



THE AVERAGE WEIGHT OF MOLECULE - AN INDICATOR OF ENDOGENOUS INTOXICATION AT VASOMOTOR RHINITIS

G. E. KALDYGOZOVA *

International Hoca Ahmet Yesevi Turkish-Kazakh University, 29 Sattarhanova Street, 487010,
TURKESTAN, KAZAKHSTAN

ABSTRACT

Vasomotor rhinitis is a common disease of the nasal cavity. Today the most common biochemical tests in clinical practice for the evaluation of endogenous intoxication is to determine the average molecular weight. In this paper, we prove the development of endogenous intoxication and development of oxidative stress in patients with vasomotor rhinitis.

Key words: Vasomotor rhinitis, Tyrosine-containing peptides, Blood plasma, Proteins.

INTRODUCTION

Vasomotor rhinitis is a common disease of the nasal cavity. According to the research about 20% of the population suffer from this disease. Currently, there is a tendency to increase the proportion of the disease, this situation is caused by a number of interrelated circumstances - such as the increase in the load on the upper airway due to pollution, gassy environment does not reduce the level of acute respiratory viral diseases, bacterial contamination of air, reduction the immunity of the organism as a whole¹⁻⁵.

The clinical and morphological studies of several authors noted that the leading factor in the pathogenesis of vasomotor rhinitis is a morphological, and as a consequence of functional disorders of the mucous membrane of the nasal cavity: Swelling of the corpora cavernosa, the overflow of blood, leading to an increase in the size of the turbinates and the difficulty of nasal breathing^{1,2}.

It was established that shortness of nasal breathing causes various pathological conditions of the whole organism: reduced gas exchange in the cells, thereby reducing the

* Author for correspondence; E-mail: galenchik76@mail.ru

alkaline reserve of blood, change the acid-base balance, blood gases, impaired heart function, increased blood pressure, changes the circulation of cerebrospinal fluid, increased intracranial pressure, suppressed thyroid function, decreased level of basal metabolism, impaired biliary liver function^{2,6}.

In recent years, the study of endogenous intoxication plays an important role. It is shown that endotoxemia develops when all pathological conditions associated with an increased catabolism or blockade detoxification systems of the body. The substrate responsible for the emergence of local pathological effects of endogenous intoxication find protein toxins - average molecular weight⁷.

In diseases of the ENT organs, there are few studies the content of medium-weight molecules. Thus, Bobrov V. M., Shishkin S. A. 150 patients with purulent sinusitis with orbital complications, mastoiditis, parafaringit, paratonsillitis abscess complicated by boils nose and upper lip, abscessed epiglottitis found that by determining the molecular average weight can not only individually to assess the patient's condition, but also the effectiveness of the therapy and, if necessary adjust it⁸.

Therefore, summarizing the findings, we can conclude that by far the most common biochemical tests in clinical practice for the evaluation of endogenous intoxication is to determine the average molecular weight. In practice, this figure has not been studied in patients with advanced ENT - pathology - vasomotor rhinitis, which identified one of the objectives of our study.

As mentioned earlier, one of the reasons for the increase in the average molecular weight is the intensification of oxidative modification of proteins. Analysis of the literature showed that with vasomotor rhinitis almost not studied the state of oxidative modification of proteins. Research in this area will also help open new links in the pathogenesis of vasomotor rhinitis.

EXPERIMENTAL

Determination of tyrosine - and tryptophan containing peptides with correction of background absorption was performed by the method of Gavrilova et al.^{9,10}.

For determining the tyrosine-containing peptides (TSP) and tryptophan-containing peptide (TTP) and non-peptide components (NPC) to 0.2 mL of plasma were added 0.2 mL

of 1.2 M perchloric acid, the samples were centrifuged for 10-15 mins at 3000 rev/min. To 0.3 mL of the supernatant was added 1.8 mL of 0.7 M sodium hydroxide solution. Registered absorbance at wavelengths of 290 nm, 300 nm and 305 nm on a spectrophotometer SF 46 vs. control (0.3 mL of 0.6 M perchloric acid and 1.8 mL of a 0.7 M solution of sodium hydroxide) in quartz cuvettes with a pathlength 1 cm. The concentrations of the substances were calculated using the equations Firordta. The intensity of the oxidative modification of plasma proteins was determined by the method of Dubinin and Co-workers¹¹.

After precipitation of proteins of 20% trichloroacetic acid solution in the reaction of the carboxyl groups of oxidized protein with a solution of 2,4-dinitrophenylhydrazine, and then dissolving the precipitate in 8 M urea. Absorbance formed dinitrophenylhydrazone was registered at 356 nm, 370 nm, 430 nm and 530 nm. It identifies the following products: aliphatic ketones dinitrophenylhydrazone (KDNPH) neutrality (absorption spectrum $\lambda = 356$ nm), aliphatic aldehyde dinitrophenylhydrazone (ADNPG) neutrality ($\lambda = 370$ nm), aliphatic KDNFG main character ($\lambda = 430$ nm) and aliphatic ADNPG main character ($\lambda = 530$ nm), the results are expressed in units/mL plasma.

RESULTS AND DISCUSSION

At the height of the clinical manifestations of noteworthy significant increase in tyrosine peptides that exceeded the value of 1.5 times control. Tryptophan-containing peptide fraction, conversely, decreased by 5.7 times as compared with that of controls (Table 1). The level of non-peptide components of the blood plasma of patients with vasomotor rhinitis did not differ from that of controls.

Table 1: Contents of tryptophan and tyrosine-containing proteins and peptide components in the blood plasma of patients with vasomotor rhinitis adjustment on clinical manifestations ($\bar{X} \pm m$)

Groups	TSP (mmol/L)	TTP (mmol/L)	NPC Wholesale (U/mL)
Control, n = 25	0.39 + 0.0287	0.24 + 0.00051	0.59 + 0.091
Patients before treatment, n = 48	0.57 + 0.071*	0.042 + 0.0002*	0.61 + 0.055

*Significant compared to the control, $p < 0.05$ and below

Therefore, our findings allow to state with certainty the development of endogenous intoxication at the height of the clinical manifestations in patients with vasomotor rhinitis.

Table 2 shows the results of a study of indicators of oxidative modification of proteins in patients with vasomotor rhinitis at the height of the clinical manifestations. Analysis of the data presented in Table 2, showed that patients with vasomotor rhinitis adjustment on clinical manifestations fixed gain oxidative modification of proteins. It documented a significant increase in ketone dinitrophenylhydrazone and aldehyde dinitrophenylhydrazone basic and neutral nature in comparison with those of control. Thus, the content of the ketone dinitrophenylhydrazine and dinitrophenylhydrazone aldehyde neutrality exceeded the control value of 2 times, whereas the level aldehyde phenylhydrazones and ketone dinitro dinitrophenyl hydrazones increased basic character, respectively, 2.8 and 3.2 times.

Table 2: Performance of oxidative modification of proteins in blood plasma of patients at a height vasomotor rhinitis clinical manifestations ($X \pm m$)

Groups	KDNPH	ADNPG	KDNPH	ADNPG
	Neutral character (conv. units/mL)	Neutral character (conv. units/mL)	Basic character (conv. units/mL)	Basic character (conv. units/mL)
Control, n = 25	3.4 ± 0.09	3.6 ± 0.077	1.87 ± 0.04	0.46 ± 0.01
Patients before treatment, n = 48	6.9 ± 0.0014*	7.36 ± 0.0012*	5.33 ± 0.001*	1.47 ± 0.003*

*Significant compared to the control, $p < 0.05$ and below

These data suggest that the plasma of patients with vasomotor rhinitis intensification occurs oxidative modification of proteins with accumulation as the products of their aggregation and fragmentation. It is shown that the process of aggregation of oxidized protein molecules reflects the content of ketone product fractions OMB (KDPH), while OMB aldehyde fraction (ADPH) describe the process of fragmentation of blood proteins.

Based on the data, we can conclude that in patients with vasomotor rhinitis occurs both as protein aggregation and fragmentation, but given the extent of accumulation aldehyd dinitro fenilgidrazonov, it can be concluded the prevalence of protein fragmentation. Thus, we find increase in tyrosine-containing peptides and intensification of oxidative modification of proteins in blood plasma of patients with vasomotor rhinitis, suggesting the

presence of endogenous toxicity and development oxidative stress in patients with vasomotor rhinitis.

REFERENCES

1. J. M. Ovchinnikov, A. J. Ovchinnikov and V. A. Gumenjuk, Treatment of Patients with Allergic Rhinosinusitis and Bronchial Asthma, *Russian Rhinol.*, **4**, 29-31 (2003).
2. V. T. Paluchun, L. V. Beljakova, L. A. Luchihin and N. A. Kononova, The Effectiveness of Spray Physiomer in the Postoperative Period During Endonasal Surgery, *Herald of Otorhinolaryngol.*, **3**, 45-47 (2004).
3. G. Z. Piskunov and S. Z. Piskunov, *Clinical Rhinology, Miklos*, **3**, 167 (2012).
4. S. Z. Piskunov, V. S. Kozlov and A. S. Lopatin, Diseases of the Nose and Paranasal Sinuses, *Endomikrohirurgiya, M*, 65-76 (2003).
5. Je. Zh. Mahambetchin and S. A. Ospanova, Optimization of Surgical Treatment using the Methods of Radio Wave Surgery Practice in Otolaryngology, *Materials of II National Congress Rhinologists Kazakhstan and the International Conference of Young Otolaryngologists: Pathology of the Respiratory Tract, Shymkent*, 138-139 (2005).
6. S. Z. Piskunov, O. Ju. Mezenceva and A. A. Dolzhikov, The Morphological Features of Nasal Mucosa When Vasomotor Rhinitis, *Herald of Otorhinolaryngology*, **1**, 34-36 (1999).
7. V. V. Nikolajchik, V. M. Moin and V. V. Kirkovskij, Mazur and others, A Method of Determining the Middle Molecules, *Lab. Business*, **10**, 13-18 (1991).
8. V. M. Bobrov and S. A. Shishkin, The Molecules of Average Weight - An Indicator of Intoxication in Chronic Inflammatory Diseases of the ENT Organs, *Herald of Otorhinolaryngology*, **1**, 23-25 (1999).
9. V. B. Gavrilov, N. F. Lobko and S. V. Konev, Determination of Tyrosine and Tryptophan Containing Peptide in Blood Plasma by Absorption in the UV Region of the Spectrum, *Klin. Lab. Diagnostic*, **3**, 12-16 (2004).
10. V. B. Gavrilov, N. F. Lobko, A. R. Gavrilova and S. V. Konev, Determination of the Tyrosine-Containing Peptide in Blood Plasma with the Correction of Background Absorption. The Sharp Increase in Sensitivity of the Test for Intoxication, *The Sharp Increase in Sensitivity of the Test for Intoxication, Klin. Lab. Diagnostic*, **6**, 19-20 (2004).

11. E. E. Dubinina, S. O. Burmistrov, D. A. Hodov, I. G. Porotov, Oxidative Modification of Proteins of Human Serum, The Method of Determining, Problems of Medical Chemistry, **1**, 24-26 (1995).

Accepted : 26.11.2015