Study of clinical profile & outcome in elderly patients with COVID-19

Abstract

Introduction: Novel beta coronavirus (SARS-CoV-2) has caused widespread transmission of coronavirus illness (COVID-19) in India from March 2020. In comparison to younger adults, older people and those with numerous co-morbidities are known to be more severely affected by seasonal flu and to have a higher mortality rate. The mortality rate increases significantly in the age groups over 60 years old with SARS-CoV-2 infection. With this objective present study was undertaken to study clinical profile and outcome in elderly COVID 19 patients

Material & Method: Data of 100 elderly patients aged 60 years and older with COVID-19 were obtained from hospital record section. It consisted of clinical characteristics, respiratory manifestations, laboratory parameters and radiological findings. COVID-19 confirmation was based on reverse transcription polymerase chain reaction (RT-PCR). 100 patients were divided into two groups based on outcome as Group A (Survivors) and Group B (Non-Survivors). They included 66 males and 34 females.

Observation & Result: Respiratory rate more than 30 was mainly present in group B patients (19 %) compared to group A. In majority patients i.e. 79 (79 %) SpO2 was between 80 to 95 range and majority i.e. 35 (35 %) given Oxygen via nasal prongs. Haemoglobin <12 and Leucocytes ≤ 11000 was found in maximum patients. CRP, D dimer and random blood sugar showed statistically significant difference between two groups (P<0.0001). Ground glass opacities was main pattern found in 46 (46 %), Bilateral Consolidation found in 41 (41 %) and Unilateral Consolidation in 13 (13 %). Results showed no statistically significant difference amongst two groups (P=0.725)

Discussion: A progressive and relatively linear increase in nasal cavity volume with increasing age along with an age-dependent decrease of nasal resistance are possible determinants for a higher prevalence of COVID in the elderly population

Conclusion: An individualized approach should be offered to older adults targeting the beneficial and negative effects of therapeutic approach

Keywords: COVID 19, elderly patients, SARS-CoV

Introduction

Novel beta coronavirus (SARS-CoV-2) has caused widespread transmission of coronavirus illness (COVID-19) in India from March 2020[1]. "SARS-CoV-2 is a severe acute respiratory syndrome coronavirus with a high pathogenicity to humans"[1]. Fever, cough, dyspnoea, tiredness, and myalgia are some of the most typical clinical signs of COVID-19. There have been a few cases of severe pneumonia in individuals, and they may exhibit acute respiratory distress

syndrome (ARDS), extrapulmonary organ failure, or even death[2]. Globally, more than 64.9 lakh patients have perished from COVID-19, and over 60.3 Cr people have contracted SARS-CoV-2[3]. "On March 12, 2020, the World Health Organization (WHO) proclaimed the COVID-19 outbreak a global pandemic"[4].

38.6% of COVID-19-related deaths nationwide occurred in elderly individuals. 2. It has been discovered that elderly individuals are more prone to contracting this infection. Early studies from China indicated increasing disease severity and death among people 60 years of age and older[5] and early reports from Europe indicated a similar pattern, with mortality reported to be as high as 10% in individuals 70 years of age and older, compared to 1% in young adults[6]. Elderly patients have a greater need for intensive care unit (ICU) admission and mechanical ventilation than younger adults[7]. These results are consistent with other respiratory viral diseases' clinical outcomes, such as the influenza and SARS (Severe Acute Respiratory Syndrome). In comparison to younger adults, elderly individuals and those with numerous co-morbidities are known to be more severely affected by seasonal flu and to have a higher mortality rate[8,9]. "The mortality rate increases significantly in the age groups over 60 years old with SARS-CoV-2 infection. More than 800 million people worldwide will be included in this vulnerable group because more than 12% of the population is over 60"[10]. "Patients with respiratory infections may appear with exhaustion, anorexia, and delirium instead of fever and a productive cough in older patients, as well as other atypical clinical characteristics"[11,12]. This may cause these patients' diagnoses to be delayed, which would lead to increase mortality. We need to pay attention to the pandemic's at-risk group of older individuals. Thus present study was undertaken to study clinical profile and outcome in elderly COVID 19 patients

Material and Method

Present study is a retrospective observational study performed between march 2021 to April 2022 in a Tertiary care institute in Marathwada region of Maharashtra. Institutional ethics committee permission was taken prior to commencement of this study.

Inclusion criteria

1. Confirmed COVID 19 positive patients with Age > 60 years diagnosed by antigen test/RT-PCR and HRCT.
2. Moderate to severe category patients according to CT severity.[20]

Exclusion criteria

1. Immunocompromised individuals (including those on systemic immunosuppressants)

2. Malignancy

Data of 100 elderly patients aged 60 years and older with COVID-19 were obtained from hospital record section. It consisted of clinical features, respiratory support details, vitals, laboratory parameters and radiological findings. COVID-19 confirmation was based on reverse transcription polymerase chain reaction (RT-PCR). 100 patients were divided into two groups based on the ultimate outcome of patients' stay in hospital – whether patient survived the stay or not.

1. **Group A (76 patients):** Survivors
2. **Group B (24 patients):** Non-Survivors

Operational definition

Severity grading as per Maharashtra state COVID-19 task force guidelines[13]

A. **Category A:** Asymptomatic but positive for COVID-19.
B. **Category B:** Symptomatic/URTI (Upper respiratory tract infection) without comorbidity
C. **Category C:** Symptomatic/URTI with comorbidity
D. **Category D:** Pneumonia (LRTI) (Lower Respiratory tract infection) without respiratory failure
E. **Category E:** Pneumonia (LRTI) with respiratory failure
F. **Category F:** Pneumonia (LRTI) with respiratory failure with sepsis/ septic shock/ multi-organ dysfunction syndrome.

Statistical Analysis

Statistical analysis was performed using Medcalc software. Data are expressed as mean ± SD, frequency and percentage N (%). 'Unpaired t-test' were used for comparing the two groups, $\chi 2$-test was used to evaluate correlation between two variables. Statistical significance was assumed if P value less than 0.05.

Result

In **Table 1** showing distribution of cases according to clinical history, maximum patients in our study i.e. 60 (60 %) were from age group 60 to 69 years and male preponderance was found too (66 %). Category E patients were maximum in number (69 %). In **Table 2** showing distribution of cases according to respiratory vitals, > 30 RR was mainly present in group B patients (19 %) compared to group A. In majority patients i.e. 79 (79 %) SpO2 was between 80

to 95 range and majority i.e. 35 (35 %) given O2 via nasal prongs. In **Table 3** showing distribution of cases according to laboratory Parameters, Hb <12 and WBC ≤ 11000 was found in maximum patients. CRP, D dimer and RBS showed statistically significant difference between two groups (P<0.0001). In **Table 4** showing distribution of cases according to radiological findings, ground glass opacities was main pattern found in 46 (46 %), Bilateral Consolidation found in 41 (41 %) and Unilateral Consolidation in 13 (13 %). Results showed no statistically significant difference amongst two groups (P=0.725)

Table 1: Distribution of cases according to clinical history

Sr No.	Characteristic	Group A (N=76)	Group B (N=24)	P value	Total
1	**Age** 60 to 69	48 (63.15%)	12 (50 %)	0.127071	**60 (60 %)**
	70 to 79	24 (31.57%)	9 (37.5%)	0.295969	**33 (33 %)**
	80 to 89	4 (5.26%)	3 (12.5 %)	0.114336	**7 (7 %)**
	90 to 99	0 (0 %)	0 (0 %)		**0 (0 %)**
2	**Gender** Male (N %)	51 (67.10 %)	15 (62.5 %)	0.339452	**66 (66 %)**
	Female (N %)	25 (32.89%)	9 (37.5%)	0.339452	**34 (34 %)**
3	**Comorbidity** DM	30 (39.47 %)	22 (91.66 %)	0.000011	**52 (52 %)**
	<5 years	16(21.05%)	4(16.66%)	0.320308	**20 (20 %)**
	5-10 years	10(13.15%)	8(33.33%)	0.021360	**18 (18 %)**
	>10 years	2(2.63%)	12(50%)	0	
	HTN	48 (63.15 %)	24 (100 %)	0.50	**14 (14 %)**
	IHD	32 (42.10%)	12 (50%)	0.249290	**72 (72 %)**
	COPD	34 (44.73 %)	20 (83.33 %)	0.000659	**44 (44 %)** **54 (54 %)**
4	**Symptoms**				
	Breathlessness	26 (34.21 %)	22 (91.66 %)	0.000002	**48 (48 %)**
	Fever	67 (88.15 %)	24 (100 %)	0.50	**91 (91 %)**
	Cough	54 (71.05 %)	24 (100%)	0.50	**78 (78 %)**
	Myalgia	56 (73.68%)	24 (100 %)	0.50	**80 (80 %)**
	Sore throat	42 (55.26 %)	22 (91.66%)	0.819	**64 (64 %)**
	Nausea/Vomiting/Diarrho	12 (15.78 %)	8 (33.33%)	0.32012	**20 (20 %)**

	ea				
	Category of presentation				
	Category A, B, C	0 (0 %)	0 (0 %)		**0 (0 %)**
	Category D	10 (13.15 %)	1 (4.16 %)	0.111331	**11 (11 %)**
	Category E	56 (73.68 %)	13 (54.16 %)	0.037284	**69 (69 %)**
	Category F	10 (13.15 %)	10 (41.66 %)	0.001499	**20 (20 %)**

Table 2: Distribution of cases according to respiratory vitals

Sr No.	Respiratory vital		Group A (N=76)	Group B (N=24)	P value as calculated by T test	Total
1	**RR**	10 to 20	16 (21.05 %)	1 (4.16 %)	0.028890	17 (17 %)
		20 to 30	55 (72.36 %)	4 (16.66 %)	0.000002	59 (59 %)
		> 30	5 (6.57%)	19 (79.16 %)	0.000000	24 (24 %)
2	**SPO2 (On Room Air)**	< 60	0 (0 %)	2 (8.33 %)		**2 (2 %)**
		60 to 80	1 (1.31 %)	7 (29.16%)	**0.000015**	**8 (8 %)**
		80 to 90	30 (39.47 %	9 (37.5 %)	**0.431575**	**39 (39 %)**
		90 to 95	36 (47.36 %)	4 (16.66 %)	**0.4361**	**40 (40 %)**
		95 to 100	9 (11.84 %)	2 (8.33 %)	**0.316526**	**11 (11 %)**
3	**Mode of Oxygenation**					
	No supplemental O2		10 (13.15 %)	1 (4.16 %)	**0.111331**	**11 (11 %)**
	Nasal Prongs		33 (43.42 %)	2 (8.33 %)	**0.001111**	**35 (35 %)**
	NRBM		22 (28.94 %)	3 (12.5 %)	**0.053985**	**25 (25 %)**
	NIV		9 (11.84 %)	9 (37.5 %)	**0.002647**	**18 (18 %)**

	Invasive Ventilation	2 (2.63 %)	9 (37.5%)	**0.000003**	**11 (11 %)**

Table 3: Distribution of cases according to laboratory Parameters

Sr No.	Lab Parameters	Group A (N=76)	Group B (N=24)	P value
1	**Hb** < 12	42 (55.26 %)	15 (62.5 %)	
	≥ 12	34 (44.73 %)	9 (37.5 %)	**0.532**
2	**WBC** ≤ 11000	56 (73.68 %)	13 (54.16 %)	
	> 11000	20 (26.31 %)	11 (45.83 %)	**0.071**
3	**Platelet** ≤ 150000	12 (15.78 %)	8 (33.33 %)	
	> 150000	64 (84.21 %)	16 (66.67 %)	**0.061**
4	**CRP**	22.9 ± 3.99	30.03 ± 7.77	**<0.0001**
5	**D dimer**	2.02 ± 0.94	3.2 ± 0.81	**<0.0001**
7	**Serum Creatinine** ≤ 1.2	59 (77.63%)	16 (66.67 %)	
	> 1.2	17 (22.36 %)	8 (33.33 %)	**0.279**
8	**PaO2-FiO2 ratio** < 100	6 (7.89 %)	8 (33.33%)	
	100 to 200	32 (42.10 %)	12 (50 %)	**0.001**
	> 200	38 (50 %)	4 (16.67 %)	
10	**Random blood sugar**	190 ± 48.79	251 ± 42.68	**<0.0001**
11	**N/L Ratio**	2.33 ± 0.22	4.41 ± 0.62	**<0.0001**

Table 4: Distribution of cases according to radiological findings

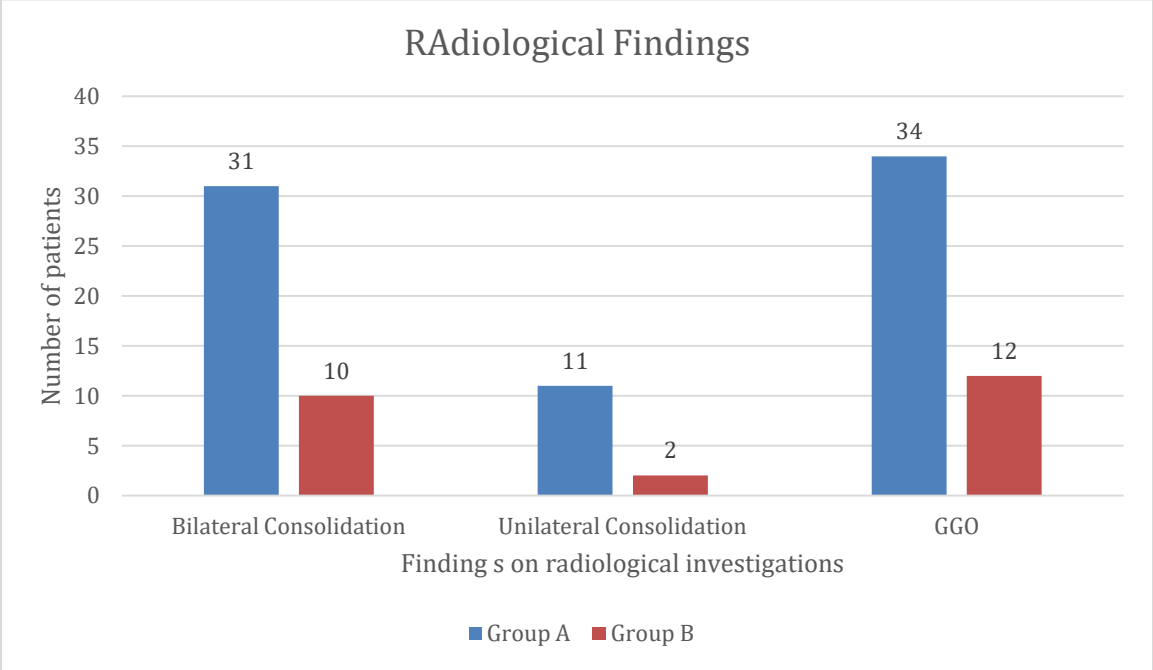
Sr No.	Radiological findings	Group A (N=76)	Group B (N=24)	P value
1	**Bilateral Consolidation**	31 (40.78 %)	10 (41.66 %)	**0.469719**
2	**Unilateral Consolidation**	11 (14.47 %)	2 (8.33%)	**0.218699**
3	**Ground glass opacities**	34 (44.73 %)	12 (50 %)	**0.326491**

Table 5: Distribution of cases according to mode of O2 and outcome

Sr No.	Comorbidi	NIV	P value	Invasive Ventilation	P value

	ty	Discharged (9) (%)	Mortality (9) (%)		Discharged (2) (%)	Mortality (9) (%)	
1	**Diabetes**	3 (33.33 %)	5 (55.5 %)	0.178446	1 (50 %)	6 (66.66 %)	0.04987
2	**Hypertensive**	4 (44.44 %)	3 (33.3 %)	0.317648	1 (50 %)	3 (33.33 %)	0.334041
3	**Both**	2 (22.22 %)	2(22.22 %)	0.50	0 (0 %)	2 (22.22 %)	-

Graph 1: Distribution of cases according to radiological findings



Discussion

Present study consisted of 100 elderly patients aged 60 years and older with COVID-19. Data on clinical characteristics, vitals, laboratory parameters and radiological findings were obtained from hospital record section. COVID-19 confirmation was based on reverse transcription polymerase chain reaction (RT-PCR). On outcome basis patients were divided into two groups Group A (Survivors) and Group B (Non-Survivors). All data were evaluated and results compared between two groups. Results obtained consisted of maximum patients i.e. 60 (60 %) from age group 60 to 69 years and more male patients (66 %). Category E patients were

maximum in number (69 %). > 30 RR was mainly present in group B patients (19 %) compared to group A. In majority patients i.e. 79 (79 %) SpO2 was between 80 to 95 range and majority i.e. 35 (35 %) given O2 via nasal prongs. Hb <12 and WBC ≤ 11000 was found in maximum patients. CRP, D dimer and RBS showed statistically significant difference between two groups (P<0.0001). Ground glass opacities was main pattern found in 46 (46 %), Bilateral Consolidation found in 41 (41 %) and Unilateral Consolidation in 13 (13 %). Results showed no statistically significant difference amongst two groups (P=0.725). In similar study by **Muhammad K. Azwar et al (2020)**[14] **"**they obtained clinical characteristics, symptoms, comorbidities, multimorbidity, and mortality outcome in elderly inpatients. Among elderly patients' majority of patients had no history of close contact with COVID-19 patient. The most common symptoms were fever, cough and shortness of breath whereas the most common chronic diseases were diabetes mellitus, hypertension, and malignancy. Multimorbidity was only found in 14% of patients, all of whom remained alive following SARS-CoV-2 infection. The death rate among elderly inpatients with COVID-19 in this study was 23%, and male older adults contributed to 90% of death cases. They concluded that male patients dominated both confirmed cases and death cases among elderly with COVID-19. Classic symptoms of COVID-19 were only found in about half of the study patients. Non-survivors had higher percentage of the classic symptoms of COVID-19 than survivors. Atypical COVID-19 presentations are possible in older adults. They postulated that immune-senescence and sex-specific immunoregulatory function play an important role in causing death in this study cohort". **Ting Guo et al (2020)**[15] reviewed **"**medical records of elderly patients who were diagnosed with COVID-19 in Hunan province, China, from January 21 to February 19, 2020. Of the 105 elderly patients confirmed with COVID-19 overall, 69.5% of patients had underlying diseases, and the most common comorbidities included

hypertension (43.8%), diabetes (25.7%), and cardiac disease (16.2%). Of the elderly patients, 22.9% were severe and 10.5% were critical severe cases. On admission, the most frequent symptoms in elderly patients included fever (66.7%), cough (64.8%), and fatigue (33.3%). Lymphopenia (31.4%), increased D-dimer (38.1%), depressed albumin (36.2%), elevated lactate dehydrogenase (41.0%), and a high level of C reactive protein (79.0%) were common among elderly patients with COVID-19. They concluded that elderly patients usually have chronic medical illness and are likely to have a severe or critically severe condition. They could show atypical symptoms without fever or cough and multiple organ dysfunction. Careful nursing, observation, and systemic treatment are very important in elderly patients". **Sunny Singhal et al (2021)[16]** in their study "forty-six studies with 13,624 older patients were included. Severe infection was seen in 51% patients while 22% were critically ill". The common comorbidities were hypertension, diabetes mellitus and cardiovascular disease. Common symptoms were fever, cough and dyspnoea. Overall, 84% required oxygen support and 21% required mechanical ventilation.

Among COVID 19 patients several conditions increase virus susceptibility. Such as comorbidities which often increase with aging, may contribute to more severe COVID-19. Aging itself has been strongly associated with pathophysiological changes in respiratory pathway. **Svartengren et al (2005)[17]** in their study have found an age-related decline in the clearance of inhaled particles in the small airway region which suggests this factor may be responsible for the high prevalence of respiratory symptoms among the elderly. There is also evidence of a gradual decrease in the number of cilia and ciliated cells in the airway with aging[18]. **Martin et al (1997)[19]** in their study demonstrated that upper airway size decreases with increasing age in both men and women. Also, men have greater upper airway collapsibility than women. This represent

different prevalence of COVID infection amongst two gender. A progressive and relatively linear increase in nasal cavity volume with increasing age along with an age-dependent decrease of nasal resistance are possible determinants for a higher prevalence of COVID in the elderly population[20]

Conclusion

To summarize statistically significant findings in our study, Diabetes as comorbidity was significantly associated with mortality (p value- 0.000011), significance rose lot when duration of disease was considered, in that >10 yr duration was most significantly associated with mortality (p value 0) while duration 5-10 years was also highly significant (0.021360). Co-existent COPD was highly associated with mortality in elderly (p value - 0.000659).

Amongst symptoms at time of presentation, elderly patients presenting with breathlessness (p value 0.000002) had high mortality.

In category of presentation, Category E(p value 0.037284) and Category (0.001499) had more mortality.

Those with RR 20-30/min (p value 0.000002) and more than 30/min (p value 0) had high mortality. Patients with SPO2 (p value 0.000015) 60-80% on room air as well as those with high PaO2-FiO2 ratio (p value 0.001) were more likely to have fatal outcome.

In the modes of ventilation, those patients requiring NIV (p value 0.002647) and Intubation (p value 0.000003) had significantly more mortality whereas those who could maintain on nasal prongs (p value **0.001111**) had significantly less mortality.

In lab values, parameters associated with high mortality were CRP (p value <0.0001), D dimer (p value <0.0001), Random blood sugar (p value <0.0001) and high N/L ratio (p value <0.0001) Hence biochemical markers and comorbid conditions significantly affect mortalities among elderly patients in our study.

Limitations of the study:

Present study was limited to single tertiary care centre. Inclusion of more number of centres would help in countering confounding factors like treatment protocols which may be specific to each hospital and would also present us with more interesting insights.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

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