Original article

Presentation, Clinical Course and Outcome in Hospitalized Patients with Covid - 19: A Retrospective Study

Nida Naseem[1], Ritwiza Thakur[1]*, Rakesh Sadhu[1], Monika Jindal[2]

[1]Department Of Anesthesiology, MM Medical College & Hospital, Solan, India
[2]Department Of Obstetrics and Gynecology, MM Medical College & Hospital, Solan, India

ABSTRACT

Aim. *Covid - 19 has spread rapidly since first being reported evoking much concern. No cure is known as yet.* **Methods**. *We conducted a retrospective study to try to identify factors contributing to mortality at our institute.* **Results.** *Out of a total 211 patients, we had 28 deaths (13.2%). Males were slightly more afflicted than females (57%: 43%). Most of the patients were more than 50 years of age (47%). Co-morbidities contributed significantly to mortality.* **Conclusion.** *We identified elderly age (> 50 yrs), multiple co-morbidities (diabetes, respiratory and cardiovascular) and a high Neutrophil:Lymphocyte Ratio (> 9) as significantly contributing to mortality.*

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INTRODUCTION

Covid - 19 is a worldwide health concern. First reported from China in December 2019, it has rapidly engulfed the world and was declared a pandemic by the WHO in January, 2020. The novel pandemic was christened as Coronavirus disease or COVID-19 caused by the *betacorona* virus SARS-CoV-2, closely akin to SARS-CoV-1 (2002) and the MERS (2012). The virus was isolated from human respiratory epithelial cells and after genomic sequencing was identified as seventh member of the family *betacoronavirus*, subfamily *Orthocoronavirus*, quite similar to bat coronaviruses [1].

The virus has a wide spectrum of symptoms due to the ability of its S protein to bind to h-ACE2 receptors on various tissues like lung, heart, kidneys, GI tract, and olfactory epithelium [2]. It predominantly affects middle aged adults. Elderly males are more commonly infected though no gender or age group has been spared [3].

Early transmission dynamics revealed the major mode of transmission to be large droplet mediated direct person to person (within ~6 ft distance) as well as through direct contact with contaminated surfaces. Aerosol (droplets of size 20–500 μm) transmission is a major mode of transmission to health care workers in hospital settings [4].

Different studies have quoted different risk factors for progression and outcome of the disease with no consensus opinion [5-8]. This study was conducted to assess the demographic characteristics of patients suffering from Covid-19 and to study their clinical features and factors contributing to mortality.

METHODS

Study design and setting

Retrospective study conducted in the Department of Anaesthesiology, MM Medical College & Hospital, Solan, India after approval from the Institutional Ethics Committee (vide MMMCH/IEC/21/490 Project No: 78). Being a retrospective study, patient consent was not needed. However, due diligence was observed to maintain patient confidentiality while collecting data. Data was analysed using Microsoft Excel (Office 2010). Complex computations were not needed since ours was not a comparative study.

Data collection procedure
Case files pertaining to Covid-19 patients admitted at our institute between 1st August 2020 and 31st January, 2021 were studied and data collected. Ethical Consideration: Due diligence was observed to adhere to all ethical considerations and patient confidentiality was maintained. No personally identifiable data was collected during the study.

RESULTS

We had 28 deaths out of 211 patients in the period under study (Mortality = 13.2%). A slight male: female preponderance was observed in the afflicted patients (57%:43%) with males at slightly higher risk of mortality. Those who presented with shortness of breath and required oxygen were 15 times more likely to succumb to the disease than those who didn't. Presence of co-morbidities especially respiratory and cardiovascular conditions increased the risk of death by at least 4 times [Table 1].

Table 1. Demographic Data

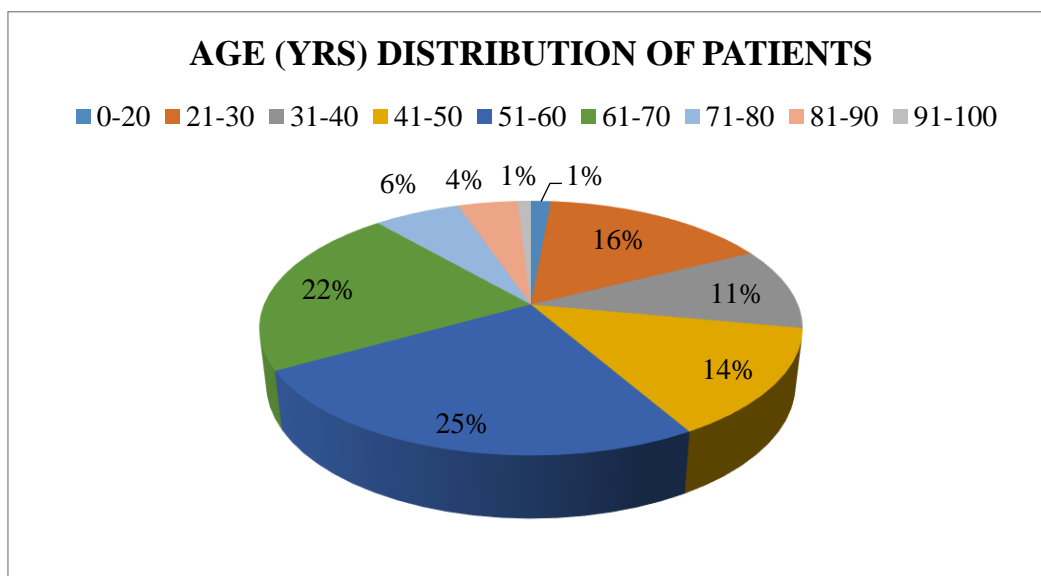| Characteristic	Observed Values (n = 211)			
Gender	Male	Mortality	Female	Mortality
	120 (57%)	18 (15%)	91 (43%)	10 (11%)
Oxygen Requirement	Yes	Mortality	No	Mortality
	137 (65%)	27 (20%)	74 (35%)	1 (1.3%)
Co-Morbidities Present	Yes	Mortality	No	Mortality
	107 (51%)	23 (21%)	104 (49%)	5 (5%)

Figure 1. Age Distribution of Patients

Most of the patients were in the 51 - 70 years age group (47%) although all age groups were affected (range 19 years - 95 years) [Fig 1].
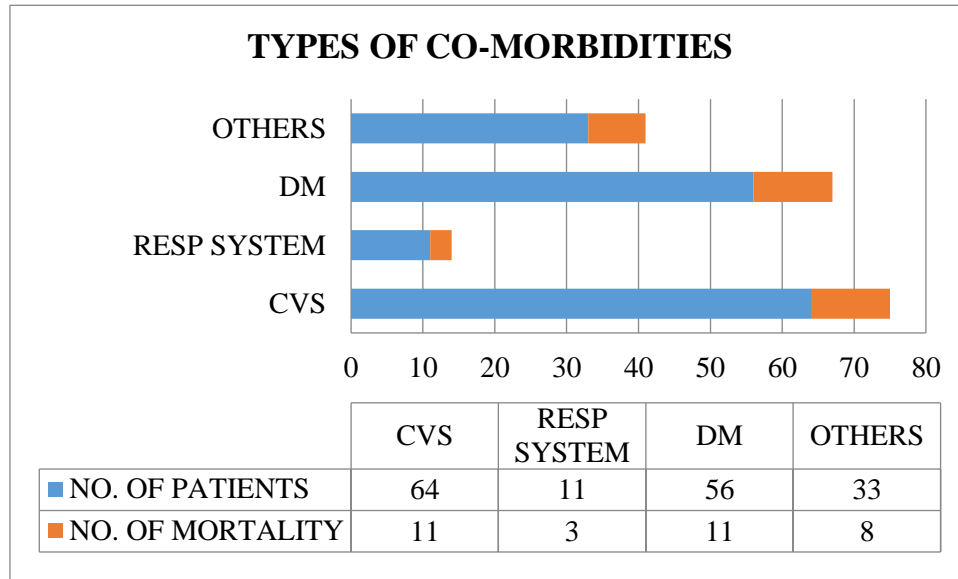
TYPES OF CO-MORBIDITIES

	CVS	RESP SYSTEM	DM	OTHERS
NO. OF PATIENTS	64	11	56	33
NO. OF MORTALITY	11	3	11	8

Figure 2. Co-Morbidities Seen in Patients
[Others included CNS Disorders, Thyroid Disorders, Cancers & Kidney Disorders].

Most of the patients had pre-existing Cardiovascular conditions (Hypertension, Coronary Artery Disease). Diabetes was the next commonly observed co-morbidity followed by respiratory conditions like COPD. Mortality was highest in the group presenting with respiratory co-morbidities (~ 25%). Diabetes had a mortality figure of 20% while Hypertension and CAD carried a 17% mortality risk [Fig 2].

Table 2. Neutrophil:Lymphocyte Ratio Observed

N:L Ratio	No. of Patients	No. of Deaths	Percent Mortality (%)
1 - 3	55	3	5.4
3.1 - 6	76	5	6.6
6.1 - 9	43	5	11.7
9.1 - 12	13	3	23
12.1 - 15	13	4	30.7
15.1 - 18	2	1	50
18.1 - 21	-	-	-
21.1 - 24	9	7	78
Total	211	28	13.2

It was observed that as the Neutrophil:Lymphocyte Ratio increased, the mortality figures rose. However, the mortality ratio rose disproportionately once the N: L Ratio crossed nine [Table 2]. The reason for this is unknown at present though it could be the subject of future study.

DISCUSSION

We collected data from a total of 211 identified cases in which 28 deaths were observed (~ 13%). This is quite high as compared to the usually mentioned ~ 2% mortality. However, since ours was a dedicated tertiary care COVID Centre, we

usually received patients in an advanced stage of the disease. Such patients usually needed ICU care including ventilator support. The higher mortality could be attributed to these factors as only 1 death (out of 133, < 1%) was recorded in patients admitted in wards while 27 out of 78 admitted in the ICU perished (~ 33%). These figures compare well with Howard et al and Woolf et al [9 - 11]. Ramanan et al found that gaps between observed and expected deaths widened at older ages [11]. Mortality ratios among males (~ 15%) as well as females (~ 11%) were comparable and followed the general age pattern. The maximum percentage of patients fell in the 50 - 70 years age group (range 19 to 95 years). No mortality was recorded in the less than 30 years age groups. This suggests that patients above 50 years are more susceptible to catch the disease and also to succumb to the disease. The reasons for this are still not known though it has been variously postulated that maybe it is because of this age group being the bread earners for the family and thus more liable to move out and thus being more liable to catch an infection. However, role of Hypertension, Diabetes Mellitus, COPD, Depressed Immunity has also been mentioned and cannot be ruled out [8-11]. It would need a much larger and a much longer study to comment on these factors.

There was, however, a clear cut relation between mortality and the Neutrophil:Lymphocyte (N:L) Ratio. It was noticed that the mortality figures showed an abrupt spike as the N:L Ratio moved upwards of 9 with almost 80% mortality when the ratio was more than twenty one. This could form the basis of a much more detailed study in the future.

CONCLUSION

Co-Morbidities, especially multiple co-morbidities, predispose a person to higher risk. So, they need intensive management early in the disease. Cardiac, Respiratory conditions and Diabetes Mellitus lead to higher mortality. These patients need to take great care not to get exposed to the disease. A Neutrophil: Lymphocyte Ratio more than nine can be a predictor of mortality.

Disclaimer

The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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