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CHARACTERISTICS OF THE TASTE SENSITIVITY OF THE TONGUE IN ELDERLY PEOPLE WHO HAVE SUFFERED COVID-19

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Abstract. ***Introduction.*** Many patients who have had COVID-19 report taste disorders that occur during the height of the disease, and sometimes persist for a certain time after recovery. Therefore, the study of taste sensitivity indicators in older people who have suffered a new coronavirus infection COVID-19 seems relevant for understanding the pathophysiological processes occurring in the human body. ***Purpose of the study:*** was to study the characteristics of the taste sensitivity of the tongue in elderly people who have suffered a new coronavirus infection COVID-19, based on a study of the thresholds of taste sensitivity of the tongue and electrogustometry. ***Materials and methods.*** The thresholds of taste sensitivity of the tongue, as well as indicators of electrogustometry of the tongue, were studied in 89 elderly people, who were divided into 2 study groups. Group 1 included 37 patients without pronounced psychosomatic pathology who did not suffer from the new coronavirus infection COVID-19. The 2nd main group of the study included 52 patients who underwent COVID-19 6 to 9 months ago. The patients of the 2 groups were divided into 2 subgroups, taking into account the presence or absence of complaints of impaired taste sensitivity during the course of COVID-19 disease. ***The results of the study.*** It was found that people who had a new coronavirus infection COVID-19, regardless of whether they had complaints of taste sensitivity disorders during the disease or not, 6 to 9 months after the disease, they had no differences in electrogustometry indicators. In patients who did not complain of taste disorders during the COVID-19 period, only an increase in the threshold of taste sensitivity of the tongue to salty was noted in the post-ovoid period, while in patients who complained of taste disorders during the COVID-19 disease, there was a significant increase in the thresholds of taste sensitivity of the tongue to all types of stimuli, although such an indicator for gorky was within the reference values. ***Conclusion.*** The data obtained indicate the peculiarities of the functioning of the taste analyzer in people who have suffered a new coronavirus infection COVID-19, and also indicate that an increase in the thresholds of taste sensitivity of the tongue in elderly patients may hinder the formation of a feeling of satiety and contribute to maintaining the desire to eat during the day, leading to difficulties with the regulation of diet therapy, an important component of the complex treatment of various psychosomatic pathologies.

Keywords: elderly people, new coronavirus infection, COVID-19, consequences of a new coronavirus infection, oral cavity, tongue, taste sensitivity, electrogustometry, threshold of taste sensitivity of the tongue

ХАРАКТЕРИСТИКА ВКУСОВОЙ ЧУВСТВИТЕЛЬНОСТИ ЯЗЫКА У ПОЖИЛЫХ ЛЮДЕЙ, ПЕРЕНЕСШИХ COVID-19

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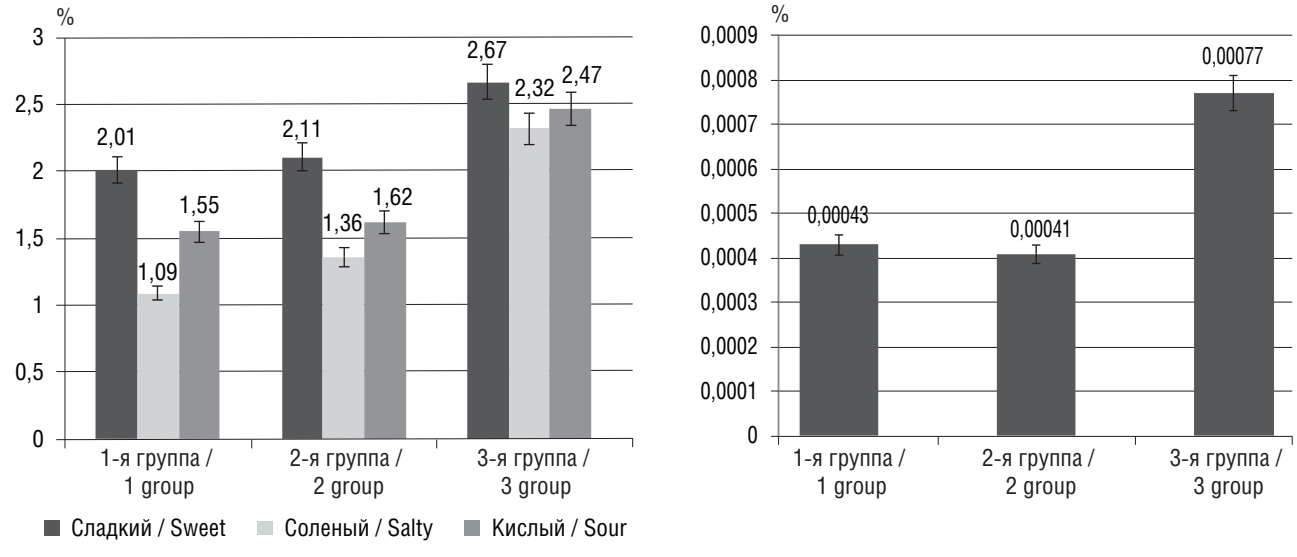
РЕЗЮМЕ. ***Введение.*** Многие пациенты, переболевшие COVID-19, отмечают нарушения вкуса, которые наблюдаются в период разгара заболевания, а иногда сохраняются определенное время после выздоровления. Именно поэтому изучение показателей вкусовой чувствительности у людей старших возрастных групп, перенесших новую коронавирусную инфекцию COVID-19, представляется актуальным для понимания патофизиологических процессов, происходящих в организме человека. ***Цель исследования*** — изучить характеристику вкусовой чувствительности языка у пожилых людей, перенесших новую коронавирусную инфекцию COVID-19, на основании исследования порогов вкусовой чувствительности языка и электрогустометрии. ***Материалы и методы.*** Изучены пороги вкусовой чувствительности языка, а также показатели электрогустометрии языка у 89 людей пожилого возраста, которые были разделены на две группы исследования. В 1-ю группу вошли 37 пациентов без выраженной психосоматической патологии, которые не болели новой коронавирусной инфекцией COVID-19. Во 2-ю, основную, группу исследования вошли 52 пациента, которые 6–9 месяцев назад перенесли COVID-19. Пациентов 2-й группы разделили на две подгруппы с учетом наличия или отсутствия жалоб на нарушения вкусовой чувствительности в ходе болезни COVID-19. ***Результаты исследования.*** Установлено, что у людей, перенесших новую коронавирусную инфекцию COVID-19, независимо от того, имели ли они в ходе болезни жалобы на нарушения вкусовой чувствительности или нет, спустя 6–9 месяцев после болезни отсутствуют различия в показателях электрогустометрии. У пациентов, которые не предъявляли жалобы на нарушения вкуса в период COVID-19, в постковидный период отмечено только повышение порога вкусовой чувствительности языка на соленое, в то время как у пациентов, которые в период болезни COVID-19 жаловались на нарушения вкуса, отмечалось достоверное повышение порогов вкусовой чувствительности языка на все виды раздражителей, хотя такой показатель на горькое был в пределах референсных значений. ***Заключение.*** Полученные данные указывают на особенности функционирования вкусового анализатора у людей, перенесших новую коронавирусную инфекцию COVID-19, а также свидетельствуют, что повышение порогов вкусовой чувствительности языка у пожилых пациентов может препятствовать формированию чувства сытости и в течение суток способствовать сохранению желания употреблять пищу, приводя к сложностям с регулированием диетотерапии, важной составляющей комплексного лечения различной психосоматической патологии.

Ключевые слова: люди пожилого возраста, новая коронавирусная инфекция, COVID-19, последствия новой коронавирусной инфекции, полость рта, язык, вкусовая чувствительность, электрогустометрия, порог вкусовой чувствительности языка

INTRODUCTION

Currently, a new coronavirus infection (COVID-19) has become an integral part of people's life all over the world. COVID-19 emerged at the end of 2019, since then it has negatively affected the social life of society, as well as the health care system of almost all countries of the world [1, 2]. In recent years, domestic and foreign literature has provided diverse scientific information that people who suffered from COVID-19, regardless of a virus strain, have problems with organs and tissues of the masticatory apparatus, including the oral cavity [3, 4].

Hyposalemia, inflammatory periodontal pathology, cheilitis, stomatitis, candidiasis and hyperesthesia of teeth hard



a/a *b/б*

Fig. 1. Indicators of taste sensitivity thresholds of the tongue for sweet, salty, sour (*a*) and bitter (*b*), % of the threshold solution of the irritant in the examined patients

Рис. 1. Показатели порогов вкусовой чувствительности языка на сладкое, соленое, кислое (*а*) и горькое (*б*), % порогового раствора раздражителя у обследованных пациентов

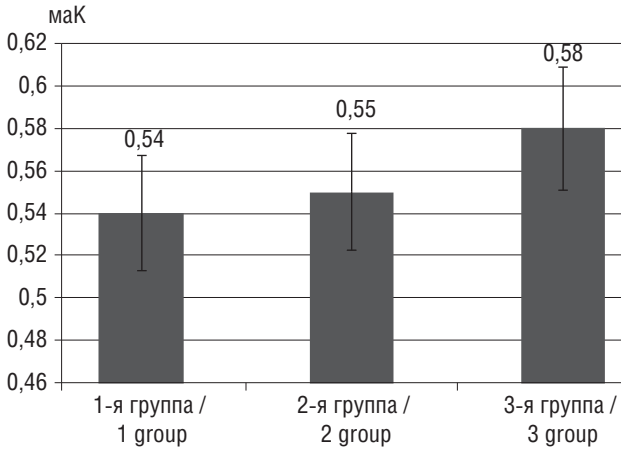


Fig. 2. Electrogustometry indicators in the examined patients, mcl

Рис. 2. Показатели электрогустометрии у обследованных пациентов, мкА

tissues are common in COVID-19 patients in the post-COVID period [5, 6]. Many patients who have survived COVID-19 note taste disturbances that are observed during the onset of the disease and sometimes persist for some time after recovery [7, 8]. These changes are especially characteristic in elderly and senile individuals [9]. That is why the study of taste sensitivity indicators in elderly people who have undergone a new COVID-19 coronavirus infection seems relevant for understanding the pathophysiological processes.

AIM

To investigate the characterization of tongue taste sensitivity in elderly people with new COVID-19 coronavirus infection, based on a study of tongue taste sensitivity thresholds and electro-gustometry.

MATERIALS AND METHODS

Clinical and physiological examination of tongue taste sensitivity thresholds of the tongue (TTST) as well as tongue electrogustometry indices were performed in 89 (28 men and 61 women) elderly people, who were divided into two study groups. The 1st, control group included 37 patients without significant psychosomatic pathology (12 men and 25 women aged 62 to 73 years), who had no new COVID-19 coronavirus infection. The 2nd, experimental group included 52 (16 men and 36 women aged 61 to 74 years) patients who had COVID-19 6 to 9 months ago. Group 2 patients were divided into two subgroups. Subgroup 2A consisted of 24 (5 males and 19 females) patients who reported impaired gustatory sensitivity during the course of the disease. Subgroup 2B consisted of 28 (11 males and 17 females) patients who did not have any changes in gustatory sensitivity after COVID-19. Patients of all groups did not suffer from endocrine pathology, did not undergo chemotherapeutic and radiation treatment due

to malignant neoplasms, as well as they did not suffer from any other diseases in decompensation stage.

Conventional methods of research were used, namely, thresholds of tongue gustatory sensitivity (TGS) for sweet, salty, sour and bitter stimuli were determined [10], and electrohustometry, i.e. determination of tongue sensitivity to direct electric current, was evaluated [11].

After the clinical study was completed, statistical evaluation of the obtained digital material was performed. The studied parameters are presented in the form of sample mean value and standard error of the mean value. Validity of differences between the mean values of independent samples was evaluated by means of parametric Student's criterion in case of normal distribution law and nonparametric Mann-Whitney criterion in case of deviation from normal distribution of indicators. The level of significance (p) was considered as achieved in all statistical analysis procedures; the critical level of significance was set at 0.05.

RESULTS AND DISCUSSION

According to literature and our findings, it is known that normally taste buds on the back of the tongue perceive 0.25–1.25% of sweet and salty solutions, 0.05–1.25% of acidic solutions and 0.0001-0.003% of bitter solutions [12, 13], while electrogustometry values are 0.35±0.08 μA [14]. An increase in TTST and electrogustometry indices increases with age, namely in elderly and old people, and the presence of any psychosomatic diseases adversely affects the above indices [15, 16]. This is especially evident in endocrine diseases, as well as after combined treatment of oropharyngeal tumors, more precisely, after chemotherapy and radiation therapy [17].

There were determined TTST rates in relatively healthy elderly people, as well as people of similar age who had a COVID-19 coronavirus infection and who did or did not experience impaired taste sensitivity during the course of the disease (Fig. 1).

Examination of TTST in patients of subgroup 2A revealed that sweet, sour, and bitter indicies did not differ from each other ($p > 0.05$) and were similar to those determined in controls, while TTST for a salty taste was significantly higher. Taste sensitivity thresholds of the tongue in patients who had complaints of taste sensitivity disorders during COVID-19 (subgroup B) had a significant increase in sweet, sour, and bitter taste sensitivity thresholds ($p < 0.05$), although the bitter taste sensitivity thresholds did not exceed the reference values for an adult and could be considered physiologic, i.e. normal [18].

The study of tongue electrohustometry parameters showed that no significant differences were observed in all groups of patients (Fig. 2), which may indicate the preserved physiologic sensitivity of tongue receptors. The average values of this index in patients of all examined groups ranged from 0.48 to 0.69 μA and amounted to 0.54±0.11 μA.

The study of TTST and electrogustometry parameters confirmed the previously known facts that there is a slight increase of TTST parameters for all types of stimuli in elderly people, while the bitter sensitivity parameters remain within the reference values. It was reported that people who had a new COVID-19 coronavirus infection, regardless of whether they had complaints of taste sensitivity disorders during the disease or not, had no differences in electrogustometry indices 6-9 months after the disease. Those patients who did not complain about taste disturbances during COVID-19 showed only an increased TTST for salty in the post-CoVID-19 period, whereas patients who complained about taste disturbances showed a significant increase in TTST for all types of stimuli, with TTST for bitter being within reference values.

CONCLUSION

Summarizing the above, it should be concluded that elderly people who had a new COVID-19 coronavirus infection and complained about impaired taste sensitivity 6–9 months after the disease had objective evidence of increased TTST for all types of stimuli, with TTST for bitter stimuli being within reference values. Elderly people who had a new COVID-19 coronavirus infection and did not complain about taste sensitivity disorders had elevated TTST for salty stimuli. The obtained data allow us to characterize the peculiarities of the gustatory analyzer functioning in people who have undergone COVID-19, as well as to note that an increase in TTST may disturb a feeling of satiety. This usually preserves the desire to eat during the day, which may cause difficulties with diet regulation, especially in the complex treatment of various psychosomatic pathologies.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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Consent for publication. Written consent was obtained from the patient for publication of relevant medical information within the manuscript.

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