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The Pattern of Covid 19 among Hospitalized Athletics Patient: A Comparative Study from Basrah City, Southern Iraq

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ABSTRACT

Background: Acute infection with the novel coronavirus causing COVID-19 illness results in a wide range of clinical manifestations in the general adult population. The clinical course and effects in non-athletic people have already been studied, but insufficient data is available on athletics.

Objectives: This study is designed to evaluate the pattern, clinical course, the outcome of COVID-19 among athletics in Basrah city in the south of Iraq.

Design and materials: A comparative study design was used to compare 18 athletics with sexed and aged match 22 non-athletic.

Results and conclusion: The study found that no noticeable difference between the duration of hospitalization between the two groups and all the inflammatory biomarkers was slightly lower among the athletics. In addition, the severity of disease among the athletes was less as the higher degree of lung involvement, the severe desaturation, and the occurrence of cytokine storm were higher among non-athletic; moreover, the response to antiviral drug "remdesivir" and the recovery outcome were higher among athletics.

Key words: Athletics, Basrah, COVID-19, Iraq

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INTRODUCTION

The Corona virus disease 2019 (COVID-19) pandemic was triggered by a modified coronavirus leading to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which quickly spread from China to all continents [1]. The disease has spread worldwide, resulting in a pandemic that is still on-going [2]. COVID-19's clinical course and effects in non-athletic populations have already been studied, and they are primarily dependent on the existence of comorbidities and age [3]. Although the infection may be asymptomatic; the clinical course is usually mild to moderate in the majority of patients [4].

Moreover, COVID-19 clinical symptoms, consequences, and response to treatment in physically active people, particularly professional athletes, are little understood [5]. Furthermore, the most common reason for hospitalization is pulmonary involvement with inflammatory pneumonitis; however, other clinical presentations such as cytokine storm and other systemic complications may be the reason an individual develops a protracted illness course and delays recovery [6]. Although it was suggested that a high degree of physical fitness might protect against the likelihood of severe disease that necessitates hospitalization, it is unclear if this influences the course and recovery patterns in COVID-19 [7].

This study aims to evaluate the pattern of COVID-19 among athletics concerning the respiratory severity, the development of cytokine storms, and the outcome.

MATERIALS AND METHODS

A case-control study was carried for three months period from the 1st of July to the 1st of October 2021 on hospitalized athletics in Basrah teaching hospital, a specialized center dealing with COVID-19 in Basrah city in the south of Iraq. During this period, 18 athletics were detected. Their information and clinical characteristics were taken from the medical records. They plotted on an organized questionnaire which included the following variables: Patient's factors (age, sex, and comorbidities), disease severity (the oxygen saturation, the degree of lung involvement, and the development of cytokine storm through clinical and biochemical assessment which includes increasing tachypnoea and oxygen requirement with elevated interlukin-6 levels and serum ferritin) [8], The duration of hospitalization, The levels of inflammatory markers (serum ferritin, interleukin-6, D. dimer, lactate dehydrogenase, and C-reactive protein), the response to the antiviral drug "remdesivir" and the outcome (recovery, death and pulmonary fibrosis). Athletics parameters were assessed in comparisons with parameters of 22 non-athletics patients, both groups were matched for age and sex. Non-athletics patients were collected from the same site in Basrah teaching hospital.

Verbal and written informed consent from the patients who enrolled in the study was taken, and approval from the Basrah medical college ethical committee and from the development and training center of the Basra health directorate/ ministry of health was also waved (No.197 - dated 15/June/2021)

For the statistical analysis, the Computerized SPSS version 20 program is used to analyse the study results. Quantitative data are tabulated as mean ± standard deviation (SD); t-test will be used for two group's comparison. Qualitative data are tabulated as numbers (%) and tested with the Pearson Chi-square test. P-value □ 0.05 is considered statistically significant.

RESULTS

Eighteen athletics patients were included in this study, all of them were males, and their mean age was 38.78 years, and their characteristics concerning the age, sex, medical illnesses, in addition to the duration and site of admission was summarized in the Table 1.

Furthermore, the degree of lung involvement was assessed by chest CT scan and classified into less or more than 50% of the lung damage. Additionally, the oxygen saturation and the presence or absence of cytokine storm depending on clinical and laboratory criteria were also taken into consideration. Moreover, the information related to the response to antiviral drug "remdesivir" and the clinical outcome was assessed in this study. Additionally, the exact level of the inflammatory biomarkers was registered, and all these parameters were summarized in Table 2.

The results in Table 3 show that there was no significant difference (p-value □ 0.05) in duration of hospitalization between the two groups and all the inflammatory biomarkers, except C-reactive protein, were non-significantly (p-value□0.05) higher among the non-athletics. The level of C-reactive protein is significantly less (p-value=0.021) in athletics patients compared with non-athletics patients.

The degree of lung involvement was significantly higher among non-athletes (p-value=0.046). Although the rate of ICU (intensive care unit) admission in athletes being less than that in non-athletes, but this was of no statistical significance (p-value=0.73). Additionally, the severity of disease according to Spo2 was insignificantly less in athletes compared with non-athletics (p-value=0.673). Moreover, cytokine storm was insignificantly more in non-athletic (p-value=0.169). Furthermore, the patient's response to the antiviral drug "remdesivir" was insignificantly better and with a higher percentage of an earlier response (p-value=0.258). In addition to the outcome of the patients which show complete recovery in around 95% of athletics and no one of them diagnosed with signs of pulmonary fibrosis, in contrast to the non-athletics group in whom about 15% develop lung fibrosis but generally these findings of no statistical significance p-value=0.158). These findings were summarized in Table 4.

Table 1: Demographic and non-demographic characteristics of the athletics patients.

No.	Age / years	Sex	Medical illnesses	Duration of admission / days	Site of admission
1	40	Male	Present	6	Respiratory ward
2	37	Male	Absent	4	Respiratory ward
3	32	Male	Present	5	Respiratory ward
4	37	Male	Absent	4	Respiratory ward
5	26	Male	Absent	4	Respiratory ward
6	34	Male	Present	4	Respiratory ward
7	40	Male	Absent	5	Respiratory ward
8	33	Male	Absent	5	Respiratory ward
9	44	Male	Absent	5	Respiratory ward
10	68	Male	Present	8	Intensive care unit
11	39	Male	Present	13	Intensive care unit
12	36	Male	Absent	6	Respiratory ward
13	40	Male	Absent	4	Respiratory ward
14	37	Male	Absent	5	Respiratory ward
15	45	Male	Absent	5	Respiratory ward
16	36	Male	Absent	6	Respiratory ward
17	37	Male	Absent	4	Respiratory ward
18	37	Male	Absent	4	Respiratory ward

Furthermore, the degree of lung involvement was assessed by chest CT scan and classified into less or more than 50% of the lung damage. Additionally, the oxygen saturation and the presence or absence of cytokine storm depending on clinical and laboratory criteria were also taken into consideration. Moreover, the information related to the response to antiviral drug "remdesivir" and the clinical outcome was assessed in this study. Additionally, the exact level of the inflammatory biomarkers was registered, and all these parameters were summarized in Table 2.

Table 2: The clinical and laboratory features of the athletics patients involved in the study.

No.	CT %	SPO2 %	Storm	D.dimer Ng/ml	CRP Mg/L	LDH U/L	Ferritin Um/L	IL-6 Pg/ml	Remdesivir	Outcome
1	>50	70-90	Yes	1124	40	424	821	120	Early	Recovery
2	>50	70-90	Yes	2115	50	532	1448	210	Early	Recovery
3	<50	70-90	Yes	2876	40	411	982	103	Early	Recovery
4	<50	70-90	Yes	1233	50	323	1458	70	Early	Recovery
5	<50	70-90	Yes	1289	50	453	1000	90	Early	Recovery
6	<50	70-90	Yes	1220	45	489	977	133	Early	Recovery
7	>50	70-90	Yes	2345	57	655	1493	187	Early	Recovery
8	<50	70-90	Yes	2467	50	452	1429	170	Early	Recovery
9	>50	70-90	Yes	1287	60	456	1034	567	Early	Recovery
10	>50	<70	Yes	2354	69	643	1843	567	Late	Death
11	>50	<70	Yes	3233	50	720	1022	786	Early	Recovery
12	>50	70-90	No	977	46	366	922	56	Early	Recovery
13	<50	70-90	Yes	2569	55	523	1159	130	Late	Recovery
14	<50	70-90	Yes	2411	50	440	2000	89	Early	Recovery
15	<50	70-90	Yes	1377	46	506	900	79	Early	Recovery
16	>50	70-90	No	977	46	366	922	56	Early	Recovery
17	>50	70-90	Yes	2115	50	532	1448	210	Early	Recovery
18	<50	70-90	Yes	1233	50	323	1458	97	Early	Recovery

The results in Table 3 show that there was no significant difference (p-value 0.05) in duration of hospitalization between the two groups and all the inflammatory biomarkers, except C-reactive protein, were non-significantly (p-value0.05) higher among the non-athletics. The level of C-reactive protein is significantly less (p-value=0.021) in athletics patients compared with non-athletics patients.

Table 3: The comparison of age, duration of admission and the levels of inflammatory biomarkers between athletics, and non-athletics patients.

Parameter	Group		p-value
	Non-Athletics (n=18)	Athletics (n=22)	
Age (years)	40.41 ± 6.62	38.78 ± 8.48	0.498
Duration of hospitalization (days)	5.1818 ± 1.26	5.3889 ± 2.17	0.708
Serum Ferritin Level (Um/L)	1653.23 ± 968.97	1239.78 ± 343.49	0.093
Interleukin - 6 Level (Pg/ml)	331.73 ± 261.22	206.67 ± 209.55	0.109
C-Reactive Protein Level (Mg/L)	66.55 ± 28.10	50.22 ± 6.89	0.021
Lactate Dehydrogenase Level (U/L)	567.68 ± 231.12	478.56 ± 111.05	0.142
D-Dimer Level (Ng/ml)	2353.73 ± 1455.62	1844.56 ± 722.81	0.184

The degree of lung involvement was significantly higher among non-athletes (p-value=0.046). Although the rate of ICU (intensive care unit) admission in athletes being less than that in non-athletes, but this was of no statistical significance (p-value=0.73). Additionally, the severity of disease according to Spo2 was insignificantly less in athletes compared with non-athletics (p-value=0.673). Moreover, cytokine storm was insignificantly more in non-athletic (p-value=0.169). Furthermore, the patient's response to the antiviral drug "remdesivir" was insignificantly better and with a higher percentage of an earlier response (p-value=0.258). In addition to the outcome of the patients which show complete recovery in around 95% of athletics and no one of them diagnosed with signs of pulmonary fibrosis, in contrast to the non-athletics group in whom about 15% develop lung fibrosis but generally these findings of no statistical significance p-value=0.158). These findings were summarized in Table 4.

Table 4: The comparison of the clinical parameters between athletics and non-athletics.

Parameter		Group		P value
		Non-Athletics (n=18)	Athletics (n=22)	
Medical illness	Present	11 (50%)	13 (72.2%)	0.203
	Absent	11 (50%)	5 (27.8%)	
Site of admission	Intensive care unit	9 (40.9%)	2(11.1%)	0.73
	Respiratory ward	13 (59.1%)	16(88.9%)	
Degree of Lung Involvement by CT scan	<50 %	4 (18.2%)	9 (50.0%)	0.046
	>50 %	18 (81.8%)	9 (50.0%)	
Degree of Oxygen Saturation	Spo2 70 - 93 %	18 (81.8%)	16 (88.9%)	0.673
	Spo2 <70 %	4 (18.2%)	2(11.1%)	
Occurrence of Cytokine Storm	Absent	0 (0%)	2 (11.1%)	0.169
	Present	22 (100%)	16 (88.9%)	
Response to Remdesivir	Early Response	16 (72.7%)	16 (88.9%)	0.258
	Late Response	6 (27.3%)	2(11.1%)	
Respiratory Outcome	Full Recovery	19 (86.4%)	17 (94.4%)	0.158
	Lung Fibrosis	3 (13.6%)	0 (0.0%)	
	Death	0 (0.0%)	1 (5.6%)	

DISCUSSION

To our knowledge, this is the first study in Basrah city and possibly in Iraq that highlights the group of athletes concerning COVID-19. The idea of this research was originated during the first pandemic wave as we noticed a few cases of athletes that showed severe and poor outcomes during the illness. Still, this bad outcome may reflect the underdevelopment of the treatment modality and lack of experience during that time, in addition to the co-existing co-morbidities among those candidates and their older age that may directly be related to the poor prognosis and worse outcome.

There is a scarcity of information about COVID-19 in athletes, and we cannot find a detailed survey among hospitalized athletics. One of the published studies held by Rajpal et al. in 2021 found that 12 (46%) of 26 competitive collegiate athletes with COVID-19 had minor symptoms, whereas 54 percent were asymptomatic [9] additionally, Schumacher et al. found a comparable number of asymptomatic athletes (58%) in their study [10]. Also, Krzywaski et al. conducted a survey with 111 elite Polish athletes. In 16 percent of participants, asymptomatic illnesses were discovered. The vast majority of symptoms were minor, which appears to be consistent with overall projections for the same age range [11]. Additionally, COVID-19 was linked to a minor, self-limiting illness that lasted on average ten days in a cohort of 147 elite athletes in 2021. Still, it also caused a protracted impact on full sports participation in a fourth of the athletes, lasting more than a month [12].

From the pathological points of view, heterogeneous immune responses associated with childhood immunizations, frequent exposure to seasonal coronaviruses, and a more diversified memory T cell repertoire can explain the moderate clinical outcome of COVID-19 in younger athletes [13]. Furthermore, enhanced angiotensin-converting enzyme 2 expression is implicated in anti-inflammatory signaling and may lessen the risk of severe disease in young people [14].

CONCLUSION

To sum up the finding of our study, we can state that COVID-19-related illnesses in athletics had a comparable pattern and duration to those reported in the general population.

LIMITATIONS

One of the significant limitations of this study is the small sample size of athletics which is more likely attributed to the lack of complete medical records details that make the author ignore any case with incomplete data. Additionally, the absence of serum troponin level and electrocardiography in those patients, which could be necessary for diagnosing cardiovascular complications, especially myocarditis in athletics patients.

RECOMMENDATIONS

We recommend a further study with larger sample size and longitudinal pattern to follow the effect on the health and the quality of life and the ability of the athletics in the future to return to their daily activity and exercise. Moreover, we also recommend studying cardiovascular complications such as myocarditis, which is suggested to increase among athletics with COVID-19.

CONFLICTS OF INTERESTS

The authors declare that there is no conflict of interest.

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