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Epidemiological and clinical characteristics of COVID-19 patients admitted in Intensive care units of the Bilda University Hospital, in Algeria

Caractéristiques épidémiologiques et cliniques des patients atteints de COVID-19 admis dans les unités de soins intensifs de l'hôpital universitaire de Blida- Algérie

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Résumé

Contexte et objectif. En mars 2020, la nouvelle maladie à coronavirus (COVID-19) est apparue à Blida, l'épicentre de l'épidémie dans le pays. L'objectif de l'étude était de décrire les caractéristiques cliniques des patients COVID-19. ***Méthodes***. Il s'agissait d'une étude transversale portant sur des patients COVID-19 admis aux soins intensifs ou en Réanimation au Centre hospitalier universitaire de Blida, entre les 12 mars et 9 mai 2020. Les paramètres d'intérêts comprenaient les données épidémiologiques, cliniques et paracliniques (radiologiques, virologiques). ***Résultats***. Au total, 560 patients étaient inclus (348 cas aux soins intensifs, soit 62,1 %). La plupart des patients (62 %) étaient de sexe masculin avec un âge médian de 65 ans [IQR 52,7-74,2]. Plus de la moitié présentaient une comorbidité (55,4 %). Les caractéristiques cliniques les plus signalées étaient la dyspnée (78,8 %), la toux (78,0 %) et la fièvre (77,9 %). Le taux de mortalité était de 46,8 % (dont 70,4 % aux soins intensifs). ***Conclusion***. les patients à risque d'être hospitalisés dans les unités de soins intensifs sont des sujets âgés, de sexe masculin, présentant des comorbidités avec un risque élevé de mortalité dans les unités de soins intensifs, ce qui met l'accent sur la nécessité de limiter l'exposition de cette population vulnérable, leur prise en charge précoce et la surveillance vigilante pendant leur hospitalisation.

Mots-clés : SRAS-CoV-2, caractéristiques cliniques, unité de soins intensifs, hôpital de Blida (Algérie)
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Summary

Context and objective. First cases of COVID-19 were reported in March 2020 in Blida, the epicentre of the epidemic in the country. The present study aimed to describe the clinical features of COVID-19 patients in this setting. ***Methods***. We conducted a cross-sectional study including COVID-19 patients admitted for treatment of in Blida University Hospital from March 12th to May 9th, 2020. Parameters of interest were epidemiological, clinical and paraclinical (radiological and virological)**.** ***Results***. A total of 560 patients (348 from ICU, 62.1%) were enrolled Most of the patients (62%) were male, median age was 65 years [IQR 52.7-74.2]. More than half presented with comorbidity (55.4%). Main symptoms were dyspnea (78.8%), cough (78.0%) and fever (77.9%). Global mortality rate was 46.8%, with 70.4% in ICU patients. ***Conclusion***. Male gender and advanced age with comorbidities were the main determinants of ICU admission and mortality, highlighting the need for targeted surveillance strategies.

Key words: SARS-CoV-2, clinical characteristics, Intensive Care Unit, hospital Blida (Algeria).

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Introduction

In December 2019, severe pneumonia cases were identified in Wuhan-China. It was a virus-like pneumonia, recalling SARS-CoV. After sequencing of DNA from samples collected in the lower respiratory tract of patients, the Chinese Center for Disease Control and Prevention (CCDC) identified on January 7th, 2020 a novel virus that was named the new virus 2019 novel coronavirus (2019-nCoV) on 12 January 2020 and later designated as SARS-CoV-2 based on phylogeny and taxonomy (1-3). The World Health Organization (WHO) named the disease coronavirus disease 2019 (COVID-19) on February 11th, 2020 (4). Within three months after the identification of its causal agent, the COVID-19 epidemic spread all over the world (1), prompting the WHO to declare the SARS-CoV-2 pandemic on March 11th, 2020 (5).

By April 7th, 2020, 211 countries were affected with 1,214,466 confirmed cases and 67 767 deaths. In Algeria, 494 deaths were reported among 5558 confirmed cases including 913 in the province of Blida on May 9th, 2020 (6). The coronavirus, such as SARS and Middle East Respiratory Syndrome MERS are responsible of respiratory tract infections in human (7). The disease features in both infections and SARS-CoV-2 are similar to those of COVID-19, ranging from mild forms with good prognosis to serious forms with severe respiratory distress syndrome (ARDS) leading to hospitalization in Intensive Care Units (ICU) and sometimes to death, with a high mortality ratio (around 70%) (8-9). This severe respiratory disease is named COVID-19 by the WHO (8). The definitive diagnosis relies on the identification of the virus by the reverse transcription polymerization chain reaction (RT-PCR) on the respiratory tract-collected sample (10-11). However, facing the limited access to this technique, the diagnosis is made on the association of clinical evocative symptoms and radiological characteristic images, namely peripheral distribution (80%), ground-glass opacities (91%) and vascular thickening (58%) (12). Due to the lack of PCR-kits in the Blida University Hospital, only a few of suspected cases of SARS-CoV-2 infection were diagnosed by PCR technique and the CT-scan imaging was used as an orientation mean for diagnosis. Being non-specific, the CT-scan was reserved to high probability cases (hospitalized patients with severe evocative clinical signs). Furthermore, the physiopathology of SARS-CoV-2, till today, is unclear. And without a vaccine that would manage to decrease the frequency and seriousness of this disease, it is particularly paramount to analyze the clinical characteristics, in order to identify, isolate and take over the potential cases, with the purpose of restraining the spread of the epidemic (13).

In this context, we aimed, through this study to describe the clinical features reported in serious patients admitted in Intensive Care Unit (ICU) of Blida University Hospital, in comparison to patients hospitalized in two other units of the Blida University Hospital, dedicated to the management of moderate and severe COVID-19 cases.

Methods

Type of study

It was a descriptive cross sectional study involving patients admitted in the ICU of Blida University Hospital of Blida, and two other wards dedicated to COVID-19 management in the same hospital, during the period from March12th to May 9th, 2020. The ICU was provided with 62 hospitalization beds and 52 respirators, and supervised by a sufficient number of reanimation doctors and paramedics, with the objective of taking care of all serious cases referred from the 6 hospitals of the province of Blida. The two other COVID-19 wards were overseen by Infectious Diseases specialists and their staffs, disposing of respectively 48 and 56 beds and 2 respirators.

Operational definitions and selection criteria

The clinical case definition of COVID-19, according to the official instructions was: a) possible case: each individual showing clinical symptoms of severe respiratory infection with temperature or febrile sensation. b) Probable case: i) every individual with clinical symptoms of severe respiratory infection appeared within the 14 days following a close contact with a confirmed COVID-19 patient; or: ii) every individual with clinical symptoms of severe respiratory infection and evocative thoracic CT-Scan COVID -19 images. c) Confirmed case: every symptomatic or non-symptomatic individual with confirmed SARS-CoV-2 infection by RT-PCR on a collected sample (14). All patients admitted to the CHU for the management of confirmed COVID-19 cases. All patients admitted directly to the intensive care unit of the CHU or referred either by the State's pneumology and infectiology departments or by the two departments of the CHU dedicated to the management of SARS-CoV-2 cases in hospital, when these cases require intensive care hospitalisation.

Data collection

Data collection was performed by the medical crew of the Department of Epidemiology and Preventive Medicine (SEMEP), with the collaboration of medical and paramedical staffs of the three concerned wards. Standardized survey questionnaires provided by the National Health Ministry were used to collect data, after adjustment by the SEMEP to match the objective of the study.

For each survey questionnaire, we registered personal characteristics: municipality of residence, sex and age of the patient. Besides, the following clinical characteristics were retained: clinical signs at the moment of admission, comorbidity, radiological features (CT scan imaging), virologic status (RT-PCR results on nasopharyngeal samples) and the hospital discharge modality (recovery, death).

The data were gathered from the medical file of each patient, the anamnesis conducted by the doctor in charge of the patient, and the administrative register of Admissions Department. These data were completed by the confirmation tests performed in the Virology Laboratory of Pasteur Institute of Algiers (IPA).

The patients involved in this study were COVID-19 confirmed cases by RT-PCR test, or patients presenting obvious evocative CT-scan images of SARS-CoV-2 pneumonia.

A major Epidemiologist Resident was in charge of compiling, controlling and capturing the data from the questionnaires.

The ARDS, mild and severe pneumopathy were defined according to the latest temporary WHO directives for the clinical management of severe a respiratory infection (15), the kidney lesion according to KADIGO world classification (16). The cardiac impairments were evoked in case of new abnormalities on Electrocardiogram (ECG), Echocardiography and Troponin superior to the referenced limit(17). Hypoxia: was defined as a PaO2/FIO2 ratio inferior to 300 mmHG (18)]. The typical aspects of CT-scan images in SARS-CoV-2 pneumonia were identified as: posterior and sub-pleural distribution of ground-glass opacities associated to alveolar condensation homes, linear opacities, thickening of the bronchial walls and rarely pleurisy and pericardial effusion (19-20). Hence, the clinical signs of SARS-CoV-2 infection included: temperature superior to 37,5°C, cough, sputum, dyspnea, breathlessness, myalgia, digestive symptoms such as diarrhea, nausea/vomit, neurological signs as headaches, anosmia, agueusia, mental confusion and stroke, but also renal disorders, myocardial lesions and ophthalmologic signs as conjunctivitis (21). Comorbidity included: Hypertension, diabetes, nephropathies, pneumopathies, cardiovascular, neurological and neuromuscular diseases, cancer as well as some conditions like pregnancy, post-partum, Immunodeficiency, overweight, smoking…

Statistical analysis

The results were expressed through: Median, inter-quartile interval, and average supported by the standard deviation for quantitative variables and percentages for the qualitative variables. The admission and mortality rates were determined by the ratio of the number of COVID-19 cases and the number of deaths, to the sum of hospitalizations all diseases included, registered in the Blida University Hospital during the period of study.

The denominator used originates from the data of admission register. Box plots were drawn up to illustrate the distribution of the quantitative variables. To meet the major objective, a descriptive analysis of the population was performed on the demographic, epidemiologic, radiologic, virologic, clinical and medical history data. The student's T-test was used to compare two averages and the chi-square test was used to compare two percentages.

The data were analyzed by SPSS software (20th version) and Open Epi Calculator (Open Source Epidemiologic Statistics for Public Heath, www.OpenEpi.com). Significance level was agreed at 0, 05 and all the tests were bilateral.

Results

Overall, 560 mildly to critically COVID-19-suffering patients of the province of Blida were admitted in the Blida University Hospital from March 12, 2020 to May 09, 2020, corresponding to an admission rate of COVID-19 of 9,2%. 348 cases of the whole cohort (62.1%) were hospitalized in ICU and 212 patients (37.9%) were admitted in the two other COVID-19 wards. The median age of patients was 65 Years [IQR 52.7-74.2]. The patients aged more than 65 were the most affected ones, with 56.2% in ICU versus 46.1% in the other wards (p=0.027). Patients under 18 years represented 0.6% of the ICU-hospitalized cohort. Whatever was the hospitalization ward (ICU or the two others), male gender was predominant (62.0% of the cohort). In ICU, male gender represented 67.8%, while it was 52.4% in the other wards (p<0.001) (table 1).

Table 1. Demographic distribution of probable and confirmed Covid-19 cases in the hospitalization Wards-UH Blida

Demographic parameters	Total number of cases, n(%)	Hospitalisationward		p
		ICU, n(%)	Otherwards, n(%)	
Gender				
Male	347 (62)	236 (67.8)	111 (52.4)	
Female	213 (38)	112 (32.2)	101 (47.6)	< 0.001
Total	560 (100)	348 (100)	212 (100)	
Age group				
1-17	2 (0.4)	2 (0,6)	0 (0)	
18-24	5 (0.9)	2 (0.6)	3 (1.5)	
25-49	105 (19.2)	53 (15.6)	52 (25.2)	0.027
50-64	148 (27.1)	92 (27.1)	56 (27.2)	
≥ 65	286 (52.4)	191 (56.2)	95 (46.1)	
Total	546* (100)	340 (100)	206 (100)	

Concerning the clinical characteristics: dyspnea, cough, fever, asthenia, breathlessness were the most common signs, respectively with 78.8 %, 78.0 %, 77.9 %, 64.6 % and 52.3 %. The difference between ICU and the two other wards was only significant for dyspnea and breathlessness (p< 0.001). Neurological signs were rare: mental confusion, irritability and seizures, respectively 3.6%, 2.7% and 0.9% (table 2).

Table 2. Clinical repartition of probable and confirmed Covid-19 cases in hospitalization wards – UH Blida

Clinical characteristics	Total number of cases, n(%)	Hospitalisationward		p
		ICU, n(%)	Otherwards, n(%)	
Dyspnea / tachypnea	441 (78.8)	304 (87.4)	137 (64.6)	< 0.001
Cough	437 (78)	270 (77.6)	167 (78.8)	0.74
Fever	436 (77.9)	278 (79.9)	158 (74.5)	0.14
Asthenia	362 (64.6)	216 (62.1)	146 (68.9)	0.10
Breathlessness	293 (52.3)	230 (66.1)	63 (29.7)	< 0.001
Headache	114 (20.4)	75 (21.6)	39 (18.4)	0.37
Joint pain	92 (16.4)	52 (14.9)	40 (18.9)	0.22
Myalgia	78 (13.9)	45 (12.9)	33 (15.6)	0.38
Throat pain	51 (9.1)	27 (7.8)	24 (11.3)	0.16
Diarrhea	49 (8.8)	34 (9.8)	15 (7.1)	0.27
Abdominal pain	42 (7.5)	22 (6.3)	20 (9.4)	0.18
Nausea / vomit	35 (6.3)	20 (5.7)	15 (7.1)	0.53
PharyngealExudate	30 (5.4)	14 (4)	16 (7.5)	0.07
Nasaldischarge	25 (4.5)	20 (5.7)	5 (2.4)	0.06
Mentalconfusion	20 (3.6)	20 (5.7)	0 (0)	< 0.001
Irritability	15 (2.7)	15 (4.3)	0 (0)	0.002
Conjuctival injection	10 (1.8)	6 (1.7)	4 (1.9)	0.89
Seizure	5 (0.9)	5 (1.4)	0 (0)	0.08
Coma	2 (0.4)	2 (0.6)	0 (0)	0.27

The number of probable admitted cases (88.2 %) was substantially more significant than PCR-confirmed cases (11.8 %), (p< 0.001). The

COVID-19 characteristic CT-scan image was encountered without significant difference, in ICU patients (83.6%), and those who were admitted in the other wards (95.8%). The number of confirmed cases was significantly higher in ICU (16.4%) than in the other wards (4.2%). The average duration of hospitalization in ICU was shorter (3.25 ± 3.66 days), with a 2 days median, than in the other wards (5.31 ± 4.56 days), with a 5 days median (p=0.03) (figure1). However, the median length of stay in the ICU for intubated patients was 1.5 days.

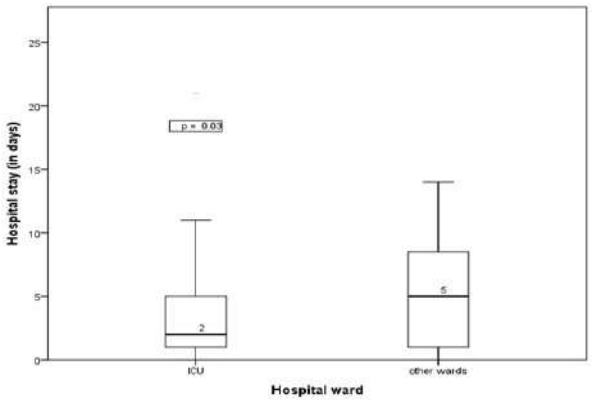

Figure 1. Stay duration distribution in probable and confirmed Covid-19 cases (560 cases) in hospitalization wards- UH Blida

The exposition to a confirmed COVID-19 case in the 14 days preceding the first symptoms was found in 29 cases, 5.2% of the whole cohort with no significant difference between ICU and the other COVID-19 wards (p =0.24). Relative to comorbidity, arterial hypertension was on the top with 33.9%, followed by diabetes (25.4%), cardiovascular diseases (12%), chronic pneumopathies (6.3%), and renal diseases (4.5%), without any significant difference between the three wards. ARDS was strongly related to age (54.1%, p= 0.01), but also to cough (80% p=0.02), fever (76.9%), hypertension (34%), diabetes (25.9%) and cardiovascular diseases (13.4%), however without any significant difference, with the exception of diabetes (p=0.03, table 3).

Table 3. Repartition of probable and confirmed Covid-19 cases in hospitalization wards based on Comorbidity UH Blida

Comorbidities	Total number of cases, n(%)	Hospitalisationward		p
		ICU, n(%)	Otherwards, n(%)	
Hypertension	190 (33.9)	120 (34.5)	70 (33)	0.72
Diabetes	142 (25.4)	99 (28.4)	43 (20.3)	0.03
Cardiovasculardiseases	67 (12)	41 (11.8)	26 (12.3)	0.86
Chronic pneumopathies	35 (6.3)	24 (6.9)	11 (5.2)	0.42
Renaldiseases	25 (4.5)	20 (5.7)	5 (2.4)	0.06
Cancer	6 (1.1)	5 (1.4)	1 (0.5)	0.28
Chronic neuromusculardiseases	3 (0.5)	3 (0.9)	0	0.18
Hepatopaties	0	0	0	*

Till the date of May 9, 2020, 262 deaths were registered, 46.8% of the whole cohort, representing a hospital mortality by COVID-19 of 4.3%. The ICU was involved in ¾ of deaths (70.4%) while the other two COVID-19 wards were involved in only 8.0 % of the total of COVID-19 deceased patients. The median time between symptoms appearance and admission at the hospital of all the cohort was 7 days (IIQ=4 – 9) and in deceased patient, the median time between the appearance of first symptoms and hospitalization was 9 days (IIQ 6- 14.5). The median age of deceased patients was 69 years (IIQ: 59 – 77), which was significantly older than that of the undeceased patients, 59 years of age (IIQ: 46 – 72) (figure 2).

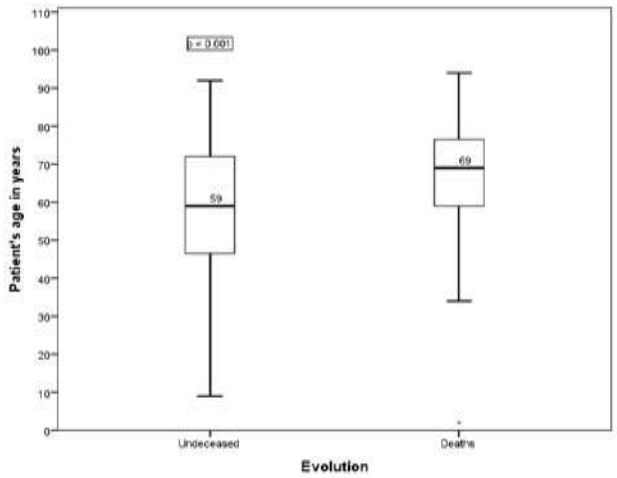

Figure 2. Age distribution of probable and confirmed COVID-19 cases (546*cases) based on evolution-UH Blida

Male gender was predominant in dead cases (71.8%; p<0.001). More than one in two, showed at least one comorbidity (58%). The most common associated diseases in dead cases was hypertension, diabetes, cardiovascular diseases, chronic pneumopathies, renal diseases and immunodeficiency, thyroid diseases respectively with 33.6%, 28.6%, 13%, 6.9%, 4.6%, 4.2%, and 1,9 % without any significant difference with non-deceased patients (34.2%, 22.5%, 11.1%, 6%, 4.4%, 3.4% and 5.7%), with the exception of thyroid disease, where the difference was significant (p=0.02).

Only few dead patients had history of cancer, smoking or overweight (1.5%, 0.4% and 1.1%). ARDS was far more frequent in deceased patients (n=235, 98.7%) versus undeceased patients (n=206; 69.1%): p<0.001 (table 4).

Table 4. Mortality evolution repartition of probable and confirmed Covid-19 cases based on comorbidity. UH Blida

Comorbidities	Total number of cases, n(%)	Hospitalisationward		p
		Deceased, n(%)	Undeceased, n(%)	
Hypertension	190 (33.9)	88 (33.6)	102 (34.2)	0.87
Diabete	142 (25.4)	75 (28.6)	67 (22.5)	0.10
Cardiovasculardiseases	67 (12)	34 (13)	33 (11.1)	0.49
Chronic pneumopathies	36 (6.4)	18 (6.9)	18 (6)	0.69
Renaldiseases	25 (4.5)	12 (4.6)	13 (4.4)	0.9
Cancer	6 (1.1)	4 (1.5)	2 (0.7)	0.33
Chronic neuromusculardiseases	3 (0.5)	3 (1.1)	0	0.06
Post partum< 6weeks	1 (0.2)	0	1 (0.3)	0.35
Hepatopathies	0	0	0	*
Immunodefisciency	21 (3.8)	11 (4.2)	10 (3.4)	0.60
Overweight	5 (0.9)	3 (1.1)	2 (0.7)	0.55
Thyroid diseases	22 (3.9)	5 (1.9)	17 (5.7)	0.02

In ICU, severe respiratory distress syndrome was the most common complication in deceased patients (n=223; 91%) versus undeceased patients (n=81; 78%): p=0.002. Among the 348 ICU-admitted patients, 125 were intubated (35.9%), among whom 123 deceased. This represented 98.4% of patients who had undergone invasive mechanical ventilation. In the two other COVID-19 wards, 6 patients have been intubated (2.8%), 2 of which had deceased (33.3%).

Discussion

Principal results

Our study described the main differences of clinical characteristics between COVID-19 patients admitted in ICU (recovered or deceased) and those with less serious condition, admitted in two other wards dedicated to COVID -19 management (recovered or deceased). In ICU, the age of the admitted patients was substantially higher than the other individuals of the cohort. Male gender was predominant, ARDS was more common, and neurological disorders were greatly more encountered in ICU-admitted patients than where those were hospitalized in the other Covid-19 wards. The average stay duration was shorter in ICU-admitted patients.

The same clinical signs were found in cases admitted in the three wards, with dominance of cough and dyspnea in ICU. Digestive signs were far less common. ARDS was strongly related to age and commonly encountered in patients with hypertension and diabetes. The majority of the cohort cases presented Covid-19 characteristic radiological images (CT-scan). The median age in deceased patients was higher than in recovered ones. Male gender was predominant in deceased patients who had, at least, one comorbidity and ARDS was far more common in dead cases than in recovered ones. The ICU fatality was very high, and almost all individuals having undergone invasive mechanical ventilation deceased. The knowledge of clinical characteristics during this period, particularly marked by a lack of RT-PCR kits in the province of Blida, as well as all over the country, represented a huge contribution to the practitioners in charge of Covid-19 management wards.

Explanation of the obtained results

The opening of an Intensive Care Unit in the Blida University Hospital, the sole in the province of Blida, was undoubtedly decisive in data collecting. In fact, it allowed gathering all the critical COVID-19 cases occurring in the province population that completed the mass of information obtained in the two other wards dedicated to the management of mild and severe COVID-19 cases. Not to mention, the efficient collaboration of the medical and paramedical personnel of the concerned wards, as well as, the teamwork of the medical crew of the department of Epidemiology (SEMEP) who permitted achieving this study.

Comparison with other studies

The clinical characteristics of COVID-19 vary hugely depending on the degree of disease seriousness, ranging from an asymptomatic illness (22-23) to a severe pneumopathy with high lethal risk. In accordance with the latest studies on the characteristics of COVID-19 patients requiring an ICU management(13,24), age above 65 years, male gender, comorbidities, notably cardiovascular diseases and hypertension would be considered as aggravating factors of COVID-19 infection. Female patients seem to be less sensitive to SARS-CoV-2 particularly and viral respiratory infection in general (SARS-Cov-1 and MERS-CoV) (25-27). This might be due to the protective role of chromosome X and sexual hormones, either through innate or adaptative immunity. Furthermore, over half the cases presented comorbidity, which would suggest the necessity of an early and special care of patients with risk factors. The median time between the appearance of symptoms and hospitalization was 7 days; this underlines the necessity to raise the population's awareness about the importance of early consultation and management, especially in persons with risk factors.

In line with the results of the latest studies on the characteristics of COVID-19 patients, the cardinal physical signs were: fever, cough, dyspnea and sputum (27-28), and there was no significant difference between ICU-patients and those admitted in the two other Covid-19 wards, except for dyspnea, breathlessness and neurological signs, which indicate a severe form of the illness, previously noticed during SARS-CoV-1 epidemic, where patients showed mental confusion, seizures and strokes (29-30).

The acute respiratory distress syndrome (ARDS), seemed to be strongly associated to the ICU fatality rate, but the frequency of ARDS observed, was far higher than reported in other studies (29). Besides, the median time of stay in ICU was 1.5 days, lower than reported in the other studies (31,32), with a fatality rate of (70.4%), far higher than observed in the recent reports ranging from:16% to 26%, 38% and 62% (13,31–33).

The number of patients who required invasive mechanical ventilation represented 35.9%, less than in the recent studies (71%) (Washington State, US) (32), 47% (Wuhan, China) (31), 42% (Wuhan, China) (8). This could be explained by the management of most of the cases requiring non-invasive mechanical ventilation in the other COVID-19 wards. The mortality was almost total in the intubated patients of our series,

higher than observed in other studies (81%) (8); this might be due to multiple reasons, the serious condition of our patients who were referred in extremis to ICU after a time delay, in the other hand, being a new department created hastily, around a qualified but heterogeneous team, not used to work together under the authority of a new chief, it got hardly overwhelmed by the flood of ARDS in the early weeks of epidemic, lacking in this critical context of efficient pre-existing processes and therapeutic protocols, ever-changing, capable of adaptation to the patients specifics (elderly and/or with co morbidity).

Strengths and weaknesses of the study

The serious shortage of RT-PCR collecting kits, in our country during the sanitary crisis of COVID-19, has made paramount the knowledge of the clinical and radiological of COVID-19 patients, to facilitate their diagnosis and anticipate their management. In this regard, our study was valuable by providing early descriptions of the clinical characteristics observed in moderate and severe patients admitted in the only ICU dedicated to COVID-19, in the whole province of Blida, epicenter of the epidemic in Algeria. The active collection of data by the physicians of the Department of Epidemiology by extracting directly the information at source has kept away the specter of failure of the procedure. Nevertheless, our study has a few limits. Firstly, for most cases of the cohort, the diagnosis was based on radiology (CT-scan), and not on RT-PCR; secondly, the follow-up was short compared to the evolution of the disease, and the becoming of the patients who remain in hospital is unknown. Therefore, the stay and mortality rates might evolve. The third point is that there is certainly some loss of data, considering the fact that information was mainly collected from the medical files and an exhaustive interrogatory was hardly possible given the critical condition of patients at admission with impaired consciousness, which lead automatically to a loss of valuable information about medical history, co morbidity and subjective clinical signs. Thereby, a deeper study seems indicated for a better comprehension of risks factors, and the improvement of the medical management of patients.

Conclusion

Patients at risk of being hospitalized in ICU are elderly people, male subjects with co morbidities of a high risk of mortality in ICU, which focuses on the need to limit the exposure of this vulnerable population, their early management and vigilant surveillance during their hospitalization. The clinical data of the ICU patients of the Blida University Hospital contribute objectively to appreciate the degree of seriousness of the COVID-19 disease and the better management of each case.

Declaration of interest

None

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Authors' contribution

Abderrezak Bouamra: wrote the study protocol, design and organisation of work to obtain data, control of data collection and data entry, analysis and interpretation of results and writing the final report. Rabah Bouhamed: drafted the protocol and wrote the final report as well as the revision. Amina Elkeboub: participated in the collection, monitoring, data entry and analysis. Souad Dahenane: participated in the collection, monitoring, data entry and analysis of data. Yasmine Saada Haroun: participated in the revision of the successive versions. Abdeljellil Bezzaoucha: participated in the revision of the successive versions. All authors approved the final and revised version.

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