Case series

Clinical, Biochemical, and Radiological Characteristics of the First Cluster of Covid-19 Cases in Benghazi, Libya: Case Series

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Abstract

The 1st confirmed Covid-19 case in Libya was reported from Tripoli on March 25, 2020. However, as of May 21, 2020, Libya has 69 confirmed cases, which is a very small number of cases in comparison to the rest of the world. This report describes the 1st cluster of confirmed Covid-19 cases in Benghazi, Libya, which was discovered during the 7th and 8th of April 2020. The clinical, biological, and radiological characterestics of a cluster of four cases (primary case and three secondary cases) were described in this report. Among the four confirmed cases, two were asymptomatic, one symptomatic and one presymptomatic. The transmission rate in this cluster was three, and the secondary attack rate among the household contacts was 37.5%. None of the four cases was severe and all of them recovered without complications. this preliminary experience is in concordance with the reports from the other parts of the world.

Keywords: Corona, COVID-19, libya, lymphopenia, severe acute respiratory syndrome coronavirus 2

INTRODUCTION

On December 31, 2019, the World Health Organization (WHO) China Country Office was informed about an outbreak of cases of pneumonia of unknown etiology discovered in Wuhan City, Hubei Province of China. A week later, the Chinese authorities identified a new type of coronavirus belonging to the beta coronavirus 2B lineage as the cause of the outbreak.[1] Later on, the novel coronavirus was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On March 12, 2020, the WHO characterized the outbreak as a pandemic.[2]

As of May 21, 2020, the total number of confirmed Covid-19 cases in Libya was only 69 cases in a country with a population of about 6 million.[3] On March 25, 2020, the 1st confirmed Covid-19 case in Libya was reported from Tripoli.[4]

Hereby, we are describing the clinical, biological, and radiological characteristics of the 1st cluster of confirmed Covid-19 cases in Benghazi, Libya, which was discovered during the 7th and 8th of April 2020.

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CASE REPORTS

This was a descriptive report of four consecutive cases of Covid-19 disease that has been diagnosed in Benghazi city during the period between the 7th and 8th of April 2020. The study follows the principles of the declaration of Helsinki. Cases of Covid-19 were diagnosed by collecting nasopharyngeal samples which were transported to the laboratory through a virus transport medium according to the Centers for the Disease Control and Prevention guidelines.[5] RNA was extracted using "EZ1 Advanced XL" extraction machine manufactured by QIAGEN, and SARS-CoV-2 infection was confirmed by the real-time reverse transcription-polymerase chain

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reaction (RT-PCR) detection of both betacoronavirus E gene and the specific RdRp genes according to Charité, Berlin protocol[6] recommended by the WHO.[7] A rapid serological test using the lateral flow immunoassay technique (RightSign kits manufactured by Biotest company Lot No. COV20030003) was performed to assess the presence of the specific SARS CoV-2 immunoglobulin M and immunoglobulin G antibodies. The severe disease was defined as (dyspnea, respiratory frequency ≥30/min, blood oxygen saturation ≤93%, PaO_2/FiO_2 ratio <300, and/or lung infiltrates >50% of the lung field within 24–48 h).[8]

Patient-1 (index case)

This was a known case of 53-year-old male Libyan patient. He had several comorbidities: chronic obstructive pulmonary disease (COPD) with predominant emphysema, a history of insertion of intrabronchial one-way valves 3 years ago, hypertension, coronary artery, and celiac diseases. He was in travel to Turkey and he returned to Benghazi-Libya through Tunisia. Ten days after his return from Tunisia, he developed hemoptysis and he felt that his cough and dyspnea became slightly worse. About 1 week later, he consulted a respiratory physician and he was admitted to the hospital, and a work-up was initiated. His diagnosis was confirmed with a positive result of RT-PCR testing of a nasopharyngeal swab specimen.

His investigations at admission are shown in Table 1, the lymphocyte count was low 796/ul (18%) and further deteriorate over the next week into 455/ul (7%). His D-dimer was remarkably raised to above 5000 ng/ml, also his erythrocyte sedementation rate, C-reactive protein, and lactate dehydrogenase all were raised, 64 mm/1st h, 39 mg/dl and 553U/L, respectively.

His chest X-ray (CXR) showed mild bilateral pleural effusion [Figure 1] and his chest computed tomography (CT)-scan [Figure 2] showed bilateral emphysematous bullae and minimal bilateral pleural effusion with no lung infiltrates. He was treated with a combination of hydroxychloroquine 200 mg twice daily for 7 days plus azithromycin 500 mg once daily for 6 days in addition to a prophylactic subcutaneous tinzaparin 7000 IU and oxygen supplementation (6–10 L/min.) through a nasal cannula. He ran an uneventful course, and he was cured after 15 days of the diagnosis. However, the lymphopenia and the raised D-dimer persisted until discharge.

Contact tracing identified 29 contacts, eight of them were household contacts. All the 29 contacts were quarantined and screened for SARS-CoV-2 by the RT-PCR testing of nasopharyngeal swab samples. Three of the household contacts were tested positive for SARS-CoV-2.

Patient-2

This was a known case of 45-year-old Libyan female. This nonsmoker' household contact of patient-1 was previously healthy and was diagnosed by RT-PCR test of a nasopharyngeal swab obtained during the screening of the contacts of the index case. Her investigations showed a lymphocyte count of 1488/ul (15.5%) and raised D-dimer: 2701 ng/ml. Four days later, her lymphocyte count dropped to 700/ul (8.3%), but she did not develop any symptoms. She ran an asymptomatic course, and she was declared cured after 15 days of the initial diagnosis. Her recovery was marked with a noticeable drop in her D-dimer level to <250 ng/ml.

Patient-3

This was a known case of 20-year-old Libyan male. This currently smoker' household contact of patient-1 was previously healthy and was diagnosed by RT-PCR test of a nasopharyngeal swab obtained during the screening of the contacts of the index case. His investigations showed a normal lymphocyte count of about 1575/ul (22.5%) and a normal D-dimer level of about 297 ng/ml. He ran an asymptomatic course, and he was declared cured after 15 days of the diagnosis.

Patient-4

An 18-year-old Libyan female. This nonsmoker' household contact of patient-1 was previously healthy and was diagnosed

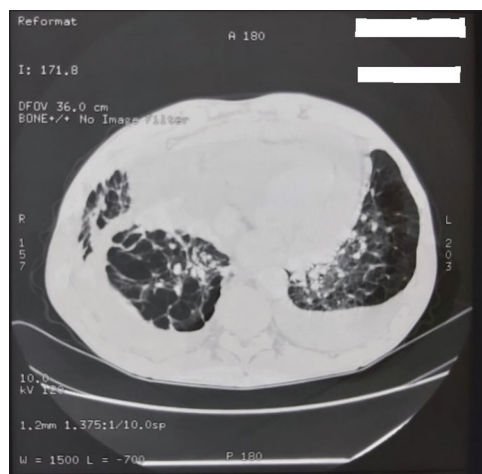
Figure 1: Chest radiogram of the index case

Figure 2: Chest computed tomography scan of the index case showing bilateral emphysematous bullae and minimal bilateral pleural effusion with no lung infiltrates

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Table 1: General characteristics of the four cases

	Patient-1 (index case)	Patient-2	Patient-3	Patient-4
Age (years)	53	45	20	18
Sex	Male	Female	Male	Female
Comorbidities	COPD, coeliac, HTN, CAD	No	No	No
Smoking status	Ex-smoker	Nonsmoker	Smoker	Nonsmoker
Drug history	Candesartan 4 mg, seretide disks	No	No	No
Travel history in the last 2 weeks	Turkey and Tunisia	No	No	No
Clinical stage at diagnosis	Symptomatic	Asymptomatic	Asymptomatic	Presymptomatic
Symptoms	Productive cough, hemoptysis, dyspnoea	No symptoms	No symptoms	Dry cough, fever, fatigue
Temperatures (°C)	37	37	36.5	39
BP (mm Hg)	130/80	115/78	125/60	100/58
RR (breaths/min)	24	14	12	15
PR (pulse/min)	94	73	83	96
Diagnosis	LRTI	Asymptomatic	Asymptomatic	URTI
CXR findings	Bilateral pleural effusion	ND	ND	Normal
CT scan	Bilateral emphysematous bullae, bilateral pleural effusion	ND	ND	ND
Oxygen saturation in ambient air (%)	85	99	99	99
WBC count (4000-11,000/ul)	4400	9600	7000	4100
Lymphocyte count (1000-4800/ul)	796 (18.1%)	1488 (15.5%)	1575 (22.5%)	779 (19%)
Platelet count (150,000-400,000/ul)	471,000	253,000	205,000	174,000
D-dimer (<400 ng/ml)	>5000	2701	296.7	486.6
Ferritin (15-300 ng/ml)	41	37	84	45
Serum IgM at time of diagnosis	Positive	Negative	Negative	Positive
Serum IgG at time of diagnosis	Positive	Negative	Negative	Negative
The severity of the infection	Mild	Asymptomatic	Asymptomatic	Mild
Treatment	Oxygen Hydroxychloroquine Azithromycin Tinzaparin	No treatment	No treatment	Hydroxychloroquine
Length of hospital stay until recovery (days)	15	15	15	15
Outcome	Recovered	Recovered	Recovered	Recovered

COPD: Chronic obstructive pulmonary disease, HTN: Hypertension, CAD: Coronary artery disease, BP: Blood pressure, PR: Pulse rate, RR: Respiratory rate, LRTI: Lower respiratory tract infection, URTI: Upper respiratory tract infection, CXR: Chest X-ray, ND: Not done, Ig: Immunoglobulin

by RT-PCR test of a nasopharyngeal swab obtained during the screening of the contacts of the index case. Her initial investigations showed lymphopenia (lymphocyte count at 797/ul [19%]) and raised D-dimer of about 487 ng/ml. Four days after her initial positive PCR result, she developed a dry cough, fever, and fatigue. Her CXR was normal. She was started on hydroxychloroquine 200 mg twice daily for 7 days. She ran an uneventful course and became asymptomatic after 2 days, and she was declared cured after 15 days of the diagnosis. Her recovery was marked by an increase in her lymphocytic count to 28.8% (1037/ul) and a drop of her D-dimer level to <250 ng/ml.

DISCUSSION

The transmission rate (R0)

The number of newly infected people from a single case of SARS-CoV-2 is estimated to be 2.5.[8] In this cluster, the index case infected three other people which is consistent with the reported transmission rate from China; moreover,

similar to the joint WHO-China report,[8] all the secondary infections in this cluster were household contacts, with a secondary attack rate of 37.5% (3 out of the 8 household contacts) and this is similar to what was reported from New York State (38%),[9] but much higher than the 3%–10% reported from China.[8]

Clinical features

The index case symptoms started about 10 days after his return from Tunisia, which is consistent with the reported incubation period for Covid-19 of 1–14 days following exposure.[8] Two out of the four patients in this cluster had mild disease, and the other two (50%) were asymptomatic. Although asymptomatic cases have been well documented worldwide, their precise frequency is still unknown.[8] Both symptomatic patients in this cluster had a mild disease, which is consistent with other reports that show that most of the infections are mild (no or mild pneumonia).[8] Although the index case was dyspneic at presentation with oxygen saturation in ambient air of 85%, this is most likely attributable to his COPD

exacerbation rather than to Covid-19 pneumonia, particularly that his chest CT scan findings did not show any evidence of pneumonia.

Laboratory findings

Lymphopenia (a lymphocyte count <1000/ul) is specifically common and can be seen in up to 90% of hospitalized adults with Covid-19;[10] a more severe lymphopenia and high D-dimer levels have been associated with a critical illness and mortality.[11] A progressive decline in the lymphocyte count and rise in the D-dimer over time was observed more commonly in nonsurvivors compared with survivors of Covid-19 disease.[12] Two out of the four patients in this report demonstrated lymphopenia at the time of diagnosis and both of them were symptomatic, while the asymptomatic individuals showed a normal lymphocytic count at the presentation. Although the reports from Wuhan show that most Covid-19 patients had a serum ferritin level above the normal range,[11] none of the four patients had a raised serum ferritin level.

Lung imaging

A common CXR findings in patients with Covid-19 are consolidation and ground-glass opacities, with bilateral, peripheral, and lower lung zone distributions. However, chest radiographs may be normal in early or mild disease and about 30% of the patients might not have any CXR abnormalities at any point during their illness.[13]

Although some chest CT findings may be characteristic of Covid-19, no finding can completely prove or exclude the possibility of Covid-19. Using the PCR tests as a reference, the chest CT-scan had a sensitivity of 97%, but its specificity was only 25%.[14] The American College of Radiology recommends against using chest CT for the screening or diagnosis of Covid-19.[15] The most common chest CT findings in patients with Covid-19 are ground-glass opacification with or without consolidative abnormalities.[16] None of the characteristic radiographic findings of Covid-19 could be demonstrated in CXR and the chest CT scan of the index patient; furthermore, the pleural effusion which was reported in his case was reported in 1% of the cases of Covid-19.[17]

Outcome

According to the joint WHO-China report, most people with laboratory confirmed Covid-19 disease recover, with a crude fatality rate of 3.8%, and with no deaths among noncritical cases. The recovery time is about 2 weeks for mild cases and 3–6 weeks for the severe disease.[8] These findings are consistent with the outcome of the patients in this report, as all of them were noncritical and recovered at about 2 weeks with no mortality. Although the index case had a set of nasty comorbidities (hypertension, cardiovascular disease, and chronic lung disease), he led a very stable course until the recovery.

Conclusion

This preliminary experience is in concordance with the reports from the other parts of the world regarding the transmission rate and secondary attack rate among the household contacts. However, the small number of the reported cluster makes it difficult to make a valid comparison regarding the clinical and laboratory features. Nevertheless, this report remains an important source of information from this part of the world with a low rate of Covid-19 cases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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