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Original Research Article

Clinical and radiological parameters among COVID deaths in a tertiary care COVID hospital

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ABSTRACT

Background: A total of 10682 patients were admitted in our tertiary care COVID hospital from April 2020 to January 2021. 419 patients died with a mortality rate of 3.92%. We have analysed 241 deaths that have taken place till 10th September 2020.
Methodology: We studied the history, symptomatology, HRCT chest, comorbidities, duration of hospital stay and special drugs administered along with the type of oxygen therapy.
Results: 88% of patients have more than 30% lung burden by HRCT. All the patients have a CO-RADS score of 4 or more. 81% of the patients have CT severity index of 15/25 or more. The CO-RADS classification is a standardized reporting system for patients with suspected COVID-19 infection developed for a moderate to high prevalence setting. 71% of patients expired within first five days of admission. 23% of patients died in 5 to 10 days of admission. 80% of patients presenting with < 80% SPO_2 died in first five days. 77% of patients have single or multiple comorbidities. 23% of patients did not have any comorbidities. 34% of patients gave history of alcohol intake 41.9% have history of smoking. 38% of patients gave past history of lung disease. Shortness of breath, generalized weakness and cough were the common symptoms. Loss of smell was seen in 22% and loss of taste was seen in 25%. 81% of patients had more than 5 days of symptoms before admission. 19% had less than 5 days of symptoms. 73% of patients presented with Modified Medical research Council Scale Grade 3 or 4 breathlessness. Patients required oxygen in multiple forms. Only 5% of patients were put on mechanical ventilator. Remdesivir was given in 96% of patients. Anti IL6 Tocilizumab was given in 25%. Plasma therapy was given in 5%.
Conclusions: Patients dying of COVID-19 disease had significant CT scan changes suggestive of corona disease. Past history of lung disease was seen in only a third. Shortness of breath was the commonest symptom and majority of the patients presented with SPO_2 of <90% and moderate to severe breathlessness.

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1. Introduction

Corona virus disease emanated from Wuhan City in China and spread throughout the world. In India the pandemic started from March 2020. Lock down observed in India decreased the spread of the disease and mortality. India witnessed more than 10 million cases in different states with a mortality of 1.47%. Severe viral Pneumonia and inflammatory storm associated with intravascular thrombosis is responsible for hypoxia and respiratory failure, ARDS and death.[1,2] The disease has a short incubation period of around 5 to 12 days and is particularly severe in old people and people with comorbidities.[3]

In this hospital based study we studied the clinical, radiological parameters, duration of hospital stay, comorbidities, history of smoking and alcohol intake, past history of lung disease, mode of oxygenation given and special drugs administered among the 241 patients who died because of COVID19.

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2. Materials and Methods

A total of 10,682 COVID patients were admitted in NRI Medical College General Hospital from 1st April 2020 to 31st January 2021. We have analysed the deaths of 241 patients who died of COVID 19 disease up to September 2020. After having taken consent from the patient and families and approval from the ethical committee of the hospital, we conducted this study. There was a total death toll of 419 patients till January 31st 2021. Hospital based mortality was 3.92%. We studied the history, symptomatology, HRCT chest, comorbidities, duration of hospital stay and special drugs administered along with the type of oxygen therapy among these 241 patients.

3. Results

Analysis of 241 deaths taken place in the hospital up to 10th September 2020 from the beginning of the pandemic in March 2020

A total of 10682 COVID patients were admitted and among them 419 patients died up to 31 January 2021 with a mortality rate of 3.92%.

4. Discussion

We have analysed 241 deaths that took place in our tertiary care covid hospital. A total of 10691 patients were admitted and 419 deaths occurred among COVID 19 patients with a mortality rate of 3.92% among hospital admissions. 71% of the patients are males and 29% are females. 93% of patients belonged to age group of 30 and above. A third of deaths occurred in the age group of 60 to 70.71% of patients died in the first five days of admission and 94% of patients died within 10 days of admission. 77% of patients dying of COVID had associated comorbidities single or multiple. 23% of the patients did not have any comorbidities.

HRCT chest analysis of the patients who have died of COVID disease revealed 88% of patients had more than 30% of lung burden. CT severity index was was more than 15/25 in 82% of these patients. All the patients have CO-RADS 4 or more in CT scan chest. Ran Yang study revealed CT index correlated with severity of inflammation with 83% specificity and 94% sensitivity.[4] Mathias Prokop etal., proposed CO-RADS score offers a five-point scale of suspicion for pulmonary involvement of COVID-19 at chest CT.[5] Same view is endorsed by Lieveld, et al.,[6] Egyptian study of Mona A. F. Hafez et al., reiterated same fact.[7]

72% of our patients died within first five days. Many of them were treated outside and were rushed to our centre with severe symptoms. Severity of symptoms hastened death among them. 99% of deaths occurred in first 10 days. 34% presented with SPO2 of less than 80% and 29% presented with SpO2 between 80 and 85%. 19% of patients had SPO2 between 85% and 90%. 82% of patients on the whole had SPO2 <90%. Xie et al., proved an association of mortality and hypoxia in COVIDd 19 patients.[8]

77% of these patients have associated comorbidities single or multiple and 23% had none. Patients having higher age, of>65 years, Diabetes, Hypertension and cardiovascular disease have more severe disease and increased mortality.[9] Smoking history was seen in 41.9% and history of alcohol intake was present in 34.43%.

Past history of Lung disease was present in 38% of patients and 62% had no history of lung disease. According to Leung et al., COPD patients have increased risk of severe COVID-19 pneumonia and poor outcome probably because of poor lung reserve and increased expression of ACE2 receptors in the small airways.[10] Hong Huang et al., study revealed patients of ILD have worse prognosis compared to non ILD COVID-19 patients.[11]

Breathlessness was present in all the patients followed by general weakness. Loss of smell and taste were found in less than 10% of patients. Hypoxemia without proportional signs of respiratory distress was found in our study also. This happy hypoxemia is due to hyperventilation secondary to leftward shift of Oxy-hemoglobin curve and alteration of hemoglobin by virus. Ventilation perfusion mismatch with increased alveolar dead space occurs in hypoxic patients.[12] 73% of our patients presented with grade 3 and 4 of MMRC at the time of admission. 81% patients in our study had 5 to 15 days of symptoms before coming to the hospital.

High flow nasal oxygen and mechanical ventilation were provided for less than 5% of patients with each modality. Bilevel positive airway pressure and non-rebreathing masks were provided for a majority.

Apart from anticoagulant and corticosteroid therapy Remdesivir was provided for more than 96% of patients. Tocilizumab was given for 26% and Convalescent Plasma therapy was given for less than 5% of patients.[13]

5. Conclusions

COVID pandemic started in our tertiary care centre in the month of April 2020 and peaked in August and September 2020 both in terms of hospital admissions and mortality. After that the pandemic has shown a decline with an overall mortality of 3.92%. Patients dying of COVID-19 disease had significant CT scan changes suggestive of corona disease. Past history of lung disease was seen in only a third. Shortness of breath was the commonest symptom and majority of the patients presented with SPO_2 of <90% and moderate to severe breathlessness. All modalities oxygenation were provided except ECMO. Ventilation and HFNO were provided for <5%. Remdesivir was given for a majority. Limited number of patients received Tocilizumab and Convalescent Plasma.

6. Acknowledgement

None.

Table 1: Gender Distribution:

Gender	No. of Patients	Total No. of Deaths No	Percentage
Male	171	241	71%
Female	70	241	29%

Table 2: Age Distribution

Age Group	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81 and above
No. of Patients	01	01	03	12	30	57	81	44	12
Percentage	0.41%	0.41%	1.23%	4.92%	12.3%	23.37%	33.21%	18.04%	4.92%

Table 3: Duration of Hospital stay

Duration of Hospital Stay	1-5 days	6-10 days	11-15 days	16-20 days	>20 days
No. of Patients	172	55	09	04	01
Percentage	71.36%	22.82%	3.73%	1.66%	0.41%

Table 4: Comorbidities among COVID deaths

Comorbidity	No. of Patients	Percentage
Diabetes Mellitus + Hypertension +Chronic kidney Disease	10	4.15%
Diabetes Mellitus +Hypertension + Cerebrovascular Accident	03	1.24%
Chronic Kidney Disease +Chronic Lung Disease	02	0.82%
Diabetes Mellitus + Hypertension +Coronary Artery Disease	07	2.90%
Diabetes Mellitus + Hypertension	32	13.27%
Hypertension	37	19.51%
Hypothyroidism	08	3.31%
Diabetes Mellitus + Coronary Artery disease	09	3.73%
Diabetes Mellitus	124	51.45%
Chronic Lung Disease	03	1.24%
Chronic Kidney Disease	28	11.61%
No Comorbidity	55	22.82%

Table 5: Lung Burden involvement by HRCT scan Chest

Lung Burden	No. of Patients	Percentage
10-20%	03	1%
20-30%	27	11%
30-40%	36	15%
40-50%	67	28%
50-60%	43	18%
60-70%	36	15%
>70%	29	12%

Table 6: CO-RADSscore by CT Chest

CO-RADS Score	No. of Patients	Percentage
CORADS 4	60	25%
CO-RADS 5	76	32%
CO-RADS 6	105	43%

Table 7: CT Severity Index

CT severity	No. of patients	Percentage
0-7/25	02	0.82%
8-15/25	42	17.42%
15-25/25	96	39.83%
20-25/25	101	41.9%

Table 8: Comparison of No. of days of Hospital stay and SPO2 at admission

No. of days of Hospital Stay	Total No. of Patients	SPO2 at admission <80%	SPO2 80-85%	SPO2 85-90%	SPO2 90-95%	SPO2 >95%
1-5 days	172(71.36%)	66 (27.38%)	54 (22.45)	42 (17.43%)	9(3.73%)	1 (0.41%)
6-10 days	55 (22.82%)	12 (4.98%)	14 (5.80%)	16 (6.64%)	08 (3.32%)	5 (2.07%)
11-15 days	9 (3.73%)	3 (1.23%)	2 (0.83%)	1(0.41%)	1 (0.41%)	2 (0.83%)
16-20 days	04 (1.66%)	1 (0.41%)	1 (0.41%	1 (0.41%)	1 (0.41%)	0
>20days	1 (0.41%)	0	0	1(0.41%)	0	0

Table 9: Comparing the SPO_2 at Admission and Hospital stay:

SPO_2 at Admission	Hospital stay 1-5 days	6-10 days	11-15 days	16 – 20 days	>20 days
<80%	66	12	3	1	0
80-85%	54	14	2	1	0
85-90%	42	16	1	1	1
90-95%	9	8	1	1	0
>95%	1	5	2	0	0
Total	172	55	9	4	1

Table 10: H/O Alcohol Intake

Habit of Alcohol Intake	No. of Patients	Percentage	Total Number of patients
Yes	83	34.43%	241
No	158	65.56%%	241

Table 11: Smoking History

Smoking History	No. of patients	Percentage	Total No. of Patients
Yes	101	41.9%	241
No	140	58.09%	241

Table 12: Past History of Lung Disease

Lung Disease	No. of patients	Percentage
COPD	29	12%
ILD	15	6.2%
Bronchiectasis	14	5.8%
Bronchial Asthma	28	11.6%
Tuberculosis	5	2%
No Lung Disease	150	62.24%

Table 13: Complaints at the time of admission

Symptom	No. of Patients	Percentage
SOB	241	100%
Fever	82	34.02%
Chest Pain	56	23.23%
Cough	96	39.83%
Generalized weakness	204	84.6%
Palpitation	108	44.8%
Loss of smell	54	22.41%
Throat pain	80	33.19%
Loss of taste	60	24.89%
Anxiety	154	63.9%

Table 14: MMRC Scale of SOB at the time of Admission

MMRC Grading	No. of Patients	Percentage
Grade I	21	8.71%
Grade II	45	18.67%
Grade III	80	33.19%
Grade IV	95	39.41%

Table 15: Duration of Symptomsbefore Admission

Duration of symptoms	No. of Patients	Percentage
1-5 days	45	18.67%
5-10 days	60	24.89%
10-15 days	136	56.43%

Table 16: Mode of Oxygenation

Type of Oxygenation	No. of Patients	Percentage
Oxygen Mask	44	18.25%
NRBM	71	29.46%
Venturi Mask	51	21.16%
BIPAP	102	42.32%
HFNO	12	4.97%
Mechanical ventilation	12	4.97%

Table 17: Special drugs given along with Steroid and Low Molecular weight Heparin

Drug	No. of patients	Percentage
Remdesivir	232	96.26%
Tocilizumab	64	25.55%
Plasma Therapy	12	4.97%

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8. Conflict of Interest

The authors declare that they have no conflict of interest.

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