The indices of the physiological norm for women of the reproductive age living in Penza city.

[1]Olga Pavlovna Vinogradova and [2]Olga Alexandrovna Biriuchkova

[1]Penza Postgraduate Doctors' Training Institute of Health Department of Russian Federation, Stasova St., 8, Penza, 440060, Russia
[2]Saratov State Medical University. Bolschaya Kazachya Str., 112, Saratov, 410012, Russia

Abstract. Under any pathological process there begin the regulation disorder of the activity and functioning of structures where it occurred. However, these disfunctions are transient, and they disappear together with or after the elimination of the pathological process and they do not represent disregulatory pathology in its full sense of this notion. For the estimation of pathological condition it is necessary to take into consideration the physiological norm, therefore, for the disregulatory abnormalities examining we have made a note of the applicability of normal dimension of organism homeostasis distinction. In our scientific work we have held the examining of the group of female donors in the reproductive age who live in Penza. Analyzing the results of the data in the investigated group, we may point out that the indices of the examined women do not differ from the values established in the medical resources for the healthy people.
[Vinogradova O.P., Biriuchkova O.A. **The indices of the physiological norm for women of the reproductive age living in Penza city.** *Life Sci J* 2014;11(11s):540-543] (ISSN:1097-8135). http://www.lifesciencesite.com. 123

Keywords: disregulatory pathology, common oxidative activity, the immune response, APTT, CRP Ultra, D-dimer test.

Introduction

Under any pathological process there begin the regulation disorder of the activity and functioning of structures where it occurred. However, these disfunctions are transient, and they disappear together with or after the elimination of the pathological process and they do not represent disregulatory pathology in its full sense of this notion.

Disregulatory pathology emerges as a result of the function and structures' activity derangement. These abnormalities are an endogenic reason of the emergence of disregulatory pathology. In a complicated and highly developed organism there can emerge disregulatory changes on every anatomical-functional level, from molecular to superior systematic one [1].

For the estimation of pathological condition it is necessary to take into consideration the physiological norm, therefore, for the disregulatory abnormalities examining we have made a note of the applicability of normal dimension of organism homeostasis distinction.

In our scientific work we have held the examining of the group of female donors in the reproductive age who live in Penza.

There was created a special group of 80 people. The group was represented by the women whose average age was 29.4 ± 6. 24 years old.

Examining the control group and taking into consideration the random sampling among healthy women, we judged about the average iron, copper andselenium status as well as about their subgroups, ceruloplasmin, transferrin, ferritin, haptoglobin and glutathione peroxidase relatively, with respect to the laboratory norms.

The obligatory condition for the formation of the group was the omission of taking vitamin-mineral complexes and other biologically active supplements containing the mentioned above microelements.

Table 1. Microelements and their subgroups

Sampling element in blood serum	Sampling group, n = 80	Laboratory norm(interval)
Serumiron, mcmol/l	18.87 ±1.69	9.0-34.0
Copper, mcmol/l	2.53±0.20	0.8-1.55
Selenium, mkg/l	136.85±5,60	46-143
Ferritin, mkg/l	75,23 ±7.37	10-120
Transferrin,mkg/l	35.03±3.98	20-36
Ceruloplasmin, mkg/l	282.2±33.77	180-450
Haptoglobin g/l	1.215±0.34	0.3-2.0
Glutathioneperoxidase of plasma (potency), mcmol of glutathione /min	151,45±6.94	-

Some increase of copper level in the blood can be explained by the data of M.M. Korobenkova (1966) who found out that the copper level does not exceed 182.7 ± 16.2 y% and 191 ± 12 y% in the organisms of men and women at the age from 20 to 25 respectively. It means that the copper level of females is raised initially. As well as O. Dobrynina and M.Kazieva (1966) established that the copper level is fluctuating periodically during the day: the highest amount of copper is at 9 am, while the lowest is at 9pm. In our research all laboratory works were held in morning hours.

It is also proved that the copper level in blood is fluctuating according to the season. Thus, V.Y. Shustov (1960) found out the decreased copper level in autumn – 152 ± 59 y%, while in other seasons 100 practically healthy people have 185 ± 82 y%. In our case the group was examined in a spring-summer period.

We also estimated the immune status in terms of the following criteria. The indices of ingestion rate and killer activity of phagocytes characterizing the response from the side of hemogenesis and containing the estimation of leucocyte number in blood (in volume 10^9/l), the percentage of leucocyte population in peripheral smear (leucoformula) [2].

The investigation results of the cell factor of immune system in the control group showed that the index of leucocyte number in peripheral blood is 5.0 ± 0.41*10 ^{9}/l.

The indices of the leucoformula were the following: band neutrophils 2.55 ± 0.78%, segmentonuclear neutrophils 57.5 ± 2.22%, eosinophils 0.875 ± 0.21%, basophils 0.87 ± 0.22%, monocytes 5.25 ± 0.85%, lymphocytes 32.97 ± 2.37%.

Table 2. The indices of ingestion rate and killer activity of phagocytes in donor groups in comparison with the laboratory norm

Indices	Investigated group, n = 80	Laboratory norm(interval)
Leucocytes,10 9/l	5.01 ±0.41	4-9
Band neutrophils, %	2.55±0.78	1-6
Segmentonuclear	57.5±0.22	47-72
neutrophils, %		
Eosinophiles, %	0.87±0.22	0.02-0.6
Monocytes,%	5.25±0.85	3-11
Tumour necrosis factor, pg/ml	24.6 ±2.03	0-250

The humoral factor defining the connection of disregulationwith the immune response of the organism and comprising the indices ofthe humoral link of non-specific resistance (Circulating immune complex (CIC) and C-reactive protein(CRP)) and the indices of the humoral immune link (the level of circulating immune complexes, the level ofimmunoglobulin IgA, IgM, IgG and IL -4 and 8 (interleukin) [3, 4].

Table 3. The indices of the humoral link of non-specific resistance in the donor group

Dimension entitlement	Investigated group, n = 80	Laboratory norm (interval)
CIC, c.u.	39.8±5.04	30-90
CRP, mg/l	4.45±0.74	0.20-6.10

Table 4. The indices of the humoral immune link

Dimension entilement	Investigated group, n = 80	Laboratory norm (interval)
Immunoglobulin A, g/l	1.97±0.09	0.6-4.5
Immunoglobulin M, g/l	11.6±0.49	8-17
Immunoglobulin G, g/l	1.28±0.048	0.6-2.8
IL-4 pg/ml	16.19±1.1	0-20
IL-8 pg/ml	32.35±1.83	0-62

The indices of the cell immune link were analyzedin terms of the lymphocytes number, of the gamma interferon and neopterin levels; we also estimated the integral indices such as the index of A.M. Zemskij (index of the immune deficiency IImD), the estimation of the leucocytes index of intoxication (LII) in accord with the formula of A.V. Ostrovskij 1983, and the infection index (II) or the lymphocytes index [5, 6].

Table 5. The indices of ingestion rate and killer activity of phagocytes in donor group

Indices entitlement	Investigated group, n = 80	Laboratory norm (interval)
Index of Ostrovskij, c.u.	1.55±0.15	0.6-1.5
Index of Zemskij, c.u.	0	0
Infection index, c.u.	0.55±0.06	0.57±0.05
Neopterin,nM/l	7.46±0.67	<10
Lymphocytes, %	32.9±0.27	19-37
gamma- interferon, pg/ml	21.58±1.96	0-25

Integral indices of the cell immune system.

- Index of Zemskij (index of immune deficiency- IImD) 0 – is taken as a norm.

$$IImD = \left(\frac{\text{index of the sick}}{\text{index of the healthy}} - 1\right) * 100\%$$

If the value isnegative, a patient has immunodeficiency.

If the value is positive, a patient has immune hyper function.

I - when the calculated value belongs to the interval from 1-33%, this caserepresents transient disfunction anddoes not need intervention;

II – the range of fluctuation is 34-66%; this case can be estimated as disregulatory pathology and it needs immunocorrection;

III –the calculated value exceeds 66%, this case can be estimated as a disregulatory disease, i.e. if disregulatory pathology grows encircling new processes and adopting the nosological characteristic, it becomes a disregulatory disease and it needs the prescription of some immunocorrectors and immunomodulators.

- the calculation of the leucocyte intoxication index (LII) was held with respect to the formula of A.V. Ostrovskij 1983. In physiological conditions the LII does not exceed 1.5 [7].

$$LII = \frac{\text{Plasma cells+myelocytes+metamyelocytes+band neutrophils+segmentonuclear neutrophils}}{\text{Lymphocytes+monocytes+ eosinophils+ basophils}} = 0,6\text{-}1,5$$

- infection index (II) or lymphocyte index; the II in physiological conditions is 0.57 ± 0.05, if this value is lower, it means the infection o the organism:

$$II = \frac{\text{Lymphocytes}}{\text{myelocytes+metamyelocytes+ band neutrophils+segmentonuclear neutrophils}}$$

The level of cytokine profile was analyzed in terms of the following dimensions - IL- 416.19 ± 1.1pg/ml, alfa-interferon 7.58 ± 0.9 pg/ml, gamma-interferon 21.58 ± 1.96 pg/ml.

Table 6. The cytokine profile in the donor group.

Dimension entitlement	Investigated group, n = 80	Laboratory norm (interval)
IL-4,pg/ml	16.19±1.1	0-20
alfa-interferon, pg/ml	7.58±0.9	<10
gamma-interferon, pg/ml	21.58±1.96	0-25

Also in our work we estimated the intensity of lipid peroxidation and we defined the following indices: malondialdehyde, the establishing of thiobarbituric acid active products, the common oxidative activity of blood serum and the glutathione peroxidase activity [8].

Table 7. The indices of the intensity of lipid peroxidation

Investigated dimension in blood serum	Investigated group, n = 80	Laboratory norm (interval)
Malondialdehyde (MDA), nM/l	2.99 ± 0.33	< 10
Common oxidative activity (COA), mM/l	1.5±0.11	1.3-1.8
Plasma glutathione peroxidase activity, mcmol of glutathione /min	151.45±6.94	No data

The intensity of the disorder was analyzed in terms of the specific dimension of estimation-the level of average molecular peptides AM_{254} (wave length is 254nm) and AM_{280} (wave length is 280nm), as well as the level of integral dimension of the average molecular index which represents the ratio of AM_{280} to AM_{254} and C-reactive protein [9].

In the donor group the level of average molecules reached AM_{254} 0.206 ± 0.12 c.u. and AM_{280} 0.295 ± 0.013 c.u. The value of one of the markers of endogenic intoxication CRP was 4.4 ± 0.74 mg/l.

Table 8. The indices of intensity of the syndrome of systemic inflammatory process in the donor group.

Dimension entitlement	Investigated group, n = 80	Laboratory norm (interval)
AM254, c.u.	0.21±0.02	0. 22-0.26
AM280, c.u.	0.295 ± 0.01	0. 22-0.26
IN AM, c.u.	1.45±0.12	1.4-1.5
CRP, mg/l	4.45±0.74	0.20-6.10

Table 9. The indices ofhemostasis system in the donor group

Dimension entitlement	Investigated group, n = 40	Laboratory norm (interval)
Fibrinogen, g/l	2,6±0,26	2,34-2,86
APTT, sec	27,5±1,58	25,92-29,08
Fibrin monomers soluble complex, g/100ml	3,44±0,08	3,36-3,52
Protein C,mg/l	0,94±0,06	0,88-1,0
Procalcitonin ng/ml	0,15±0,04	0,11-0,19
CRP Ultra,mg/l	0,7±0,12	0,58-0,8
D-dimer test,mkg/ml	66,5±15,26	51,24-81,76

Analyzing the results of the data in the investigated group, we may point out that the indices of the examined women do not differ from the values established in the medical resources for the healthy people [10, 11].

However, estimating selenium level in serum blood of citizens of Penza (in comparison with the data in 2003), take place the growth of average values of this dimension [12].

According to the data of 2003, we can refer our town to the category of regions with the average or temperate deficit of selenium. (The average value in the examined group was 81.2 ± 14.26 mkg/l) [12].

Thus, nowadays the region can be referred to the favourable one in terms of the selenium status that may be connected with the improvement of the socio-economic situation in the town, with the increase of fish, seafood, beans and another food rich in selenium in the meals of citizens. The programs of providing children in educational institutions and pregnant women with well-balanced meals, and social preventive work and rehabilitative tendency in healthcare policy of the region allowed on the whole to improve the indices of the population health.

Analyzing the results of the research, we can point out that the values of the immune system of the examined women do not differ from the values stated in the medical literature for healthy women.

Corresponding Author:
Dr. Vinogradova Olga Pavlovna
Penza Postgraduate Doctors' Training Institute of Health Department of Russian Federation.
Stasova St., 8, Penza, 440060, Russia.

References:

1. Goldberg, E.D. and G.N. Krishanovsky, 2009. Blood pathology disregulation. Medical News Agency.
2. Martinez-Pomares, L., Antibody Fc Linking Adaptive and Innate Immunity. Phagocytes and Immunoglobulins, pp: 95-113.
3. Winans, B., M.C. Humble, B.P. Lawrence, 2011. Environmental toxicants and the developing immune system: A missing link in the global battle against infectious disease. Reproductive Toxicology, 31(3): 327-336.
4. Paul, W.E., 1984. Fundamental Immunology. Mir, pp: 230.
5. Biochimica et Biophysica Acta (BBA), 2014. General Subjects. 1840(2): 809–817.
6. Wachter, H., S. Fuchs, A. Hausen, G. Raibnegger, E. Werrow, 1989. Neopterin as marcer for activation of the cellular immunity-imunologic basis and clinical application. Clin Chem. 27, pp: 81-141
7. Alenkina, S.A., 2011. Clinic laboratory criteria of pelvic inflammatory disease among women of fertile period.
8. Lankin, V.Z., A.K. Tikhaze, Y.N. Belenkov, 2001. Free radical processes in normal state and pathological conditions. Moscow, pp: 78.
9. Kariakina, E.V., and S.V. Belova, 2004. Metabolic disease factors. Reviews. Clinic Lab Diagnostics.
10. Belialov, F.I., 2009. Laboratory standards. Irkutsk.
11. Tietz, N.W., 1995. Clinical Guide To Laboratory Tests. W.B. Saunders Company, pp: 1095.
12. Vinogradova, O.P., 2003. Clinic diagnosis of endotoxemia in pyoinflammatory complex gynecological therapy. Penza, pp: 54.

7/10/2014