Clinical manifestations and progression of COVID-19: A case report from the Maldives

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ABSTRACT *A cluster of pneumonia was reported from Wuhan, Hubei province, China in December 2019. The causative agent was named as novel coronavirus "SARS-CoV-2" and the disease as COVID-19. The disease rapidly spread to several countries and WHO declared the outbreak as a Public Health Emergency of International Concern and as a pandemic on 11th March 2020. In the Maldives, the first case of COVID-19 was detected on the 7th of March. At the time of writing, there are 3103 cases of confirmed COVID-19 including 15 fatalities. The SARS-CoV-2 causes mild to severe pneumonia complicated by ARDS, sepsis, and multi-organ dysfunction syndrome. Other manifestations include anosmia, ageusia, fatigue, and rash. In many requiring hospitalization, hypoxemia is a key clinical finding. The clinical manifestations including the clinical progression of COVID-19 is being described in this report. The case was conservatively managed in a makes-shift hospital, with the utilization of the awake prone positioning which had resulted in better oxygenation and aided in the improvement of hypoxemia.*

In late December of 2019, a cluster of pneumonia occurred in Wuhan China (Lu et al., 2020). This outbreak had surged to a Public Health Emergency of International Concern and was declared a pandemic on 11th of March 2020 (Cucinotta & Vanelli, 2020). The causative agent was identified as SARS-CoV-2 (Lin, Lu, Cao, & Li, 2020). A sister virus of the SARS-CoV-1 and MERS-CoV (Arabi et al., 2017; Cherry & Krogstad, 2004). This novel coronavirus is believed to be a zoonosis, postulated to originate from either bats or pangolins (Zhang et al., 2020). An infectious respiratory pathogen with the potential for transmission among humans

mainly through droplet and contact (van Doremalen et al., 2020). While many fairly do well in COVID-19, some patients with severe disease have a sequel to pneumonia (Pan et al., 2020; Zhou et al., 2020). As of today, fifteen million people have been affected globally and over half a million have succumbed to the infection (University, 2020). The first case of COVID-19 in the Maldives was detected in a resort employee on the 7th of March 2020 (Ministry of Health). He was identified as a close contact of a tourist who tested positive after returning home from a holiday in the Maldives. A total of 3103 cases have been reported as positive for COVID-19 and fifteen patients have died of complications (Agency, 2020). In this report, the clinical course, laboratory profile including the radiological progression of a confirmed case of COVID-19 and the management is described.

Methodology

Written informed consent was obtained from the patient before obtaining the clinical and laboratory data. These were collected from the patient medical chart by the doctors on duty at the make-shift hospital established for treating COVID-19 cases. Notes from the attending doctors during their daily follow up was updated until the patient's clinical condition improved and was discharged from the facility. The radiographic images were provided by the radiologist who performed and reported the chest x-rays and lung computed tomography.

Case Report

A 43-year-old male migrant worker in the Maldives had presented to the make-shift hospital facility constructed in the greater Male' region to manage cases of COVID-19 in the Maldives. The patient had presented with complaints of shortness of breath. He was febrile for ten days and had a non-productive cough and pleuritic chest pain. In addition, he had fatigue, anosmia, and ageusia. There were no other signs of systematic illness such as vomiting, diarrhea, or headache. Having a body mass index of 33kg/m2, he denied any known underlying comorbidity but provided a history of tobacco use. His vitals recorded at presentation were a body temperature of 400C with a pulse rate of 101 beats per minute and normal blood pressure of 120/80 mmHg but an increased respiratory rate of 30 breaths per minute was noted with a decreased oxygen saturation of 89% in room air. Auscultation of the lungs revealed fine crepitation's on the bilateral infra-scapular area and more prominently on the right axillary area. The laboratory profile at presentation and during the course of illness are tabulated in Table 1. The chest x-ray done at the time of admission is seen in Figure 1. A nasopharyngeal swab was taken for rRT-PCR was positive for SARS-CoV-2 with a cycle threshold value of 30. With hypoxemia and toxic nature of the patient, empirical antibiotic coverage was initiated, supplementary oxygen was delivered by nasal cannula and the patient was admitted for optimal management. Without any clinical improvement, a high resolution computed tomography of the chest was taken on the third day of admission which is shown in Figure 2. On the 3rd day of admission, a trial of Dexamethasone at the dose of 6mg per day for 10days was administered. The patient was managed supportively emphasizing mostly on oxygenation and prone positioning. A summary of the clinical progression is depicted in Figure 3.

Discussion

In the Maldives cases of COVID-19 was initially imported through tourists and eventually lead to a community spread. At the time of writing there are 3103 confirmed cases with the majority 57% of the confirmed cases are among migrant workers (Agency, 2020). This vulnerability to SAR-CoV-2, is likely to have contributed due to unprivileged over-crowded living conditions (Bouffanais & Lim, 2020; Maldives, 2020). This humanitarian crisis has existed for decades in the Maldives and has flared up with this pandemic (Gossman, 2020; Organization, 2019). There are over 250,000 migrants workers, of which 60,00 are unregistered without proper legal documentation (Plewa, 2018). The patient described in this case report exhibited clinical manifestations characteristic to COVID-19 as described elsewhere (Yu et al., 2020). The average duration of onset of symptoms to presentation to the hospital has been reported to be 4 days with a range from 2 to 7 days (Chen et al., 2020). In contrast to this, the patient had presented on the 11th day after the onset of symptoms. His fever persisted for 14 days before being afebrile, it has been reported that duration of fever to last 9 to 31 days in hospitalized cases (Chen et al., 2020). Anosmia has been reported to occur in 11-40% of cases and ageusia in 12% of cases (Hornuss et al., 2020; Vaira et al., 2020). Anosmia and ageusia in the patient lasted up to eight days and twelve days respectively. It was observed that the patient did not manifest any cutaneous eruptions which have been increasingly reported with cases of COVID-19 (Avellana Moreno et al., 2020; Recalcati, 2020). In this report, he serial hematological and biochemical profile until the resolution of his symptoms. Reports have described the leucocytes and lymphocytes to be reduced or within the normal ranges (Terpos et al., 2020). The hematological profile in the patient had a similar trend as with what had been described in the literature. It was observed that there were no dynamic changes throughout the course of illness. The neutrophil/leucocyte ratio increased to 7 but gradually declined. During the course of admission, the platelet counts had an increasing trend. Increments in the neutrophil/leucocyte ratio and thrombocytopenia have been identified as a prognostic marker of severity (Maquet et al., 2020). The biochemical profile in COVID-19 has been reported to have characteristic features. Serum ferritin has been reported to be significantly elevated with the mean of 1297·6 ng/ml in non-survivors vs 614·0 ng/ml in survivors (Wang et al., 2020). The patient described in this report had similarly elevated levels of serum ferritin of 609ng/mL. The D-Dimer has also been identified as a prognostic marker of severity where the association of levels exceeding 0.28 μg/L, with the sensitivity and the specificity of 86.7% and 82.1%, respectively (Gao et al., 2020). D-Dimer level of the patient in this report at the time of presentation was 0.96 μg/L. The C-reactive protein level in the patient was 80mg/mL. It has been described that the elevation of this acute-phase protein correlated with the extent of lung lesions in COVID-19 (Wang, 2020). The chest x-ray findings have been reported to occur peripherally in 40% and 50% with bilateral involvement, which was consistent with the x-ray findings in the patient described in this report (Wong et al., 2019). The computed-tomography scan done revealed hallmark features of COVID-19 with bilateral peripheral ground-glass opacities as having been described by others (Bernheim et al., 2020). Based on the arterial blood gas analysis (PaO2

of 74, FiO2 of 32% and PaO2/FiO2 ratio was 231) the patient was classified as having mild acute respiratory distress syndrome based on the Berlin definition of ARDS (Ferguson et al., 2012). With no clinical improvement and radiological deterioration on 3rd day of admission, a trial of Intravenous Dexamethasone was administered. As part of the supportive care of ARDS, there have been benefits from prone positioning (Gattinoni et al., 2010; Guerin et al., 2013). Awake prone positioning in non-intubated patients with the requirement of oxygen has shown to improve oxygenation (Caputo et al., 2020). Utilizing this maneuver in the patient, resulted in better oxygenation and aided in the improvement of hypoxemia. On the 18th day of illness, dyspnea and oxygenation had improved, with a respiratory rate of 18 breaths per min, and oxygen saturation was 98% with 2 liters per min. The oxygen supplementation was discontinued and the patient had maintained oxygen saturation over 95% in room air. The radiological resolution of most of the consolidative lesions was observed on the 25th day of illness. With only a few peripheral ground-glass attenuations in the right upper lobe and thin sub-pleural bands in both upper lobes. Limitation in this report were not having excluded other possible pathogens to cause community-acquired pneumonia. In conclusion, COVID-19 causes atypical pneumonia with a hematological profile consistent with a viral etiology. Symptoms of anosmia and ageusia seem to be characteristic of COVID-19. Fatigue and cough persisted even with the resolution of radiological and findings. Awake prone positioning may be utilized in non-intubated patients with COVID-19 in attempts to optimizing the oxygenation.

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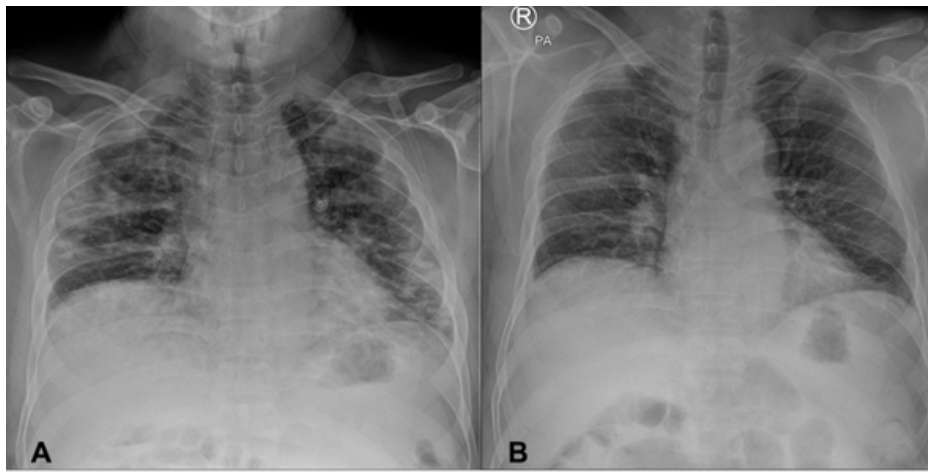
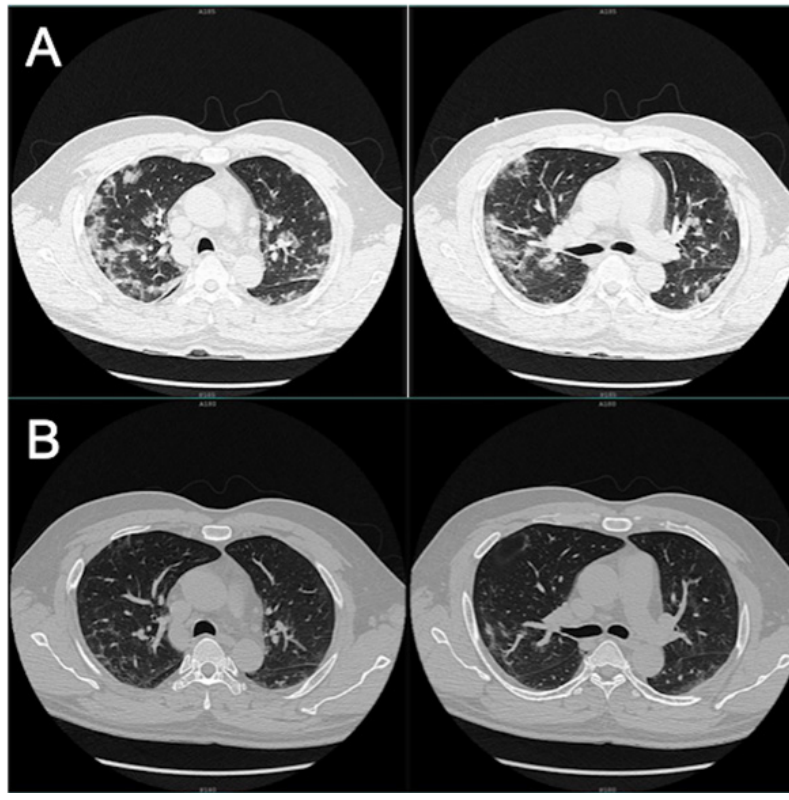


Figure 2. (A) HRCT of chest with bilateral multi-lobar extensive peripheral areas of ground glass appearance



(B) Follow up HRCT chest showing resolution of the lung infiltrates.

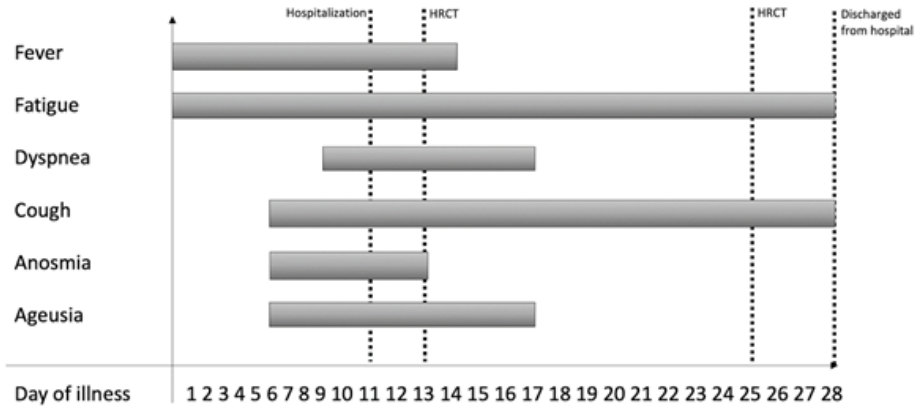


Figure 3. Summary of clinical progression

Table 1
Serial hematological and biochemical profile

Laboratory parameters	*Day of illness*				
	Day 10	*Day 13*	*Day 15*	*Day 17*	*Day 20*
Leucocytes, 10^3mL [range: 5.0-10.0]	*6.68*	*6.33*	*5.78*	*6.34*	*9.71*
Lymphocytes, % [range: 16-45]	*12.3*	*17.6*	*16.8*	*29.8*	*24.2*
Neutrophils, % [range:45-74]	*83.9*	*73.9*	*72.1*	*55.6*	*67.2*
Eosinophils, % [range: 0.0-7.0]	*0*	*1.61*	*0.28*	*1.73*	*0.54*
Basophils, % [range: 0.0-2.0]	*0.1*	*0.58*	*0.54*	*1.82*	*0.35*
Monocytes, % [range: 0.0-10.0]	*3.7*	*6.28*	*10.2*	*11*	*7.64*
Hemoglobin, g/dL [14-18]	*16.1*	*13.6*	*14.1*	*14.4*	*14.4*
Hematocrit, % [range: 40.0-54.0]	*49.3*	*42.8*	*41.4*	*41.7*	*40.9*
Platelets, 10^3mL [range: 150-450]	*211*	*214*	*281*	*334*	*366*

Creatinine, mg/dL [range: 0.8 – 1.2]	*1*	*0.78*	*0.78*	*0.73*	*0.76*
Blood Urea Nitrogen, mg/dL [range: 9-20)	*18*	*11*	*11*	*16*	*20*
Sodium, mmol/L [range: 136-145]	*134*	*136*	*136*	*141*	*140*
Potassium, mmol/L [range: 3.5 – 5.1]	*4.3*	*4.5*	*4.5*	*4.5*	*4*
LDH, U/L [range: 150-280]		*425*	*295*	*270*	*225*
Ferritin, ng/mL [range: 20-150]		*607*	*517*	*506*	*400*
D-Dimer. mg/L [Range: <0.5]		*0.96*			*0.54*
C-reactive protein, mg/mL [Range: 0-10]	*80*				*0.28*
Neutrophil-Lymphocyte ratio	*7*	*4*	*4*	*2*	*3*

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