12. Pérez AE, Olivares MV, Martínez-Espinosa RM, Molina V, García-Galbis RM. New Insights about How to Make an Intervention in Children and Adolescents with Metabolic Syndrome: Diet, Exercise vs. Changes in Body Composition. A Systematic Review of RCT. Nutrients. 2018 Jul 06; 10(7):878. DOI: 10.3390/nu10070878.
13. Pieters M, de Maat MPM. Diet and haemostasis – a comprehensive overview. Blood Reviews. 2015; 29(4): 231-241. DOI: 10.1016/j.blre.2014.12.005.
14. Widimsky J. The role of arterial hypertension in the primary prevention of stroke. Cor Vasa. 2016 Apr;58(2):e279-86. DOI: 0.1016/j.crvasa.2015.11.005.
15. Williams B, Mancia G, Spiering W, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension. Eur Heart J. 2018 Sept 01; 39(33):3021-104. DOI: 10.1093/eurheartj/ehy339.

Реферати

ДІЄТИЧНА КОРЕКЦІЯ ГІПЕРІНСУЛІНЕМІЇ, ПОКАЗНИКІВ ГЕМОСТАЗУ У ХВОРИХ НА АРТЕРІАЛЬНУ ГІПЕРТЕНЗІЮ З ПІДВИЩЕНОЮ МАСОЮ ТІЛА

Лизогуб В.Г., Крамарьова В.Н., Полонська Л.Н., Камінська Т.М., Мельничук І.О., Тиравська Ю.В.

Метою дослідження було вивчити вплив дієти з обмеженням вуглеводів до 250 г на добу впродовж 12 тижнів на індекс маси тіла, рівень інсуліну, показники гемостазу у хворих на артеріальну гіпертензію з метаболічними розладами. Терапія з обмеженням вуглеводів дала змогу у хворих основної групи знизити ІМТ на 7%, рівень інсуліну на 27.8%, достовірно покращити АДФ-індуковану та ристоцетин-індуковану агрегацію тромбоцитів, знизити активність фактора фон Віллебранда (p=0.009) і вміст розчинного фібрину (p=0.03). Доцільно рекомендувати гіповуглеводну дієту з обмеженням вуглеводів до 250 г на добу хворим на артеріальну гіпертензію з підвищеною масою тіла та гіперінсулінемією разом з антигіпертензивною терапією.

Ключові слова: артеріальна гіпертензія, гіповуглеводна дієта, індекс маси тіла, рівень інсуліну, показники гемостазу.

Стаття надійшла31.08.2019 р.

ДИЕТИЧЕСКАЯ КОРРЕКЦИЯ ГИПЕРИНСУЛИНЕМИИ, ПОКАЗАТЕЛЕЙ ГЕМОСТАЗА У БОЛЬНЫХ АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ С ПОВЫШЕНОЙ МАССОЙ ТЕЛА

Лизогуб В.Г., Крамарева В.Н., Полонская Л.Н., Каминская Т.М., Мельничук И.О., Тыравская Ю.В.

Целью исследования было изучить влияние диеты с ограничением углеводов до 250 г в сутки в течение 12 недель на индекс массы тела, уровень инсулина, показатели гемостаза у больных АГ с метаболическими нарушениями. Проводимая терапия у больных основной группы дала возможность снизить индекс массы тела на 7%, уровень инсулина на 27.8%, достоверно улучшить АДФ-индуцированную и ристоцетин-индуцированную агрегацию тромбоцитов, снизить активность фактора фон Виллебранда (p=0.009) и содержание растворимого фибрина (p=0.03). Гипоуглеводная диета с ограничением углеводов до 250 г в сутки должна рекомендоваться больным АГ с повышеной массой тела и гиперинсулинемией наряду с антигипертензивной терапией.

Ключевые слова: артериальная гипертензия, гипоуглеводная диета, индекс массы тела, уровень инсулина, показатели гемостаза.

Рецензент Катеренчук І.П.

DOI 10.26724/2079-8334-2020-3-73-69-74
UDC 616.31.17:616.89-053.81

A.V. Marchenko, G.A. Loban, T.O. Petrushanko, V.V. Chereda, M.O. Faustova, M.M. Ananieva
Ukrainian Medical Stomatological Academy, Poltava

THE EFFECT OF THE PSYCHO-EMOTIONAL STRESS ON THE STATE OF MICROBIOTA OF THE GINGIVAL SULCUS

e-mail – mashafaustova@ukr.net

This study aimed to investigate the effect of psycho-emotional stress on the state of microbiota of the gingival sulcus in the state of eubiosis and dysbiosis in young people. The research involved 182 students of the medical university. As a model of acute psycho-emotional stress the situation of passing an important exam was used. A microbiological examination of the total microbial population of gingival sulcus and its population of microbiota, was performed with the standard methods. The impact of the stressor on the background of imbalance of the microbial homeostasis of the tooth-gingival crevice, causes the intensification of the imbalance of microbial associations in the form of commensal microflora reduction and the increase of opportunistic microflora.

Keywords: microbiota of the gingival sulcus, eubiosis, dysbiosis, psycho-emotional stress.

The work is a fragment of the research project "Study of the role of opportunistic and pathogenic infectious agents with different sensitivity to antimicrobial antiviral drugs in human pathology», state registration No. 0118U004456.

The complex of symbiotic microorganisms, that inhabit the open biotope of a macroorganism, make up its microbiome, provide a colonization resistance and have a great impact on the health and development of pathological processes in the human body. [4, 5, 8, 9].

The oral cavity has one of the most diverse microbiome in the human organism, which includes bacteria, fungi, protozoa and viruses. The uniqueness of the biotope of the gingival sulcus lies in the fact that quantitative and qualitative changes of microbial communities (dysbiosis) of this micro-ecological system can lead to major dental diseases such as: gingivitis, periodontitis and caries. Structural and

functional disorders of the microbiota of the gingival sulcus lead to pathological changes that have not only local but also systemic significance [15].

The impact of psycho-emotional stress on the microbiome of the body has been studied by the vast majority of researchers on the example of the intestinal microbiota. It is shown that the stress factors contribute to the imbalance of the intestinal microbiota and enhance the growth of pathogenic organisms [6, 7, 10, 12]. A limited number of studies are dedicated to the influence of psycho-emotional stress on the microbiota of the oral cavity [13, 14], and the state of microbiota of gingival sulcus has not been yet investigated. It is important to examine the extent of the effects of psycho-emotional factors in the areas of the oral cavity, which are responsible for the development of the most common dental diseases such as inflammatory periodontal diseases and caries, namely, biotope of a gingival sulcus. Studying the changes of microbiota of the gingival sulcus under different micro-ecological situations in the oral cavity will permit to better analyze interaction between bacteria and the immune response under the conditions of the body's stress reactions.

The purpose of the work was to study the effect of psycho-emotional stress on the state of microbiota of the gingival sulcus that is in the state of eubiosis and dysbiosis, in young people.

Materials and methods. The research involved 182 students of the medical university at the age of 19-29 years without somatic diseases. Group 1 consisted of 22 people (11 men, 11 women), in which clinically no lesions of periodontal tissues and teeth were detected. Group 2 was formed of 57 people (29 men, 28 women), who were diagnosed with chronic catarrhal gingivitis and carious lesions of dental hard tissues. As a model of acute psycho-emotional stress, a natural situation was used of passing an important exam socially significant in the lives of the young people. The survey was conducted just before the exam, namely in the state of psycho-emotional tension. As control indicators, those indicators were used, which were obtained in the state of relative calm, that is during normal college classes in the middle of the semester. To determine the level of personal and reactive anxiety the scale of C.D. Spielberger was used and adapted by J.L. Khanin. An index that is less than 30 points indicates low anxiety, from 30 to 45 points - moderate, above 45 points – high [3].

The microbiological examination of the total microbial population of the gingival sulcus and its population of individual species of microbiota was performed on the methods, which are based on anaerobic and aerobic cultivation. The taking of the content sample of the gingival sulcus was conducted in the morning on an empty stomach, with the help of a sterile paper endodontic pin of standard size (№30), of 1 cm length, which after impregnation was put in the sterile saline solution and carefully washed. The usage of standard dilution was conducted on the special, selective and differential diagnostic culture mediums: blood agar, yolk-salt agar, Sabouraud medium, Endo's medium, sugar agar with the further cultivation under aerobic and anaerobic conditions. On the samples which were obtained in aerobic cultivation conditions, the microbial population of gingival fluid of aerobic and facultative anaerobic bacteria was determined (further conventionally called aerobes). On the samples under the anaerobic cultivation conditions using our proposed method (Patent №62889, Ukraine) [3] the microbial population of facultative and obligate anaerobes was determined (further conventionally called anaerobes). An identification of the isolated pure cultures was carried out by morphological, tinctorial, cultural and biochemical characteristics. The results of quantitative research were expressed through the decimal logarithm by colony forming units per 1 ml – lg CFU / ml. There was also determined the frequency of detection of some representatives of the colonizing microflora in people of the studied groups.

All the patient investigations conformed to the principles outlined in the Declaration of Helsinki and have been performed with the permission N123, June 2015, released by the responsible Ethic's Committee of Ukrainian Medical Stomatological Academy. All the patients were informed about the purposes of the study and have signed their "consent of the patient". This article does not contain any studies with animals performed by any of the authors. The statistical analysis of survey results was implemented with the help of the programs SPSS 17.0 and Microsoft Excel 2003 [4].

Table 1

Impact of psycho-emotional tension on total microbial colonization of the gingival sulcus, lg CFU/ml (M ± m)

Groups / Indices	Intact gums and teeth		Gingivitis and caries	
	State of relative calm	Stress	State of relative calm	Stress
Colonization by aerobes	7.26±0.04	7.40±0.03^	7.79±0.03*	7.85±0.03*
Colonization by anaerobes	6.81±0.04	7.07±0.08^	7.73±0.03*	7.76±0.03*

Note: *- the likelihood of differences of indexes in people with gingivitis and caries compared with a group of people without lesions of teeth and gums by Student's test, $p<0.05$; ^ - the likelihood of indices difference in people under conditions of emotional stress in comparison with the state of relative calm by Student's test, $p<0.05$.

Results of the study and their discussion. In the first phase of the study the characteristic condition of the microbiome of the gingival sulcus was defined (eubiosis or dysbiosis) in young people with different dental status in the state of relative calm.

As it is shown in table 1, quantitative and qualitative composition of a gingival sulcus microbiota among young people with gingivitis and caries was different from those with intact teeth and gums. In the state of relative calm the microbial load of the biofilm of the gingival sulcus in patients of the second group was higher than those of the first group. As our research has shown, the population of the gingival sulcus of aerobic and anaerobic microflora in people with gingivitis and caries in the state of relative calm was exceeding the indicators in young people with intact teeth and gums by 3, 4 times ($p<0.05$) and in 8.3 times ($p<0.05$), respectively.

The qualitative composition of the microbiota of the gingival sulcus in the state of relative calm also depended on the dental status.

Table 2

Impact of psycho-emotional tension on the composition of microbiota of the gingival sulcus in people without lesions of periodontal tissues and teeth, % people/lg CFU/ml (M ± m)

Microorganisms	State of relative calm	Stress
S.viridans spp.	95.5/6.91±0.09	81.8/6.79±0.05
S.γ-haemolyticus spp.	81.8/6.81±0.10	95.5/7.08±0.06
S.β-haemolyticus spp.	9.1/5.80±0.30	9.1/6.51±0.39
Neisseria spp.	36.4/5.88±0.26	36.4/7.07±0.10^
Corynebacterium spp.	31.8/5.84±0.25	4.5^/5.30
Lactobacillus spp.	27.3/5.30±0.10	9.1^/5.25±0.25
S.epidermidis	31.8/4.99±0.13	31.8/5.65±0.23^
Bacillus spp.	18.2/5.28±0.19	9.1/5.50±0.20
Actinomyces spp.	0/0	0/0
S.aureus	0/0	0/0
Enterobacteriaceae	0/0	0/0
Candida spp.	0/0	0/0

Note: ^ – the likelihood of frequency difference by φ Fisher criterion and lg CFU/ml in the study groups by Student's criterion under conditions of psycho-emotional tension in comparison with the state of relative calm, $p<0.05$.

Table 3

Impact of psycho-emotional tension on the composition of microbiota of the gingival sulcus in people with catarrhal gingivitis and caries % people/ lg CFU/ml (M ± m)

Microorganisms	State of relative calm	Stress
S.viridans spp.	31.6"/6.43±0.14*	12.3"^/6.74±0.14
S.γ-haemolyticus spp.	89.5/7.35±0.05*	96.5/7.34±0.04*
S.β-haemolyticus spp.	28.1"/6.39±0.21	21.1/6.68±0.20
Neisseria spp.	73.7"/7.33±0.08*	89.5"^/7.62±0.04*^
Corynebacterium spp.	19.3/5.24±0.21	1.8^/5.7
Lactobacillus spp.	8.7"/4.86±0.22	5.3/5.43±0.29
S.epidermidis	42.1/5.50±0.19*	22.8^/5.47±0.29
Bacillus spp.	38.6"/5.58±0.22	56.1"/6.40±0.13*^
Actinomyces spp.	8.8"/5.24±0.10	8.8"/5.82±0.48
S.aureus	21.1%/5.0±0.20	26.3"/5.02±0.13
Enterobacteriaceae	26.3"/5.12±0.16	42.1"^/5.36±0.10
Candida spp.	26.3"/4.61±0.10	28.1"/4.66±0.13

Note: * - the likelihood of differences lg CFU/ml of people with gingivitis and caries compared with a group of people without lesions of teeth and gums by Student's criterion, $p<0.05$; "– the likelihood of frequency difference of detection of certain microorganisms in groups of people with gingivitis and caries in comparison with a group of people without lesions of teeth and gums by φ Fisher criterion, $p<0.05$; ^ – the likelihood of frequency difference by φ Fisher criterion and lg CFU/ml groups by Student's criterion under conditions of psycho-emotional tension compared with the state of relative calm, $p<0.05$.

Thus, tables 2.3 proved, that the frequency of colonization of the gingival sulcus by alpha hemolytic streptococcus in people with gingivitis and caries was at 63.9% ($p<0.05$) lower than in people without dental and gums diseases. Also, under conditions of development of dental diseases in 3.0 times ($p<0.05$) decreased the population density of the gingival sulcus by S.viridans spp .

There was a downward trend of the frequency of colonization of Corynebacterium spp. in people with gingivitis and caries, although these changes were not reliable. The density of population of the gingival sulcus by γ-hemolytic streptococci, which include S.mutans in patients with dental and gums diseases was 3.5 times($p<0.05$) higher, than in those without this pathology. Neisseria spp. by 37.3% was detected more often in people with gingivitis and caries, also the colonization density by Neisseria spp. was higher in this examined group at 28.2 times ($p<0.05$), compared with the people without teeth and gums diseases.

The density of population of epidermal staphylococcus in patients with catarrhal gingivitis and caries was 3.2 ($p<0.05$) times higher, than in those without these diseases.

In the second group of people, more often than those with intact teeth and gums opportunistic microorganisms were found: Bacillus spp. at 20.4% ($p<0.05$), S.aureus at 21.1% ($p<0.05$), S.β-haemolyticus spp. at 19.0% ($p<0.05$), Actinomyces spp. at 8.8% ($p<0.05$), Enterobacteriaceae at 26.3% ($p<0.05$), Candida spp. at 26.3% ($p<0.05$). We have found a reduction in the frequency of colonization of Lactobacillus spp. in patients with catarrhal gingivitis and caries at 18.6% ($p<0.05$).

If you use the classification of dysbiosis of oral cavity by Khazanova V.V. [3], then 100% of people with intact teeth and gums in the state of relative calm had an eubiosis, and 100% of people with catarrhal gingivitis and caries had a dysbiosis (in 42.1% - was found a dysbiotic shift, 57.9% - dysbiosis of 1-2 degree). Thereby, the further research was to examine the influence of psycho-emotional stress on the characteristics of the microbiome of the gingival sulcus that is in the state of eubiosis and dysbiosis.

The objective criteria of presence of examination stress in examined people were indicators of the level of reactive anxiety. In the group of people with intact teeth and gums an increase in reactive anxiety was found at 24.6% ($p<0.05$), in patients with catarrhal gingivitis and caries – at 14.3% ($p<0.05$), which confirmed the presence of the stressful situation.

The study on the influence of stress agents on the state of microbiota of the gingival sulcus showed some changes in biological characteristics of the resident microflora. Under conditions of psycho-emotional tension the total microbial population of the gingival sulcus in people with eubiosis increased for aerobic microorganisms in 1.4 times ($p<0.05$), for anaerobic- in 1.8 times ($p<0.05$). As far as people with dysbiosis the total microbial load of the gingival sulcus didn't significantly change and remained at a high level.

Let us consider how the microbiota of the gingival sulcus changed in the state of eubiosis and dysbiosis in people who were exposed to emotional stress.

In the first group of people (at the state of relative calm an eubiotic state of microbiota was detected) Lactobacillus spp. plated by 18.2% less ($p<0.05$), Corynebacterium spp. – by 27.3% less ($p<0.05$). At the same time an increase of the microbial number of S.epidermidis was observed in 4.6 times ($p<0.05$) and Neisseria spp.in 15.4 times ($p<0.05$).

In the people who were in the state of relative calm a dysbiotic state of the microbiota (2nd group) was detected, by 19.3% less ($p< 0.05$) was plated S.viridans spp., by 17.5% ($p<0.05$) - Corynebacterium spp., by 19.3% ($p<0.05$) - S.epidermidis, often was found Neisseria spp. (by 15.8%, $p<0.05$) and Enterobacteriaceae (by 15.8%, $p<0.05$), increased the density of colonization of Neisseria spp. in 1.9 times ($p<0.05$), Bacillus spp. – in 6.6 times ($p<0.05$).

Describing the changes in microbiota of the tooth-gingival crevice in the state of psycho-emotional stress, it should be noted that, in 2 students out of the first group of 22 people, the emergence of imbalances of microbial populations were detected, which were characterized as a dysbiotic shift. In all the people of the second group who were involved in the action of stressful factors on the background of existing dysbiotic changes of microbiota, an increasing imbalance of microbial associations was observed. Among the 57 of the examined people, the dysbiotic shift was found in 18 people (31.6%), dysbiosis of 1-2 degree – 39 people (68.4%).

Thereby, our study showed that, psycho-emotional stress had an influence on the quantitative and qualitative characteristics of the gingival sulcus microbiota of both examined groups, however this effect was more significant in the second group. The microbiota, which already has an imbalance of microbial populations on the action of the stress factor, reacted with more intensive violation of the correlation of symbiotic and opportunistic microflora [12]. The frequency of population of *S.viridans spp*. in people with dysbiosis of the biofilm of the gingival sulcus was lower at 69.5% ($p<0.05$) compared with the people with eubiosis. The second group of examined people were more likely to have the opportunistic microorganisms Bacillus spp., Actinomyces spp., S.aureus, Enterobacteriaceae, Candida spp. Most often the second group of people had : Bacillus spp.- at 47.0% ($p<0.05$) more often than people of the first group, S.aureus – in 26.3% ($p<0.05$) cases, Actinomyces spp. - in 8.8% ($p<0.05$), Enterobacteriaceae – in 42.1% ($p<0.05$), Candida spp. – in 28.1% ($p<0.05$) cases.

We showed that the microbiota is a highly sensitive indicator system, that reacts with quantitative and qualitative changes, influenced by factors of the external and internal environment. A subjective assessment of the significance of the exam can turn it into a strong emotional stressor. Studies have shown, that psycho-emotional stress influences the state of microbiota of the gingival sulcus, although the level of this impact depends on the initial state of the balance of microbial associations. Under conditions of dysbiosis - the initial imbalance of microbial populations increases a susceptibility to invading pathogens [14].

The development of psycho-emotional tension in young people in conclusion of our data leads to a decrease of the level and frequency of colonization of the gingival sulcus by stabilizing microflora. The disbalance of representatives of the resident microflora with a shift towards the opportunistic microflora is a prerequisite for the development of infectiously caused pathology of the oral cavity [15].

Consequently, the psycho-emotional tension influences the biological characteristics of a gingival sulcus microbiota. The stress-induced changes of microbiota are different in nature, depending on the initial state of the ratio of bacterial populations in the it. An eubiotic character of the interaction of microbial populations is a stabilizing factor and provides an adaptive support for quantitative and qualitative composition of microbiota. The impact of the stressor on the background of an imbalance of the microbial homeostasis of the tooth-gingival crevice, causes a strengthening imbalance of the microbial associations in the form of reducing the commensal microflora and increasing of the opportunistic microflora.

Conclusion

The impact of the stressor on the background of imbalance of the microbial homeostasis of the tooth-gingival crevice, causes the intensification of the imbalance of microbial associations in the form of commensal microflora reduction and the increase of opportunistic microflora.

References

1. Khazanova VV, Rabinovich IM, Zemskaia EA, Rabinovich OF, Dmitrieva NA. Issledovanie mikrobiotsenoza khronicheskikh zabolevaniy slizistoy obolochki polosti rta. Stomatologiya. 1996; 75(2):26-7. [In Russian]
2. Loban GA, Hancho OV, Chereda VV. Sposib vidnovlennia anaerobnykh mikroorhanizmiv u porozhnyni rota. Patent Ukrainy, № 62889; 2011. [In Ukrainian]
3. Mihaylov BV, Serdyuk AI, Fedoseev VA. Psihoterapiya v obshchey meditsine (klinicheskoe rukovodstvo). Harkov: Prapor; 2002. 108 s. [In Russian]
4. Ananieva MM, Nazarchuk OA, Faustova MO, Basarab YaO, Loban' GA. Pathogenicity Factors of Kocuria kristinae Contributing to the Development of Peri-Implant Mucositis. Mal J Med Health Sci. 2018; 14(3):34-8.
5. Bercik P, Denou E, Collins J, Jackson W, Lu J, Jury J, et al. The intestinal microbiota affect central levels of brain-derived neurotropic factor and behavior in mice. Gastroenterology. 2011 Aug;141(2):599-609, 609.e1-3. doi: 10.1053/j.gastro.2011.04.052.
6. Galley JD, Yu Z, Kumar P, Dowd SE, Lyte M, Bailey MT. The structures of the colonic mucosa-associated and luminal microbial communities are distinct and differentially affected by a prolonged murine stressor. Gut Microbes. 2014;5(6):748-60. doi: 10.4161/19490976.2014.972241.
7. Guo S, Gao Q, Jiao Q, Hao W, Gao X, Cao JM. Gastric mucosal damage in water immersion stress: mechanism and prevention with GHRP-6. World J Gastroenterol. 2012 Jun 28;18(24):3145-55. doi: 10.3748/wjg.v18.i24.3145.
8. Hansen CH, Nielsen DS, Kverka M, Zakostelska Z, Klimesova K, Hudcovic T, et al. Patterns of early gut colonization shape future immune responses of the host. PLoS One. 2012;7(3):e34043. doi: 10.1371/journal.pone.0034043.
9. Heijtz RD, Wang S, Anuar F, Qian Y, Björkholm B, Samuelsson A, et al. Normal gut microbiota modulates brain development and behavior. Proc Natl Acad Sci U S A. 2011 Feb 15;108(7):3047-52.
10. Panduro A, Rivera-Iñiguez I, Sepulveda-Villegas M, Roman S. Genes, emotions and gut microbiota: The next frontier for the gastroenterologist. World J Gastroenterol. 2017; 23(17):3030-42. doi: 10.3748/wjg.v23.i17.3030.
11. Senn S. Statistical pitfalls of personalized medicine. Nature 563. 2018: 619-621.
12. Selkrig J, Wong P, Zhang X, Pettersson S. Metabolic tinkering by the gut microbiome: Implications for brain development and function. Gut Microbes. 2014 May 1;5(3):369-80. doi: 10.4161/gmic.28681
13. Shoji M, Takeshita T, Maruyama F, Inaba H, Imai K, Kawada-Matsuo M. Recent advances in the field of oral bacteriology. Nihon Saikingaku Zasshi. 2015;70(2):333-8. doi: 10.3412/jsb.70.333.
14. Stothart MR, Bobbie CB, Schulte-Hostedde AI, Boonstra R, Palme R, Mykytczuk NCS, et al. Stress and the microbiome: linking glucocorticoids to bacterial community dynamics in wild red squirrels. Biol Lett. 2016 Jan;12(1):20150875. doi: 10.1098/rsbl.2015.0875.
15. Wade WG. The oral microbiome in health and disease. Pharmacol Res. 2013 Mar;69(1):137-43. doi: 10.1016/j.phrs.2012.11.006.

Реферати

ВПЛИВ ПСИХО-ЕМОЦІЙНОГО СТРЕСУ НА СТАН МІКРОБІОТИ ЯСНЕВОЇ БОРОЗНИ

Марченко, А.В. Лобань Г.А., Петрушанко Т.О., Череда В.В., Фаустова М.О., Ананьєва М.М.

Це дослідження мало на меті дослідити вплив психоемоційного стресу на стан мікробіоти ясенної борозни у стані еубіозу та дисбіозу у молодих людей. У дослідженні взяли участь 182 студенти медичного університету. Як модель гострого психоемоційного стресу була використана ситуація складання важливого іспиту. Мікробіологічне дослідження загальної мікробної популяції ясенної борозни та її популяції мікробіоти проводили стандартними методами. Вплив стресового фактору на тлі дисбалансу мікробного гомеостазу зубо-ясенної щілини викликає посилення

ВЛИЯНИЕ ПСИХОЭМОЦИОНАЛЬНОГО СТРЕССА НА СОСТОЯНИЕ МИКРОБИОТЫ ДЕСНЕВОЙ БОРОЗДЫ

Марченко А.В., Лобань Г.А., Петрушанко Т.А., Череда В.В., Фаустова М.А., Ананьева М.Н.

Это исследование имело целью исследовать влияние психоэмоционального стресса на состояние микробиоты десневой борозды в состоянии эубиоза и дисбиоза у молодых людей. В исследовании приняли участие 182 студента медицинского университета. Как модель острого психоэмоционального стресса была использована ситуация сдачи важного экзамена. Микробиологическое исследование общей микробной популяции десневой борозды и ее популяции микробиоты проводили стандартными методами. Влияние стрессового фактора на фоне дисбаланса микробного гомеостаза зубо-десневой щели вызывает

дисбалансу мікробних асоціацій у вигляді зменшення коменсальної мікрофлори та збільшення умовно-патогенної мікрофлори.

Ключові слова: мікробіота ясеневої борозни, еубіоз, дисбіоз, психоемоційний стрес.

Стаття надійшла 27.08.2019 р.

усиление дисбаланса микробных ассоциаций в виде уменьшения коменсальной микрофлоры и увеличения условно-патогенной микрофлоры.

Ключевые слова: микробиота десневой борозды, эубиоз, дисбактериоз, психоэмоциональное напряжение.

Рецензент Єрошенко Г.А.

DOI 10.26724/2079-8334-2020-3-73-74-77
UDC 314.4:616-052: 616-08

A.N. Naumenko, [1]Yu.N. Skaletsky, [2]M.M. Regan, V.L. Didkovsky
Bogomolets National Medical University, Kyiv
[1]SI O.M. Marzeev Institute for Public Health, NAMS of Ukraine", Kyiv
[2]Medical Center for sports traumatology and restorative medicine,
National University of Ukraine on Physical Education and Sports, Kyiv

THE SCOPE OF INPATIENT MORTALITY DUE TO SAFETY INCIDENTS IN DOMESTIC HOSPITALS

e-mail: yns53@i.ua

The problem of unintentional harm to patients is common in all countries, and especially in low- and middle-income countries. The article analyzes methodological approaches to assessing the levels of patient safety incidents in healthcare institutions. It has been established that more than 18 thousand patients die in Ukraine as a result of adverse events that can be prevented, which is significantly more than the number of victims of road traffic accidents and industrial accidents. The data obtained indicate the extreme urgency of the problem of unintentional harm to patients and the need for urgent measures to improve patient safety in domestic health care facilities. The purpose of the work was to assess patients' mortality scope due to safety incidents in domestic hospitals. Were analyzed thematic scientific publications, statistical directories of the Center for Medical Statistics of the Ministry of Health of Ukraine, national reports, and analytical reviews on the state of man-made and natural safety in Ukraine.

Keywords: incident, patient safety, health care, inpatient mortality, unintentional harm.

The work is a fragment of the research project "Science on the establishment of an optimal risk management system to ensure a safe medical environment", state registration No. 0120U101432.

During the provision of medical care, along with the benefit to the patient, for various reasons and primarily due to errors of medical personnel and other reasons that can be prevented, prerequisites for harm or harm to the patient arise, that is, patient safety incidents occur [9]. The adverse events (an incident that caused damage) caused by the unsafe treatment or patient care (organizational, diagnostic, treatment errors, traumatizing of patient in a healthcare facility as a result of a fall, injury by physical, chemical, or biological factors, etc.) is considered nowadays one of 10 [10], and in some studies [11] one of 3 leading causes of death and disability worldwide.

The terms "patient safety incident" and "adverse event" are used interchangeably in most works. In addition, phrases such as "unintentional harm" and "preventable harm" are used identically.

The problem of patient safety is extremely relevant for countries with low and middle incomes [10]. In addition to medical and social aspects, the problem of patient safety has a significant economic component. It has been established [14] that up to 15% of the funds allocated for inpatient care are spent on the treatment of patient safety cases.

Data on patient safety incidents and their consequences have prompted the international community and some countries to take large-scale measures to minimize this problem. Only in 2018¬2019 were adopted four thematic declarations, two of which were initiated by the WHO [2,3].These declarations mention, among other things, the significant potential for creating a hospital environment that is safe for patients.

As for Ukraine, there have been practically no research on prevalence estimates of patient safety cases incidents and their consequences, except in certain areas of medical practice, such as anesthesiology and intensive care [7].

The available data on the extension of unfavorable for patient health care cases are questionable.

Thus, officially according to the Y40-Y84 codes (complications due to therapeutic and surgical interventions) of the International Classification of Diseases (ICD 10) in Ukraine in 2017 were registered 1,334 deaths [1]. We have similar values for this indicator for 2018.

But there is reason to suppose that these figures are significantly underestimated [4,5], which, in our opinion, explains the underestimation of the problem of patient safety in Ukraine.

The best option for assessing the scale of the negative consequences of patient safety incidents in domestic hospitals would be to establish them by analyzing primary medical materials, and we are doing