ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Severity Of Vascular Disaggregation Control Over Neutrophils In Patients With Abdominal Obesity.

Medvedev IN*.

Russian State Social University, st. V. Pika, 4, Moscow, Russia, 129226.

ABSTRACT

Stably low physical activity of the population of developed countries leads to a very wide prevalence among middle-aged abdominal obesity. Among this category of population, a high incidence of thrombosis is seen. Apparently, with abdominal obesity, it is caused by a violation of the functions of the vessels, especially the weakening of their disaggregation effects on the uniform elements of the blood. The goal is to evaluate the disaggregation effects of blood vessels on neutrophils in patients with abdominal obesity.We examined 46 patients of the second mature age (mean age 52.7±2.2 years) with abdominal obesity. The control group was composed of 26 clinically healthy people of the same age. All the examined persons gave written informed consent on participation in the research. There were applied biochemical, hematological and statistical methods of investigation.High thromboses' frequency of various localizations at abdominal obesity is closely connected with angiopathy development against their background. Weakening of plasma antioxidant protection with activation of lipids' peroxidation processes in it leading to alteration of vascular wall, is noted in conditions of abdominal obesity. The persons with abdominal obesity are detected to have evident weakening of disaggregating vascular impacts of vascular wall on strengthening aggregative ability of neutrophils. In the result of it given patients get sharply increased risk of thromboses of any localization which can lead to invalidism and lethal outcome.

Keywords: neutrophils, abdominal obesity, vascular wall, antiaggregation.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Improving the quality and volume of nutrition of the bulk of the population with low physical activity leads to the prevalence of abdominal obesity among the population of industrially developed countries [1,2]. Very often it occurs in the working population, causing a high incidence of vascular complications leading to disability and early mortality [3]. High frequency in the population of thromboses with abdominal obesity with weakened vascular functions, especially their disaggregation control over shaped elements [4,5]. It is noted that the strengthening of the aggregation of blood elements occurs necessarily with vasopathy, accompanied by activation of hemostasis and the development of thrombosis [6,7,8]. This process is ensured by a decrease in synthesis in the vessels of disaggregants, the most important of which are prostacyclin and nitric oxide [9,10]. Given the widespread prevalence of abdominal obesity and serious significance for microcirculation of neutrophil aggregation, it was important to assess the level of vascular control over the level of neutrophilic leukocyte aggregation in these patients [11].

The goal is to assess the disaggregation effects of blood vessels on neutrophils in patients with abdominal obesity.

MATERIALS AND METHODS

The research was approved by the Ethics Committee of Russian State Social University (record №5 from 12.05.2014).

We examined 46 patients of the second mature age (mean age 52.7±2.2 years) with abdominal obesity [12]. The control group was composed of 26 clinically healthy people of the same age. All the examined persons gave written informed consent on participation in the research. All participants in the study gave their written consent to participate in it [13].

Intensity of lipids' peroxidation (LPO) processes in plasma was estimated according to the content of thiobarbituric acid (TBA)-active products by a kit "Agat-Med" and acylhydroperoxides (AHP) [14]. Antioxidant abilities of liquid part of blood were determined according to the level of its antioxidant activity [15].

LPO activity in studied regular blood elements was determined according to the quantity of malondialdehyde (MDA) in reduction reaction of thiobarbituric acid in washed and resuspended cells and the content of AHP in them [14]. In studied washed and resuspended regular blood elements we estimated the levels of cholesterol by enzymatic colorimetric method with the help of a kit "Vital Diagnostikum" and CPL according to the content of phosphorus in them.

Evidence of vascular wall's control over neutrophils' aggregation was detected according to its weakening in the test with temporal venous occlusion [16].

Vessel control over the process of neutrophil aggregation was elucidated in plasma taken after temporary venous occlusion and without it on a photo electrocolorimeter. Inductors were used lectin wheat germ at a dose of 32 μg/ml, concanavalin A - 32 μg/ml and phytohemagglutinin - 32 μg/ ml.

The results were processed by Student's criterion (t). Statistical processing of received information was made with the help of a program package "Statistics for Windows v. 6.0", "Microsoft Excel". Differences in data were considered reliable in case of $p<0.05$.

RESULTS AND DISCUSSION

The patients were noted to have evident plasma LPO activation – the content of AHP in it surpassed the control value in 2.0 times, TBA-active products – in 1.3 times, being accompanied by suppression of antioxidant plasma activity in 1.34 times (Table).

The observed patients were noted to have increased CS content in neutrophils membranes which was accompanied by the decrease of CPL in them and LPO activation on behalf of weakening of their antioxidant protection (Table).

ISSN: 0975-8585

In the patients under observation, neutrophil aggregation in intact plasma in response to the tested inductors appeared earlier than in the control (with lectinon35.2%, concanavalin A on21.6%, phytohemagglutininon27.8%) (Table).

All the patients were noted to have the decrease of vessels' disaggregative impacts on neutrophils (Table).

Table. Registered indicators in the surveyed

Registrated parameters	Patients, n=46, M±m	Control, n=26, M±m
acylhydroperoxides plasma, D_{233} /1ml	2.92±0.08	1.42±0.09 p<0.01
TBA-compounds, mcmol/l	4.85±0.12	3.56±0.07 p<0,01
antioxidantactivityplasma, %	25.0±0.16	32.9±0.12 p<0.01
biochemical parameters of neutrophils		
cholesterol of neutrophils, mkmol/10^9 neutrophils	0.78±0.008	0.62±0.004 p<0.01
common phospholipids of neutrophils, mkmol/10^9 neutrophils	0.39±0.006	0.51±0.003 p<0.01
acylhydroperoxides of neutrophils, D_{233}/10^9 neutrophils	3.25±0.10	2.36±0.05 p<0.01
malonicdialdehyde of neutrophils, nmol/10^9 neutrophils	1.14±0.05	0.73±0.03 p<0.01
catalase of neutrophils, ME/10^9 neutrophils	6750.0±14.27	9950.0±19.77 p<0.01
superoxidismutase of neutrophils, ME/10^9 neutrophils	1360.0±2.81	1780.0±4.21 p<0.01
aggregation of neutrophils in intact plasma		
Aggregationwithlectin, %	21.1±0.10	15.6±0.07 p<0.01
Aggregation withconcanavalin A, %	18.0±0.07	14.8±0.04 p<0.01
Aggregationwithphytohemagglutinin, %	39.1±0.06	30.6±0.09 p<0.01
vascular control of aggregation neutrophils		
Aggregationwithlectinafter temporary venous occlusion, %	19.2±0.14	11.8±0.06 p<0.01
Aggregation withconcanavalin Aafter temporary venous occlusion, %	16.5±0.06	11.0±0.07 p<0.01
Aggregationwithphytohemagglutininafter temporary venous occlusion, %	33.8±0.10	24.1±0.03 p<0.01

Note: p - reliability of differences in the indices of a group of patients and a control group.

Important significance in the development of rheological disturbances and thrombophilia in persons with abdominal obesity belongs to aggregation increase of regular blood elements and especially – neutrophils [17,18]. At of abdominal obesity the depression of plasma antioxidant activity is formed which provides the increase of LPO activity in it [19]. The increase of freely radical processes in liquid part of blood inevitably promotes the damage of neutrophils' membranes [20]. The development of these manifestations in

combination with found in these patients' neutrophils lipid imbalance leads to their hyperaggregability. The level of disaggregating impacts from the side of vascular wall [21,22] lowers simultaneously with it in respect of neutrophils [23].

The increase in neutrophil aggregation in the patients observed in this study was largely due to the weakening of the production in the vessel wall of physiological disaggregants against the background of an increase in the activity of glycoprotein receptors of leukocytes with respect to lectins used as inducers in the study [24,25]. Increased lectin and concanavalin A-induced neutrophil aggregation in plasma after temporary venous occlusion in patients with abdominal obesity is associated with an increase in expression on the membrane of neutrophils of adhesion receptors, which include a large number of sites containing N-acetyl-D-glucosamine, N- acetyl-neuraminic acid and mannose [26, 27]. The activity of neutrophil aggregation in response to phytohemagglutinin is caused by an increase in their receptors of glycoproteins containing bD-galactose [28,29] on the background of a weakening of synthesis in the vessels of prostacyclin and NO [30,31,32]. The emerging situation is very dangerous for the loss of a significant part of the patients' health [33,34,35].

CONCLUSION

The frequent occurrence in modern society of abdominal obesity requires a comprehensive study of this pathology. Particular attention to it is caused by a high frequency of thrombosis on its background. In the study, it was found that lipid peroxidation in plasma was significantly enhanced in these patients. Apparently, they cause the phenomenon of vasopathy with a weakening of the production in the vessels of physiological antiplatelet agents. This is due to the weakening of their vascular control over the dramatically increasing aggregation of neutrophils. The weakening of the disaggregation properties of the vessels and the increased aggregation of neutrophils worsen trophism of tissues and make a weighty contribution to the risk of thrombosis in patients with abdominal obesity.

REFERENCES

[1] Kotseva K, Wood D, De Backer G. (2009) Euroaspre Study Group. Cardiovascular prevention quidelines in daily practice: a comparison of Euroaspre I, II, and III surveys in eiqht European countries. Lancet.373 : 929-940.

[2] Kotova OV, ZavalishinaSYu, Makurina ON, KipermanYaV, Savchenko AP, Skoblikova TV, Skripleva EV, Zacepin VI, Skriplev AV, AndreevaVYu. (2017) Impact estimation of long regular exercise on hemostasis and blood rheological features of patients with incipient hypertension.Bali Medical Journal. 6(3): 514-520. doi:10.15562/bmj.v6i3.552

[3] Zamorano J, Edwards J.(2011) Combining antihypertensive and antihyperlipidemic agents - optimizing cardiovascular risk factor management. Integr.Blood Press Control.4 : 55-71.

[4] VatnikovYuA, ZavalishinaSYu, Pliushchikov VG, Kuznetsov VI, Seleznev SB, Kubatbekov TS, Rystsova EO, Parshina VI. (2017) Early-changes diagnostics of erythrocytes microrheological features in the model of dyslipidemia development in rats at the late stages of ontogenesis. Bali Medical Journal. 6(1) : 216-222.doi: 10.15562/bmj.v6i1.483

[5] Gurevich VS. (2013) Correction of dyslipidemia with concomitant arterial hypertension from the perspective of an updated paradigm of cardiovascular risk.Systemic hypertension.3 : 54-59.

[6] Skoryatina IA, ZavalishinaSYu. (2017) Ability to aggregation of basic regular blood elements of patients with hypertension anddyslipidemia receiving non-medication andsimvastatin.Bali Medical Journal. 6(3): 514-520.doi:10.15562/bmj.v6i3.552

[7] ZavalishinaSYu, VatnikovYuA, Kulikov EV, Yagnikov SA, Karamyan AS, Sturov NV, Byakhova VM, Kochneva MV, Petryaeva AV. (2017) Diagnostics of erythrocytes' microrheological features and early abnormalities of rats in the model of experimental hypertension development. Bali Medical Journal. 6(3): 470-475. doi:10.15562/bmj.v6i3.589

[8] VatnikovYuA, ZavalishinaSYu, Kulikov EV, Vilkovysky IF, Nikishov AA, Drukovsky SG, Krotova EA, Khomenets NG, Bolshakova MV.(2017) Correctional abilities of regular muscle activity in relation to erythrocytes' microrheological features of rats with experimentally developed hypertension.Bali Medical Journal. 6(3): 449-456. doi:10.15562/bmj.v6i3.586

[9] Bikbulatova AA.(2018) The Impact of Daily Wearing of Medicinal-Prophylactic Clothes on The Evidence of Clinical Manifestations of Osteochondrosis Of The 2nd Degree and Platelet Activity in Persons Of The

Second Mature Age. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(1) : 677-683.
[10] Skorjatina IA. (2018) Therapeutic Possibilities OfRosuvastatin In The Medical Complex In Relation To Disaggregation Vascular Control Over Erythrocytes In Persons With Arterial Hypertension And Dyslipidemia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(2) : 977-983.
[11] ZavalishinaSYu. (2012) Dynamics of hemostasis system at newborn calves with iron deficiency by use ferroglucin and glicopin. Zootekhniya.7 : 14-16.
[12] Diagnosis and treatment of hypertension. In the book: National Clinical Recommendations. 3rd edition.Moscow: Silicea-Polygraph, 2010: 463-500.
[13] Diagnostics and correction of lipid disorders for the prevention and treatment of atherosclerosis. Russian guidelines (V revision).Cardiovascular Therapy and Prevention. 2012; 4(1) : 31.
[14] Bikbulatova AA.(2018) The Impact Of Medicinal-Prophylactic Trousers' Daily Wearing On Pregnancy Course In The Third Term Of Women With Habitual Miscarriage Of Fetus. Research Journal of Pharmaceutical, Biological and Chemical Sciences.9(3) : 663-671.
[15] Volchegorskiy IA, Dolgushin II, Kolesnikov OL, Tseilikman VE. (2000) Experimental modeling and laboratory evaluation of adaptive reactions of the organism.Chelyabinsk, 167.
[16] Bikbulatova AA. (2018) Formation Of Psychological Comfort In Women With Habitual Miscarriage Of Pregnancy Against The Background Of Their Daily Wearing Of Medicinal Prophylactic Trousers.Research Journal of Pharmaceutical, Biological and Chemical Sciences.9(3) :1417-1427.
[17] ZavalishinaSYu, Nagibina EV.(2012) Dynamics of microrheology characteristics of erythrocyte in children 7-8 years with scoliosis with therapeutic physical training and massage.Technologies of Living Systems. 9(4) : 29-34.
[18] Carrizzo A, Puca A, Damato A. (2013) Resveratrol improves vascular function in patients with hypertension and dyslipidemia by modulating NO metabolism. Hypertension.62 : 359-366.
[19] Bikbulatova AA, PochinokNB.(2017) Professional Skills Competitions for People with Disabilities as a Mechanism for Career Guidance and Promotion of Employment in People with Special Needs.Psikhologicheskayanaukaiobrazovanie. 22(1) : 81-87.
[20] ZavalishinaSYu.(2010) Anticoagulative and fibrinolitic activity of plasma of blood at calves. Veterinariya. 11: 41-43.
[21] ZavalishinaSYu.(2012) Vascular hemostasis at calves in milk-and-vegetable phase of feeding. Zootekhniya.2 : 21.
[22] ZavalishinaSYu. (2011) Functional condition of system of a hemostasis at newborn calves.Veterinariya.6 : 42-45.
[23] ZavalishinaSYu.(2012) Activity of a vascular hemostasis at calfs of a dairy food. Russian Agricultural Sciences. 4 : 49-51.
[24] ZavalishinaS.Yu. (2012) Hemostatic activity of a vascular wall at newborn calfs.Russian Agricultural Sciences.1 : 37-39.
[25] ZavalishinaSYu. (2013) State of the system in neonatal calves in hemostasis with iron deficiency. Russian Agricultural Sciences. 3 : 43-46.
[26] ZavalishinaSYu. (2013) Vascular hemostasis in newborn calves with ferrum deficiency treated withferroglucin. Zootekhniya.8 : 24-26.
[27] Vorobyeva NV, Skripleva EV., MakurinaON, Mal GS. (2018) Physiological Reaction of The Ability of Erythrocytes to Aggregate to Cessation of Prolonged Hypodynamia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(2) : 389-395.
[28] Skripleva EV, Vorobyeva NV, KipermanYaV, Kotova OV, Zatsepin VI, Ukolova GB. (2018) The Effect Of Metered Exercise On Platelet Activity In Adolescents.Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3) : 1150-1154.
[29] Bikbulatova AA, Karplyuk AA, Parshin GN, Dzhafar-Zade DA, Serebryakov AG. (2018) Technique for Measuring Vocational Interests and Inclinations in High-School Students with Disabilities.Psikhologicheskayanaukaiobrazovanie-psychological science and education. 23(2) : 50-58.doi: 10.17759/pse.2018230206
[30] ZavalishinaSYu. (2010) Activity of curtailing of blood plasma in calves of a dairy feed.Veterinariya. 8 : 49-51.
[31] ZavalishinaSYu. (2010) Activity of blood coagulation system at healthy calves at phase of milk-vegetable feeding.Zootekhniya. 9 : 13-14.
[32] ZavalishinaSYu. (2011) Fibrinolysis blood activity at calves in the first year of life.Zootekhniya.2 : 29-31.

[33] Apanasyuk LA, Soldatov AA. (2017) Socio-Psychological Conditions for Optimizing Intercultural Interaction in the Educational Space of the University.Scientific Notes of RussianStateSocialUniversity. 16(5-144) : 143-150. doi: 10.17922/2071-5323- 2017-16-5-143-150.

[34] MaloletkoAN, Yudina TN.(2017) (Un)Making Europe: Capitalism, Solidarities, Subjectivities. Contemporary problems of social work. 3 (3-11) : 4-5.

[35] Pozdnyakova ML, Soldatov AA. (2017)The Essential and Forms of the Approaches to Control the Documents Execution. 3 (1-9): 39-46. doi: 10.17922/2412-5466-2017-3-1-39-46.