energy substrate. Edaravone suppresses brain swelling by means of free radicals absorption, cytokine inhibition, decrease of lipid peroxidation and

oxidated stress reduction, reduce of permeability of the blood-brain barrier, activation of anti-inflammatory and decrease of pro-inflammatory peptides, activation of antiapoptotic mechanisms.

11. In terms of pathogenesis the therapeutic complex of acute back pain syndrome (dorsopathy) shall care not only about treatment of pain syndrome and inflammation level but of vascular component too. Quite often general practitioners ignore it but it causes impairment of blood supply to definite region of spine and in such a way a stable level of ischemia is formed in the affected region. Complex approach to treatment of Claudication in case of low back pain includes levorotatory arginine protecting vessels, activating endothelium dependant mechanism of vasodilatation; balanced solution of pentoxifylline and electrolytes for correction of intravascular disorders; hyperosmolar crystalloid fluids that relieve swelling due to hyperosmolarity, open precapillary sphincters that went into spasm and improve microcirculation. As a result the patient gets long term and stable remission.
12. Free radicals play a key role in pathogenesis of acute ischemic stroke, amyotrophic lateral sclerosis, heart attack, diabetes, atherosclerosis, development of acute respiratory distress syndrome in case of COVID-19. Complex approach to treatment of abovementioned nosologies when medication with antiradical operation is prescribed increases the efficiency of treatment and contributes to better prognosis. Edaravone is a powerful absorber of free radicals and blocking agent for ischemic cascade. Edaravone captures free radicals and has anti-inflammatory, anti-apoptopik, anti-cytokine action with different diseases, as far as it can penetrate into many disease-affected organs and demonstrates protective influence in the heart, lungs, intestine, liver, pancreas gland, kidneys, and bladder.
13. Post-COVID syndrome is characterized by specific viral damaging of endothelium through receptors ACE-2. It was named "SARS-CoV-2 associated endotheliitis" with microangiopathies of myocardium primarily and other target-organs. During post-COVID period there is a high risk of development of thrombovascular complications, as well as of systemic thrombovasculitis and generalized endothelial dysfunction. So the therapy should have pathogenic orientation. Fixed combination of L-carnitine and L-arginine will restore endothelium and will protect the heart from defeat. Particular attention should be given to use of L-carnitine which is useful for patients in post-COVID period. Thanks to its immunomodulatory action and inhibition of inflammation mediators, C-reactive protein in particular, tumour necrosis factor and B cell stimulatory factor 2, the sings of endotheliitis, the main reason of damaging of cardio-vascular system, decrease.
14. Endothelial dysfunction (ED) is a transitive stage in continuum of peripheral vascular diseases leading to undesired clinical events. As far as endothelium is a key element in such pathologic process it requires special approach when protective strategies are applied. The main role of L-arginine is to be the main substrate for NO-synthase that catalyzes NO synthesis in endotheliocytes. It prevents thrombus formation, decreases cholesterol in blood, prevents development of atherosclerosis and significantly improves endothelial function. Arginine decreases blood pressure and promotes blood flow by means of regulating of smooth muscle tonus, vascular permeability and microcirculation. In such a way it makes it easier to deliver oxygen to myocardium, brain, limbs and other organs.

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