

Descriptive Analysis of COVID-19 Related Deaths in Resource Poor Setting in Central Sri Lanka

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Abstract

Background: Globally and locally unprecedented COVID-19 related deaths were reported. Exploration of clinical and biochemical characteristics of COVID-19 related deaths plays a major role in developing treatment guidelines and improving the outcomes of the patients. As there is a scarcity of publications locally describing the clinical characteristics of the COVID-19 related deaths, our endeavor was to fill the vacuum of studies related to the clinical and biochemical characteristics of COVID-19 related deaths in Sri Lanka.

Methods: A retrospective observational study was conducted in the Respiratory Disease Treatment Unit two at National Hospital Kandy, Sri Lanka. Information regarding clinical presentations, comorbid diseases and laboratory investigations were extracted from the medical records of the deceased patients. Statistical analysis was performed using IBM SPSS statistics data editor.

Results: A total of 42 COVID-19 related deaths were analyzed. Out of deceased patients, 30 (71.4%) were males. The median age was 68 years. The majority of patients 35 (83.3%) were given a history of at least one underlying comorbid disease: Hypertension (42.9%), diabetes mellitus (38.1%), bronchial asthma (14.3%), ischemic heart disease (11.9%) and heart failure (11.9%). The symptoms at presentation were breathlessness (66.7%), cough (54.8%), fever (52.4%) and, arthralgia/myalgia (35.7%). The main causes of death were severe COVID pneumonia (59.5%), Post COVID Interstitial lung disease (14.3%), sepsis (11.9%) and COVID associated myocardial infarctions (11.9%).

Conclusion: The majority of the deceased patients were elderly males with multiple comorbidities, had delayed presentations to the treatment facility, and had altered vital signs and deranged biochemical findings at presentation. Detection of these should alert the clinicians provide prompt and optimized care in order to minimize deaths.

Keywords: COVID-19; Coronavirus Disease; Clinical Characteristics; Death; Sri Lanka

Abbreviations

COVID: Coronavirus Disease; CRP: C-reactive Protein; DBP: Diastolic Blood Pressure; GCS: Glasgow Coma Scale; HR: Heart Rate; LDH: Lactic Acid Dehydrogenase; SARS-CoV 2: Severe Acute Respiratory Syndrome Coronavirus 2; SBP: Systolic Blood Pressure

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or Novel Coronavirus is the causative organism for the COVID-19 pandemic which was first identified in Wuhan, China, in 2019 [1]. Two years on, it continues to remain at pandemic proportions. As of January 2022, COVID-19 has caused over 343 million infections and over 5.58 million deaths around the world [2].

The first case of COVID-19 was diagnosed in Sri Lanka on January 27, 2020, with the first related death occurring on March 29, of a person aged 65 years suffering from hypertension and Diabetes Mellitus [3]. By January 15, 2022, more than 0.6 million confirmed cases and 15272 deaths were announced by the Health Ministry of Sri Lanka [3].

Analysis of Previous studies on the clinical features of critically ill and the deceased cases of COVID-19 revealed that the elderly patients accounted for the highest mortality rate while COVID related deaths have been reported in young and middle-aged patients as well [1,4,5]. There is increasing evidence that patients with existing comorbidities are more prone to be a victim of COVID-19 [5,6].

As a developing country, Sri Lanka has recognized COVID- 19 not only as a health crisis but also as an economic and social crisis [7]. Exploration of clinical and biochemical characteristics of the COVID related deaths plays a major role in developing treatment guidelines and improving the outcomes of patients in resource poor settings. As there is a scarcity of publications locally describing these clinical and biochemical characteristics of COVID-19 related deaths, our endeavor was to fill the vacuum of the studies.

Materials and Methods

This is a retrospective observational study conducted in the Respiratory Disease Treatment Unit two at National Hospital Kandy, Sri Lanka. Written and electronically stored medical records of COVID-19 confirmed patients admitted to the unit during the 6th January 2021-12th August 2021 were used as the data source. COVID-19 related deaths were defined as a positive result by using real-time reverse-transcriptase polymerase chain reaction (RT-PCR) detection on nasopharyngeal swab.

A questionnaire developed by the main author was used as the data collection tool, which consisted of demographic data, clinical presentations, vital signs, comorbid diseases, vaccination status, smoking and alcohol history, and causes of deaths. Laboratory data including complete blood count, serum electrolytes, coagulation function, C-reactive protein, lactic acid dehydrogenase, serum creatinine, and procalcitonin were collected. Data collection was carried out by the respiratory team headed by a consultant pulmonologist. Data analysis was carried out by using the IBM SPSS version 25.00 statistics data editor. The data were presented by using descriptive statistics.

Results and Discussion

Results

A total of 387 COVID-19 confirmed patients were admitted of which, 42 (10.8%) COVID-19 related deaths were reported. Out of them, 30 (71.4%) were males. The median age of the deceased was 68 years. Half of the total deaths, 21 (50%) were in the age group of 61-70 years (Table 1).

Age category	Frequency	Percentage (N = 42)
51-60	9	21.4
61-70	21	50
71-80	9	21.4
81-90	3	7.1

Table 1: Age distribution of COVID-19 related deaths.

Majority of deceased patients, 25 (59.5%), had not received any vaccine for COVID-19. Nine (21.4%) had received a single dose and three (7.1%) had received two doses of the vaccine. Vaccination history was unknown in seven patients due to the limited available data. Out of the male patients, 13 (43.3%) had a positive smoking history of which five (16.6%) patients were current and eight (26.6%) were ex-smokers. Alcohol consumption was evident in 12 (40%) of male patients.

Majority, 35 (83.3%), of patients had a history of at least one comorbidity. Hypertension was the commonest comorbidity which accounts for 18 (42.9%), followed by Diabetic Mellitus 16 (38.1%), Bronchial Asthma 6 (14.3%), Ischemic Heart Disease 5 (11.9%) and Heart Failure 5 (11.9%) (Table 2). Two comorbidities were found in seven (20%) of the deceased patients, namely hypertension and Diabetes Mellitus. Three comorbidities were found in six (17.1%) which included Asthma in addition to hypertension and Diabetes mellitus.

Underlying Comorbidity	Frequency	Percentage (N = 42)
Hypertension	18	42.9
Diabetes Mellitus	16	38.1
Bronchial asthma	6	14.3
Ischemic heart disease	5	11.9
Heart failure	5	11.9
Dyslipidemia	3	7.1
Chronic liver cell disease	2	4.8
Chronic kidney disease	1	2.4

Table 2: Underlying comorbidities of COVID-19 related deaths.

Multiple symptoms were observed in majority of COVID-19 patients at the time of admission. Tables 3 and 4 summarize the commonly observed symptoms and vital signs at presentation.

COVID-19 symptoms	Frequency	Percentage (N = 42)
Arthralgia and myalgia	15	35.7
Cough	12	28.6
Fever	22	52.4
Headache	13	30.9
Loss of appetite	6	14.2
Sore throat	4	9.5
Shortness of breathing	28	66.6
Wheezing	5	11.9

Table 3: COVID-19 symptoms of the deceased patients.

Vital sign	Frequency	Percentage (N = 42)	
Tachycardia (HR>100 bpm)	19	45.2	
Hypoxia (SPO ₂ <94%)	24	57.1	
Hypertension (SBP>140 mmHg)	12	28.6	
Hypotension (DBP<60 mmHg)	8	19	
Level of consciousness (GCS level)	3-8	2	4.8
	9-12	12	28.6
	13-15	28	66.7

Table 4: Vital signs at presentation.

Laboratory abnormalities were detected as severe leukopenia 6 (14.2%), lymphocytopenia 14 (33.3%), elevated Lactic Acid Dehydrogenase (LDH) 32 (76.1%) procalcitonin 22 (52.4%), D-Dimer 28 (66.6%), CRP 33 (78.5%), and Serum creatinine 25 (59.5%) of the deceased patients (Table 5).

Variables	Patients, n (%)		
White blood cell count (×10 ⁹ /L; normal range 3.5-9.5)	Decreased	Mild (3.0-3.999)	4(9.5%)
		Moderate (2.0-2.99)	2(4.8%)
		Severe(1.0-1.99)	6(14.2%)
	Increased	18(42.9%)	

Lymphocyte count (×10 ⁹ /L; normal range 1.1-3.2)	Decreased	14 (33.3%)
Lactic Acid Dehydrogenase (LDH) (U/L; normal range 120-250)	Increased	32 (76.1%)
Procalcitonin (ng/mL; normal range ≤ 0.10)	Increased	22 (52.4%)
D-Dimer (mg/L; normal range ≤ 0.55)	Increased	28 (66.6%),
C-reactive protein (mg/mL; normal range ≤ 10.0)	Increased	33 (78.5%)
Serum creatinine (μmol/L; normal range 41-81)	Increased	25 (59.5%)

Table 5: Laboratory findings of 42 COVID-19 related deaths.

The median interval from symptom onset to receiving treatment (door to treatment) was 6 days. Majority of the patients were presented late (Table 6).

Duration of days	Frequency	Percentage (N = 42)
1-5 days	13	31
6-10 days	25	59.5
11-15 days and more	4	9.5

Table 6: Duration of days to the door to treatment.

Median length of hospital stay was 12 days. Little more than half of the patients 24 (54.1%) experienced COVID-19 associated complications including respiratory failure (41.6%), Acute Interstitial lung disease (25%), sepsis (20.8%) and myocardial infarction (12.5%). The main causes of death were COVID-19 pneumonia 25(59.5%), COVID related Interstitial lung disease 6 (14.3%), sepsis 5 (11.9%), myocardial infarction 5 (11.9%) and coagulopathy 3 (7.1%) (Figure 1).

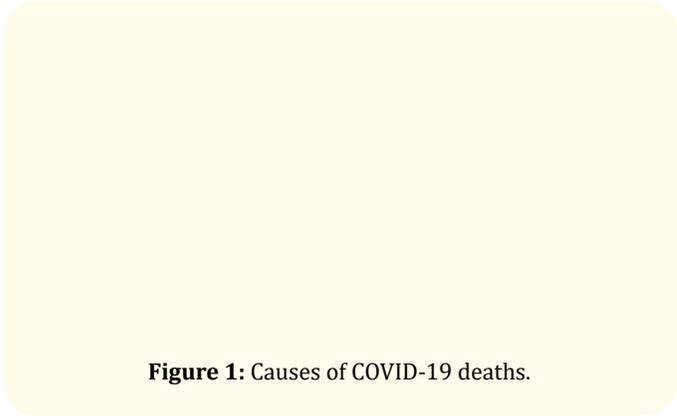


Figure 1: Causes of COVID-19 deaths.

Discussion

This descriptive analysis explored the clinical and biochemical characteristics of COVID-19 related deaths in a single tertiary care centre in Sri Lanka. It was found that the elderly population, age range of 61-70 years had the highest proportion of deaths due to COVID-19. Several studies have reported the age range of COVID-19 related deaths as 65-75 Years [4,8]. The median age of death in our study was 68 years, which is similar. However, higher age ranges (75-85 Years) were reported in other countries compared to our age range (61-70Years) [4,9]. Similar to the findings of previous studies, the male predominance was observed in our study as well [5,10].

In this study, more than three fourth (83.3%) of the deceased patients had at least one underlying comorbidity. This is consistent with the published literature [5,11]. This finding highlights that the patients with existing comorbidity tend to experience increased mortality, thus would require special attention and care. In addition, present study found that hypertension was the commonest comorbidity followed by Diabetes Mellitus and bronchial asthma. These findings were same as in other reported studies [5,12]. The risk of mortality in COVID-19 is high in patients with hypertension, comparing to the patients without hypertension [13]. These findings highlight the necessity of immediate screening for comorbidities.

As in previous studies, symptoms at the presentation were shortness of breath, cough, fever, headache, loss of appetite, sore throat and wheezing [4-6]. In our study, more than half of the patients (57.1%) were hypoxic on arrival and had altered vital

signs. We observed that majority of the patients who died presented to the hospital after 5 days from symptoms onset. This could be a significant factor contribution to the mortality. The median length of hospital stay was 12 days. Which is parallel with other reported literature [5,10].

Diseased patients had abnormal biochemical and haematological investigations, in particular procalcitonin, D-Dimer, CRP and LDH. In line with previous studies, we found lymphocytopenia in 33.3% of deceased patients [14]. Lymphocyte count is significantly decreased in patients with severe COVID-19 compared to the lymphocyte count in mild cases. More over the systemic immune response for the infection was indicated by the elevated levels of CRP and LDH. Elevated procalcitonin levels may indicate the severe COVID-19 cases with severe inflammatory pneumonitis syndrome and special attention should be pointed for the treatment strategies. Elevated D-Dimer levels indicated the hypercoagulable status of the patients. Hence, anticoagulant therapy should be actively administered.

COVID-19 associated complications were detected in more than half (54.1%) of the deceased patients. The early detection and appropriate management are essential to minimize COVID related deaths and complications. Similar to our findings, Menbeu Sultan and colleagues found respiratory failure, sepsis, and acute renal failure as the lethal complications of COVID-19 deaths. Secondary interstitial lung disease due to COVID-19 was recognized as an important complication and a cause of death in our study. However it was not reported in other published literature.

Conclusion

This study reveals that elderly males with multiple co morbidities, delayed presentation to the treatment facility, altered vital signs, and significantly deranged biochemical findings are the major contributors to COVID-19 related deaths. These findings should alert the clinicians provide prompt and optimized care in order to minimize deaths. Further it is important to improve the awareness of patients with COVID-19 infection to seek medical advice without delay to prevent COVID-19 related complications and deaths. The main limitation of this study was the small sample size. Hence, we recommend multicenter studies and comparative studies with those survived of COVID-19.

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Conflict of Interest

There is no any financial interest or any conflict of interest related to this paper.

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