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Dysgeusia in Ukrainian Woman with COVID: Case Report

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Abstract

The COVID infection continues its march across the planet and has already affected us in many ways. Along with acute infection, people continue to struggle with the long-lasting symptoms following the acute period described as a long-covid syndrome. The interest in various conditions and the risk of long-term consequences due to SARS-CoV-2 infection is still ongoing. The dysfunctions in olfactory and taste are related to SARS-CoV-2 infection and might occur in 21,5% of people. Different factors were described which may facilitate the taste loss, such as a lack in the character and quantum of the saliva, pro-inflammatory cytokines, ACE inhibitors' use, systemic diseases, zinc deficiency, and excessive use of some chemicals etc., and have been poorly understood so far. We described an atypical course of COVID respiratory disease. The woman was diagnosed with a respiratory COVID infection. She had a lingering taste perversion for 28 days, headaches, and some mental disturbances such as mood and personality changes. The woman was under the close supervision of the family doctor until full recovery. The standard screening tools were useful for the assessment of comorbid to COVID anxiety, depressive symptoms, sleep disturbances, dysautonomia and fatigue, as well as for cognitive impairment or self-violent behavior prevention.

Keywords: Dysgeusia; Loss of taste; Lingering symptoms; Mental disturbances.

1. Abbreviations

ACE: Angiotensin-converting enzyme; COVID: Coronavirus disease; CURB65: Community-acquired pneumonia criteria for predicting mortality; PCR: Polymerase chain reaction

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2. Introduction

The COVID infection continues its march across the planet and has affected us in many ways. Scientists from many countries around the world are working hard to study the nature of the virus, the nature of its mutations, the characteristics of the body's immune response, and develop treatment and prevention protocols.

Recently, there has been an increase in the number of visits to psychologists and psychiatry specialists of people, COVID survivors, with complaints of unusual sensations after the illness. The number of publications and ongoing clinical studies describing the neuropsychiatric conditions including various psychotic and non-psychotic symptoms that people experience during and after illness are raising constantly.

There is so-called post-acute COVID-19 syndrome [1] (aka “long COVID” [2]. It is defined as “a syndrome characterized by persistent symptoms and/or delayed or long-term complications beyond 4 weeks from the onset of symptoms”. The symptoms persist more than 4 weeks after initial infection and could include: fatigue, arthralgia, chest pain, palpitations, dyspnea, cognitive impairment, mood changes, headaches, hearing loss, vision changes, loss of smell/taste, tremors, and myalgia.

Among the neurological and mental symptoms, the most often were observed and described such disturbances as clinically significant anxiety and depression -23% [3,4], sleep disturbances (e.g., non-restorating sleep) -24-30,8% [5,6], PTSD -31% [7,8], cognitive disturbances (brain fog) [9], headaches 1,8 - 17,8% (e.g., migraine-like [10], late-onset headaches [11]) which started from week 12 with duration up to 6 months, and the taste disturbances 21,5% [12]. Some clinical researchers described cases of self-violent behavior in older individuals with COVID-pneumonia as well [13].

We would like to present a woman who has begun to experience a perversion of the taste during the illness. As is known, the main and the most important symptoms of COVID infection are fever, cough, fatigue, shortness of breath/difficulty breathing, loss of taste and many other concomitant symptoms [14]. However, the taste perversion has not been reported as a frequent symptom. Therefore, we considered it necessary to highlight in this case.

Dysgeusia is a condition where a person's perception of taste is altered/perverted/distorted. Everything seems sweet, sour, bitter, or metallic; or at times, the perception may occur when no tastant is present (gustatory hallucinations) [15]. The taste disorders are common in adults.

3. Case History

A 66-year-old retired woman, city of Kiev (Ukraine) resident; she is currently working as a passport officer.

She has been taking ACE inhibitors for hypertension and statins for hyperlipidemia. She did not use tobacco, alcohol, caffeine, or illicit drugs. Family history is unremarkable.

She felt acutely ill on February 24, 2021 (1st day). She experienced severe fatigue and weakness, and as a result, she fell asleep at her desk while at work. On February 25, 2021 (2nd day) after lunch "I felt general weakness, nausea, refused to eat and in

the evening a temperature rose to 38ºC". Since that time, she has had a regular rise in the body temperature of 38.5ºC - 39ºC. The woman had not eaten due to nausea and vomiting even on “empty stomach”. Smell and taste disorders were not observed.

The family doctor by the phone recommended arranging an appointment, taking an antipyretic, and drinking plenty of fluids.

On the 8th day (March 03, 2021), she went to the doctor on an outpatient basis. The examination revealed t 38.5ºC. Nasopharyngeal swab for the COVID rt-PCR test was "negative". The contact was unsure because many employees have had similar symptoms over the past 2 weeks. She did not leave Kiev last year. BP 120/90 mm Hg, heart sounds were clear, no murmurs, respiration rate 20 per minute. The room oxygen saturation was 90%. The breath sounds were increased, especially during expiration. The abdomen was soft and painless on palpation, no organomegaly. The rest of the physical examination showed no abnormalities.

The tentative diagnosis was an upper respiratory tract infection; COVID pneumonia was suspected.

The CT scan of the chest, common blood count and urinalysis “on cito!” were ordered and she was commenced on Cefixime 400 mg, antipyretics (acetaminophen), and plenty of liquids.

The woman could not go to the laboratory for the blood work the next morning because of the high temperature (39ºC). However, she regularly took the prescribed treatment and did not eat anything solids, as she vomited after eating.

The fever of 39ºC was noted until the 10th day (March 05, 2021), and profuse diarrhea also appeared. The temperature began gradually drop till 38.2ºC in the evening. She, little by little, had begun to eat liquid food but noticed that all the food was oversalted (so called "salt as a herring"). Even the water had a salty taste. Therefore, she began to eat a little again. She cannot distinguish the taste of sugar, lemon, or pepper. Since the 11th day (March 6th), the temperature has stabilized in the daytime at 37.7ºC with raising in the evening up to 38.2ºC.

Day 13th. (March 08, 2021). She has not taken antipyretic for 3 days. But she noticed a thick, viscous mucus which appeared in the throat, for which she began to take acetylcysteine-long once a day per mouth. The food was still "salty" despite the lack of salt in some foods (e.g., no sodium tomato juice, mineral water, tea). Meanwhile, mental exhaustion was noted. The woman was irritable ("how long can I tolerate this temperature"), “when I will finally be able to eat normal food, and not this salty one”. She noted a slight improvement in her well-being, and her exclusive complaint was “the food is oversalted." She perfectly sensed all smells. No psychotic symptoms were observed, and she was organized in behavior, judicious and talkative.

Neurological examination. She complained of recurrent headaches, a heaviness in the head in the morning. Pupils were symmetric, D=S, convergence, and accommodation unremarkable. The face was symmetrical, and the cranial nerves were intact. There was no neck stiffness. Motor examination revealed 5/5 strength and 2+ deep tendon reflexes bilaterally.

Normal plantar response was present. Neurologic sensory examination was unremarkable. Finger-nose-finger and Romberg tests showed no dysmetria. No focal symptoms were observed.

On the 14th day (March 09,2021), the woman was hospitalized to the internal medicine department of the Kiev City Clinical Hospital #5 with community-acquired bilateral lower lobe pneumonia. The CURB65 score was 2 (1 point for age>65, and 1 point for confusion). The oxygen saturation in the room air was 95%. An ECG was unremarkable. She was difficult to ambulate without support due to severe fatigue and slight confusion.

The CT scan of the chest showed bilateral, multifocal peripheral lungs opacities in the basal lobes (i.e., the “ground glass opacities”), but no consolidation. The nasopharyngeal swab for the COVID rt-PCR test was «negative» on March 09th, 2021.

She was commenced on IV dexamethasone 8 mg, IM ceftriaxone.

On the 15th day (March 10th, 2021), the woman made some improvement. She ambulated, the oxygen saturation in room air was 95%. She continued with treatment and still felt "all food salty". IM Ceftriaxone was added to the treatment.

An Echo-CG revealed age-related changes in the myocardium, left ventricle hypertrophy with ejection fraction of 70%.

The ultrasonography of the abdomen showed moderate liver changes consistent with fatty hepatoses.

She was discharged from hospital on March 17, 2021 (22nd day) with marked improvement and residual effects in the lungs. She had continued treatment under a family doctor supervision until complete recovery and improvement in taste on 04/02/2021 (until the 38th day).

The SARS-CoV-2 IgG after treatment (medical laboratory "Synevo" in Kiev) detected by enzyme-linked immunosorbent assay (ELISA immunology: method of chemiluminescence analysis (cmia)/ABBOT USA)) were:

Date	PCR	Index S/C*	Result
04/02/2021	SARS-CoV-2, IgG	7,09	positive
07/07/2021	SARS-CoV-2, IgG	6,81	positive

*Index (S/C) Interpretation<1.40 Negative≥1.40 Positive

IgG - immunoglobulin G

4. Discussion

Many nerves are responsible for transferring information about taste to the brain (FIG.1). On the grounds of these numerous pathways, it is rare when a person has complete loss of taste (ageusia). Somatosensory sensations like tingling, burning, coldness, sharpness, as in the case of the olfactory system, are caused by different products (e.g., hot pepper) through the fibers of the trigeminal nerve (CN V) and the oral cavity.

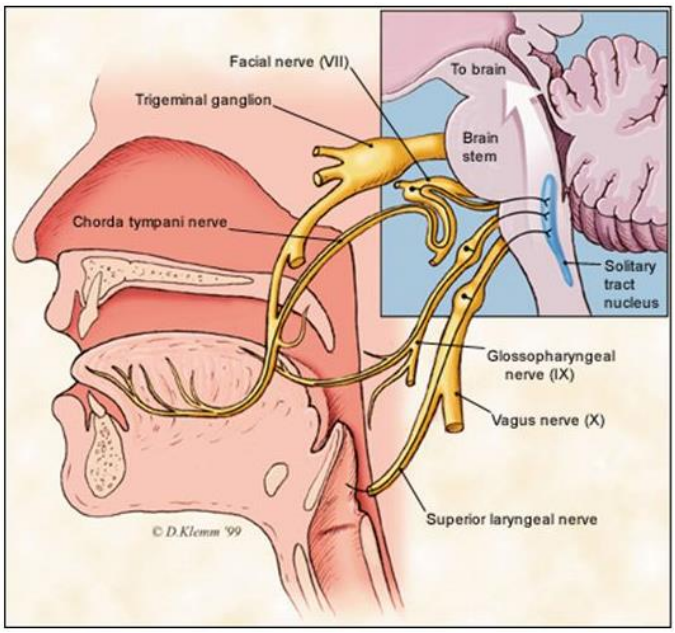

FIG. 1. **Peripheral gustatory (taste) pathways anatomy [16].**

The taste transmission from the mouth to the pharynx to the brain occurs by multiple cranial nerves (CN): (CN VII, IX, X) via brain stem [16]. The gustatory pathway includes several cranial nerves which provide the next function.

Taste - CN VII, IX, X:

- facial nerve (CN VII) 2/3 anterior portion of tongue,
- glossopharyngeal nerve (CN IX) posterior 1/3 of tongue,
- the vagus nerve (CN X) has a few taste buds on the epiglottis and pharynx.

These afferent fibers synapse in the medulla>thalamus>gustatory cortex in peripheral lobes and fibers to the hypothalamus in the limbic system. The figure below (FIG. 2) shows the classic taste regions of the tongue.

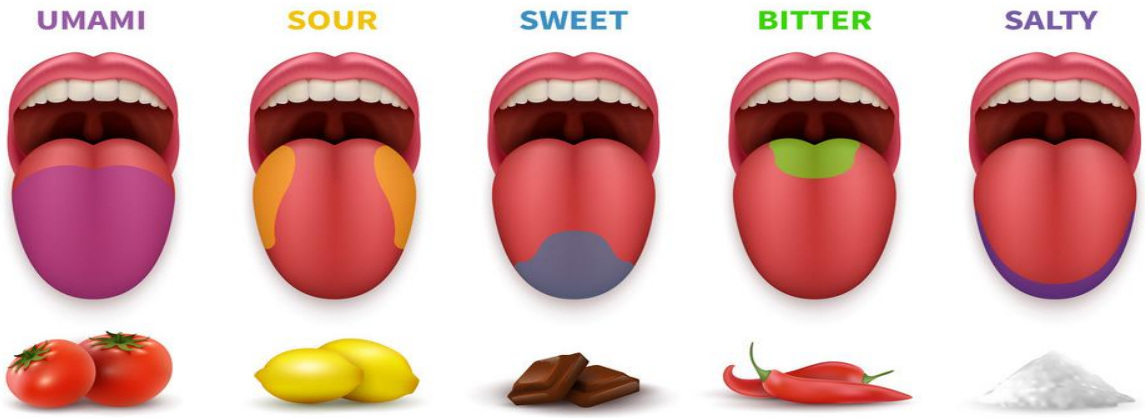

FIG. 2. **The classic taste regions on the tongue [17,18].**

For some reason, a person may experience a taste disorder - dysgeusia, which is divided into the following types: ageusia - complete loss of taste functions of the tongue, particularly the inability to detect any taste; parageusia - an abnormal or hallucinatory sense of taste; phantageusia - is an unpleasant, usually constant taste in the mouth occurring outside of any oral receptors' stimulation. The patient experiences it as a rule after the loss of taste acuity (hypogeusia). Hypogeusia - a reduced ability to taste things. Aliageusia, occurs when a typically enjoyable food or drink commences to have unpleasant taste [19].

ENT health [18] lists many causes of taste disturbances. They can be either bacterial, viral or fungal infections of the oral cavity, swelling of the tongue due to inflammation, xerostomia aka dry mouth, medication side effects, nerve damage or trauma which leads to sudden loss of taste, neurologic disorders such as Multiple sclerosis, metabolic disorders due to diabetes or hypothyroidism, tobacco use, gastroesophageal reflux disease and aging.

The peripheral neurotropism or straight toxicity to taste buds of the tongue, and olfactory epithelium are the most likely pathophysiological ground of temporary dysgeusia in COVID-19 patients [20,21].

According to one hypothesis, coronavirus affects the nerve endings and activates the inflammatory response, changing molecular and cellular pathways associated with taste loss. However, scientists have not yet found the final cause [12]. On average, the sensation of lack of taste and smell in patients with coronavirus lasts eight days [22]. Other authors reported the changes in the sense of smell and taste have been notified to continue even six months from the onset of symptoms average in 21,5% of patients [5,23-26]. Our woman has tasted salty food for about a month (28 days).

Sometimes, taste changes or taste loss may occur with ACE inhibitors treatment. Mild dysgeusia is one of the infrequently reported side effects in patients taking ACE's. A bond between the taste disturbance related to ACE (e.g., Captopril) [27-29] inhibitors which lead to angiotensin II accumulation and changes in plasma zinc concentration have been suggested, but the data for these bonds remains uncertain.

Despite the presence of ACE inhibitors in treatment, this woman was unlikely had a taste perversion due to taking this class of drugs, because she never had such symptoms during the long time of using them and the taste perversion was only for the period of the COVID illness. The common symptoms of zinc deficiency include alopecia, pustular skin rash (perioral region and extremities), hypogonadism, impaired wound healing, impaired taste, immune dysfunction. But this woman did not have any symptoms listed above except for the taste impairment.

Thus, the neuropathology of taste in COVID-19 might be described in some categories as direct viral infection, severe systemic inflammation, neuroinflammation, microvascular thrombosis and neurodegeneration [30].

5. Conclusions

Dysfunctions in olfactory and taste are highly related to SARS-CoV-2 infection. Different factors may facilitate dysgeusia, such as a lack in the character and quantum of saliva, pro-inflammatory cytokines (e.g.IL-1, IL-6, and TNF-α), angiotensin II accumulation due to ACE inhibitors use, systemic diseases, zinc deficiency, and excessive use of chemicals and other disinfectants.

This case of the disease describes an atypical course of COVID respiratory illness. The woman had a false negative nasopharyngeal PCR for SARS-CoV-2, but she had most other symptoms consistent with the respiratory COVID infection. Moreover, IgG was detected twice, indicating past infection and immunity.

In addition, she had a lingering taste perversion (28 days), headaches, and mental disturbances like an irritability.

After discharging from the hospital, the family doctor's follow-up visits and close supervision are recommended until full recuperation. The standard screening tools may be beneficial for assessment comorbid to COVID patients' anxiety, depressive symptoms, sleep disturbances, dysautonomia and fatigue, as well as for cognitive impairment or self-violent behavior prevention.

6. Author Contributions

Conceptualization - MS, methodology - NO, software - MS, investigation - MS and NO, writing - original draft preparation - NO, writing - review and editing - MS and NO, project administration-NO. All authors have read and agreed to the published version of the manuscript.

7. Disclosure

Authors declare no conflict of interests.

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