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Research Article

RESULTS OF CLINICAL AND LABORATORY TESTS IN COVID -19

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ABSTRACT

A lot of evidence supports the genetic hypothesis of the development of purulent - necrotic inflammatory diseases of the maxillofacial region that develop after COVID-19. Purulent - necrotic inflammatory diseases of the face - jaw area developing after COVID-19, in the presence of heredity , the risk of development of these pathologies is 2-3 times, in such patients, this is usually due to pro-inflammatory markers such as IL-1, IL-6 and tumor alpha-necrosis (TNF- a) is characterized as an increase in the number of CD4 and CD8 cells, which increases susceptibility to bacterial infections and fungal infections, decreases CD4-interferon-gamma expression and proved by . Since chromosomal polymorphism can determine individual sensitivity to the onset of any disease, that is, the individual response of the organism to a harmful factor, individuals with karyotype variants that differ from the norm are at risk of developing certain diseases depending on the hypo-, hyper- or normal sensitivity of the genetic apparatus.

KEYWORDS

COVID-19, face - jaw area, pro-inflammatory markers, polymorphism.

INTRODUCTION

In the purulent-inflammatory process, the depth of tissue damage and the intensity of the inflammatory reaction associated with it largely depend on the activity of the enzymes of neutrophils that prevail in the area of inflammation [3-7] . Harmful effects and the following cells present at the site of entry of foreign substances: endothelial cells of small vessels, resident macrophages and epitheliocytes are activated [1]. Migrating neutrophils and monocytes perform phagocytosis after differentiation into macrophages [12,13].

Currently, more than 100 biologically active substances are known to be secreted by macrophages activated by a bacterial agent, including:

1. Proteases: plasminogen activator , collagenase , elastase a , angiotensin convertase [2] .

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Mediators of inflammation and immunomodulation : TNFα, IL-1, 3, 6, 8, 10, 12, 15, IFN, lysozyme, components of the complement system [6-13].

3. Growth factors: CSF-GM, CSF-G, CSF-M, FGFs, TGF [6].

4. Coagulation system factors and fibrinolysis inhibitors : V, VII, IX, X, plasminogen inhibitors, plasmin inhibitors [14] .

5. Adhesive substances: fibronectin, proteoglycans, etc. [1] .

After monocytes/macrophages, neutrophilic granulocytes that appear at the site of damage secrete mediators that increase vascular permeability, perform phagocytosis, and activate the inflammatory reaction through azurophilic and special granules in them . One of its main manifestations is extravascular migration and accumulation of neutrophils in the area of damage . Special granules of these cells contain alkaline phosphatase and bactericidal cation proteins . They have pronounced coagulant and anticoagulant properties , promote the release of histamine, thereby increasing vascular permeability [2].

Tissue macrophages activated by bacterial antigens formed as a result of phagocytosis of the pathogen secrete a number of cytokines - TNFα, IL-1β, 8, 12, etc. produces new cells (monocytes, neutrophils) that migrate to the site of inflammation has an activating effect. This cell population also begins to produce cytokines, thereby recruiting more and more cells to the defense process [8,9].

RESULTS

Patients in the main group (n =118, average age 57.09±4.6) were admitted to the hospital in a state of compensation. Inflammatory processes of post-covid etiology were located in 2 or 3 or more cell spaces. The majority of patients (79.8%) after having COVID-19, on the 10-16th day from the onset of the disease, due to the failure of self-treatment, sought inpatient or medical care late . On admission, most of the patients had an elevated body temperature, 18% of patients had subfebrile body temperature, and 68% - febrile. Tachycardia was noted in 65% of patients, tachypnea in 10% of patients.

Traditionally, the indicators of cellular content determined in the general blood analysis of peripheral blood are used as the main indicators describing the severity of the inflammatory process. In all those examined during hospitalization of patients in this group, it was found that the total number of leukocytes was shifted to the left and increased in number; In 43% - leukocytosis higher than 11.8 × 10/l, in 12% of patients more than 13% of rod-shaped neutrophils were detected.

In the main observation group, we included 118 patients with post-covid abscess and phlegmon of the orbit, nasolabial fold, suborbital area, hard palate, cheek area, chewing area in front of the ear, temporal bone area, nose and upper lip.

Patients were divided into groups according to age and gender (Table 1). Of the 118 people who made up the main group, 73 were men (61.86%), 45 (38.14%) were women.

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Table 1

The proportion of patients in the control group by gender and age

Young	Sex		Total	
	Men	Women	Abs.	%
21-30 years old	16	12	28	23.7
31-40 years old	27	15	42	35.6
41-50 years old	15	9	24	20.3
51-60 years old	10	6	16	13.5
61-70 years old	5	3	8	6.8
Total	73	45	118	100

Note: r<0.05

As it can be seen from the presented table, the post-covid abscess and phlegmon of the UJS were more common in people of the most active and working age, that is, 31-60 years old (79.6%). 58 of them were men

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(49.15%), 36 (30.5%) were women. The age of the patients was between 30 and 75 years.

All patients of the main group were urgently hospitalized at different times after the onset of the disease (Fig. 1).

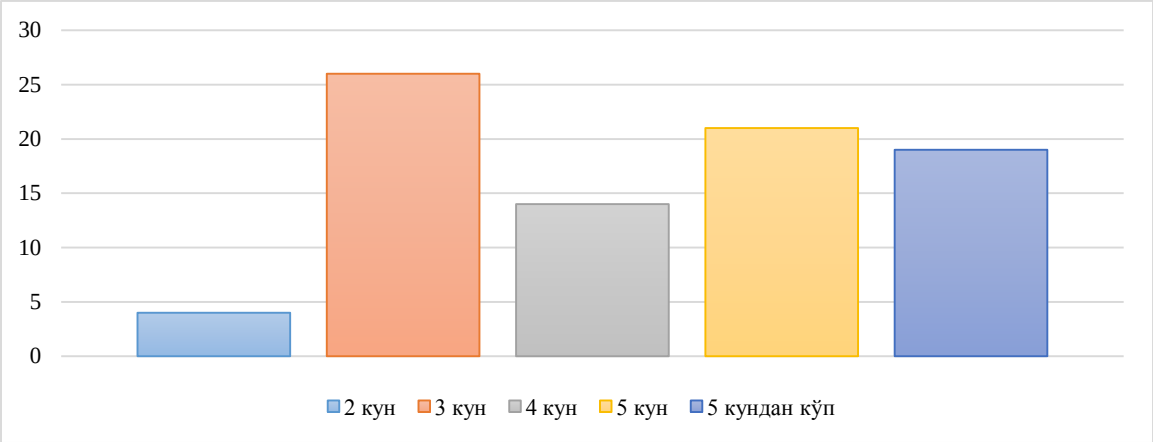

Figure 1. Comparison graph of post-Covid abscess and phlegmon patients with hospitalization periods

At the same time, the majority of patients, 80 (67.8%) were admitted to the clinic on days 3-5. The average duration of appeals was 4.57±1.36 days.

a total of 118 patients, 104 patients (88.1%) had general somatic pathology in their anamnesis, the remaining 14 patients (11.9%) had concomitant diseases , including diabetes in 104 patients (88.1 %), diabetes in 10 patients (8 , 4 %) cardiovascular system pathology, 13 patients (11 %) hypertension, 2 patients (1.7 %) respiratory system diseases, 2 patients (1.7 %) endocrine diseases.

Post-covid purulent-necrotic process of the face-jaw area with damage to one or more cellular cavities was diagnosed in the contingent of observed patients. In 42 (35.6%) patients, the inflammatory process affected one anatomical area or one cavity (Table 2). According to topography, orbital abscess and phlegmon were detected in 65

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people (55.1%), nasolabial fold abscess and phlegmon in 16 people (13.5%). In 13 cases (11.01%), abscess and phlegmon of the suborbital area were observed; in 10 cases (8.5%) - abscess and phlegmon of the hard palate; in 5 cases (4.2%) - phlegmon of lung area; in 4 cases (3.4%) - abscess and phlegmon of the masticatory area before the ear; in 2 cases (1.7%) – abscess and phlegmon of the temporal region; In 1 case (0.8%) - abscess and phlegmon of the nose and upper lip were noted.

Table 2

Number of patients with post-covid abscesses and phlegmon of a single cell cavity or area

Damaged area , space	Number of patients	Occurrence in this group (%)
Orbits, nasolabial folds, under eye sockets and hard palate areas	20	16.9
Orbit, nasolabial fold, sub-orbital, hard palate areas, pre-auricular lobe and masticatory area	24	20.3

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Orbits, nasolabial folds, under eye sockets, hard palate, preauricular and masticatory areas, and temporal area	25	21.2
Orbit a and hard palate area	45	38,13
Nose, upper lip and orbital areas	4	3.4

Note: r<0.05

In all 118 (100.0%) patients, the inflammatory process spread to several cellular spaces (Table 2): in 45 cases, phlegmon and abscess of the orbit and hard palate, in 25 cases - orbit, nasolabial fold, suborbital area, phlegmon and abscess of the hard palate, lung, pre-auricular masticatory area and temporal area were detected. In 24 patients , phlegmon and abscess of the masticatory area in the orbit, nasolabial fold, under the eyeball, hard palate, buccal and in front of the ear were detected. We also observed four patients with phlegmon and abscess of orbit, nasolabial fold, suborbital and hard palate areas. Phlegmon and abscess of the nose, upper lip and orbital area were noted in 4 patients.

The severity of the inflammatory reaction, the intensity of the pain syndrome, the presence and nature of disturbances in the functions of swallowing, chewing, speech, and movement in the lower jaw were taken into account in the objective examination. Complaints of patients at the time of admission to the hospital are presented in Table 3.

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Table 3

Complaints of patients with post-covid complications in the maxillofacial area

Complaints	An absolute number	In % relative to the number of patients in the group
General weakness	102	86.4
Headache:	112	94.9
Hemicranial headache	104	92.9
General headache	8	7.1
Disturbance of sensitivity of the face and scalp	91	77.1
Hypoesthesia	70	76.9
Anesthesia	21	23.1
Nausea	38	32.2
Visual impairment:	101	85.6
Completely one-sided	76	75.3
Fully two-way	4	3.9
Not completely one-sided	1 8	17.9
Incomplete bilateral	3	2.9
Pain at the site of inflammation	118	100
Exophthalmos	98	83.1

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Ptosis	114	96.6
Ophthalmoplegia	61	51.7
Restriction of mouth opening	14	11.9
Disturbance of facial nerve sensitivity	25	21.2
Disturbance of sensitivity of the 1st and 2nd horn of the trigeminal nerve	82	69.5
Swallowing disorder	40	33.9
Disturbance of breathing through the nose	115	97.5
Impaired sense of smell	118	100
Increased body temperature:	118	100
36.8-38.0 ^{0}C	94	79.7
38.1-39.0 ^{0}C	16	13.6
39.1-40.0 ^{0}C	8	6.8

Note: r<0.05

As can be seen from the table, all patients complained of olfactory disorders, fever, pain in the inflammatory area, and most of the patients mainly complained of headache (hemicranial headache 104, general headache 8), general weakness (102), visual disturbances (101), face and complained of scalp sensitivity disorder (91), nasal

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breathing disorder (115), and exophthalmos (61).

During the initial examination, asymmetry of the sides of the face was detected in all patients, which depended on which side of the purulent-necrotic process was located. Skin redness, smoothness, pain, fluctuation and cyanosis during bimanual palpation were detected in the skin covering where the purulent-necrotic process is located (Fig. 2, 3). In some areas of the skin, a necrotic area of the skin was detected. This process develops against the background of impaired nutrition of the skin's soft tissues, which in turn predicts a violation of vascular pathology.

2 . Purulent-necrotic process on the left face with skin necrosis in the left cheek area

Figure 3. Purulent-necrotic process in the mucous membrane of the hard palate on the left

Exophthalmos, ptosis, mydriasis and ophthalmoplegia were also observed when examining the orbital area. On the affected side, the corner of the mouth is not reduced, the nasolabial fold is flattened. In diffuse purulent-necrotic processes, for example, in processes in the temple and ear-chewing area, the mouth does not open well. Examination of the oral cavity reveals

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necrotic areas on the mucous membrane of the hard palate, as well as redness and swelling (Fig. 3).

This pathology, against the background of vascular thrombosis, disrupts the trophism of soft tissues and bone structures, as a result of which purulent-necrotic processes gradually develop and secondary microflora is added. When the wound was punctured, a large amount of liquid, cloudy, white pus was released (Fig. 4).

4 . Diagnostic puncture of the purulent-necrotic zone in the area under the left eye socket

Based on clinical and laboratory changes, a working classification of disease severity in patients with COVID -19 was developed.

Table 4

Of the disease according to the severity level b according to the results of clinical - laboratory and instrumental examination .

Severity level	Local changes	Laboratory indicators						
		Leukocyte	Sugar	SR O	D-dimer	Ferritin	Procal - citonin	Lipo - protein

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Light	Ptosis, ophthalmoplegia, swelling of soft tissues, sensitivity disorders of the 5th and 7th pairs of nerves	9-10 10^9 /l	10-12 mmol/l	20-25 mg/l	300-400 ng/ml	400-500 µg/l	0.1-0.4 ng/ml	35-55 mg/dL
Average	Exophthalmos, swelling of soft tissues, necrotic ulcer of the nasal cavity, sensitivity disorders of the 5th and 7th pairs of nerves	10-12 10^9 /l	13-16 mmol/l	25-35 mg/l	400-600 ng/ml	500-700 µg/l	0.5-0.65 ng/ml	60-75 mg/dL
Heavy	Exophthalmos, swelling of soft tissues with necrotic changes in the skin, necrotic ulcers of the palate and nasal cavity, loss of sensitivity of the 5th and 7th pair of nerves	15-18 10^9 /l	16-20 mmol/l	35-40 mg/l	800-950 ng/ml	800-1300 µg/l	0.70-1 ng/ml	75-90 mg/dL

Note: $r<0.05$

Based on the data in Table 4, the general condition of patients at the severe level of the disease remains extremely severe, tachycardia, tachypnea, blood pressure increases above 150/100 mm Hg, rO2 saturation decreases to 90%, pain on one or the other side of the head, body temperature 39-40 0 Increase to C, impaired swallowing, loss of sensitivity of the 5th and 7th pairs of nerves, swelling and paleness of the soft tissues of the face were found on objective examination, smoothing of the skin, often a symptom of fullness with pain is felt when the middle and upper 1/3 of the face is pressed, the corner of the mouth on the affected side does not shrink when opened , deep necrotic foci in the mucous membrane of the nasal cavity starting from the medial wall of the nasal septum and continuing on the lateral wall, as well as on

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the mucous membrane of the hard palate, the sensitivity of the upper jaw teeth is completely lost on the affected side, exophthalmos, ophthalmoplegia, mydriasis, complete loss of vision is observed on the affected side of the orbit, laboratory in the indicators: a decrease in the level of hemoglobin in the blood to 70 g/l, leukocytosis 18-10 9 /l, neutrophilia, an increase in EChT, a decrease in total protein in the blood, an increase in creatinine and urea in the blood, an increase in the level of sugar in the blood to 20 mmol/l, a level of CRO of 40 mg /l, increase of d-dimer level up to 950 ng/ml, increase of ferritin level up to 1300 μg/l, increase of procalcitonin level up to 1 ng/ml is determined. In MSKT, chronic hemisinusitis is often detected in the form of hyperplasia of the mucous membrane of the paranasal sinuses. At the average level of severity, the general condition of patients is more stable, but the complaints of patients remain the same as at the severe level of this pathology. Laboratory indicators will be lower than the severity of the disease.

CONCLUSION

Patients with COVID -19 have a mild purulent-necrotic process of the face-jaw area, the general condition is satisfactory, mydriasis, partial exophthalmos appear, the movement of the eyeball is preserved, the natural fold of the mid-face zone is flattened on the outside, on the damaged side, partial paresis of the facial nerve due to which the sensitivity of the skin of the face decreases. Over time, cyanosis and pastosis of the soft tissues of the face appear due to impaired blood circulation. In the oral cavity, the mucous membrane of the half of the hard palate turns white and remains intact.

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