Importance of cardioprotective ALV in patients with severe brain injury.

Toshev I.I. Republican Scientific Center for Emergency Medical Assistance to the Bukhara branch

ABSTRACT

This article discusses the significance of SPM in patients with traumatic brain injury, changes in the respiratory and cardiovascular systems of the patient's body after extended mechanical ventilation. In total, 295 patients with craniocerebral injuries have been treated in the Department of Neuro -Resuscitation of the Republican Scientific Center for Emergency Medical Assistance to the Bukhara branch this year. In 85 of these patients, an IVDS device was connected. During the examination of 49 patients, 20 showed various changes in the cardiovascular and respiratory systems. The article describes X-ray studies, laboratory studies and ECG changes in these patients.

Keywords: ALV, closed craniocerebral injury, IVS cardioprototype , X-ray studies, laboratory studies, ECG

The basis of intensive care in neurosurgery is the prevention and treatment of secondary cerebral ischemic attacks. In their prevention, it is of great importance to ensure the function of external respiration, adequate to the needs of the affected brain. Insufficient minute volume of breathing can cause hypoxia, while hyperventilation due to hypocapnia and spasm of cerebral vessels can also be dangerous. Modern respiratory devices allow for effective assisted ventilation while maintaining the patient's spontaneous rhythm. But we must not forget that in case of injuries and diseases of the central nervous system, the principles of respiratory support developed in general resuscitation for various types of primary lung damage cannot be fully transferred to neuroreanimatology . It should be remembered that without targeted pharmacological and/or surgical intervention on the underlying pathological process, the effectiveness of the treatment of respiratory disorders is significantly lower.

Purpose: to study the effect of mechanical ventilation (ALV) and some types of assisted lung ventilation (ALVL) on cerebral hemodynamics and intracranial pressure in patients with severe traumatic brain injury (STBI).[6,7,8,9]

Material and methods: Examinations showed that most of these patients are between the ages of 30 and 50 years, and among them, patients aged 45+1-48+1 years have many changes in the cardiovascular system. In most patients, hypotensive complications from the cardiovascular system are observed, a sharp decrease in intracranial pressure is observed, and constant parameters of the apparatus, hemodynamic and respiratory parameters are controlled. 50-55% of cases of lowering blood pressure and the occurrence of ischemic changes in the heart in the early stages of mechanical ventilation in complicated patients. [14,22].

Indications for mechanical ventilation and mechanical ventilation were not only the increase in respiratory failure, but also the progression of neurological disorders. All patients underwent a clinical and neurological examination in dynamics, control of laboratory parameters (general blood count, acid-base state of the CBS), including arterio-venous oxygen difference (AVDO2) and hemoglobin oxygen saturation in the bulb of the jugular vein (SjO2). To study the gas composition, capillary, arterial, and venous blood taken from the internal jugular vein was examined. Blood sampling from the jugular vein was carried out by puncture method from v.jugularis interna on the 1st, 3rd and 5th day. Blood gas parameters were recorded at least 4 times a day during the entire period of respiratory support. The indicators of the gas composition of the blood were studied on the Analyze apparatus blood gas (USA). AVDO2 was calculated from pulse oximetry and hemoglobin oxygen saturation in the blood of the jugular vein, as well as by comparison with arterial blood gas parameters. [11,12,18,20] In the postoperative period, all patients underwent mechanical ventilation using Savina, Evita devices against the background of standard intensive care 2+ (Dreager , Germany). At first, the IPPV mode (Intermittent Positive Pressure Ventilation) - intermittent ventilation under positive pressure. Subsequently, various ventilation modes were used individually: BIPAP (Biphasic Positive airway Pressure) - two-phase www.sta.uz Shoshilinch tibbiyot axborotnomasi , 2011, no. 2 41 positive airway pressure, SIMV (Synchronized Intermittent Mandatory Ventilation) - synchronized intermittent mandatory ventilation. Ventilation parameters: inspired oxygen fraction (FiO2) not lower than 40-45%, peak inspiratory pressure (Pins) from 10 to 30 mbar , PEEP from 2 to 10 mbar . At the same time , invasive intracranial pressure (ICP) was measured in all patients using the IIND 500/75 device (Triton-Electronics , Russia) during the entire period of respiratory support. Monitoring of hemodynamic parameters (BP, mean arterial pressure MAP , heart rate) was carried out by Nihon devices Cohden (Japan) and Datex Ohmeda (USA). If necessary, to increase systemic blood pressure, pressor amines were used in generally accepted dosages, and to prevent cerebral edema, 3% hypertonic solutions of sodium chloride at an average dose of 5.3 ml/kg were used. Cerebral perfusion pressure (CPP) was calculated by the formula: CPP = MAP - ICP, where: ICP - intracranial pressure, MAP - mean arterial pressure, which is calculated by the formula: MAP = (BP syst + 2BPdiast)/3.

Results and discussion :

The works devoted to the prognosis and outcomes of treatment in patients with TBI who underwent mechanical ventilation indicate only the fact that the results of treatment in this category of patients depend on the initial severity of the patient and do not reflect the role of timely and adequate respiratory support [19]. Unreasonable use of the hyperventilation mode leads to hypocapnia, which causes vasoconstriction and a decrease in cerebral blood flow [22,23,25]. The decrease in cerebral blood flow following vasospasm will be more pronounced in the affected areas of the brain. Thus, the metabolism and oxygenation of cells, which are already in a state of apoptosis , worsen, an ischemic cascade and secondary ischemia of the brain parenchyma develop [14,20]. With a decrease in cerebral blood flow, oxygen utilization by neurons increases, and the SpO2 index decreases. In this regard, an increase in AVD O 2 may reflect the potential danger of ischemic changes [20,22,26]. With forced ventilation of the lungs, an increase in intrathoracic pressure will lead to a decrease in cardiac output and an increase in ICP [2,4,6]. These two factors will certainly lead to a decrease in CPP. Optimization of respiratory support methods in patients with subarachnoid hemorrhage (SAH) deserves close attention, since mortality among patients with cerebrovascular pathology who underwent mechanical ventilation is very high and, according to the literature, ranges from 49 to 93% [3]. In patients with acute cerebrovascular accident, hypoxia and impaired spontaneous breathing often occur, which worsens the outcome, so patients should be intubated and transferred to mechanical ventilation [18, 21]. The indication for tracheal intubation and artificial lung ventilation is not only respiratory, but also cerebral insufficiency. Patients with severe brain damage, including those with SAH, have features of respiratory support, which include a wide range of respiratory disorders of central origin, as well as the need to maintain the concentration of carbon dioxide in the blood plasma in a narrow therapeutic range in order to avoid cerebral ischemia due to hypercapnia. . During mechanical ventilation, two tasks are solved: maintaining adequate gas exchange and preventing lung damage. The purpose of mechanical ventilation is to ensure sufficient oxygenation of arterial blood (PaO2 - 100 mm Hg or more) and maintenance of carbon dioxide tension (PaCO2) within 33-40 mm Hg. Art. With intact lungs, the tidal volume should be 8-10 ml per 1 kg of ideal body weight, the pressure at the height of inspiration should not exceed 30 cm of water . with t., positive pressure at the end of expiration - 5 cm of water. Art., minute respiratory volume - 6-8 l / min, and the oxygen content in the respiratory mixture - 30-50% [7-9]. It is important to prevent episodes of PaCO2 falling below 30 mm Hg. Art., since hypocapnia leads to a decrease in cerebral blood flow and cerebral ischemia [24]. The choice of the mode of respiratory support is carried out individually. As a rule, in the process of respiratory therapy, ventilation modes are periodically changed depending on the needs of the patient. It is believed that the expediency of using mechanical ventilation is associated not only with overcoming respiratory disorders, but with the possibility of using the hyperventilation mode to influence the tone of the pial -capillary vessels, to achieve an increase in peripheral vasoconstriction and thereby reduce the volume of the intracranial blood flow fraction, which leads to an increase in craniospinal compliance and a decrease in intracranial hypertension [10,11]. There is evidence that volume-controlled ventilation modes should be used. The problem of optimal minute volume of lung ventilation for patients with neurosurgical pathology is discussed in the literature. In the study of A.A. Belkina et al . (2005) showed that the use of volumetric ventilation in patients with acute cerebral insufficiency is accompanied by a significant increase in the hydrodynamic resistance of the pial vessels of the brain, which may be due to the effect of mechanical ventilation on the increase in pressure in the cerebral venous system and on the autonomic innervation of cerebral vessels [11] E .A. Kozlova et al . (2005) studied the autoregulation of cerebral circulation in patients in the acute period of severe TBI as a guideline for managing the parameters of artificial lung ventilation. They showed the possibility of a directed change in the autoregulatory reactions of cerebral arteries by changing the level of CO2 and determined the conditions for the optimal mode of mechanical ventilation, which optimizes the state of cerebral circulation [1]. A.V. Oshorov et al . (2004) offer a differentiated approach to the use of hyperventilation in the acute period of severe TBI, depending on the state of cerebral blood flow. [2 7 ,2 8 ,2 9]. The authors note that the use of hyperventilation to combat intracranial hypertension in vasospasm leads to a temporary decrease in ICP, but at the same time causes changes in cerebral blood flow that do not correspond to the oxygen needs of the brain, a decrease in CPP, which increases the risk of ischemic damage to the brain tissue . This requires multi-parameter monitoring of cerebral functions as a prerequisite for the strictly justified use of hyperventilation during the intensive care of intracranial hypertension [5]. Thus, there is practically no complete picture of changes occurring in the brain in patients with TBI during mechanical ventilation, the influence of respiratory support parameters on the state of the brain and outcomes of treatment in patients with TBI. It is especially important to resolve these issues in order to prevent the occurrence of hypoxemia and hypoxia of the brain, as the leading causes of secondary ischemic episodes that worsen the course and prognosis of neurosurgical pathology. This can be avoided by rational respiratory therapy, which, along with other methods of intensive therapy, is based on the results of complex monitoring of the functional state of the brain and its life support systems. All of the above determines the relevance of research in this area in order to develop optimal methods of respiratory support, which is based on long-term artificial ventilation of the lungs of patients with TBI.

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