studies — JELIS [10], COMBOS [6]. In the GISSI-HF study included approximately 7000 patients with heart failure. Use of Omacor in a dose of 1 g/day for an average of 3.9 years, caused a significant reduction in the risk of death from any cause by 9% compared with placebo. According to the results of many studies have highlighted the effectiveness of Omega 3 PUFA-in terms of their ability to reduce the severity of hypertriglyceridemia. It has been shown that their use will reduce the serum concentration of triglycerides by more than 60%. Application ω3-PUFA during the initial hypertriglyceridemia also contributes to a marked reduction in the likelihood of thrombus formation, decrease cardiovascular risk.

Findings

The preparation of omega-3 PUFA (Omacor) has lipid-lowering effect of reducing the level of TC, LDL–C, TG and increasing the concentration of HDL in patients with coronary artery disease and heart failure. Our experience of Omacor has shown that the drug has a sufficient efficiency, well tolerated and can be recommended for use in patients with coronary artery disease and heart failure with hypercholesterolemia.

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Non-invasive Brain Cooling in Severe Multisystem Brain Injury Complicated Septic Shock

Abstract: The basis of the therapeutic effect of non-invasive brain cooling in severe traumatic brain injuries is to protect brain tissue from the damaging effect of oxygen deficiency. From this perspective, the results of studying the effect of nasopharyngeal cooling on the state of the brain stem structures both in primary and secondary ischemic injury are of interest.

Keywords: severe brain injury, non-invasive brain cooling, nasopharyngeal cooling, brain stem structures.

Traumatic brain injury (TBI) is a critical public health and socio-economic problem throughout the world. It is a major cause of death, especially among young adults [1], and lifelong disability is common in those who survive. Although high-quality prevalence data are scarce, it is estimated that in the USA, around 5.3 million people are

living with a TBI-related disability [2], and in the European Union ('old' Member States), approximately 7.7 million people who have experienced a TBI have disabilities [3]. In Uzbekistan incidence of TBI is 91 cases per year per 100 000 adult population [4], in the United States — from 20 to 536 [5]. Defeat brainstem structures (BS) to 81% by histological study in vitro [6] and 12–47% — in accordance with the data of a magnetic resonance tomography (MRT) in vivo [7, 8, 9]. 66% of these injuries result in adverse (death, severe disability) outcome of the disease [8].

The worldwide burden of sepsis is high and is increasing [10]. Brain dysfunction is a severe complication of sepsis with an incidence ranging from 9% to 71% that is associated with increased morbidity and mortality [11]. High body temperature in patients with increased intracranial pressure may be a deleterious association [10]. Various drugs acting on sepsis-induces blood-brain barrier dysfunction, brain oxidative stress and inflammation have been tested in septic animals but not yet in patients [12].

The wide variety of mechanisms of injury that are exaggerated by hyperthermia and may be ameliorated by moderate hypothermia. They include mechanisms of neuroexcitotoxicity [11], release of free radicals, changes in blood-brain barrier and vascular permeability, the release of proinflammatory mediators, drawing leucocytes across the blood-brain barrier, increasing the number of inflammatory cells in the brain tissue and the passage of neutrophils, phagocytes, monocytes and macrophages into the brain, additionally injuring neuronal cells by stimulating further immune reactions [13]. We are aiming to reduce rates of morbidity and mortality through the new methods of therapy being studied [13]. The aim of our study was to optimize prevention and treatment of septic shock and toxic encephalopathy in patients with multisystem severe TBI.

Material and methods of research. During the period from 2010 to 2015, 113 patients with TBI were admitted to our hospital urgently after accidents, falls, fights. 91 (80.5%) patients were subjected to emergency surgery: 46 (50.5%) patients underwent neurosurgical intervention on the removal of intracranial hematoma hydroma, the rest — midline laparotomy (ML), 10 of them (22%) cases of simultaneous operations: removal of intracranial hematoma (hydroma) with ML. ML accompanied nephrectomy (3 patients), nephrectomy with splenectomy (3 patients), nephrectomy with resection of the liver (2), splenectomy (3), resection of liver and intestine (4) and bowel resection (3). After ML laparostomy set to the disappearance of inflammation signs.

Brain cooling started all patients immediately after admission to the hospital. The control group was carried out using conventional cooling techniques: cooling of the cranial vault and the projection of the carotid bifurcation. The study group receives conventional cooling techniques in aggregate nasopharyngeal cooling (NFC).

The main indication of the developed method of brain hypothermia — is NFC component by use intranasal balloons connected with the outer system, where circulation of cold water provided by a roller pump. NFC directly influences on BS, where located the centers of the respiratory, circulatory, endocrine, and thermoregulation. In addition NFC can block the activity of the thermoregulatory center, located in the hypothalamus, which is especially relevant in our febrile septic patients.

As a rule, this method should be combined with known methods of cooling of the cranial vault and the projection of the carotid vessels by icepacks. For relief general and motor excitation and shivering performed neurovegetative blockade (NVB), which was achieved by intravenous continuous infusion of propofol 1 mg/kg/h (dormicum 0.125 mg/kg/h, thiopental 2 mg/kg/h), fentanyl (1 mcg/kg/h) and droperidol (0.08 mg/kg/hr).

Blood pressure is maintained at the required level by infusion of norepinephrine and/or dobutamine.

Received results and their discussing. It should be noted that all patients had risk factors for the development of sepsis: intubation, catheters in the stomach, bladder and central vein. Furthermore, the general hypothermia is also one of the main factors in the development of infectious complications by impairing the secretion of proinflammatory cytokines and suppresses leukocyte migration and phagocytosis [14, 15]. Recently it has been speculated that hypothermia may induce insulin resistance leading to hyperglycemia possibly promoting infection onset [15, 16]. That's why in our work we have used the local cooling, mainly to stabilize the functional state of BS, and inhibit the activity thermoregulation center, located in the hypothalamus.

In the control group three-five days in 12 patients showed signs of toxic encephalopathy, 5–8 days — liver failure (3 patients), 7–11 — renal failure (5), 6–12 — septic shock (11), 4 — refractory septic shock, 8 — hyperthermic syndrome. Malignant fever was observed in 4 patients. Due to the above, for 2–4 days in all patients on the basic therapy with prophylactic or therapeutic purposes began recurring brain cooling.

In study group brain cooling for 24–72 hours contributed to the complete disappearance/prevent symptoms of toxic encephalopathy, as well as hyperthermia syndrome and malignant fever. No need for the implementation of repeated sessions of brain cooling. This will reduce the length of stay of patients in intensive care unit (ICU) and greatly reduce the costs associated with the treatment of septic patients.

Results shows a statistically significant absolute predominant influence on the NFC on course and outcome of patients with severe TBI: the study group noted reduction in the length of stay of patients in the ICU of 1.4 times in the hospital — 1.4, the length of hemodynamic instability — 1.7, depending on from mechanical ventilation (MV) — 1.3, coma — 2 times. Glasgo outcome scale (GOS) was also the most favorable in the study group — 4.7 b versus 3.8 in the control group. The mortality was 25.35, and 30.95%, respectively.

From the 71 patients only 10 (14.1%) had severe sepsis with temperature response. Besides, the duration of intubation, catheterization of central vein, bladder and stomach was significantly lower.

Further, we supported prophylactic normothermia in patients with sepsis and fever. It is noteworthy that 14 (33.33%) patients of the control group has moderate neurological failure (GOS — 4). From 71 patients of the study group 18 died (25.35%), 43.62% — fully recovered, 11.32% — has moderate neurological failure.

Using these data, we were able to design a model of economic efficiency of the use of NFC for patients with severe TBI. Of course, the main advantage of using the NFC at TBI should be a decrease in the patient's disability throughout his life and improve its quality. The economic effect of reducing disability in the implementation of a new method of treatment in clinics of Uzbekistan amounted to UZS 171 944 017.2 UZS/year, by shortening the time of disability — 28 458.47 UZS/day, by reducing the cost of treatment (shortening hospital stay) — 7 920 484.7 UZS/day.

Conclusion. Add to NFC set of simple methods leads to a significant reduction in brain temperature, the temperature gradient brain-body reaches 3,1 °C. NFC by circulating in the intranasal balloons with cold water in the presence of normal blood circulation contributes to BS neuroprotection with located in these vital centers of the respiratory, circulatory, endocrine, and thermoregulation in contrast to conventional cooling methods of the cranial vault and the projection of the carotid bifurcation. Positive stabilizing effect on the NFC on BS appears to reduce the length of stay in ICU, normalization of hemodynamic and respiratory parameters. Brain cooling, in according to our method, allowed us to obtain good results in the treatment of patients with toxic encephalopathy, malignant hyperthermia, septic shock.

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