The American Journal of Medical Sciences and Pharmaceutical Research (ISSN – 2689-1026)
VOLUME 05 ISSUE 12 Pages: 6-12
SJIF IMPACT FACTOR (2020: 5. 286) (2021: 5. 64) (2022: 6. 319) (2023: 7. 396)
OCLC – 1121105510
Publisher: The USA Journals

Journal Website: https://theamericanjournals.com/index.php/tajmspr

Research Article

MONITORING OF CEREBRAL PERFUSION PRESSURE IN PATIENTS WITH ACUTE ISCHEMIC STROKE

Submission Date: December 02, 7023, **Accepted Date:** December 06, 2023,
Published Date: December 11, 2023 |
Crossref doi: https://doi.org/10.37547/TAJMSPR/Volume05Issue12-02

Murotov Temur Malik Nizomovich
Phd, Associate Professor, Department Of Anesthesiology And Resuscitation Of The Tashkent Medical Academy, Tashkent, Republic Of Uzbekistan

Igamkulov Behzod Zafar O'g'li
Master Of The Department Of Anesthesiology And Resuscitation Of The Tashkent Medical Academy, Tashkent, Republic Of Uzbekistan

ABSTRACT

we studied patients with ischemic stroke with antihypertensive medication for high arterial hypertension.

Material and methods: we studied 28 patients in the general intensive care unit of multidisciplinary TMA with acute cerebral ischemia syndrome caused by ischemic-type ACCD. The age of the patients was on average 61±7 years. There were 20 males and 8 females. The level of consciousness was assessed using the Glasgow scale. It ranged from 4 to 10 points.

Results: the given data clearly indicate a more pronounced decrease of SBP, DBP, ICP during intravenous infusion of Tahiben at the stages of the study. A significant difference in the duration of drug effects in the studied groups was noted. Thus, when using Tahiben, the target level of SBP and DBP could be maintained up to 220±54 minutes, while in the standard treatment group it was maintained for 68±8 minutes.

Conclusions: intravenous administration of Tahiben (urapidil) at the early hospital stage in patients with arterial hypertension against the background of standard baseline therapy of ACCD is an effective and safe method of urgent therapy, providing dosage BP reduction by 15-25% of the initial one.

KEYWORDS

The American Journal of Medical Sciences and Pharmaceutical Research
(ISSN – 2689-1026)
VOLUME 05 ISSUE 12 Pages: 6-12
SJIF IMPACT FACTOR (2020: 5. 286) (2021: 5. 64) (2022: 6. 319) (2023: 7. 396)
OCLC – 1121105510
Publisher: The USA Journals

Intracranial hypertension (ICH), intracranial pressure (ICP), cerebral perfusion pressure (CPP), Tahiben (urapidil), acute cerebral circulation disorder (ACCD), ischemic stroke (IS), cerebral edema, cerebral ischemia.

INTRODUCTION

Despite the decrease in morbidity and mortality in recent years, ischemic stroke (IS) remains one of the leading causes of mortality and disability from cerebrovascular diseases [1]. One of the important factors affecting the prognosis in critically ill patients with cerebral ischemia is intracranial hypertension. In this regard, monitoring

and timely diagnosis of increased intracranial pressure is of fundamental importance for the choice of intensive care tactics.

Arterial hypertension (AH) is one of the key risk factors and triggers for the development of acute cerebral circulatory failure [2]. The role of arterial hypertension in the development of ischemic stroke, as well as in the poststroke period, complicating the clinical course of stroke, and relatively often used in health care practice hypotensive agents that lower BP uncontrollably (magnesium sulfate, etc.) remains poorly studied. All the literature on arterial hypertension indicates the need to implement controlled hypertension [3]. Based on the above mentioned, this study of tachyban was performed.

Since the verification of stroke with arterial hypertension along with the standard treatment of ACCD, we used the drug Tahiben (urapidil hydrochloride EVER PHARMA), a hypotensive agent with a central and peripheral mechanism of action, to reduce arterial hypertension. We analyzed 28 episodes with ischemic stroke with depression of consciousness from 4 to 10 points on the Glasgow Coma Scale. The mean age of patients was 61±7 years, male/female ratio 5:2.

Patients were randomized into two groups: standard treatment (n=14) and Tahiben treatment (n=14). Treatment efficacy was evaluated by clinical data, BP and heart rate dynamics, invasive control of ICP was also performed, CPP was monitored and gas composition parameters of arterial and venous blood were assessed. The survival rate of patients in the groups was assessed.

ICH is one of the important independent risk factors for the development of unfavorable outcome of ischemic stroke. Thus, with ICP exceeding 15 mm Hg, an unfavorable outcome was recorded in 57% of patients, with ICP less than 15 mm Hg- in 23% [6].

ICP monitoring allows to control and manage cerebral perfusion pressure, which reflects the efficiency of cerebral blood flow and is an independent prognostic indicator, as well as to conduct directed pathogenetic therapy for various cerebral pathologies. ICP monitoring allows us to evaluate the effectiveness of the conducted antitussive therapy. We proceeded from the fact that it is impossible to carry out therapy without evaluating the effectiveness and duration of its effect.

Most patients with acute ischemic stroke (AIS) have a significant increase in BP in the first hours of the illness, followed by an involuntary decrease over the next few days. BP elevation may be due to a stress response to the development of cerebral circulatory failure, nausea, pain, preliminary AH, response to hypoxia or increased ICP.

The increase in BP in stroke is presumably aimed at maintaining adequate intracerebral blood flow,

The American Journal of Medical Sciences and Pharmaceutical Research
(ISSN – 2689-1026)
VOLUME 05 ISSUE 12 Pages: 6-12
SJIF IMPACT FACTOR (2020: 5. 286) (2021: 5. 64) (2022: 6. 319) (2023: 7. 396)
OCLC – 1121105510
Publisher: The USA Journals

especially in the periinfarct zone. The compensatory nature of a moderate increase in BP in the first hours after stroke makes it possible to maintain cerebral perfusion.

On the other hand, lowering acutely elevated BP may reduce mortality, decrease the risk of cerebral edema and hemorrhagic brain transformation in massive cerebral infarction, and decrease the likelihood of complications associated with concomitant pathology (e.g., myocardial ischemia) [4].

The correct choice of hypotensive agents is important. An ideal drug should meet many requirements: it should act quickly and effectively, be easily titrated, prevent too sharp a drop in BP and have a relatively short-term effect, so that if the BP drops too sharply and the drug is discontinued, there will be no long-term aftereffect [5].

The aim of our study was to investigate the efficacy and safety of treatment with Tahiben (urapidil) in complex therapy in patients with ischemic stroke, to assess the functional state of the CNS using dynamic control of CHD and CPD in hospital conditions, as well as its comparison with standard treatment.

MATERIALS AND METHODS OF RESEARCH

We studied 28 patients in the general intensive care unit of a multidisciplinary TMA clinic with acute cerebral ischemia syndrome caused by ischemic-type ACCD. The age of the patients averaged 61±7 years. There were 20 men and 8 women. The level of consciousness was evaluated according to the Glasgow scale. It ranged from 4 to 10 points.

All patients underwent complex intensive therapy of STEMI according to the standards of treatment of this contingent of patients. The patients were divided into 2 groups depending on the method of treatment. Thus, in the 1st group (n = 14) standard baseline therapy was used, in the 2nd group (n = 14) - along with standard therapy the drug Tahiben (urapidil) was used intravenously slowly in a dose of 5-10 ml (25-50 mg) depending on the level and rate of BP decrease.

MgSO4 (prehospital stage), loop diuretics (furosemide), calcium channel blockers (verapamil, amlodipine), beta blockers (metoprolol, bisoprolol), neuroprotectors, antiaggregants, statins were used as standard therapy for ischemic stroke in routine practice.

Urapidil was administered by intravenous bolus, the initial dose was 25 mg. To maintain BP at the achieved level, the drug was administered by prolonged infusion (4-6h) at a dose of 100mg.

According to modern recommendations, the target BP values were considered to be a 20% reduction in SBP and 15% reduction in MAP from baseline, but SBP not lower than 160/ 90 mmHg in ischemic stroke.

Tahiben (Urapidil) is an antihypertensive drug with a dual mechanism of action. Its central component is agonism of brain 5HT1A serotonin receptors. This leads to a decrease in the impulse activity of serotoninergic neurons, which inhibits their excitatory impulses that activate sympathetic neurons. Thus, Tahiben reduces preload (reduces pressure in pulmonary capillaries and pulmonary artery) and afterload (reduces TPR) on myocardium [5]. Tahiben penetrates the blood-brain barrier and the placental barrier. Also, tahiben is able to reduce platelet aggregation activity caused by catecholamines, which is important in the therapy of ischemic strokes. Intravenous administration of Tahiben leads to the development of a rapid antihypertensive effect (within 2 minutes). Along with the rapid onset, the drug has a long duration of action

The American Journal of Medical Sciences and Pharmaceutical Research
(ISSN – 2689-1026)
VOLUME 05 ISSUE 12 Pages: 6-12
SJIF IMPACT FACTOR (2020: 5. 286) (2021: 5. 64) (2022: 6. 319) (2023: 7. 396)
OCLC – 1121105510
Publisher: The USA Journals

- up to 9 hours. This time is enough to effectively stabilize hemodynamics.

ICP was determined by invasive method (tonometry during lumbar puncture). Cerebral perfusion pressure was calculated as the difference between MBP and ICP.

CPP = MBP - ICP

Mean BP was calculated using the following formula:

MBP = (SBP + 2 DBP)/3

where SBP - systolic BP, DBP - diastolic BP.

All patients underwent invasive monitoring of ICP, determination of central hemodynamic parameters by the method of integral rheography (IRGT) according to M.I.Tishchenko. ....

A protocol for correction of intracranial hypertension was used to reduce elevated ICP:

1) The head end of the beds was kept elevated 30-40 degrees

2) If necessary, sedation therapy (propofol, benzodiazepines, opioids) was used to control the patient's agitation and synchronize him with the ventilator;

3) Hyperthermia was corrected by medical and physical methods;

4) Respiratory support was performed with a respiratory volume of 8-10 ml/kg of the patient's ideal body weight and positive end-expiratory pressure of 5 cm Hg, RASO2 was maintained within 30-40 mmHg;

5) Standard conservative therapy;

All patients were treated with standard intensive therapy for ACCD. The volume and structure of infusion were determined on the basis of systemic hemodynamics monitoring data. Enteral nutrition was started from the first day of the patient's stay in the intensive care unit at the rate of 20-25 kcal per kg of body weight per day. The patients in need were ventilated with Wella artificial lung ventilation

apparatus with respiratory volume of 8-10 ml per kg of ideal body weight in norm ventilation mode.

A persistent (within 15-20 minutes) increase in intracranial pressure above 20 mmHg, which could not be controlled by conventional measures of ICP correction (elevation of the head end of the bed, maintenance of normothermia and normoxia, hyperventilation), was considered an indication for conservative therapy.

ICP, cerebral perfusion pressure (CPP), mean arterial pressure (MAP), systolic blood pressure (SBP), and diastolic blood pressure (DBP) were determined before the study and at 20 min, 120 min, and 220 min after the end of infusion.

Before the beginning of the study, we evaluated baseline parameters of all patients under study. The data obtained at the stages of the study were compared with the initial values. The Kolmogorov-Smirnov test was used to determine the "normality" of the distribution. Intergroup comparisons were performed using the Mann-Whitney test. Differences were considered reliable when the significance level (p) was less than 0.05.

Statistical processing of the obtained data was performed using the STATISTICA 6.0 program package (StatSoft, USA). Data are presented in the format M±δ (M- arithmetic mean, δ- standard deviation).

The American Journal of Medical Sciences and Pharmaceutical Research (ISSN – 2689-1026)
VOLUME 05 ISSUE 12 Pages: 6-12
SJIF IMPACT FACTOR (2020: 5. 286) (2021: 5. 64) (2022: 6. 319) (2023: 7. 396)
OCLC – 1121105510
Publisher: The USA Journals

RESULTS AND THEIR DISCUSSION

The dynamics of intracranial and cerebral perfusion pressure, as well as hemodynamic parameters are shown in Table 1. As can be seen from the above data, the use of tahiben (urapidil) along with the drugs of standard treatment of ischemic stroke resulted in a significant decrease in ICP, increase in CPP, decrease in SBP and MAP to the target level in 20 minutes after the end of infusion, as well as maintenance of this level up to the 220th minute (Table 1).

Tahiben statistically significantly reduced SBP by the 20th minute from the beginning of treatment (from 208 (203-222) mmHg to 159 (149-180) mmHg) and maintained the achieved level of SBP until the 220th minute. The reduction of SBP by the 20th minute in the standard therapy group was also statistically significant (from 198 (189-212) mmHg to 177 (163-201) mmHg), but the target level (see below) was reached only by the 220th minute.

Table №1 Monitoring of ICH, CPD and hemodynamic parameters during the study phases.

Indicators	Parameters at study stages									
	1-group (standard therapy)					2-group (tahiben)				
	Initially	Target BP level	20 min after the end of infusion	120 min after the end of infusion	220 min after the end of infusion	Initially	Target level	20 min after the end of infusion	120 min after the end of infusion	220 min after the end of infusion
SBP, mm.Hg.	189±24	162 ±27	185±21	178±26	172±32	190± 28	162 ±27	178± 25	167±34	160±14
MAP,mm.Hg	114±17	96± 38	109±36	107±15	105±55	115± 15	96± 38	108± 46	105±18	100±25
BP cf,mmHg	139,6 ±9,5	118 ±34 .3	134,2± 2,3	130,7± 4,2	127,4± 4,0	140, 2±3, 1	118 ±34. 3	131,1 ±4,0	125,6±4, 2	120,0±3, 5

The American Journal of Medical Sciences and Pharmaceutical Research
(ISSN – 2689-1026)
VOLUME 05 ISSUE 12 Pages: 6-12
SJIF IMPACT FACTOR (2020: 5. 286) (2021: 5. 64) (2022: 6. 319) (2023: 7. 396)
OCLC – 1121105510
Publisher: The USA Journals

HR, 1 min.	86,0±4,5	74.5±3.8	78,0±4,2	80,2±3,7	82,7±4,5	77,5±2,7	74.5±3.8	77,0±3,7	78,0±3,4	75,9±3,1
ICP, mmHg	23,7±1,3	20.5±2.2	22,9±1,3*	22,0±1,5*	21,4±1,4*	23,8±1,8	20.5±2.5	22,5±1,5*	22,1±1,3*	20,2±1,4*

Note: *- reliable relative to baseline values (p<0.05)

****p<0.01 relative to baseline values**

The above data clearly indicate a more pronounced reduction of SBP, DBP, and ICP with intravenous infusion of Tahiben at the study stages. There was a significant difference in the duration of drug effects in the studied groups. Thus, when using Tahiben, the target level of SBP and MAP could be maintained up to 220±54 minutes, while in the standard treatment group it was maintained for 68±8 minutes.

Analysis of the dynamics of BP levels revealed that in the group of patients who were administered Tahiben, a faster decrease in systolic, diastolic and mean arterial pressure was observed. It is important to note that BP decrease during Tahiben administration was not accompanied by compensatory tachycardia.

It can be seen that the target SAD levels were achieved within an hour from the beginning of treatment in both groups, but in the Tahiben group the target level was established already at the 20th minute of drug administration and remained significantly lower than before the start of treatment during one hour of observation. In the control group, the MAP level also did not exceed the target values by the end of one hour of administration, but this decrease was slower and was not significant compared to the Tahiben group.

According to the results of our study on achieving target BP in patients with MI, Tahiben (urapidil) alone had a significantly greater and significant effect (p<0.003) on rapid achievement and retention of target BP levels compared to 25% magnesia, which is routinely used for BP control. The mean time to reach target BP levels was shorter in the tachyban group (26+12 min) compared to the group that received only baseline therapy (68+8min) (p<0.003).

In clinical practice, the use of Tahiben in patients with IS along with the improvement of central hemodynamic parameters had a normalizing effect on cerebral blood circulation: spasm of cerebral vessels was eliminated, venous outflow increased and the initially reduced cerebral blood flow rate increased. The use of Tahiben in emergency therapy of hypertensive encephalopathy and acute cerebral circulatory failure promotes normalization of neurological status, which was also confirmed by clinical outcomes and dynamics of neurological symptoms in patients of our study.

In clinical conditions, this difference is of significant importance, since the use of large doses of antihypertensive drugs can lead to undesirable side effects. In experiments with the development of ACCD,

The American Journal of Medical Sciences and Pharmaceutical Research (ISSN – 2689-1026)
VOLUME 05 ISSUE 12 Pages: 6-12
SJIF IMPACT FACTOR (2020: 5. 286) (2021: 5. 64) (2022: 6. 319) (2023: 7. 396)
OCLC – 1121105510
Publisher: The USA Journals

intravenous administration of Tahiben contributed to the reduction of the necrosis zone. Therefore, the fact that intravenous tahiben is one of the main methods recommended by European guidelines for BP lowering in stroke is quite obvious and is confirmed by the data of our study.

In conclusion, we did not observe any side effects during the course of the study when using the studied drug.

CONCLUSIONS

1. Neurophysiologic monitoring of intensive therapy of arterial hypertension in ischemic stroke with the use of Tahiben makes it possible to conduct pathogenetic substantiated treatment, to carry out dynamic control over its effectiveness.
2. Intravenous administration of Tahiben (urapidil) at the early hospital stage in patients with arterial hypertension against the background of standard baseline therapy of ACCD, providing dosage reduction of BP by 15-25% of the initial one, is an effective and safe method of urgent therapy.
3. Conducting a set of diagnostic studies, including monitoring of ICP and CPP in patients with arterial hypertension and AI, showed that the use of Tahiben in bolus doses, initial 25 mg, maintenance 100mg with hypotensive purpose leads to a decrease in ICP (by 15%) and improvement of CPP indicators (by 14%).
4. The use of Tahiben (urapidil) causes a significantly faster decrease in systolic, diastolic and mean BP, achievement of their target levels within an hour and more frequent retention in the hospital period in the absence of compensatory tachycardia in comparison with standard antihypertensive therapy in ischemic stroke.

REFERENCES

1. Ke-Qiong Yan, Qi-Si Wu. et.all. Blood Pressure Variability May Be a New Predictor for the Occurrence and Prognosis of Ischemic Stroke. Chinese MedicalSciences Journal Volume 38, Issue 3, September 2023, Pages 242-249
2. Mursalov I., Muneer A. et.all. Managing high blood pressure in hypertensive patients with an acute ischemic stroke. Hipertensión y Riesgo Vascular Volume 39, Issue 4, October-December 2022, Pages 157-166
3. Bruce M., Deborah B. et.all. Clinical Policy: Critical Issues in the Management of Adult Patients Presenting to the Emergency Department with Acute Ischemic Stroke. Annals of Emergency Medicine Volume 82, Issue 2, August 2023, Pages e17-e64
4. Ricardo R., Blanca F. et.all. Management of acute ischemic strokeAbordaje y tratamiento del ictus isquémico en la fase aguda. Medicina Clínica (English Edition) Volume 161, Issue 11, December 7, 2023, Pages 485-492
5. Natasha P. Appraisal of Clinical Practice Guideline: 2018 Guidelines for the Early Management of Patients with Acute Ischemic Stroke. Journal of Physiotherapy Volume 64, Issue 3, July 2018, Page 199
6. Castillo J., Leira R. et al. Blood pressure decrease during the acute phase of ischemic stroke is associated with brain injury and poor stroke outcome. Stroke. - 2004.- Vol.35- P. 520-527.