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COVID-19; Experience at the National Institute of Infectious Diseases, Sri Lanka

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Introduction

The corona virus disease (COVID-19), first identified in Wuhan, China in December 2019, was declared a Public Health Emergency of International Concern on 30th January by the World Health Organization (WHO) and later as a pandemic on 11th March 2020[1].

The National Institute of Infectious Diseases (NIID) of Sri Lanka, the single specialized hospital for communicable diseases in the country is the main hospital designated for COVID-19 management. The policy of the Ministry of Health (MoH) requires that all COVID-19 positive patients are admitted to hospitals to facilitate monitoring and to prevent the spread of the disease to the community. Since late-January 2020, all individuals who were suspected of COVID-19 were admitted to the NIID. As the patient numbers were rising, MoH designated several other hospitals to accommodate COVID-19 suspected individuals and five other hospitals for management of confirmed cases.

The first patient reported in Sri Lanka was a Chinese national, diagnosed on the 27th January while the first local patient was reported on 11th March 2020. Our initial patients were returnees from Italy and India. Their contacts were traced and admitted to NIID for observation. Subsequently, the Government of Sri Lanka took several immediate measures to curtail the spread of COVID-19 via imported cases. From 11th March 2020, those arriving from Italy, Iran and South Korea were quarantined for a period of 14 days at the quarantine centres while other overseas returnees were subjected to self-quarantine. Later every person returned from overseas were admitted to quarantine centres for isolation. They were subjected to real time Reverse transcriptase polymerase chain reaction (RT-PCR) tests for SARS-CoV-2 and once confirmed positive, were admitted to designated hospitals for isolation and management. Since late March, clusters of cases have been reported from several areas of the country. Currently the occurrence of cases is restricted to clusters and returnees from overseas. The upsurge of cases in mid-May was caused by a cluster which occurred in a Navy garrison, Welisara[2].

By the 25th May, 1055 of either suspected individuals or COVID-19 confirmed patients have been admitted to NIID. Of this 327 are were confirmed positive for SARS-CoV-2 by the real time RT-PCR analysis. Out of them 240 confirmed patients have been discharged from the hospital, while 6 patients have died.

Patient characteristics

Of the 327 confirmed cases, majority of patients (92.6%) were between 20-59 years with a mean age of 39.06 years (SD 16.62). Most of the infected (71%) were men. The male preponderance in COVID-19 infection, is reported from other countries across the globe. The youngest patient was 03 months old while the oldest was a 94 years old woman.

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Table 1. Age distribution of patients (n=327)

Age group	*Number of patients*
0-1 years	03
1-10 years	17
11-20 years	22
21-30 years	72
31-40 years	83
41-50 years	60
51-60 years	36
61-70 years	21
71-80 years	10
81-90 years	02
91-100 years	01

Co-morbidities

In an interim analysis done on first 257 patients (including 6 deaths), 77 (29.9%) had co-morbidities (Table 2). Hypertension and diabetes were the commonest co-morbidities. Out of 77 patients who had co-morbidities 49.3% had hypertension and 37.66% had diabetes mellitus. 45.4% were having two or more co-morbidities which is about 13.6% of the total population.

Table 2. Frequency of co-morbidities (n=257)

Comorbidity	*Frequency n (%)*
Hypertension	37 (14.3)
Diabetes mellitus	29 (11.2)
Dyslipidaemia	19 (7.3)
Bronchial asthma	16 (6.2)
Ischemic heart disease	13 (5.0)
Cerebrovascular disease	03 (1.1)
Hypothyroidism	03 (1.1)
Chronic liver cell disease	01 (0.003)
Chronic obstructive pulmonary disease	01 (0.003)
Heart failure	01 (0.003)
Nephrotic syndrome	01 (0.003)
Bipolar affective disorder	01 (0.003)
Kidney transplant	01 (0.003)
Chronic cellulitis	1 (0.003)
Osteoarthritis	1 (0.003)

Clinical features

Cough, fever and sore throat were the commonest symptoms; 118 (45.9%) patients had fever, 119 (46.3%) had cough and 75 patients had both (Table 3). Sore throat was reported in 72 (28%) patients. Interestingly, only 36 (9%) of patients complained of dyspnoea as an initial symptom. Rhinorrhoea was reported in 43 (16%) of patients while 18 (7%) patients had anosmia. However, anosmia is likely to be an underestimate as this symptom was not inquired into during the early phase of the epidemic.

Table 3. Frequency of symptoms in 257 patients

Symptom	*Number (%)*
Cough	119 (46)
Fever	118 (46)
Sore throat	72 (28)
Headache	59 (23)
Myalgia	53 (20.6)
Rhinorrhoea	43 (16.7)
Dyspnoea	36 (14)
Diarrhoea	36 (14)
Nasal congestion	26 (10)
Chest pain	26 (10)
Dyspepsia	24 (9)
Loss of appetite	23 (8.9)
Anosmia	19 (7.3)
Fatigue	18 (7)
Loss of taste	18 (7)
Vomiting	15 (5.8)
Arthralgia	13 (5)
Abdominal pain	12 (4.6)
Dysgeusia	9 (3.5)
Nausea	6 (2.3)
Dysuria	4 (1.5)
Haemoptysis	4 (1.5)
Conjunctivitis	3 (1.1)
Pruritus	3 (1.1)

Disease severity

The disease severity was categorized as mild, severe and critical illness. Those without pneumonia and mild pneumonia cases were categorized as mild cases. Patients were identified as severe if they had dyspnoea, respiratory rate ≥30/minute, blood oxygen saturation ≥93%, PaO2/FiO2 ratio <300, and/or lung infiltrates >50% within 24-48 hours. Critical cases were those who had respiratory failure, septic shock, and/or multiple organ dysfunction/failure[3].

Out of the first 100 patients who were discharged from the hospital or died, 92.0% (n=92) were either asymptomatic or had mild disease, 2.0% (n=2) had severe disease and 6.0% (n=6) had critical disease that resulted in death[4].

Treatment

In the absence of an effective anti-viral therapy, supportive care is the mainstay of treatment. Several drugs that are used for other medical conditions such as hydroxychloroquine (HCQ), macrolides, antiviral drugs; remdesivir and favipiravir have been used by clinicians across the globe to treat COVID-19 patients[5-8]. The Expert Committee on Guideline development in Sri Lanka recommended the use of HCQ on all COVID-19 patients[9], a decision based on limited available evidence[5,6]. No other antivirals are recommended for use in Sri Lanka. There is widely divided opinion in the world on the efficacy of HCQ. The Solidarity Trial, which was launched by the WHO will compare four treatment options against standard care to discover whether any of these drugs are effective against COVID-19[6].

Convalescent plasma had been studied in other respiratory viral infections including SARS-CoV-1 and H1N1 influenza epidemics[11,12]. It has been approved for use in COVID-19 patients as an investigational drug by the FDA[13]. We used convalescent plasma on three critically ill patients and one patient recovered. Plasma from few recovered COVID-19 patients, who have consented for donation, has been collected and stored for future use.

Tocilizumab, an interleukin-6 inhibitor, has shown to cause a marked decline in inflammatory markers, radiological improvement and reduced ventilatory support requirements when treated along with concomitant investigational antiviral agents[14,15]. We treated three critically ill patients with Tocilizumab.

There is emerging evidence that almost all of the severe and critical ill COVID-19 cases present with coagulation abnormalities and risk of thrombosis. Venous thromboembolism (VTE) has frequently been reported as a potential cause of unexplained deaths[16,17]. However, the pharmacological management of VTE in COVID-19 is complex and challenging due to the risk of bleeding. Low molecular weight heparin (LMWH) is recommended in moderate and severe disease in the VTE prophylaxis dose while for critically ill patients an increased dose is recommended[18,19]. We used LMWH prophylaxis dose for patients with moderate illness while the dose was doubled in critically ill patients.

SARS-CoV-2 is known to utilize angiotensin converting enzyme 2 (ACE2) receptors for entry into the target cells. Hence, there are concerns that the use of angiotensin converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) could enhance the susceptibility for COVID-19 and also increase the mortality. A rapid review of available evidence showed that patients on long-term therapy with ACEIs or ARBs are not at higher risk of poor outcomes from COVID-19[20]. As per the current recommendations we continued ACEIs or ARBs in those who are already taking them and if new onset of hypertension was detected they were given either beta blockers or calcium channel blockers.

Outcome

By 25th of May, 240 patients were discharged after recovery and 2 patients were transferred out: one for drainage of an abscess in the leg and the other for hemodialysis. 79 still remain as in-patients. Some of them have persistent PCR positivity in samples taken from nasopharynx despite clinical recovery. 06 patients died including one patient who was dead on admission. Details of the deaths given in table 4.

Summary

A large majority of our patients were either asymptomatic or mildly symptomatic. Common symptoms were fever and cough and the presentations were similar to common viral respiratory tract infections. Prognosis was poor in critically ill patients. Management strategies of severe and critically ill patients are still uncertain and under evaluation in many countries.

Table 4. Details of deaths occurred at NIID

	Patient 1	*Patient 2*	*Patient 3*	*Patient 4*	*Patient 5*
Age (years)	60	50	80	48	44
Sex	Male	Male	Male	Male	Female
Co-morbidities	Hypertension, Diabetes, CKD, (KT 7yrs back)	Diabetes mellitus Hypertension Hypothyroidism	Diabetes mellitus IHD (CABG 7 yrs back)	Hypertension	None known
Day of illness on admission	07	03	05	03	30
Duration of hospital/ ICU stay	13/07	18/09	09/09	25/20	8 hours/ 8 hours

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