Research Article

Epidemiological and Clinical Features of 156 Cases of COVID-19: A Prospective Study in Algerian Population

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ABSTRACT

Background: COVID-19 is an emerging disease caused by SARS-CoV-2. It has caused millions of infected cases and thousands of deaths since January 2020. In Algeria, the situation seems less alarming with 58,272 confirmed cases and 1,973 deaths as of November 1, 2020.

Aim of Study: To describe the clinical, biological and radiological profiles of our patients with COVID-19 during the first two months of the epidemic.

Methods: Our study is prospective over two months (April 12-June 10, 2020) including 156 patients based on clinical, radiological and/or immunological criteria.

Results: The study involved 77 men and 79 women with COVID-19 having a mean age of 48.97 ± 14.350 years. Common symptoms included asthenia (54.5%), anorexia (26.9%), fever (19.9%) and dry cough (52.6%). Biological inflammatory syndrome occurred in 32% of patients and Lymphopenia in 46%. Chest computed tomographic scans showed minimal to moderate lesions in 85.9% of cases. 56% of patients present at least one comorbidity: diabetes (25.6%), arterial hypertension (23.7%), obesity (21%), asthma (3.1%) and cancer (1.9%). The rapid serology test was positive in only 29% of 76 patients tested while Rt-PCR was positive in 35 of 55 patients tested. Length of hospital stay was 10 days for a half of patients while the rest received outpatient care. All patients were treated with hydroxychloroquine, azithromycin and preventive heparin and were followed closely until the end of treatment. The use of another antibiotic or corticosteroid was rare (3.8% and 1.3% respectively). Only one death was recorded and no transfer to an intensive care unit.

Conclusion: Our study showed that the situation was not very worrying in our population during the first two months of the epidemic. A very close surveillance of new infected cases and the analysis of their clinical profile during the following months are the subject of work in progress.

Introduction

In December 2019, the first cases of unexplained pneumonia were reported in Wuhan, China, caused by a novel coronavirus [1, 2]. This virus was temporarily named Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2). The disease caused by this virus, later named COVID-19 by the World Health Organization (WHO), quickly spread in China and around the world causing on November 1, 2020 more than one million deaths and 46 million infected cases [3, 4]. The spread of this disease affected Algeria in February 2020, causing, eight months later, more than 58,000 confirmed cases and 1,900 deaths [5]. Little is known about the data on the clinical profile of Algerian patients.

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The objective of the present study was to describe the clinical, biological and radiological profiles of our patients with COVID-19 during the first two months of the epidemic.

Method

I Study Design and Participants

We carried out a descriptive and prospective study at the El Biar Hospital of Algiers University. From April 11 to June 10 2020, we enrolled 156 patients. Only adults with a diagnosis of COVID-19 confirmed by serology test (IgM, IgG) and/or by RT-PCR (Reverse transcription polymerase chain reaction) and/or radiological signs on chest CT compatible with the disease were included in the study. We did not take care of children and pregnant women.

II Clinical Data

Demographic information, medical history, exposure history, comorbidities (diabetes, hypertension, obesity, respiratory diseases and cancer) and symptoms (asthenia, dyspnea, cough, chest pains, digestive disorders, etc.) were collected by a pre-established questionnaire. The body mass index (BMI) was measured using the formula BMI = weight (kg)/height^2 (cm) and the results were interpreted according to the IDF definition: A BMI of 20-24.9 kg/m^2 was considered normal, a BMI of 25-29.9 kg/m^2 as overweight and a BMI $\geq$ 30 kg/m^2 as obese [6]. Blood pressure figures were classified according to ESC 2018 [7]. Temperature, respiratory rate, heart rate and oxygen saturation were also measured. An electrocardiogram (ECG) was performed in all patients on inclusion and then every two days until the end of treatment with hydroxychloroquine to detect any prolonged QT interval [8].

III Laboratory Testing

Medical laboratory finding results, including blood cell counts (white blood cell, lymphocyte and Platelet count), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), liver test (Alanine Aminotransferase [ALAT] and Aspartate aminotransferase [ASAT]), creatinine, natremia and kalemia were collected for each patient. COVID-19 IgG/IgM Rapid Test was used for the qualitative detection of IgG and IgM antibodies to COVID-19 in whole blood, serum or plasma as an aid in the diagnosis of primary and secondary infections while nasopharyngeal samples made the molecular diagnosis by highlighting the genomic material of SARS-CoV-2 by real-time RT-PCR at Pasteur Institute of Algiers [9].

IV Computed Tomography (CT) Data

The Chest CT identified images compatible with COVID-19 pneumonia: peripheral multifocal frosted glass opacities, parenchymal condensation or mosaic appearance [10]. Based on the extent of lung lesions, radiological damage was classified into minimal (<10%), mild (10-25%), moderate (25-50%) and severe (50-70%).

V Support Protocol

All patients were treated with the combination of hydroxychloroquine (600mg/day), azithromycin (500mg on first day then 250mg/day until the fifth day) and a preventive dose of heparin (Enoxaparin) according to the national protocol for the fight against COVID-19 [11]. A cephalosporin (Cefotaxime) was prescribed for any bacterial infection and corticosteroid therapy (80mg/day of methylprednisolone) of short duration if respiratory complications. A biological monitoring workup and an ECG (calculation of the QT interval) were performed on the third, seventh and tenth days of treatment.

VI Statistical Analysis

Categorical variables were described as frequency rates and percentages and continuous variables were described using mean, median, and interquartile range. Proportions for categorical variables were compared using the χ^2 test. The tests with *P* value of <0.05 were considered statistically significant. All statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) version 21.0 software.

Results

I Demographics and Clinical Characteristics

The 156 participants included in the analyse were distributed in 77 (49.35%) men and 79 (50.64%) women. The mean age was 48.97±14.350 years (W: 48.89±14.336 years, M: 48.97±14.358 years, p=0.94) ranging from 19 to 87 years old; 66% of patients were between 30 and 59 years old (Table 1). Nearly half (51.3%) of patients were admitted to isolation wards, and 48.7% received outpatient care. Length of care was 10 days for all patients.

Table 1: Distribution of patients by sex and age groups.

Age (Years)	Women		Men		Total	
	Number	%	Number	%	Number	%
< 20	1	1,3	2	2,6	3	1,9
20-29	6	7,6	4	5,2	10	6,4
30-39	13	16,5	15	19,5	28	17,9
40-49	25	31,6	23	29,9	48	30,8
50-59	16	20,3	11	14,28	27	17,3
60-69	13	16,4	15	19,5	28	17,9
≥70	5	6,3	7	9,0	12	7,7
Total	79	100,0	77	100,0	156	100,0

The most common symptoms at onset of illness were asthenia (85 [54.5%]), dry cough (82 [52.5%]), headache (57 [36.5%]), myalgia (44 [28.2%]), and fever (31 [19.8%]). Anosmia and ageusia were noted in 27.5% and 30.1% of cases respectively. Less common symptoms were abdominal pain (13.5%), diarrhea (15.4%), nausea (13.5%), and vomiting (5.1%). All clinical data are shown in (Table 2). Hypertension (23,7%), diabetes (25,6%), obesity (21%) and malignancy (1.9%) were the most common coexisting conditions (Table 3). We noted contact with an infected person in 39.74% of cases while preventive measures were not respected in 69.23% of cases.

Table 2: Prevalence of clinical symptoms.

Symptoms	Number	%
asthénia	85	54,5
cough	82	52,5
headache	57	36,5
ageusia	47	30,1
myalgia	44	28,2
anosmia	43	27,5
anorexia	42	26,9
throat irritation	38	24,4
fever	31	19,8
diarrhea	24	15,4
chest pain	21	13,5
nausea	21	13,5
abdominal pain	13	8,3
dyspnea	12	7,7
vomiting	08	5,1
dysphagia	03	1,9
Patients Profile		
Weight (Kg)	79,47±16	
BMI (Kg/m2)	27,84±4.27	
SBP (mmHg)	117,88±15.191	
DBP (mmHg)	75,62±10.25	
HR (b/mn)	85±12,064	
RR (c/mn)	22,35±7,49	
SpO2 (%)	96,29±8,866	

BMI: Body Mass Index; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; HR: Heart Rate; RR: Respiration Rates.

Table 3: Prevalence of co-morbidities in order of frequency.

	Number	%
diabetes	40	25,6
Hypertension	37	23,7
asthma	5	3,2
cancer	3	1,9
Cardiac arrythmia	2	1,3
Ischaemic heart disease	1	0,6

II Laboratory and Radiological Findings

The blood cell count showed leukopenia (10.9%), lymphopenia (46.15%) and thrombocytopenia (10.9%). Other laboratory findings included higher concentration of CRP (67%), hypokalaemia (22.4%) and hepatic cytolysis (18.6%) while increased concentration of D-dimer (7%) and LDH (7%) was relatively less common in all patients (Table 4).

The CT scan was performed in 148 patients, it was normal in 10 patients, showed signs of minimal to moderate COVID pneumonia in 134 patients and severe in 4 patients (Table 5).

Table 4: Summary of the values of biological abnormalities.

Parameters	Mean values
Haemoglobin (g/dl)	12,84±1,485
Leukocytes (10^3/mm^3)	6174,92±2384,65
lymphocytes (10^3/mm^3)	1227,3±663,655
platelets (10^3/mm^3)	235186,29±85272,318
Natremia (mmol/l)	137,9±12,657
kalemie (mmol/l)	3,79±0,589
ESR (mm) (1ere h)	45,83±29,480
CRP (mg/l)	19,29±24,515
LDH (u/l)	325,88±166,485
D-dimers	0,416±0,449
ASAT (u/l)	27,23±17,723
ALAT (u/)	24,23±26,434
Patients Profile	
Leukopenia (N %)	17 (10,9)
Lymphopenia (N %)	72 (46,1)
Thrombocytopenia (N %)	17 (10,9)
Hypokalemia (N %)	35 (22,4)
Elevated ESR (N %)	50 (32)
CRP increased (N %)	105 (67)
Hepatic cytolysis (N %)	29 (18,6)

ESR: Erythrocyte Sedimentation Rate; CRP: C-Reactive Protein; LDH: lactate dehydrogenase; AST: Aspartate transaminase; ALT: Alanine transaminase.

Table 5: Radiological abnormalities on chest CT.

Extent of lesions	Number	%
<10%	70	44,9
10-25%	44	28,2
25-50%	20	12,8
50-70%	04	2,6
normal CT	10	6,4
No CT	08	5,1
Total	156	100

On the baseline ECG, the QT interval averaged $398,03 \pm 23,635$ms; it was high (> 450ms) in two patients justifying the absence of prescription of hydroxychloroquine. No prolong QT interval was observed with the combination of hydroxychloroquine and azithromycin on the third ($400,94 \pm 23,416$ms) and seventh days ($403,86 \pm 21,690$ms) of treatment.

Two patients showed severe symptoms and required oxygen, corticosteroids (80mg of methylprednisolone) and anticoagulation (Enoxaparin in double injection). Cefotaxime (4g/d) was prescribed in four additional patients due to a bacterial infection. We noted a favourable outcome in all of the patients, only one death was noted, it was a diabetic patient with hypertension and coronary heart disease, who presented a respiratory distress on the seventh day of treatment.

Discussion

Covid19 is a complex pathology which first goes through a short viral entry and then an inflammatory response characterized by a decrease in viremia, a cytokine storm and tissue damage. The clinical spectrum will be complicated by thromboembolic events and bacterial infection [12, 13]. It can vary widely, ranging from asymptomatic infection to respiratory distress [14-16]. Fever, cough, asthenia, myalgia, dyspnea, headache, odynophagia and gastrointestinal signs appear as the main clinical symptoms of the infection, but the semiology can be different from one population to another [17, 18]. Our study described patients infected during the first two months of the epidemic in El Biar hospital in Algiers; their symptoms were dominated by asthenia, cough and otolaryngeal involvement; digestive signs were infrequent and dyspnea was rare.

The mean age of our patients was younger than that reported by Tunisian authors [19]. Only 43% of them were over 50 years old against 75% in Tunisia and 75% in China [19, 20]. The male-female ratio tends to be approximately 1:1. This is lower than that observed in several publications which showed a male predominance, probably related to a higher prevalence of cardiovascular risk factors in men [18, 21-23]. In fact, cardio-metabolic comorbidities, such as hypertension, diabetes and cardiovascular disease affected nearly half of the patients in different published series and some authors even reported that mortality was high among these patients [14, 24, 25]. In our study, this prevalence was around 56%, it was not associated with a high mortality rate. In addition, the frequency of cancerous pathologies noted in our patients (1.9%) was higher than those reported in Chinese studies (0.5% and 0.9%, but did not lead to any death [21, 22].

The most frequent biological abnormality in studies seems to be lymphopenia, it affected nearly half of our patients, as for inflammatory syndrome noted in more than a third of our patients [15, 26, 27]. Hepatic cytolysis was observed in half of the patients in these same studies, it concerned only 18% of our patients. The positive diagnosis of COVID infection in the present study was made mainly by chest CT (95% of cases). The extension of the lesions made it possible to classify the majority of patients in the category of minimal to moderate forms (86%), which joins the figure found by our colleagues at the Rouïba hospital in the east of Algiers (88%) [28, 29]. The literature shows that the performance of CT is highly variable, its sensitivity approach 90% and its specificity is less than 50% [30-32]. However, a normal CT does not exclude a COVID-19 infection, especially in the first days of illness, which was the case in 6% of our patients [33]. Although Rt-PCR is considered to be the essential element in the diagnosis of COVID-19, it has only been performed in 55 patients due to its unavailability during the first months of the epidemic [34, 35]. It was positive in 63.6% of cases.

The outcome was favourable in 99.4% of patients (one death), we noted a good tolerance of the combination hydroxychloroquine + azithromycin. This efficacy and safety of this treatment has been reported in several publications and thus, the treatment was recommended by several organizations [19, 29, 36-38]. However, some studies dispute these advantages and suggest that these treatments have been associated with increased mortality, probably due to the cardiac toxicity of each molecule, potentiated by their combination [39, 40]. In our report, clinical and electrical monitoring of patients treated with the combination hydroxychloroquine + azithromycin (ECG every two days until the end of treatment) demonstrated the safety of these drugs.

Our study has several limitations. First, chest CT has been used to diagnose COVID-19 in the majority of cases, instead of Rt-PCR (the start of the epidemic in Algeria, an emergency situation, a technical platform not yet ready). Second, our study was observational, of short period (two months) and included only mild clinical forms in the majority of cases; it is therefore difficult to compare our data with those from Chinese and European studies. The finding of a favourable outcome in all of our patients should be interpreted with caution. Finally, a very close surveillance of new infected cases and the analysis of their clinical profile during the following months are the subject of work in progress.

Conclusion

In this single-center series of 156 patients treated during the first two months of the COVID epidemic, the clinical forms were mostly benign and the mortality was exceptional despite the frequency of cardio-metabolic comorbidities. This situation does not seem worrying, compared to that of other countries, it is probably explained by the early drastic measures introduced by the Algerian authorities, such as social distancing imposed by the closure of the country's borders, the closure of schools and the ban on all social, cultural and sporting meetings.

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