ejpmr, 2021,8(9), 55-58

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

CLINICAL AND PATHOGENETIC ASPECTS FEATURES OF COVID-19 COURSE (DATA OF RETROSPECTIVE ANALYSIS)

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Article Received on 28/06/2021 **Article Revised on 19/07/2021** **Article Accepted on 08/08/2021**

ANNOTATION

Aim of the study. Estimate of the clinical and pathogenetic characteristics of COVID-19 in the early rehabilitation period according to retrospective analysis. Material and research methods. A retrospective analysis of the case histories of 128 patients who underwent COVID-19 and persistent symptoms of the disease was carried out. The number and frequency of underlying diseases and clinical manifestations of various pathological syndromes were determined. The results of the analysis of case histories of patients showed that 44 patients suffered moderate severity of COVID-19, 45 patients - severe, 39 - extremely severe. 40 patients were diagnosed with a lesion of 25% of the lungs or less (CT-1), in 43 patients - more than 25 to 50% of the lung volume (CT-2), in 32 patients - more than 50 to 75% (CT-3) and in 13 patients - more than 75% (CT-4). On average, the number of background pathologies was 4.53 ± 2.20. The average number of background diseases was significantly higher in patients of the older age group ($p < 0.001$). In patients with severe and extremely severe infections diabetes and obesity were more common ($p < 0.05$ for both comparisons). Conclusion. According to the data of retrospective analysis, the average number of background diseases was significantly higher in patients of the older age group. Diabetes and obesity were more common in patients with severe and extremely severe COVID-19.

KEYWORDS: COVID-19, clinical and pathogenetic variants of COVID-19, comorbid background.

COVID-19 is a new highly contagious infection, the first reports of which appeared in the fall of 2019. The SARS-CoV-2 pandemic is putting tremendous pressure on healthcare systems around the world.[1] Many people who have recovered are at risk of facing various complications and long-term consequences, especially if there are concomitant pathologies. In these patients, even after the disappearance of the infection.[2,3] Scientific research is actively proposing various options for rehabilitation measures for patients who have undergone coronavirus infection. The effectiveness of early rehabilitation largely depends on the clinical condition of patients and the comorbid background.[4]

AIM

Estimate of the clinical and pathogenetic characteristics of COVID-19 in the early rehabilitation period according to retrospective analysis.

MATERIAL AND RESEARCH METHODS

A retrospective analysis of the case histories of 128 patients who underwent COVID-19 and were hospitalized in the RSSPMCT and MR for further rehabilitation was carried out. The criteria for inclusion in the study were: 1) virologically confirmed no earlier than 30 and later 7 days prior to inclusion in the study COVID-19; 2) negative result of PCR studies for SARS-CoV-19 at the time of inclusion in the study; 3) age 16-75 years.

RESEARCH RESULTS AND DISCUSSION

The results of the analysis of the case histories of patients who underwent COVID-19 showed that the average age of patients was 49.84 ± 12.54 years. There were 76 - 59.38% men. The median time to admission was from acute onset of COVID-1913.19 ± 4.34 days from onset of COVID-19. The distribution according to the severity of the course of the new coronavirus infection showed that 44 patients suffered from the moderate severity of COVID-19, 45 patients - severe, 39 - extremely severe disease.

In terms of the prevalence of intrestal pneumonia, 40 patients were diagnosed with a lesion of 25% of the lungs or less (CT-1), in 43 patients - more than 25 to 50% of the pulmonary volume (CT-2), in 32 patients - more than 50 to 75% (CT- 3) and in 13 patients - more than 75% (CT-4). Saturation on the day of hospitalization in patients averaged 92.62 ± 5.07%. Correlation analysis showed that an increase in the severity of the transferred COVID-19 is associated with a decrease in the level of saturation (strong negative

relationship - r = -0.75, p <0.01). The volume of the lesion of the pulmonary parenchyma correlated with the severity of the disease (r = 0.90, p <0.01).

Also, a decrease in oxygen saturation in patients who underwent COVID-19 in the early rehabilitation period strongly negatively correlates with the volume of interstitial lung damage (r = -0.66, p <0.01).

During the study, the comorbid background of patients who underwent COVID-19 was assessed. According to the analyzed case histories, all patients had background diseases during the early rehabilitation period after COVID-19.

On average, the number of background pathologies was 4.53 ± 2.20. The most common were hypertension - 78 patients (60.94%), pathology of the pancreato-duodenal zone (dysfunction of the sphincter of Oddi, gallstone disease, chronic pancreatitis) - 54 patients (42.19%) and functional disorders of the gastroesophageal zone (gastroesophageal reflux disease, hiatal hernia, reflux esophagitis, functional cardia insufficiency) - 49 patients (38.28%). The analysis of comorbidity was carried out in accordance with the age of the patients and the severity of the transferred infection (moderate versus severe and extremely severe). The median age was 47 years, and 2 groups of patients were identified - up to 47 years old and over 47 years old (Table 1).

The analysis showed that the average number of background diseases was significantly higher in patients of the older age group (5.73 ± 2.02 versus 3.51 ± 1.81, p <0.001). Also, in the older age group, IHD (p <0.001), hypertension (p <0.001), chronic hepatitis (p <0.05), chronic colitis (p <0.001), chronic urinary tract infection (p <0, 01), chronic cerebral ischemia (p <0.001) and type II diabetes (p <0.01). The groups with moderate and severe COVID-19 did not differ in the number of background diseases. However, patients with severe and extremely severe infections had a higher incidence of diabetes mellitus and obesity (p <0.05 for both comparisons), while in the group of patients with moderate severity of infection, chronic viral hepatitis was more common (p <0.05). A possible explanation for this phenomenon may be the appearance of the phenomenon of immunological suppression induced by the hepatitis C virus, which is associated with a lower activity of the systemic inflammatory response developed against the background of COVID-19.

Table 1: The frequency of occurrence of background conditions in patients with COVID-19 in the early rehabilitation period (in the numerator - the number of patients, in the denominator - the relative share in the group).

Nosology	According to the age			According to severity COVID-19		
	47 years and younger (n=69)	Over 47 (n=59) years old	Chi square	Moderate severity (n=44)	Severe and extremely severe (n=84)	Chi square
ICHD	2 2,90%	33 55,93%	44,97***	14 20,29%	21 35,59%	ur
HD	33 47,83%	45 76,27%	10,86***	27 39,13%	51 86,44%	ur
Heart defects, condition after surgery	3 4,35%	2 3,39%	ur	2 2,90%	3 5,08%	ur
DCM	3 4,35%	0 0,00%	ur	0 0,00%	3 5,08%	ur
Hepatits	4 5,80%	11 18,64%	5,08*	9 13,04%	6 10,17%	4,72*
NAFLD	21 30,43%	18 30,51%	ur	10 14,49%	29 49,15%	ur
Gastritis, gastric ulcer	20 28,99%	19 32,20%	ur	12 17,39%	27 45,76%	ur
Colits	10 14,49%	33 55,93%	24,47***	14 20,29%	29 49,15%	ur
Dysfunction of sf.Oddi, gallstone disease	29 42,03%	25 42,37%	ur	22 31,88%	32 54,24%	ur
GERD	27 39,13%	22 37,29%	ur	16 23,19%	33 55,93%	ur
Ch.G	6 8,70%	1 1,69%	ur	4 5,80%	3 5,08%	ur
COPD	16 23,19%	18 30,51%	ur	11 15,94%	23 38,98%	ur
BA	17 24,64%	9 15,25%	ur	6 8,70%	20 33,90%	ur

CILD	3 4,35%	2 3,39%	ur	2 2,90%	3 5,08%	ur
CCI	2 2,90%	26 44,07%	31,48***	8 11,59%	20 33,90%	ur
Parkinsonism	0 0,00%	9 15,25%	11,29***	3 4,35%	6 10,17%	ur
Epilepsy	2 2,90%	1 1,69%	ur	0 0,00%	3 5,08%	ur
AIT	7 10,14%	3 5,08%	ur	3 4,35%	7 11,86%	ur
Type 2 DM	3 4,35%	14 23,73%	10,34**	2 2,90%	15 25,42%	4,78*
Obesity	24 34,78%	24 40,68%	ur	11 15,94%	37 62,71%	4,57*

Note: * - reliability of the chi square test in accordance with the degrees of freedom. One sign - p <0.05, two signs - p <0.01, three signs - p <0.001.

Analysis of clinical symptoms and signs revealed the following clinical syndromes in patients in the early period of rehabilitation after COVID-19: cardiovascular, neurological, vasculitic-urticarial, respiratory (Table 2), as well as pathogenetic mechanisms of their formation: autoimmune, fibrosing, dystrophic, coagulopathic. Each syndrome includes several clinical variants due to different pathogenetic mechanisms.

In general, clinical syndromes pathogenetically explained by an autoimmune inflammatory reaction were observed in 99 patients (77.34%), cell dystrophy (including sideropenic, hypoproteinemic mechanisms, mitochondrial deficiency) - in 123 patients (96.09%), coagulopathy and procoagulant status - in 73 patients (57.03%), fibrosis - in 44 patients (34.38%).

According to the literature, along with damage to the lung tissue in a number of observations revealed changes, including the type of vasculitis, and in other organs, including with damage to the nervous system.[5,6,7] These changes can presumably be associated with the generalization of coronavirus infection: catarrhal and hemorrhagic gastroenterocolitis, encephalitis and meningitis, myocarditis, pancreatitis, kidney and spleen damage. If we consider the possible clinical manifestations of pathology on the part of the skin, then typical manifestations of COVID-19 are described - from hemorrhagic syndrome to rashes of various types with unspecified pathogenesis.[8,9]

Table 2: Clinical and pathogenetic classification of the manifestations of post covid syndrome.

Syndrome	Clinical symptoms	Pathogenesis	Number of patients
Cardiovascular	Arrhythmias and heart block	Autoimmune	82 (64,06%)
	Myocarditis, decreased systolic heart function, heart failure	Autoimmune, dystrophic	68 (53,13%)
	Thromboembolism	Coagulopathy	66 (51,56%)
Collagenosis similar	Vasculits	Autoimmune, coagulopathic	32 (25,00%)
	Caronaroarthritis	Autoimmune, coagulopathic	25 (19,53%)
	Serositis	Autoimmune	82 (64,06%)
	Hives	Autoimmune	42 (32,81%)
	Aggravation of pre-existing autoimmune and rheumatologic diseases	Autoimmune	26 (20,31%)
	Nephritis / glomerulonephritis	Autoimmune	37 (28,91%)
	Hepatits	Autoimmune, Toxic	51 (39,84%)
Respirator	Interstitial pulmonary fibrosis	Fibrosis	44 (34,38%)
	Broncho-obstructive syndrome	Autoimmune	32 (25,00%)
Neurological	Asthenic / asthenodepressive syndrome	Dystrophic	115 (89,84%)
	Cognitive impairment	Autoimmune	67 (52,34%)
	Paresthesias	Autoimmune, dystrophic	16 (12,50%)
	Guillain-Barré Syndrome	Autoimmune	9 (7,03%)

	Pain syndrome	Autoimmune	86 (67,19%)
	Myasthenia gravis	Dystrophic	109 (85,16%)
	Disturbances in taste and smell	Autoimmune, dystrophic	65 (50,78%)
	Dry skin, hair loss	Dystrophic	99 (77,34%)
	Hypo/hyperthermia	Autoimmune	54 (42,19%)
	Hyperglycemia	Autoimmune, dystrophic	37 (28,91%)

CONCLUSION

According to a retrospective analysis, the average number of background diseases was significantly higher in patients of the older age group ($p < 0.001$). Patients with severe and extremely severe infections had a higher incidence of diabetes mellitus and obesity ($p < 0.05$ for both comparisons). Patients with moderate infection were more likely to have chronic viral hepatitis ($p < 0.05$). The pathogenetic syndrome of an autoimmune inflammatory reaction was observed in 77.34% of patients, cell dystrophy syndromes in 96.09% of patients, coagulopathic in 57.03% and fibrosis in 34.38% of patients.

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