The Importance of Cardioprotective Artificial Ventilation of The Lungs in Intensive Care

Pulatova Sh.Kh — Republican Scientific Center for Emergency Medical Care Bukhara Branch

Ganiev N.S — Republican Scientific Center for Emergency Medical Care Bukhara Branch

ABSTRACT

This article deals with the importance of the cardof ioprotective ventilation in intensive care units and changes in patients who are under treatment for a long time in critical condition. In total, this year, 200 patients with traumatic brain injuries were treated in the **neuroresistance** department of the RSTEIM BF. 85 of these patients were connected to the OSV device. When examining 55 patients, 40 observed various changes in cardiovascular and **respiratory Systems**. The article describes X-ray studies, laboratory tests and ECG changes in these patients

Keywords: ventilation, closed craniocerebral injury, cardioprototype of USV, X-ray studies, laboratory tests, ECG

The basis of intensive care in neurosurgery is the prevention and treatment of secondary cerebralx ischemic attacks. In their prevention, it is of great importance to ensure the function of external respiration that is adequate to the needs of the affected brain. Insufficient minute volume of breathing can cause hypoxia, at the same time hyperventilation due to hypocapnia and spasm of cerebral vessels can also be dangerous. Modern respiratory devices allow for effective auxiliary ventilation lungs 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 variants of primary lung damage cannot be completely transferred to neuroreanimatology. It should be remembered that without directed pharmacological and / or surgical effects on the main pathological process, the effectiveness of treatment of respiratory disorders is significantly lower.

Objective: To study the effect of artificial ventilation (ventilator) and some types of assisted ventilation (HIVL) on cerebral hemodynamics and intracranial pressure in patients with severe traumatic brain injury (TCMT). [8,12]

Material and methods: Surveys have shown that most of these patients are aged 30 to 50 years, and among them in patients 45 + 1-48 + 1 years there are many changes in the cardiovascular system. Most patients have hypotensive complications from the cardiovascular system, there is a sharp decrease in intracranial pressure, and the constant parameters of the apparatus, hemodynamic and respiratory parameters are monitored. 50-55% of cases of lower blood pressure and the occurrence of ischemic changes in the heart in the early stages of ventilation in complicated patients. [31,32]. Indications for ventilation and VENTILATION were not only the increase in respiratory failure, but also the progression of neurological disorders. In all patients, clinical and neurological examination, monitoring of laboratory parameters (complete blood count, acid-base state of the KOS), including arteriovenous oxygen difference (AVDO2) and hemoglobin oxygen saturation in the bulb of the jugular vein (SjO2) were carried out in dynamics. To study the gas composition, capillary, arterial, as well as 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. Parameters of the gas composition of the blood were recorded at least 4 times a day during the entire period of respiratory support. Indicators of the gas composition of the blood were studied on the Analyze blood gas apparatus (USA). AVDO2 was calculated from pulse oximetry and hemoglobin oxygen saturation in the blood of the jugular vein, as well as by comparison with the gas composition of arterial blood. [13,15,16,17] In the postoperative period, all patients were ventilated with Savina, Evita 2+ (Dreager, Germany) against the background of standard intensive care. Initially, the IPPV (Intermittent Positive Pressure Ventilation) mode was used - intermittent ventilation under positive pressure. Subsequently, various ventilation modes were individually applied: BIPAP (Biphasic Positive Airway Pressure) - a 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: fraction of inhaled oxygen (FiO2) not lower than 40-45%, peak inhalation pressure (Pins) from 10 to 30 mbar, PEEP from 2 to 10 mbar. At the same time, invasive measurement of intracranial pressure (ICP) was performed in all patients using the IIND 500/75 apparatus during the entire period of respiratory support. Monitoring of hemodynamic parameters (blood pressure, mean blood pressure SrADA, heart rate) was carried out by Nihon Cohden (Japan) and Datex Ohmeda (USA) devices. If necessary, pressor amines were used to increase systemic blood pressure in generally accepted dosages, and to prevent cerebral edema - 3% hypertonic solutions of sodium chloride in an average dose of 5.3 ml / kg. Cerebral perfusion pressure (CPD) was calculated according to the formula: CPD = SrADA - ICP, where: ICP - intracranial pressure, SrADA - average blood pressure, which is calculated according to the formula: SrAD = (AD cyst + 2ADdiast) / 3.

Results and discussion:

In the works on the prognosis and outcomes of treatment in patients with TBI who underwent ventilation, 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]. Unjustified use of the hyperventilation regimen leads to hypocapnia, which causes vasoconstriction and a decrease in cerebral blood flow [22,23,25]. A 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 that are already in a state of apoptosis deteriorate - an ischemic cascade and secondary ischemia of the brain parenchyma develop [14,20]. With a decrease in cerebral blood flow, the utilization of oxygen by neurons increases, and the SpO2 indicator decreases. In this regard, an increase in AVD O2 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 the CPD. Optimization of methods of respiratory support in patients with subarachnoid hemorrhage (SAH) deserves close attention, since the mortality rate among patients with cerebrovascular pathology who underwent ventilation is very high and, according to the literature, from 49 to 93% [3]. In patients with acute disorders of cerebral circulation, hypoxia and impaired independent breathing are often found, which worsens the outcome, so patients should be intubated and transferred to a ventilator [18, 21]. Indication for intubation of the trachea and artificial ventilation of the lungs is not only respiratory, but also cerebral insufficiency. In patients with severe brain damage, including those with SAH, there are features of respiratory support, which include a wide range of respiratory disorders of central genesis, 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. When carrying out ventilation, two tasks are solved: maintaining adequate gas exchange and preventing damage to the lungs. The purpose of ventilation is to ensure sufficient oxygenation of arterial blood (PaO2 - 100 mm Hg or more) and maintain carbon dioxide tension (PaCO2) in the range of 33-40 mm Hg. 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 be no more than 30 cm of water. art., positive pressure at the end of exhalation - 5 cm of water. st., the minute volume of breathing is 6-8 l / min, and the oxygen content in the respiratory mixture is 30-50% [7-9]. It is important to prevent episodes of decrease in RaCO2 below 30 mm Hg. art., since hypocapnia leads to a decrease in cerebral blood flow and cerebral ischemia [24]. The choice of respiratory support mode is carried out individually. As a rule, in the process of conducting respiratory therapy, ventilation modes are periodically changed depending on the needs of the patient. It is believed that the expediency of using ventilation is associated not only with overcoming respiratory disorders, but with the possibility of using the hyperventilation regimen to affect the tone of the pial-capillary vessels, to achieve an increase in peripheral vasoconstriction and thereby reduce the volume of the intracranial fraction of blood flow, which leads to an increase in craniospinal compliance and a decrease in intracranial hypertension [10,11]. There is evidence that it is necessary to use ventilation modes with volume control. The literature discusses the problem of the optimal minute volume of ventilation for patients with neurosurgical pathology. In the study of A.A. Belkin et al. (2005) it was shown 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 ventilation on the increase in pressure in the cerebral venous system and on the autonomic innervation of cerebral vessels [11] E.A. Kozlov et al. (2005) studied 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 the cerebral arteries by changing the level of CO2 and determined the conditions for the optimal ventilation regimen that optimizes the state of cerebral circulation [1]. A.V. Oshorov et al. (2004) propose a differentiated approach to the use of hyperventilation in the acute period of severe TBI, depending on the state of cerebral blood flow. [27,28,29]. 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 meet the oxygen needs of the brain, a decrease in CPD, which increases the risk of ischemic damage to brain tissue.This requires multiparametric monitoring of cerebral functions as a prerequisite for the strictly justified use of hyperventilation during intensive care intracranial hypertension [5]. Thus, a holistic picture of the changes occurring in the brain in patients with TBI during ventilation, the effect of respiratory support parameters on the state of the brain and the outcomes of treatment of patients with TBI is practically absent. It is especially important to solve these issues 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 will be avoided by rational respiratory therapy, along with othermethods of intensive care based on the results of comprehensive monitoring of the functional state of the brain and its life support systems. All of the above determines the relevance of the study 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.

Literature

1.Autoregulation of cerebral circulation as ori1. Actor for controlling the parameters of artificial ventilation of the lungs in the acute period of severe craniocerebral trauma / E.A. Kozlova, A.V. Oshorov, V.L. Anzimirov [et al.] // Voprosy neurosurgery. — 2005. — № 1. pp. 24–29.

2. Kenzhaev, M. L., & Rizaeva, M. Zh. (2020). Clinical course of atrial fibrillation in patients with coronary heart disease. In Science and Innovation-Modern Concepts (pp. 103-109).

3. Khayrullaeva D. Kh., Avezova S.M. Changes in hormonal in adverse environmental condition//World Journal of Pharmaceutical Research 2020 Vol.9 Issue 5, pp. 2450-2458.

4. Kenzhaev, M. L., & Rizaeva, M. Zh. (2020). Identification of predictors of atrial fibrillation in patients with coronary heart disease. A new day in medicine, (2), 403-406.

5. Chodieva M.S., Komilova B.O. Immunogenetic aspects of Helicobacter Pylori associated gastroduodenal pathology in children // Russian Journal of Gastroentrology of Hepatology of Coloproctology.Russia.- 2019 No5tom26.-P.57-59.

6. Pulatova Shakhnoza Khaydarovna Features of thrombolytic therapy in patients with acute myocardial infarction // Bulletin of Emergency Medicine. 2019. №6. URL: https://cyberleninka.ru/article/n/osobennosti-tromboliticheskoy-terapii-u-bolnyh-ostrym-infarktom-miokarda (date of access: 09.12.2022)

. 7. Rizaeva, M. Z. (2022). EFFICIENCY AND SAFETY OF ELECTRIC CARDIOVERSION IN PERSISTENT FORM OF ATRIAL FIBRILLATION. European journal of molecular medicine, 2(5).

8. Khaitov Dilshod Khayotovich, & Toshev Izzat Ikromovich. (2022). Specific Morpho functional Changes of the Lymphatic System in Patients Suffering from Burns. *Eurasian Research Bulletin*, *15*, 81–84. Retrieved from https://geniusjournals.org/index.php/erb/article/view/2800

9. Pulatova SH.Kh., Azimov B.K., Toirov I.R. ENDOVASCULAR TREATMENT OF PATIENTS WITH ISCHEMIC HEART DISEASE // EKZH. 2019. №S1. URL: https://cyberleninka.ru/article/n/endovaskulyarnoe-lechenie-bolnyh-ishemicheskoy-boleznyu-serdtsa (date of access: 09.12.2022).

10. UROQOV, S., & RIZAEVA, M. NEW DAY IN MEDICINE. NEW DAY IN MEDICINE Учредители: Бухарский государственный медицинский институт, ООО" Новый день в медицине", (1), 230-232.11. Rizaeva, M. Z. (2022). The clinical course of atrial fibrillation in patients with coronary heart disease. European journal of molecular medicine, 2(1).

12. Safarov S.S, & Toshev I.I. (2022). The role of therapeutic nutrition in acute cerebrovascular accidents. *Eurasian Research Bulletin*, *15*, 71–74. Retrieved from https://www.geniusjournals.org/index.php/erb/article/view/2798

13. Kayimov Mehriddin Tuymurodovich, & Babanazarov Umid Turobkulovich. (2022). Manifestation of Coagulopathy in Patients on The Background of Covid-19. *Eurasian Research Bulletin*, *15*, 59–64. Retrieved from https://geniusjournals.org/index.php/erb/article/view/2796

14. Pulatova Sh.H. Improvement of treatment of patients with acute heart failure, a comparative evaluation of the effectiveness of dobutamine and levosimendan// World Journal Of Pharmaceutical Research. 2020. Vol 9 (6). –P. 2283-2288

15. Babanazarov Umid Turobkulovich, & Kayimov Mehriddin Tuymurodovich. (2022). Coronavirus Infection - A Trigger Factor in Liver Damage. *Eurasian Research Bulletin*, *15*,52–58.Retrievedfrom https://www.geniusjournals.org/index.php/erb/article/view/2795

16. Лекции по черепно-мозговой травме: учеб. пособие / под ред. В.В. Крылова 17. Khaitov Dilshod Khayotovich, & Toshev Izzat Ikromovich. (2022). Specific Morpho functional Changes of the Lymphatic System in Patients Suffering from Burns. *Eurasian Research Bulletin*, *15*, 81–84. Retrieved from https://geniusjournals.org/index.php/erb/article/view/2800

18. Severe traumatic brain injury in Austria / V. Rudel, J. Leitgeb, I. Janciak et al. // Bulletin of Intensive Care. — 2008
19. Rizaeva, M. Zh. (2020). Efficiency And Safety Of Electric Cardioversion In Persistent Form Of Atrial Fibrillation. A new day in medicine, (4), 322-325.
20. Bleck T.P. A look at the top 5 topics in Neurocritical Care: an expert interview. Med. Crit. Care 2001; 5:. — № 2. — C.35—42.
21. Boltayev Elmurod Bekmurodugli, & Sabirov Joraboy Marifbayevich. (2021). Organization Of Oxygen Therapy Using A Nasal Mask And Ventura Mask In Severe Patients With Covid-19 Corona Virus Infection. *Emergent: Journal of Educational Discoveries and Lifelong Learning (EJEDL)*, *2*(08), 6–10. https://doi.org/10.17605/OSF.IO/N26VB
22. Urakov, Sh. T., Eshonov, O. Sh., & Boltaev, E. B. (2019). Postoperative Cognitive Dysfunction. A new day in medicine, (2), 56-60.
23. Pulatova Sh.H. Method of improving vasopressor therapy for acute myocardial infarction complied with cardiogenetic shock // American Journal Of Medicine And Medical Sciences. 2020.– Vol. 10 (11). – – P. 911-913

24. Oliveira-Abreu, M.30. Management of mechanical ventilation in brain injury: hyperventilation and positive end-expiratory pressure / M. Oliveira-Abreu, L.M. de Almeida // Rev. Bras. Ter. Intensiva. — 2009. — Vol. 21, № 1. — P.72—79.
25. Khayrullaeva D. Kh., Avezova S.M. Changes in hormonal in adverse environmental condition//World Journal of Pharmaceutical Research 2020 Vol.9 Issue 5, pp. 2450-2458.

26. Czosnyka M., Picard J.D. Monitoring and interpretation of intracranial pressure. J Neurol Neurosurg Psy-chiatr 2004; 75: 813-821.
27.USMONOV U.R, IRGASHEV I,E, CHANGES IN THE MORPHOFUNCTIONAL PROPERTIES OF THYMUS AND SPLEEN UNDERTHE INFLUENCE OF MITES OF DIFFERENTORIGINS”//Тиббиётда янги кун Узбекистан.-2020.-№2(30).-С. 242-245.
28. Usmonov U.R., Sobirov Sh.Ҳ. Morphofunctional aspects of the lymphatic system and its actual problems. Tibbiyotda yangi kun Uzbekistan.-2020.-No2/1 (30/1).-S. 123-125.
29. Usmonov U.R, SobirovSh,H, Irgashev I,E. The role of neuroimmunoendocrine processes in the human body// World Journal of Pharmaceutical Research Belgium-2020.-Volume9.-Issue. 62413-2424 pages.
30. Ochilova D.A., Ruziev O.A., Khudoyberganova N.Kh., Boboev A.T. Evaluation of the effectiveness of antihypertensive drugs // Bulletin of the Medical Center for The Management of the President of the Republic of Kazakhstan. - 2015. - No. 3 (60) . - S. 41-44.
31. Ochilova D.A., Rakhmonkulova N.G., SH. H.Sobirov. Feature of the Course of Hypertension Disease in people with Dyslipidemia//Medical and Medical Sciences, America-2020.