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FEATURES OF THE COVID-19 CLINICAL COURSE IN DOCTORS IN THE FAMILY CLUSTER OF INFECTION. DESCRIPTION OF A CLINICAL CASE

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Abstract

This case has several features. First of all, it covers the clinical course of Covid-19 disease in a family cluster, everyone of this family has a different medical specialization. This makes it possible to observe the case constantly. Diaries were kept by all family members. Secondly, there are two age groups in the cluster: 24-30 years old (let's call them "Children") and 50-60 years old (let's call them "Parents"). This allowed us to compare the course of the disease depending on the age and the presence of chronic diseases. On one hand the presence of a dentist in the cluster made this observation unique. We were able to compare change in general condition with the change in dental status. Also important opportunity for the polymerase chain reaction to be conducted weekly at the "Children's" work place. In retrospect we can say that the precursors of the disease appeared earlier than the positive result of laboratory diagnostics. The first confirmed contacts with infected patients occurred in the "Children" group. Due to this fact it was possible to assume about the way of transmission of the SARS-Cov-2 virus to "Parents". It should be noted that the disease wasn't one-stage for all family members, despite everyone daily contact. With 2 days in between, "Children" got sick. After 7 and 11 days, "Parents" fell ill. This fact raised a question of a "reference point". Which symptoms really show the beginning of the disease? The disease severity was different: one "parent" - mild, second "parent" – moderate, one "child" - moderate, second "child" - severe. All of the family members recovered. The diagnoses were confirmed by laboratory tests, and pneumonia was diagnosed based on multislice computed tomography.

Diagnostics, treatment and quarantine measures met the standards of the "Temporary clinical recommendations" 6 revision of 24.05.2020 of the Ministry of health of the Russian Federation, methodological recommendations MR 3.1.0170-20 with amendments No 1 "Epidemiology and prevention of COVID-19".

Keywords: *COVID-19, hyperthermia, anosmia, ageusia, hyperesthesia, myalgia, facial pain, oral-dental diseases.*

Introduction

On February 11, 2020, World Health Organization assigned the official name of the infection caused by the new virus – COVID-19. At the same time the international Committee of taxonomy assigned the official name of the infected agent – SARS-CoV-2. One month later, on March 11, WHO announced a pandemic of a new coronavirus infection [*Kamkin E et al., 2020; Cevik M et al., 2020; Linares M et al., 2020*]. Virologists quickly established the degree of pathogenicity of the virus to group II pathogenicity. Recommendations were received from infectious disease doctors and epidemiologists, covering the spread, resistance of the virus and the associated tasks of limiting the spread of infection, preventing infection, and describing the main signs of the disease. Starting in February, articles began to be published describing clinical cases of COVID-19 disease in closed groups, occurring with and without symptoms.

Main symptoms of the disease are considered to be

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an increase in body temperature, cough (dry or with a small amount of sputum), dyspnea, fatigue, a sense of congestion in chest [*Feng Ye et al., 2020*; *Malik Z et al., 2020*]. Every month, there was evidence of new symptoms and manifestations of COVID-19. There were more and more of them, and at a certain moment the question arose, what is still typical of this disease. The problem of systematization consists in a variety of different symptoms that are not combined into symptom complexes. This masks the disease as dermatitis, with an isolated skin lesion [*Tatu A et al., 2020*; *Casas G et al., 2020; Gisondi P et al., 2020; Recalcati S, 2020*]. There is myositis [*Qian G et al., 2020*] without an increase in body temperature and respiratory signs, exacerbation trigeminal neuralgia [*Malayala S, Raza A, 2020*] or multiple pulpitis [*Doroshina V et al., 2019; Arzukanyan A et al., 2020; Dikopova N et al., 2020; Spagnuolo G et al., 2020*] fatigue, rapid apathy, headache [*Yu P et al., 2020; Belvis R, 2020; Xia X et al., 2020*]. And also, significant symptoms of this disease are anosmia and ageusia (different in duration), manifested in patients with an established diagnosis of pneumonia [*Biadsee A et al., 2020; Chung T et al., 2020; Fantozzi P et al., 2020; Giacomelli A et al., 2020;Giacomelli A et al., 2020;Jang Y et al., 2020; Lee Y et al., 2020;Marinosci A et al., 2020; Mishra P et al., 2020; Sedaghat A et al., 2020;*]. The variety of symptoms of the disease attracts the attention of doctors of different specialties (therapists, dentists, otorhinolaryngologists, dermatologists). After all, the onset and course of the disease does not always follow the "classical scenario" and no one can know which specialty doctor will face the onset of the disease in a patient. The symptoms are not only diverse, but also poorly consistent with each other, which makes it difficult to clearly identify the syndromes. One of the reasons, in our opinion, is the interaction of the virus with the host organism. Second, the polymorbidity of patients, still young people. Most often, when using word "polymorbidity", clinicians mean general somatic pathology, excluding a large group of dental diseases from consideration. Third, a large number of cases reduces time for detailed history collection and subsequent data analysis. Finally, the serious condition of some patients does not allow for a long and detailed survey. However, it was noted that the vast majority of patients, about 80%, carry the disease in a mild or asymptomatic form [*Kamkin E et al., 2020; Pan X et al., 2020*], without seeking help from medical institutions. As a result, it is unavoidable to lose some

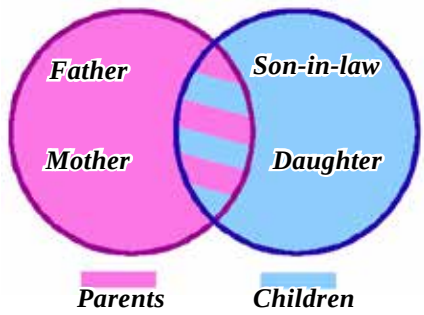

Figure 1. *Family structure.*

of the data and align them with the clinical manifestations of the disease.

Clinical case

Purposed clinical case description is a unique medical evidence of the gradual change in the health status of patients diagnosed with COVID-19. An important aspect is continuous monitoring of general clinical and dental status of doctors infected with SARS-Cov-2 virus in the family cluster of infection (Fig. 1). According to the ICD-10 classification, the main diagnosis is: U07.1 Coronavirus infection caused by the COVID-19 virus, the virus has been identified (confirmed by laboratory test despite of the severity of clinical symptoms).

At the beginning of the disease, general state of health is satisfactory. The oral cavity is sanitized. High level of individual oral hygiene.

Father (56 years old) has chronic diseases (essential hypertension, metabolic syndrome, podagra) and associated constant medication intake. Mother and children have no chronic diseases.

A retrospective analysis of events indicated that the first contact with COVID – infected patients (confirmed by PCR tests) occurred in Children group between 08 and 10 April 2020. Starting April 19-20, son-in-law (26 years old) was feeling weakness, increased sweating and fatigue, and had pale skin. Daughter (24 years old) developed a small urticaria, enanthemas, and itching in the left breast, right supraclavicular area, upper third of the right shoulder (external surface), internal surface of the left forearm (Fig. 2

To overcome it is possible, due to the uniting the knowledge and will of all doctors in the world

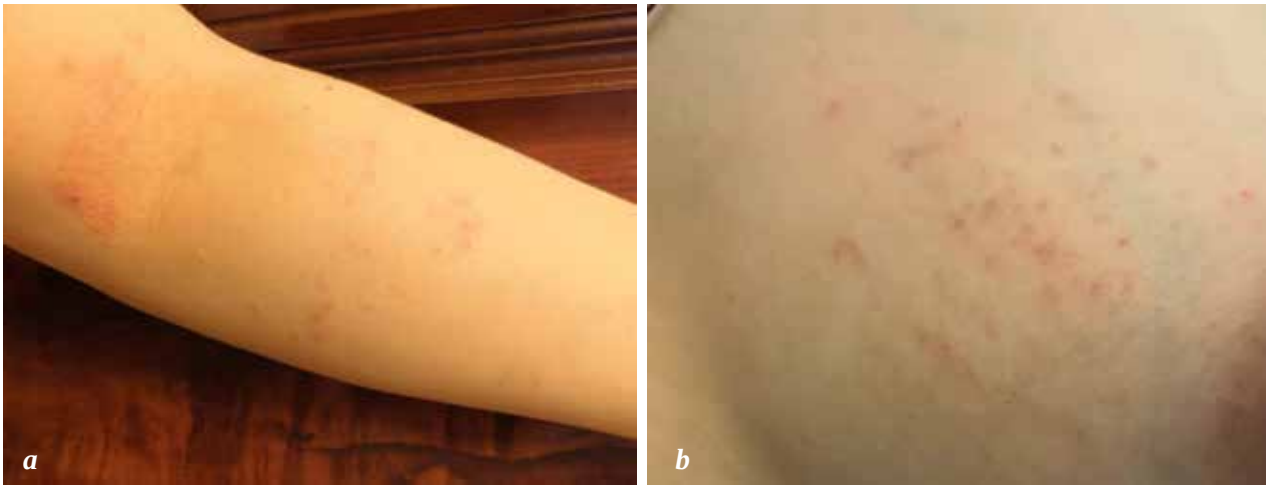

FIGURE 2. *Erythematous Papular Rash* ***a)*** *on breast skin and* ***b)*** *on the skin of the arm.*

a, b).

PCR - diagnostics performed weekly indicated a negative result in both children. The weakness increased during the week. There was pain in the submandibular region. Palpation of the lymph nodes revealed a slight (up to 10 *mm*) increase in submandibular lymph nodes, compacted, mobile, and sharply painful. The most important is the absence of visible causes of inflammation in the form of diseased teeth, periodontitis, tonsillitis, and otitis (Table 1).

Lymphadenitis persists for more than a month after main clinical symptoms disappear and PCR-test is negative.

On April 27-29, hyperesthesia appeared. Son in-law had it in his elbow joints, Daughter- in her back. The nature of the sensations: "as skinned". It was impossible to touch, it hurt from the clothes contact. Common for all were myalgia of various muscles, pain in the legs only at night, headache, weakness, sore throat, rhinorrhea with scanty mucous discharge, decreased appetite, sleep disorders of varying severity. During the examination of the mouth and oropharynx, a slight hyperemia of the posterior pharyngeal area, an increase in lymphoid granules on the posterior pharyngeal area was determined. The oral mucosa and gums was not changed. Salivation was normal (Table 2).

On 30.04.2020 children had a negative PCR-diagnostic test, but symptoms persist. Weakness, lymphadenitis appeared in the parents' group. The delay in symptoms in both Children and Parents was 5-7 days.

Nagging pain in the parascapular region was on the side of the primary lung lesion. During this period, it was possible to determine a slight limited dulling of percussion sound and listen to small-bubble rales on the side of pain. Son-in-law, Daughter, and Mother had these symptoms. The duration of pain was 48-72 hours for all patients, differing only in intensity. Later, on 10.05.2020 the MSCT study in the projection of rales revealed single "frosted glass" type infiltrations in segments S3, S8. Size was from 7 to 33 *mm*. The zone of unilateral damage was 10%.

Starting from 01.05 2020, temperature of the children increased. Son-in law temperature rose up to 37.1-37.3ºC with a tendency to gradual increase, hyposmia, hypogeusia appeared. From 05.05.2020, anosmia, ageusia, against the background of cough and dyspnea, general weakness, drowsiness, persistent hyperthermia up to 38.5-39.6 ° C, with a low response to drug therapy. A maximum value of 40.1°*C* with reduced saturation (SpO2) down to 92% and multiple lung lesions (CT – 2) led to hospital in the intensive care unit since 15.05.2020.

On 03.05 daughter had a single increase in temperature up to 38.7°*C*, accompanied by the appearance of cough, dyspnea, a slight hyposmia, and saturation (SpO_2) which was 96-99%.

Father had a single increase in temperature up to 38.4°*C*, and a slight cough. No changes were found in the MSCT examination of his lungs.

Mother's health condition (52 years old) was characterized by an appearance of cough and severe dyspnea 01-02.05.2020. Temperature increased only after 10 days (11.05) in the evening and at night up to 39.9°*C*, and an independent decrease in temperature in the morning to 35.5-35.8°*C*, and saturation (SpO_2) 95-98%. Weakness, apathy, and drowsiness depended on the severity of the disease and were manifested in all family members (Table 3).

Worth mentioning that xérostomie appeared in the son-in-Law against the background of prolonged hy-

perthermia. Oral mucosa retained light pink color, glance, and transparency. Exacerbations of dental diseases, periodontal disease, and bleeding gums were not noted in any of the cases. Electrical excitability of the pulp of vital teeth did not exceed values of 2-9 mkA. There was no violation of the temporomandibular joint function, not the appearance or amplification of bruxism. The COVID-19 disease caused by the SARS-CoV-2 virus did not change the dental status of any family members.

It should be emphasized, the description of facial pain that lasted for 3-5 days in the prodromal period and reduced after the appearance of the main symptoms: cough, fever. Facial pain is severe, diffuse, without a clear localization, along the branches of the trigeminal nerve, simulates pain in the group of teeth or the entire jaw, radiates to the ear, frontal and parietal part of the head, in the submandibular region. This symptom cannot be terminated by non-steroidal anti-inflammatory drugs.

Discussion

The sample of a family cluster of infection confirms the high virulence of the SARS-CoV-2 virus, which is indicated by the majority of authors [*Kamkin E et al., 2020; Linares M et al., 2020; Yu P et al., 2020*]. Exact time of infection of all family members could not be accurately determined, but the difference in the appearance of symptoms between the primary and re-infected was 7-10 days [*Qian G et al., 2020*]. The incubation period was more than 14 days, which opposes the information [*Cevik M, et al., 2020; Xia X et al., 2020; Feng Ye et al., 2020*], but corresponds to the data [*Kamkin E et al., 2020; Linares M et al., 2020*]. It is impossible to say that age and the presence of accompanying diseases complicate course of the disease and its severity. In our case, the most severe variant was suffered by a young man without bad habits and chronic diseases.

Next, we want to point out the symptoms that we have not seen in the literature in relation to the COVID-19 disease. This is submandibular lymphadenitis, which is characterized by a slight increase in the lymph nodes (up to 10 *mm*), but significant pain, even with a wide opening of the mouth. And the disorder of thermoregulation, which was for all patients and subjectively looked like a desire to keep warm as much as possible: to wear more warm clothes, additional cover. Sick people stop feeling their body temperature. They accept both an increase and a decrease in body temperature in the same way. There are no

Table 1

List of COVID-19 precursors

Family	Father	Mother	Son in law	Daughter
Age	57	52	26	24
Anxiety	+	-	+++	+
Asthenia	+	+	+++	+
Sleep disorder	+	+++	+++	+++
Disturbance of thermoregulation	++	+++	+++	+++
Skin rash	-	-	-	+
Lymphadenitis	+	+	+	+

Notes: *(—) - no symptom; (+) - the symptom is mild; (++) - the symptom is moderate; (+++) - the symptom is significantly pronounced.*

Table 2

Early symptoms of the COVID-19 disease

Family	Father	Mother	Son in law	Daughter
Age	57	52	26	24
Rhinorrhea	+	+	++	+
Sore throat	++	+++	+++	+++
Myalgia	++	+++	+++	+++
Leg ache (scelalgia)	+	+++	+++	+++
Facial pain	+	+++	+++	++
Skin hyperesthesia	+	+++	+++	+++

Notes: *(—) - no symptom; (+) - the symptom is mild; (++) - the symptom is moderate; (+++) - the symptom is significantly pronounced.*

Table 3

Latest symptoms of the COVID-19 disease

Family	Father	Mother	Son in law	Daughter
Age	57	52	26	24
Cough	+	+++	+++	++
Hyperthermia	+	+++	+++	+
Hyposmia Anosmia	-	-	+++	+
Hypogeusia Ageusia	-	-	+++	+
Dispnea	-	+++	+++	++
SpO<95%	≥ 95%	≥ 95%	< 95%	≥ 95%

Notes: *(—) - no symptom; (+) - the symptom is mild; (++) - the symptom is moderate; (+++) - the symptom is significantly pronounced.*

signs such as chills and sweating. Simply unclothing leads to a decrease in body temperature from 0.5°*C* to 1°*C*. At the recovery, 3 patients (25,27, 53 y.o.) had attacks of "tides": 5-15-minute attack of heat was replaced by a longer attack of chills. The duration of this period was from 2 to 8 weeks and depended on the severity of the disease.

We could not link a decrease or lack of taste sensitivity with xerostomia [*Fantozzi P et al., 2020*], since we had not observed it in our patients. However, they noted not only a change in taste, but also tactile sensitivity, which caused difficult chewing. Patients described their meals as "chewing cotton". Term represented not only the lack of taste of food, but also changes in the feeling of density and amount of food.

Considering the issues of dental pathology, we want to note that in this clinical case, the SARS-CoV-2 virus did not cause any new or exacerbation of chronic dental disease. Daily oral examination by a dentist did not reveal changes in the oral mucosa, periodontal tissues, the occurrence of caries or its complications. In this case, oral sanitation combined with a high level of personal hygiene prevented, in our opinion, the occurrence of possible complications. We considered as a possible cause of pain: pulpitis, trigeminal neuralgia, myofascial or facial pain syndrome, temporomandibular joint pain dysfunction syndrome, during the period of facial pain. When we examined patients on a daily basis, we found no data to support one of these diseases [*Dikopova N et al., 2020*].

Thus, the COVID-19 disease caused by the SARS-CoV-2 virus, despite the variety of studies conducted, is still a "Pandora's box", closed from our final understanding of this problem.

CONCLUSION

Understanding that description of one clinical case presented by 4 doctors in a family cluster of infection cannot be statistically correct, we suggest reviewing the information, which we have collected. We presented it in the following conclusions:

Disease COVID-19 caused by the SARS-CoV-2 virus does not have specific pathognomonic symptoms. The symptoms of this disease correspond to the onset of any other acute respiratory viral infection. Symptoms have a wide variety and severity.

Combination and severity of symptoms depend on the severity of the disease.

Objective reasons are: limited follow-up time, lack of constant contact with the patient, lead to the loss of rapid symptoms or their incorrect interpretation.

For example, our clinical case, we can identify several stable signs of the disease that can help in the primary diagnosis of COVID-19. These include: sudden, persistent submandibular lymphadenitis that has no visible causes, sore throat, hyperemia of palatal arches, tonsils, posterior pharyngeal area, back area of pharynx with its increased granularity, hyperesthesia of skin of back and arms.

SARS-CoV-2 Virus which causes COVID-19 provokes specific changes in thermoregulation both at the beginning and at the height of the disease and during the recovery period in both young and older patients.

Features of facial pain and headache are permanent, its appearance and disappearance after 3-5 days for no obvious reason, 2-sided nature of the lesion, has no trigger zones, incurable. It has a high frequency of occurrence and intensity in our clinical case.

SARS-CoV-2 Virus, which causes COVID-19 disease, did not provoke appearance or exacerbation of dental diseases, amplification in the dental status of patients if they observed individual oral hygiene during the disease.

Loss or reduction of smell and taste are interrelated. Patients gave a specific characteristic of the meal, calling it "chewing cotton".

ACKNOWLEDGEMENT: *We thank the patients, who were members of the same family, who agreed to take part in the experiment, despite their serious condition during the most difficult periods of the disease. They honestly described their symptoms and emotions, and agreed to publish the results.*

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