COVID-19 PANDEMIC

STRATEGIES OF A PRIVATE UNIVERSITY HOSPITAL FACING COVID-19 IN LEBANON
Hôtel-Dieu de France Readiness: How Did We Do It?

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INTRODUCTION

Since the initial report of the SARS-CoV-2 virus outbreak in the Hubei province of China in late December 2019, the virus has spread across the world leading to over 1 765 000 cases of COVID-19 reported worldwide complicated by 108 000 deaths up to April 11, 2020 [1].

Lebanon has declared its first COVID-19 case on February 21, 2020, and since then the total number of positive cases has risen to reach 619 cases and 20 deaths (as of April 11, 2020) [2].

The speed of spread of the virus in 210 countries with no pre-existing scientific data coupled with media coverage [3] drove Hôtel-Dieu de France Medical Center (HDFMC) of the Saint-Joseph University (USJ) to hasten its organizational procedures and move to the frontlines to face the COVID-19.

HDF, is one of the leader university hospitals of Lebanon, with 430-bed tertiary care and 1600 working personnel. It was the first private hospital to manage COVID-19 patients in Lebanon, the first one being diagnosed on March 8, 2020. The hospital has taken on 78 cases since.

During the course of the COVID-19 pandemic, the key point in the HDF strategy has been to continuously try to anticipate the evolution of the pandemic and determine the optimal plan of action accordingly. The policies of the hospital being:

a. Provide prompt and timely medical management for the infected patients and fatalities reduction.
b. Prevent disease dissemination to hospital employees, patients and the general community.
c. Secure a healthcare pathway for the non-infected patients requiring the services of a general hospital.

Lebanon healthcare system depends on the private system in 80% of the hospitalized cases. Hereafter we describe the response to the COVID-19 challenge at our center. Hôtel-Dieu de France hospital is a private university hospital affiliated to Saint-Joseph University, its volunteer engagement in the war against SARS-CoV2 gives insights on the resilience of the Lebanese medical system against the pandemic.

ADMINISTRATIVE MANAGEMENT CLINICAL PATHWAYS IDENTIFICATIONS & ORGANIZATION

We determined four clinical pathways: emergency room, flu clinic, isolation and respiratory infection ward, and critical care.

Emergency departments

- Triage: Secured nurses with PPE (personnel protection equipment) triaged patients looking for upper respiratory infection (URI) symptoms and fever. A form was filled identifying symptoms and suspicious contacts. Patients fulfilling URI criteria were oriented to a separate zone in the emergency ward where diagnostic procedure were pursued.
- A negative pressure isolation room allowing nasopharyngeal sampling was organized.
- All walk-ins were oriented to the flu center during opening hours 8:00 am to 5:00 pm. Otherwise they were given an appointment for the next day.

Flu clinic

An outpatient area separated from the outpatient clinics was identified. Engineering work transformed this zone in a space under negative pressure. It was conceived as a one-stop shop for the patient including administrative and secretarial office, waiting and exam rooms. Samplings were done for all patients consulting for URI and fever. It was also used for patients follow-up and nasal sampling. All personnel were protected with adequate equipment as recommended by WHO and all patients

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wore masks. Flu clinic was attended only by pulmonary, infectious disease and internal medicine specialists. Medical residents were not allowed in.

A call center attended by volunteer students from Saint-Joseph University was put together. Its purpose was to triage patients, refer and schedule susceptible patients to the flu clinic and answer patient queries.

Pulmonary isolation unit (PIU)

Initially a 16-room unit with single beds was prepared and started admitting patients on March 10.

Nursing staff and aids worked together with one doctor of the following specialties: pulmonary, infectious disease, or internal medicine. This was a closed unit where visits were not allowed and one doctor attended all patients, avoiding back and forth movements in the unit and spare changing PPE. When the occupancy reached 70% another unit was adapted to reach a total of 32 isolation non-intensive care unit (ICU) beds.

A subunit of the PIU was identified as a quarantine unit for COVID-19 positive personnel unable to isolate themselves at home.

Medical intensive care unit (MICU)

Nine beds of the MICU were put on negative pressure in addition to 5 beds in the coronary care unit (CCU) and 8 beds in the surgical ICU; a total of 22 intensive care beds were ready to accommodate COVID-19 patients in case a surge was to happen.

Those units were separated by a lockup. A three-step plan of action was developed, thus (a) transforming the MICU to a COVID-19 ICU, (b) extending the COVID-19 ICU to the CCU and (c) admitting COVID-19 patients in the surgical ICU.

A secured elevator dedicated for COVID-19 patients was identified for patient transfer between the ER and the different inpatient wards.

Laboratories and radiology departments

Our hospital has a joint venture with Rodolphe Mérieux laboratory at the school of pharmacy where reverse transcriptase polymerase chain reaction (RT-PCR) laboratory screenings were done from the start of the Lebanese epidemic after accreditation by the Ministry of Health.

Later during the epidemic, ELISA quantitative serological tracing SARS-CoV-2 IgG and IgM antibodies were put in place at Hôtel-Dieu according to a specific medical protocol.

Imaging: a high-resolution CT scanner was reserved for suspected or confirmed COVID-19 patients with regular cleaning protocol enforced. Eventually a dedicated CT scan for the suspected patients with an isolated path was installed.

Pharmacy

The necessary drugs as per the Medical Task Force protocol (Addendum) were obtained by the pharmacy.

The hospital also developed a laboratory to manufacture hydro-alcoholic solutions which helped us to be autosufficient in this high demand time.

HUMAN RESOURCES MANAGEMENT

Different teams were put in place, including doctors from different specialties. They volunteered to address different issues besides their clinical duties. During a pandemic, a trans-professional cross-functional management is of paramount importance.

- *Epidemiological team*: infectious disease (ID) specialists joined the infection prevention and control (IPC) specialists with the pivotal role of tracking the origin of infection in every positive patient and healthcare worker. Their task was to recommend confinement and testing for whoever was suspected. They played a major role in keeping our staff safe and recommended time of confinement.
- *The Medical Task Force* was formed of physicians specialized in pulmonary and critical care (PCC), infectious disease (ID), internal medicine-clinical immunology (CI) and anesthesiologists (A) with an invited list of experts in the fields of pharmacy, anesthesia, hematology, cardiology and laboratory medicine. A weekly meeting reviewing scientific evidence, updates and medical needs led to recommendations embraced by the whole group. A medical treatment and testing protocol was put together and updated regularly according to the last evidence and the consensus of the board.
- The "crisis unit" was formed by the hospital administration and grouped all stakeholders: medical directors, Medical Task Force representatives, nursing directors, quality directors, human resources, pharmacy and laboratory directors. This unit steered all the administrative decisions mentioned under that section. Logistics, PPE, pharmacy and laboratory needs were all addressed. At some point meetings were held every other day.
- *Caring for the mental health of the medical professionals*: A specialized team headed by the Psychiatry department rounded on the different COVID-19 wards providing counseling and guidance for the healthcare workers on issues like coping with COVID-19 isolated patients in this stressful environment.

CLINICAL MANAGEMENT (Table I)

The Medical Task Force first met on multiple occasions to elaborate on March 11, 2020, the first version of the

TABLE I PATIENT STRATIFICATION AND MEDICAL OF COVID-19 PATIENTS PROTOCOL

Levels	Clinical presentation	Place	Treatment	Considerations
A	Asymptomatic	Home quarantine	Symptomatic	Close monitoring in case of deterioration
B	Mild cough w/o dyspnea No risk factors*	Home quarantine	Symptomatic	Close monitoring in case of deterioration
C	Mild cough w/o dyspnea/ No radiological infiltrates **with** risk factors	Home quarantine	1/ Hydroxycholoroquine 400 mg po q12 (D1) then 200 mg q8 for 7 days **+** 2/ Azithromycin 500 mg PO (D1) then 250 mg PO qd for 4 days **+** 3/ Pitavastatin (Livazo) 2 mg po qd (if patient not on statins) **+** 4/ Zinc (Amplified Zinc ou Immunofort) 2 tabs po qd for 7 days	1) Start treatment empirically before results 2) ECG. If prolonged QTc, no Azithromycin and monitor QTc q 72hrs 3) No steroids or NSAIDs 4) Inform of side effects 5) If on ACE inhibitors or ARB continue and consult cardiologist 6) Cs gynecologist if pregnant
D1	Moderate cough with dyspnea with radiological infiltrates of ground glasses (Rx or CT) **w/o** risk factors (*) : PSI < 71 CURB-65 < 2	Home quarantine (evaluated in 48 h)/ PIU (Pulmonary Isolation Unit)	**Same as C**	1 ➔ 6
D2	Moderate-cough with dyspnea with radiological infiltrates of ground glasses (Rx or CT) **w/o** risk factors (*) PSI > 71 CURB-65 > 2 NB : **SpO2 > 92% and RR < 24/minute**	PIU	**Same as C** **+** 5/Lopinavir 400 mg/ ritonavir 100 mg q12 for 10 days	1 ➔ 6 7/ Liver function tests q 72 hrs 8/ If diarrhea Racecadotril (Hidrasec) 1 tab q 8 hrs Alternative : Smectalia q 8 hrs
E	Moderate cough with dyspnea with radiological infiltrates **with** risk factors (*) PSI > 71 CURB-65 > 2 NB : **SpO2 > 92% and RR < 24/minute**	PIU	**Same as D**	**Same as D**
F	Severe: a. Respiratory: SpO2 < 92% and RR > 24/minutes on room air or O2 > 6l/min for SpO2 > 94% b. Organ failure	MICU	**Same as D** **+** Tocilizumab (Actemra) 8 mg/kg IV 1 dose (max 800 mg) If cytokine release syndrome upon H-score or IL6 > 30 pg/ml	**Same as D** 9/ Monitoring inflammation with ESR not CRP
G	**Same as F** **+** Intubation and mechanical ventilation	MICU	**Same as F** **+** Consider Remdesivir 200 mg D1 then 100 mg daily (compassionate use from Gilead) Or Convalescent plasma transfusion	**Same as F** 10/ Daily liver function tests

D: day NSAIDs: non-steroidal anti-inflammatory drugs ACE: angiotensin converting enzyme ARB: angiotensin II receptor blockers PSI: Pneumonia severity score RR: respiratory rate PIU: Pulmonary Isolation Unit MICU: Medical Intensive Care Unit

* Risk factors: Age > 70 years old Chronic kidney disease (Creatinine clearance < 30 ml/min) or dialysis Heart failure NYHA III or IV Advanced chronic respiratory failure (GOLD > B, GINA > 3, on oxygen, on non-invasive ventilation) Cirrhosis > stage B Diabetes mellitus type 1 Immunosuppression Cancer

medical protocol on the management of COVID-19 patients at Hôtel-Dieu de France. A weekly meeting was organized afterwards to adapt the appropriate management according to the scientific evidence, local possibilities, and board consensus. The meetings also aimed at homogenizing physicians practices, considering the different medical specialties involved and working together to fight the pandemic effects.

The clinical management protocol – at date of submission – addressed the following:

1. Admission criteria to the PIU based on the suspicion of a COVID-19 pneumonia and its severity (Pneumonia severity score > 71 or CURB-65 > 2).
2. Admission/transfer criteria to the ICU.
3. Stratification of the disease severity (from A to G). Treatment customization for each category and gradual increases according to severity went from a mere surveillance to multiple pharmacological treatments and reaching organ support (Cf. Table).
4. Prophylactic anticoagulation: COVID-19 patients have a marked inflammatory syndrome and hypercoagulability. The rate of thrombosis observed is very high. Prophylactic anticoagulation is recommended according to the level of risk:
   - Intermediate risk (BMI < 30): anticoagulation with usual prophylactic dose.
   - High risk (mechanical ventilation/high flow oxygen or BMI > 30): anticoagulation with reinforced prophylactic dose.
   - Very high risk (mechanical ventilation/high flow oxygen with BMI > 30; ECMO; marked inflammatory syndrome; hypercoagulability (fibrinogen > 8 g/L or D-Dimers > 3 μg/ml)): anticoagulation with therapeutic goal.
5. Nutrition: COVID-19 patients should be considered at risk of undernutrition beyond 2 to 3 days, particularly if they are ventilated, infected or have chronic illness. Oral/enteral nutrition should be preferred. It must be started as early as 24-36 hours after admission to PIU or 12 hours after intubation and mechanical ventilation in the MICU. The prone position does not contraindicate enteral nutrition.
   The energy target is 25-27 Kcal/kg/d and 30 Kcal/Kg/d in the malnourished. The carbohydrate-fat ratio should aim 50:50 ratio in ventilated patients with a protein intake of 1.3 g/kg/d.
6. Convalescent plasma: Plasma treatment is reserved for severe and early cases. It is prescribed to the patients with hyperacute (beginning) and biphasic (5-7 days) patterns. Donors must be confirmed diagnoses COVID-19, asymptomatic for at least 10 days, have a neutralizing antibodies titers > 40 with negative tests for: HIV, Hepatitis B and C, syphilis. The critical patient receives 2 consecutive transfusions of 200 mL of ABO compatible convalescent plasma (400 mL in total) on the same day as the donor sample.
7. Specific mechanical ventilation is applied to the acute respiratory failure of COVID-19 patients. Other supportive care including prone position, usage of Cytosob and ECMO (extracorporeal membrane oxygenation) are indicated upon specific protocols in MICU.

CONCLUSION

The support of the hospital management and its leadership, the participation of the different medical teams and nursing involvement are of upmost importance to succeed in our endeavor. Smooth and transparent communication with the different stakeholders helped us put together a fantastic team still working in synchrony after many weeks of epidemics.

Many health structures will be exposed to a rising number of patients with COVID-19 and will therefore have to anticipate and prepare.

Acknowledgement
This work would not have been possible without the unwavering support of our visionary and humanistic administration, namely the Society of Jesus, our president P. Salim Daccache S.J., our director Ms. Martine Orio and all the medical and nursing staffs.

This policy was at the service of humans and for humans in the image of our noblest principles.

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COVID-19 CORONAVIRUS

RAFIC HARIRI UNIVERSITY HOSPITAL PREPAREDNESS
Sharing Initial Experience on COVID-19

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Hassoun M, Abyad F, Feghali R, Olaywan L, Jaafouri H, Ghalayini W, Saliba M, Abi Hanna P. Rafic Hariri University Hospital preparedness: Sharing initial experience on COVID-19. J Med Liban 2020; 68 (1-2) : 47-51.

ABSTRACT • Background : The first cases of novel coronavirus (2019-ncov) infected patients occurred in Lebanon in February 2020 and March 2020. Rafic Hariri University Hospital was the first hospital in Lebanon that rapidly responded to this crisis through the effective use of scarce resources and the swift arrangement of departments as part of the contingency plan. It was able to mitigate the impact of the first COVID-19 wave in Lebanon through active management and proper preparedness. We analyzed data on the first 63 confirmed cases of COVID-19 to determine their epidemiological and clinical characteristics. **Methods :** We collected information on demographic characteristics, exposure history, the severity of clinical presentation and clinical outcomes of cases. **Results :** Among the first 63 patients with confirmed COVID-19, the median age was 37 years, where 55% were males. On average, the time to virologic cure was estimated at 17.5 days, while the length of stay was estimated at 16 days. The pattern showed a limited community transmission, with most cases either with a positive travel history to endemic areas or from close contact with index cases. Most of the cases were mild (65.1%), and few patients had comorbidities. Four patients presented with acute respiratory distress syndrome (ARDS), and two of them died. The fatality rate was 3.2%. **Conclusion :** This study describes the first cases of COVID-19 over one month after diagnosing the first case in Lebanon. Most of the cases were mild to moderate, but isolated in the hospital to limit community spread. This strategy has probably helped the country in containing the disease so far. Describing the clinical presentation over a more extended period might provide a better assessment of the clinical patterns. Meanwhile, the most effective measure is to prevent the spread of disease by a combination of proper infection prevention and control measures, early detection and isolation of cases, active contact tracing, and the quarantine of contacts.

Keywords : COVID-19; RHUH; Lebanon; épidémiologie

Hassoun M, Abyad F, Feghali R, Olaywan L, Jaafouri H, Ghalayini W, Saliba M, Abi Hanna P. Préparatifs à Rafik Hariri University Hospital: l'expérience initiale de COVID-19. J Med Liban 2020; 68 (1-2) : 47-51.

RÉSUMÉ • Contexte : Les premiers cas de nouveaux patients infectés par un coronavirus (2019-ncov) se sont produits au Liban en février et mars 2020. L'hôpital universitaire Rafic Hariri a été le premier hôpital au Liban à répondre rapidement à cette crise grâce à l'utilisation efficace de ressources limitées et l'organisation rapide de départements dans le cadre du plan d'urgence. Il a pu atténuer l'impact de la première vague COVID-19 au Liban grâce à une gestion efficace et une bonne préparation. Nous avons analysé les données des 63 premiers cas confirmés de COVID-19 pour déterminer leurs caractéristiques épidémiologiques et cliniques. **Méthodes :** Nous avons collecté des informations sur les caractéristiques démographiques, les antécédents d'exposition, la gravité de la présentation clinique et les résultats cliniques des cas. **Résultats :** Parmi les 63 premiers patients avec COVID-19 confirmé, l'âge médian était de 37 ans dont 55% d'hommes. En moyenne, le délai de guérison virologique était estimé à 17,5 jours, et la durée du séjour à 16 jours. La transmission communautaire s'est révélée limitée avec dans la plupart des cas soit des antécédents de voyages dans des zones endémiques, soit un contact étroit avec les cas index. La plupart des cas étaient bénins (65,1%) et peu de patients présentaient des comorbidités. Quatre patients ont présenté un syndrome de détresse respiratoire aiguë (SDRA) et deux sont décédés. Le taux de mortalité était de 3,2%. **Conclusion :** Cette étude décrit les premiers cas de COVID-19 sur une période d'environ un mois après le diagnostic du premier cas au Liban. La plupart des cas étaient légers à modérés, mais isolés à l'hôpital pour limiter la propagation dans la communauté. Cette stratégie a probablement aidé le pays à contenir la maladie jusqu'à présent. Décrire la présentation clinique sur une période plus longue pourrait fournir une meilleure évaluation des modèles cliniques. En attendant, la mesure la plus efficace consiste à prévenir la propagation de la maladie en combinant de bonnes mesures de prévention et de contrôle des infections, la détection précoce et l'isolement des cas, la recherche active des contacts et leur mise en quarantaine.

Mots-clés : COVID-19; RHUH; Liban; épidémiologie

INTRODUCTION

At the end of December 2019, and as a part of a surveillance system following the severe acute respiratory syndrome (SARS) outbreak in 2003, at the hospital of Hunan China, four cases which fulfilled the case definition of pneumonia of unknown etiology were detected [1].

The criteria included: fever, lung infiltrates on imaging studies, low or average white cell count or low lymphocyte count, and no improvement after three to five days of recommended intravenous antibiotic treatment. Polymerase chain reaction (PCR) for influenza and other respiratory pathogens was adverse.

All cases were linked to the Hunan seafood wholesale

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market, which is known for selling live and exotic animals.

On 31/12/2019, the Chinese government formally announced the outbreak, and the virus was rapidly isolated and sequenced. Its genome sequence was shared with the international community. It was found to be a new type of Coronavirus with some similarities to SARS.

On 30/01/2020, and after the spread to other countries, the World Health Organization (WHO) declared it a Public Health Event of International Concern (PHEIC).

On February 5, 2020, Rafik Hariri University Hospital (RHUH) admitted a few travelers returning from China for quarantine. Office testing using Reverse transcription (RT)-PCR for Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), the name of the newly discovered Coronavirus, was initiated with the support from the Lebanese Ministry of Public Health (MOPH) and WHO.

On 21/02/2020, the country declared its first case of Coronavirus Disease 2019 (COVID-19), a returning traveler from Iran. The case was mild but hospitalized. Subsequently, we had five cases from the same trip.

A contingency plan was enacted, and the hospital was physically divided into two parts – a part allocated for COVID-19 patients, and a separate part earmarked for the other patients. Four ICU beds equipped with negative pressure were also wholly separated from the other floors. An Emergency Room (ER) was added for patients with respiratory infections suspected with COVID-19. The hospital's third floor was evacuated in preparation, in addition to 64 naturally ventilated rooms for isolated patients.

Subsequently, another 24 rooms and two additional Intensive Care Units (ICUs) with 8 and 12 beds respectively were added. All the newly allocated premises had separate access from other parts of the hospital. The working staff was also assigned roles separately. Those working in COVID-19 units were required to don full personal protective equipment (PPE) precautions at the start of the shift, limit movement within the unit, and take a shower at the end of the shift before putting their clothes on.

Isolation rooms were naturally ventilated. The ventilation system at the Coronavirus allocated ER and ICU was transformed into negative pressure ventilation with high-efficiency particulate air (HEPA) filters.

Training for the working staff at RHUH was immediately started. It included training on donning and removing PPE in a way that avoids self-contamination. The essential PPE used included the following:

- _ Face masks or N95 respirator for aerosol generating procedures
- _ Eye goggles or face shields
- _ Impermeable gowns
- _ Gloves
- _ Hair cover and shoe cover in certain situations.

In this small descriptive study, we discuss the presentation of the first 63 cases diagnosed with COVID-19 at RHUH.

METHODOLOGY

This is a descriptive study of the first hospitalized cases with COVID-19 at RHUH over 25 days. Data were collected prospectively by two specialist medical doctors. The hospital's Institutional Review Board (IRB) approved this study. Patients' names were concealed to protect confidentiality.

Clinical severity was stratified as follows:

- Asymptomatic: no symptoms
- Mild: upper respiratory symptoms with no imaging abnormalities
- Moderate: moderate symptoms with imaging abnormalities
- Severe/critical:
  - o O_2 saturation ≤ 93%
  - o Respiratory rate ≥ 30 breaths per minute (BPM)
  - o PaO_2/FiO_2 ≤ 300 mmHg.

RESULTS

Epidemiology

During the first 25 days of the outbreak in Lebanon, 63 patients diagnosed with COVID-19 were hospitalized at RHUH. At that time, only symptomatic contacts or travelers from high-risk areas were screened and tested. All patients with a definite diagnosis based on RT-PCR were isolated at the hospital irrespective of the clinical severity at the time of presentation.

MOPH investigated the index cases. Asymptomatic contacts of patients were placed in quarantine for 14 days, and symptomatic contacts were tested and isolated.

The epidemic curve of the first 25 days is shown in Figure 1.

The first positive case, diagnosed on 21/02/2020, was a passenger on a returning flight from Iran presenting with mild symptoms. The second case followed on 24/02/2020 and the next three cases on 28/02/2020, with a marked increase in cases during March.

Table I shows the epidemiological characteristics. Table II lists the clinical features. The proportion of males was higher, at around 55% compared to 45% females. Most patients were young to middle-aged. The pattern showed a limited community transmission, with most cases either with a positive travel history to endemic areas or from close contact with index cases. Only one example during that period had an unknown route of exposure. Subsequently, it was determined that this patient was exposed to a traveler from an endemic area.

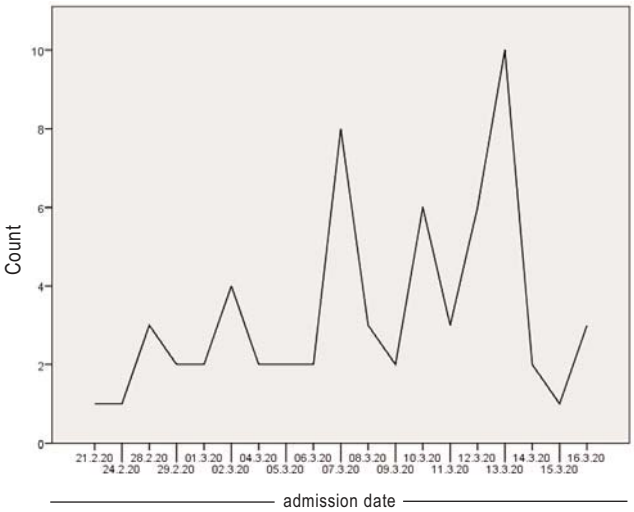

Figure 1
Epidemic curve during the first month of the outbreak

Most of the travel-related cases were from Iran and Europe. One case had a travel history to Egypt and two cases to UAE. The three diagnosed healthcare workers worked at other hospitals and were exposed to patients or visitors that were not initially suspected for COVID-19.

Clinical features (Tables II and III)
Most of the cases were mild (65.1%), and few patients had comorbidities.

Around 5% had prior cardiac problems, 5% had diabetes mellitus, and around 12% were active smokers. Four patients presented with acute respiratory distress syndrome (ARDS). Three were placed on mechanical ventilation, and one on noninvasive ventilation. Those four patients with ARDS presentation received a Lopinavir and Ritonavir combination. The other patients only received symptomatic treatments. Two patients died with a fatality rate of 3.2%.

Among the patients who had a chest computed tomography (CT) scan done, 44.4% had a ground-glass appearance. Sixty out of the 63 patients recovered completely. The median number of days for a virologic cure was 17.5 days, and the median length of stay 16 days.

The most common symptoms were fever and cough, although only present in 49% and 43% of the cases, respectively. Sore throat, runny nose, and fatigue were also common presentations, whereas diarrhea was present in only three patients (4.8%).

TABLE I
EPIDEMIOLOGICAL FEATURES OF COVID-19 CASES

	Patients (N = 63)
Sex	
Male	35 (55.5%)
Female	28 (44.5%)
Age (years)	
Median (IQR)	37 (5-81)
Exposure	
Travel	30 (48.4%)
Contact to Index case	31 (50%)
Unknown	1 (1.58%)
Missing	1
Countries	
Iran	13 (20.6%)
United Kingdom (UK)	5 (7.9%)
France	4 (6.34%)
United Arab Emirates (UAE)	2 (3.17%)
Italy	1 (1.58%)
Egypt	1 (1.58%)
Austria	1 (1.58%)
Regions	
Beirut	14 (22.2%)
Baabda	12 (19%)
Maten	11 (17.5%)
Jbeil	6 (9.5%)
Keserwan	5 (7.9%)
Other	15 (24%)
Healt Care Workers (HCW)	3 (5%)

DISCUSSION

This is a descriptive study of the cases during the first month after the emergence of COVID-19 in Lebanon. The Lebanese government and MOPH were active in screening travelers from high-risk endemic regions and investigating the contacts of index cases. RT-PCR tested symptomatic cases, and if positive, were isolated at the hospital. Asymptomatic travelers and contacts were quarantined at home for two weeks. This approach contributed to limiting the spread of this novel virus in the community. Afterward, when the numbers increased, the national lockdown slowed down the spread of the virus markedly.

Of notice is that no cases were reported from China. The first cases came from Iran, and the plane that carried the first case was screened at the airport before the outbreak was declared in Iran. This attests to the vigilance of MOPH officers. The first cases in Lebanon came from a few clusters. The first cluster from Iran was contained. The second cluster in Byblos went from a patient with a travel history to Egypt, at a time when no cases were reported from Egypt. During that time, a series of French travelers returning to their country tested positive [2]. A third cluster emerged in Keserwan, with the index case

presumed of not having a route of exposure. Subsequently, the MOPH investigation revealed that the index case was exposed to a traveler from Europe. A fourth cluster developed from a patient with a travel history to France.

In this series, only three patients were healthcare workers, and they did not work at our hospital. All three were exposed without donning PPE, or any protective precautions, to patients or visitors not suspected of having COVID-19. No cases were reported in RHUH staff working in the COVID-19 wards. Infection control practices are effective in protecting healthcare workers from contracting the virus.

TABLE II
CLINICAL CHARACTERISTICS AND SEVERITY OF COVID-19 CASES

	Patients (N = 63)
Comorbidities	
Chronic cardiac disease	3 (4.8%)
DM	3 (4.8%)
Smoking status	
Never	46 (73%)
Current	7 (11.1%)
Former	6 (9.5%)
Missing	4 (6.3%)
Severity	
Mild	41 (65.1%)
Moderate	18 (28.6%)
Severe/critical	4 (6.3%)
Intensive Care Unit (ICU)	5 (8.1%)
Mechanical Ventilation	3 (4.8%)
Noninvasive ventilation	1 (1.58%)
ARDS	4 (6.3%)
Mortality	2 (3.17%)
CT scan (ground glass appearance)	20/45 (44.4%)
Days to virologic cure	
Median (IQR)	17.5 (7-29)
Length of stay	
Median (IQR)	16 (4-32)

TABLE III
CLINICAL PRESENTATION OF THE CASES

Symptoms	Patients (N = 63)
Fever	31 (49.2%)
Cough	27 (42.9%)
Sore throat	12 (19.4%)
Runny nose	14 (22.6%)
Muscle aches	7 (11.3%)
Joint pain	1 (1.6%)
Fatigue/malaise	12 (19.4%)
Shortness of breath (SOB)	6 (9.7%)
Headache	4 (6.5%)
Diarrhea	3 (4.8%)

Most of the cases were young or middle-aged, with few comorbidities, and a small percentage of smokers. This might explain why most cases were mild or moderate. In these series, patients who presented with mild or moderate symptoms recovered completely. The four cases with ARDS were transferred from other medical institutions in critical conditions. They were all aged above fifty with some comorbidities. Three required mechanical ventilation, and one required noninvasive ventilation. Two of those patients died. Also, one patient in his eighties, having multiple comorbidities and active cancer, required oxygen therapy and admission to the ICU; however, he recovered completely.

During February and March, there was no recommended specific treatment for COVID-19. We opted for symptomatic treatment for mild and moderate cases.

For the four critical cases, we opted for a Lopinavir/Ritonavir combination, which was after that shown ineffective in one small randomized study of severe cases. [3]

All mild and moderate cases recovered without specific treatment. Most of the cases were hospitalized at the start of their symptoms due to active follow-ups. RT-PCR remained positive long after recovery. The median duration for a virologic cure was 17.5 days. This is consistent with the experience published in the literature. [4-6] This can possibly be explained by the presence of non-infectious portions of the virus that persist for a long time. [7]

Nevertheless, we followed the international and national guidelines for defining a cure, which requires the cessation of symptoms and two consecutive negative RT-PCR tests of nasopharyngeal, oropharyngeal or sputum specimens.

Imaging studies, mainly chest CT scans, were found helpful in the diagnosis of COVID-19. [8] At the beginning of March, we started performing a chest CT scan for most of our hospitalized patients. The most common finding was bilateral ground-glass appearance. Mild cases with upper respiratory symptoms mostly had a normal chest CT scan. Another category with mild to moderate symptoms had an abnormal chest CT scan, but showed a favorable course. The third category of patients with severe symptoms sometimes ended up with ARDS and respiratory failure, and sometimes with death.

Fever and cough were present in about only half the cases, which is lower than the numbers in published literature. This reflects that many of our hospitalized patients had a mild presentation. Other common symptoms upon presentation included fatigue, sore throat, and runny nose.

CONCLUSION

This study describes the first cases of COVID-19 over one month after diagnosing the first case in Lebanon. One of the strengths of this study is that the claims were documented prospectively. Most of the cases were mild to moderate, but isolated in the hospital to limit community spread. This strategy has probably helped the country in containing the disease so far.

This study is limited to the first 63 patients during the early 25 days of COVID-19 in Lebanon. Subsequently, mild cases were isolated at home, and only moderate and severe cases were hospitalized. Describing the clinical presentation over a more extended period might provide a better assessment of the clinical patterns.

Finally, our experience suggests four major patterns of this disease:

1. Asymptomatic patients that can spread the disease.
2. Patients with mainly mild upper respiratory symptoms.
3. Patients with moderate symptoms and abnormal imaging findings.
4. Patients with severe symptoms that might lead to ARDS.

It is essential to predict which patient might progress to the severe or critical form of the disease and whether any treatment might prevent this deterioration.

Meanwhile, the most effective measure is to prevent the spread of disease by a combination of proper infection prevention and control measures, early detection and isolation of cases, active contact tracing, and the quarantine of contacts.

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