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CHARACTERISTICS OF CLINICAL AND LABORATORY MANIFESTATIONS DURING COVID - 19 WITH PNEUMONIA.

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Abstract:

Relevance. The first outbreak of COVID-19 was recorded in December 2019, in Wuhan, China. Four months after the outbreak, who declared the COVID-19 pandemic (March 11, 2020), which indicates a high contagiousness of this infection. The entrance gate of the pathogen is the epithelium of the upper respiratory tract, epitheliocytes of the stomach and intestines. The initial stage of infection is the penetration of SARS-CoV-2 into target cells that have receptors for angiotensin-converting enzyme type II (ACE2 - angiotensin-converting enzyme 2). The new human coronavirus can cause a number of diseases - from mild forms of acute respiratory infection to severe acute respiratory syndrome (SARS). Extrapulmonary manifestations include: bleeding disorders, myocardial dysfunction and arrhythmia, acute coronary syndrome, acute renal failure, gastrointestinal disorders, hepatocellular lesions, hyperglycemia and ketosis, neurological diseases, eye symptoms and dermatological Complications.

Materials and methods of research. The examination and treatment data of 102 patients with moderate severity of COVID-19, treated from July to August 2020 in a specialized hospital formed for the treatment of patients with COVID-19 by the Bukhara State Medical Institute in the dormitory of the Bukhara Technological Institute, were analyzed. When assessingthe condition and method of treatment, we were guided bythe belt recommendations for the management of patients infected with COVID-19 - No. 7 approved by the Ministry of Health of the Republic of Uzbekistan on 15.08.2020 According to the protocol, patients with COVID -19, depending on the severity of the disease, are divided into 4 groups. The protocol provides specific recommendations on the scope of examination and treatment taking into account the severity of the condition of patients.

Conclusion. When assessing the condition of patients with COVID-19 associated pneumonia, indicators of intoxication, blood coagulation system and SpO2% of blood are of important importance. The main criteria for assessing the state of the coagulogram in COVID-19 are*:* D-dimer; PV; Platelets; Blood Fibrinogen.

Keywords: COVID-19, SARS-CoV-2, covid-19 - associated pneumonia.

TOPICALITY. The first outbreak of COVID-19 was recorded in December 2019, in the city of Wuhan, China. Four months after the outbreak, WHO declared the COVID-19 pandemic (March 11, 2020), which indicates a high contagiousness of this infection [1; from 78]. The entrance gates of the pathogen are the epithelium of the upper respiratory tract, epitheliocytes of the stomach and intestines. The initial stage of infection is the penetration of SARS-CoV-2 into target cells having receptors for angiotensin-converting enzyme type II (ACE2 - angiotensin-converting enzyme 2) [2; p 491]. The new human coronavirus can cause a number of diseases - from mild forms of acute respiratory infection to severe acute respiratory syndrome (SARS). Extrapulmonary manifestations include: bleeding disorders, myocardial dysfunction and arrhythmia, acute coronary syndrome, acute renal failure, gastrointestinal disorders, hepatocellular lesions, hyperglycemia and ketosis, neurological diseases, eye symptoms and dermatological complications [3; since 1720].

COVID-19 induced hypercoagulation is due to dysfunction of endothelial cells, which in turn leads to excessive thrombin formation and decreased fibrinolysis activity [4; p 147]. The ability of coronaviruses to penetrate directly into the bone marrow, and disrupt the processes of hematopoiesis [5; p 145], is not excluded.

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Violations of coagulation lead to thrombotic complications, which are clinically significant. The resulting microthrombosis, disrupting microcirculation, can significantly aggravate the course of acute respiratory failure in patients with COVID-19. Therefore, treatment of COVID-19 must necessarily include measures aimed at correcting hemostasis disorders [6; 657].

MATERIALS AND METHODS.

The examination and treatment data of 102 patients with moderate severity of COVID-19, treated from July to August 2020 in a specialized hospital formed for the treatment of patients with COVID-19 by the Bukhara State Medical Institute in the dormitory of the Bukhara Technological Institute, were analyzed. When assessingthe condition and method of treatment, we were guided bythe belt recommendations for the management of patients infected with COVID-19 - No. 7 approved by the Ministry of Health of the Republic of Uzbekistan on 15.08.2020 According to the protocol, patients with COVID -19, depending on the severity of the disease, are divided into 4 groups. The recommendations give specific recommendations on the scope of the examination and treatment, taking into account the severity of the patient's condition.

All patients, depending on sex and age, were divided into groups according to the classification adopted at the regional seminar of the World Health Organization in Kiev in 1963.

Of the 102 patients examined, 68 (66.6%) were men, 34 (33.4%) were female, aged 17 to 76 years (average age was 48.42.1 years). All patients examined on the day of admission were urgently started complex therapy for the treatment of ± COVID-19, drugs based on Protocol No. 7 recommended by the Ministry of Health of the Republic of Uzbekistan.

From the moment of admission, all patients were measured body temperature, respiratory rate, an objective study of the lungs (auscultation, percussion), pulse oximetry, X-ray examination of the lungs, and, if necessary, MSCT of the chest. When collecting anamnesis, attention was focused on determining the duration of the disease and contact of patients with COVID-19 patients.

To determine the level of oxygen saturation of the capillary blood of the body, the $SpO_{of\ 2}$% was studied using a pulse oximeter apparatus by fixing the device on the end of the phalanx of the patient's hand.

All admitted patients from the day of hospitalization and in dynamics were determined indicators of body temperature and blood intoxication: Leukocytes of the blood, LII, MSM, ESR of blood. Indicators of D - dimer are studied; Prothrombin time; Platelets; Blood fibrinogen.

RESULTS AND DISCUSSIONS. All patients examined were admitted with COVID-19 associated pneumonia, which was confirmed on X-ray radiological examination.

As noted above, patients on the day of admission began conservative therapy on an emergency basis in thebelt recommendations for the management of patients infected with COVID-19 No. 7. From the moment of admission, all patients were given a nasopharyngeal swab to verify the diagnosis using the polymerase chain reaction (PCR) method for COVID-19, regardless of clinical manifestations, the detection of specific antibodies in the blood (IgA; IgM and/or IgG) to SARS-CoV-2, thermometry, measured respiratory rate. An objective study of the lungs (auscultation, percussion), pulse oximetry, X-ray examination of the lungs, and, if necessary, MSCT of the chest were carried out. Taking into account the results of clinical and X-ray radiological studies, all patients, if necessary, were given oxygen therapy using the CPAP or Bobrov apparatus.

The effectiveness of treatment was assessed by the dynamics of the results of clinical and X-ray radiological studies (X-ray, MSCT). The condition of the lung tissue and the assessment of the degree of lung damage were assessed by conducting MSCT or X-ray studies. The main criterion for the treatment of COVID-19 was the results of a PCR study from the nasopharynx for COVID-19 and the detection of antibodies to SARS-CoV-2 in the blood. Important indicators for assessing the condition of the patient were the results of the study of the indicatorof blood intoxication: blood leukocytes, LII, MSM, blood ESR, indicators of D -dimer; PV; Platelets; Blood Fibrinogen, and MSCT of the lung in dynamics.

Analysis of laboratory indicators of intoxication of the body in the examined patients revealed the following changes (Table 1). As shown in the table, on the first day of treatment, the body temperature of patients averaged 37,800.40. The content of leukocytes of blood was an average of 7,820.11 x±± 10 9 / L. The volume of MSM is 0.1760,008 units.±

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Table 1 Resource requirements by component

Dynamics of intoxication rates in examined patients with COVID - 19 associated pneumonia (n = 102).

Indicators	Observation time				
	Day of admission	Day 3	Day 7	Day 14	Reference values
t^0 тела	37,800,40±	37,440,14***±	36,810,12***±	36,600,21±	35,6-37,2 °C
L крови $\times 10^9$/l	7,820,11±	7,100,17***±	6,700,21*±	6,600,18*±	4,0-9,0 × 10^9/l
MSM units	0,1760,008±	0,1480,04±	0,1220,022**±	0,1280,004*±	0,240±0,04 usl.u.
LII units	1,700,10±	1,300,04±	1,00,03**±	1,00,03±	0,3 – 1,5 units
ESR mm/h	45,601,28±	41,401,21±	34,702,11*±	25,20±2,10***	2-15 mm/h

Note: * - reliability of the difference relative to the data of the previous day значимы (* - P<0.05, ** - P<0.01, *** - P<0.001).

On the third day of treatment, there is a slight decrease in body temperature to 37,440,14, the number of blood leukocytes decreased to an average of 7,100,17×±±10 9 / L. The volume of average molecules averaged 0.1480.04 units.±±±

By the seventh day of treatment, the examined patients retained a slight febrileness (36,810,12). At the same time, for all laboratory indicators of intoxication of the body: L, MSM, LII and ESR of blood, their further decrease was noted, that is, there was a tendency to normalize -±± 6,700,21×10 9; 0.1220,022; 1,00,03; 34,702,11, respectively. By the fourteenth day of treatment, these indicators, although they tended to further normalize, but remained above normal.±±±

With further treatment and observation by the seventh day, all analyzed indicators of intoxication, except for blood ESR, were within the reference values.

In the following, the compositionof patients was studied according to pulse oximetry indicators - SpO_2%. Upon admissionand in patients, a slight deviation of SpO_{2}% from normal values was observed, that is, - 93.60±0.06% (Table. 2).

Table 2 Resource requirements by component

Dynamics of pulse oximetry indicators of the examined patients (n = 102)

Показатель SpO_2 %				Normal SpO values of $_2$% according to WHO (2009). SpO_2 - 95% or higher
Day of admission	3 overnights	7 overnights	14 overnights	
93,60±0,06	93,80±0,11	94,10±0,30	95,20±0,40*	

Note: * - reliability of the difference relative to the data of the previous day значимы (* - P<0.05, ** - P<0.01, *** - P<0.001).

Against the background of the therapy, the pulse oximetry indicators of SpO_2% slowly tended to normalize. By the thirdday of treatment, the dynamic growth curveof the SpO_2% indicator was insignificant. By the 6-7 days of treatment, there was a positive dynamics of the SpO_2% indicator, reaching 94.10% ±0.30, which corresponds to the lower limit of the norm. On average, the increase in the oxygen saturation of tissues at this time reached up to 0.5% of the initial one. In the future, with a dynamic increase by the 14th day - up to 95.20% ± 0, 40, which significantly differs from the initial indicators by an average of 2.14%.

To verify the diagnosis of COVID -19 as mentioned above, all patients underwent a PCR test from the nasopharynx. It should be noted that 2% of patients at the time of admission had confirmed results of a PCR test for COVID-19. The rest of all patients with a PCR test for COVID-19 were performed on the day of admission. According to the results of the PCR study, 45% of patients had a false positive result of the coronavirus test, 55% of patients had positive

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PCR tests. Given the presence of clinical signs such as: anosmia, headaches, fever, patients whose PCR test showed a false negative or negative result, were diagnosed with COVID - 19. All of these patients anamnestically had contact with COVID - 19 patients within the last 14 days, before admission. 70% of patients in the family had patients with confirmed tests for COVID-19.

Dynamic study of hemostasis indicators of the examined patients revealed the following indicators: D-dimer on the day of admission were higher than normal, which averaged 1535 ng / ml; The indicator of thrombosed time was - 14 seconds; Platelets and Fibrinogen were above the norm of 202 * 10 ^ 9 / l, and 4.3 g / l, respectively. Table 3

Table 3 Resource requirements by component

Indicators of hemostasis in the examined patients (n = 102)

Index	Indicator in dynamics				
	Day of admission	3 overnights	7 overnights	14 overnights	reference values
D-димер	1535 ng/ml	955 ng/ml	544 ng/ml	353 ng/ml	0-500 ng/ml
PV	14 sec	12 sec	11sec	11 sec	11-16 seconds
Platelets	202 *10^9/L	184 *10^9/L	175 *10^9/L	170 *10^9/L	150 - 400 *10^9/l
Fibrinogen	4,3 g/l	4,1 g/l	4,0 g/l	4,0 g/l	2—4 g/l

Note: * - reliability of the difference relative to the data of the previous day значимы (* - P<0.05, ** - P<0.01, *** - P<0.001).

Against the background of complex treatment with the use of heparin anticoagulants and low molecular weight heparins (clexane, enoxyparin), all these indicators gradually normalized in dynamics by the 7-8th day of treatment.

The main radiological signs of COVID-19 associated pneumonia in the examined patients were the following symptoms: numerous compactions of the lung tissue of the "frosted glass" type, with the involvement of the lung parenchyma up to 25-40%, occurred in 68 (66.6%) patients, similar to foggy compaction of the lungs, while preserving the contours of the bronchi and blood vessels.

Less often on the CT scan there were signs: areas of consolidation, perilobular seals in 19 (18.6%) patients; symptom of air bronchogram, traction bronchiectasis in 7 (6.8%) ; pleural effusion, hydrothorax in 2 (1.9%) bilateral, prevails on the left. All these signs were mainly determined on the 6-10th day of the disease

In the process of complex treatment synchronously with the improvement of the general condition and clinical and laboratory data of the examined CT patients, the picture also had a positive trend. By 7-8 days of treatment, in most cases, the patients examined had normal CT pictures, it should be noted that in 20-25% of patients at this stage of treatment with CT examination, residual phenomena of the X-ray picture were noted.

FINDINGS:

1. When assessing the condition of patients with COVID-19 associated pneumonia, the MSCT picture, intoxication rates and SpOof 2% of the blood are important.
2. The main criteria for assessing the state of the coagulogram in COVID-19 are: D-dimer; PV; Platelets; Blood Fibrinogen.

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