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To compare COVID-19 disease in elderly (young old and elderly-old) in a tertiary care center

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ABSTRACT

Background: SARS-Cov-2 is a coronavirus that caused the coronavirus disease 2019 (COVID-19) disease outbreak in late 2019 in Wuhan China. By early 2020, the disease had rapidly spread across the world and was declared a global pandemic as a public health emergency of international concern. The mechanisms behind the behavior of SARS-cov-2 in the elderly include immunosenescence and related impaired antiviral immunity, mature immunity, and related hyper-inflammatory responses. We aim to summarize the clinical features and outcomes of elderly COVID-19 patients and compare the difference between young-old patients (60–74 years old) and elderly-old patients (≥75 years old). **Aims and Objective:** (1) The aim of the study was to compare the clinical and biochemical profile of young-old patients and elderly-old COVID-19 patients. **Materials and Methods:** A cross-sectional study was conducted on a total of 389 patients, during the study period from March 2021 to September 2021. Case record form with follow-up chart was used to record the duration of disease, history of treatment, and complications. Patients underwent biochemical investigations. **Results:** The study includes 389 patients, 331 were not young-old and 58 were elderly-old. Mean age of young-old group 65.01 ± 4.10 years and elderly-old group 80.74 ± 5.35 years. Mortality in elderly-old group (29.3%) and young-old group (15.4%) with significant P = 0.02. Comparing inflammatory markers such as total leucocyte count and neutrophil count are more in elderly-old than young-old COVID-19 patients, this difference is statistically significant P < 0.005. **Conclusion:** Elderly patients usually have chronic comorbidities and are likely to have a severe or critically severe condition. They could show atypical symptoms. Elderly-old patients tend to have more complications than young-old patients during hospitalization. Careful nursing, observation, and systemic treatment are very important in elderly patients.

Key words: COVID-19; Young-old; Elderly-old; Total leukocyte count; D-dimer

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INTRODUCTION

SARS-Cov-2 is a coronavirus that caused the coronavirus disease 2019 (COVID-19) disease outbreak in late 2019 in Wuhan China. SARS-cov-2 pathogenesis is mainly dependent on the spike protein binding to angiotensin-converting enzyme 2 (ACE2) receptors, with cell entrance required ACE2 receptor cleavage by a Type 2 transmembrane serine protease to activate the viral spike protein.[1]

The mechanisms behind the behavior of SARS-Cov-2 in the elderly include immunosenescence and related impaired antiviral immunity, mature immunity and related hyper-inflammatory responses, comorbidities and their effects on the functioning of critical organs/systems, and the altered expression of ACE2 that acts as an entry receptor for SARS-Cov-2.[2]

In addition, the elderly exhibit a continual production of inflammatory mediators and cytokines, also known as

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"inflammaging." Furthermore, aberrant ciliary function and ciliary ultrastructural anomalies might jeopardize successful clearance of virus SARS-CoV-2 particles in older adults.[3]

The pneumonia severity index (PSI) score of the elderly group was higher when compared to the young and middle-aged group: The proportion of patients with PSI Grade IV and V was significantly higher in the elderly group. Among elderly patients, it should be noted that the percentage of patients complaining of more severe dyspnea and tachypnea was higher in non-survivors, while fever and headache were more common in survivors. Atypical presentation in older adults may include delirium, low-grade hyperpyrexia, and abdominal pain, complicating the diagnostic course.[4]

All the studies suggest that elderly are more susceptible to COVID-19 and likely to have poor outcomes. The features and differences in young-old (60–74 years old) and elderly-old (≥75 years old) patients are less. In this study, we aim to summarize the clinical features and outcomes of elderly COVID-19 patients and compare the difference between young-old patients and elderly-old patients.

Aims and objective

1) The aim of the study was to compare the clinical and biochemical profile of young-old patients and elderly-old COVID-19 patients.

MATERIALS AND METHODS

A cross-sectional study was conducted on a total of 389 patients, during the study period from March 2021 to September 2021. Data were collected from a total of 389 patients presenting to the Department of General Medicine Triage and COVID ward/intensive care unit fulfilling the inclusion criteria.

After obtaining approval and clearance from the Institutional Ethics Committee (BMCRI/PS/02/2020-21), the patients fulfilling the inclusion criteria were enrolled for the study after obtaining informed consent. Case record form with follow-up chart was used to record the duration of disease, history of treatment, and complications. COVID-19 infection was be diagnosed by either reverse transcription-polymerase chain reaction (RT-PCR) or rapid antigen test (RAT) technique. Patients underwent biochemical investigations which included complete blood count, liver function test, renal function test, serum electrolytes, serology, C-reactive protein (CRP), lactate dehydrogenase (LDH), D-dimer, and serum ferritin. Based on age, patients are divided into two groups young-old (60–74 years) and elderly-old (>75 years).

Inclusion criteria

The following criteria were included in the study:

1) Patients willing to give informed written consent
2) Adult patients (60 years and above) with either RT-PCR or RAT positive for COVID-19.

Exclusion criteria

The following criteria were excluded from the study:

1) Patient not willing to give informed consent
2) Age <60 years

Method of statistical analysis

The data were collected and entered in the MS Excel spread sheet and analyzed using STATA statistical software version 14 (StataCorp LCC, Lake way Drive College Station, Texas, USA). The categorical variables were summarized using frequencies and proportions. The continuous variables were summarized using mean with standard deviation or median with interquartile range based on the distribution of data. Age was categorized based on 10 year intervals. Chi-square test and Fischer's exact test were using to test the statistical significance of categorical data. T test and Mann–Whitney U test were used to test the statistical significance of continuous variables. $P<0.05$ was considered to be significant.

RESULTS

Demographic data

The study included 389 patients in that 331 were young-old and 58 were elderly-old. Mean age of young-old group 65.01±4.10 years and elderly-old group 80.74±5.35 years, this difference is statistically significant with $P<0.001$ (Table 1).

Majority are male in both the groups 62.5% in young old and 60.3% in elderly-old, this difference is statistically insignificant.

In our study, in young-old group, majority patients are diabetic with hypertensive (24.5%), CKD (17.2%), and others (11.5%) and in elderly-old group diabetic with hypertensive (27.6%), CKD (15.5%), and others (22.4%) (Table 2).

Table 1: Demographic data

Age	60–74 (years) Young-old	>75 (years) Elderly-old	P-value
Number	331	58	
Age mean (SD)	65.01 ± 4.10	80.74 ± 5.35	<0.001
Sex			
Male	207 (62.5%)	35 (60.3%)	0.75
Female	124 (37.5%)	23 (39.7%)	

In young-old group, the most common clinical features are fever (34.7%), cough (32%), and dyspnea (28.4%) and in elderly-old group, cough (41.4%), dyspnea (34.5%), and fever (31%) (Table 3).

Table 2: Comorbidities

Comorbidities	60–74 (years) Young-old	>75 (years) Elderly-old
None	108 (32.6)	11 (19.0)
Diabetes	25 (7.6)	2 (3.4)
Hypertension	22 (6.6)	7 (12.1)
DM/HT with complication	81 (24.5)	16 (27.6)
CKD	57 (17.2)	9 (15.5)
Others	38 (11.5)	13 (22.4)

Table 3: Clinical features

Clinical feature	60–74 (years) Young-old	>75 (years) Elderly-old	P-value
Fever			
Absent	216 (65.3%)	40 (69.0%)	0.58
Present	115 (34.7%)	18 (31.0%)	
Cough			
Absent	225 (68.0%)	34 (58.6%)	0.16
Present	106 (32.0%)	24 (41.4%)	
Dyspnea			
Absent	237 (71.6%)	38 (65.5%)	0.35
Present	94 (28.4%)	20 (34.5%)	
Sore throat			
Absent	313 (94.6%)	53 (91.4%)	0.34
Present	18 (5.4%)	5 (8.6%)	
Myalgia			
Absent	279 (84.3%)	52 (89.7%)	0.29
Present	52 (15.7%)	6 (10.3%)	

Table 4: Outcome

Outcome	60–74 (years) Young-old	>75 (years) Elderly-old	P-value
Discharged	273 (82.5%)	39 (67.2%)	0.026
Death	51 (15.4%)	17 (29.3%)	
Referred	7 (2.1%)	2 (3.4%)	

In our study, there is an increased death rate in elderly-old group (29.3%) and young-old group (15.4%) with significant P=0.02 (Table 4)

Comparing inflammatory markers in young-old and elderly-old COVID-19 patients.

Median TLC in young-old patients7900 (6200-9900) IQR) and elderly-old patients 9350 (7100-11900) with significant p value=0.02. Mean Neutrophil count in young-old 70.72 ±14.52 and elderly-old patients 95.89 ±147.11 with significant p value=0.02, that is elderly-old patients have increased TLC and neutrophil count which is statistically significant. Lymphopenia was common in elderly-old group then young old group. Other inflammatory markers such as LDH, D-dimer, CRP, and ferritin are higher in elderly-old patients than in young-old COVID, patients which was statistically insignificant with P>0.005 (Table 5).

DISCUSSION

We carried out study on 389 laboratory confirmed COVID-19 patients in tertiary care center, Bangalore. Three hundred and thirty-one were young-old and 58 were elderly-old.

In young-old group, the most common clinical features are fever (34.7%), cough (32%), and dyspnea (28.4%) and in elderly-old group cough (41.4%), dyspnea (34.5%), and fever (31%). Ravi et al., reported that fever, dyspnea, and cough were the major symptoms prevalent among patients who succumbed to death than in patients who survived.[5] Azwar et al., the most common symptoms in elderly were fever, cough, and shortness of breath (classic symptoms of COVID-19).[6] Norman et al., elderly patients may not present with typical symptoms, such as fever or cough, like young

Table 5: Laboratory parameters

Laboratory parameters	60–74 (years) Young-old	>75 (years) Elderly-old	P-value
N	331	58	
Hb, mean (SD)	12.8872 (9.39393)	11.2816 (2.07584)	0.30
TLC, median (IQR)	7900 (6200, 9900)	9350 (7100, 11900)	0.029
N, mean (SD)	70.7251 (14.5246)	95.8947 (147.116)	0.022
L, median (IQR)	20 (12, 28)	16 (10, 28)	0.38
NLR, median (IQR)	3.5 (2.1, 4.9)	2.35 (1.3, 7.7)	0.56
LDH_1, median (IQR)	308 (229, 440)	325.5 (277, 442.5)	0.35
D-DIMER1, median (IQR)	0.6 (0.225, 1.05)	0.75 (0.3, 1.6)	0.17
CRP_1, median (IQR)	25 (5.3, 103.5)	39.7 (7.3, 81.8)	1.00
FERRITIN_1, median (IQR)	265.3 (119.4, 598)	367 (198.5, 950.45)	0.15

TLC: Total leucocyte count, NLR: Neutrophil-to-lymphocyte ratio, IQR: Interquartile range, SD: Standard deviation, LDH: lactate dehydrogenase

patients when infected with SARS-CoV-2. A previous report indicated fever might be blunted or even absent in elderly patients with bacterial or viral infection, because of a low basal temperature, disturbance in thermal homeostasis by aging, and frequent use of medications.[7]

In our study, there is an increased death rate in elderly-old group (29.3%) then young old group (15.4%) with significant P=0.02, Guo et al., here were no differences in the discharge rates and mortality between the young-old and elderly-old groups.[8]

Comparing inflammatory markers in young-old and elderly-old COVID-19 patients.

Median TLC in young-old patients7900 (6200-9900) IQR) and elderly-old patients 9350 (7100-11900) with significant p value=0.02. Mean Neutrophil count in young-old 70.72 ±14.52 and elderly-old patients 95.89 ±147.11 with significant p value=0.02, that is elderly-old patients have increased TLC and neutrophil count which is statisticallysignificant. Lymphopenia was common in elderly-old group then young old group. Guo et al., more than half of elderly patients had normal white blood cells, and nearly one-third of elderly patients had reduced white blood cells and lymphocytes.[8] Qin et al., from a large study, it was shown that the circulating naïve CD4+ and CD8+ T cells would decrease with aging, which is a sign of immunosenescence of the immune system.[9]

Other inflammatory markers such as LDH, D-dimer, CRP, and ferritin are higher in elderly-old patients than in young-old COVID patients which was statistically insignificant with P>0.005. In total, 38.1% of elderly patients had an increased D-dimer level in our cohort, but no subjects were diagnosed with venous thromboembolism during the hospitalization, which suggests the elevated D-dimer was more likely to be associated with inflammation in the infection of SARSCoV-2.[10,11,] Slaats 79.0% of elderly patients had an increased CRP, which indicated the intensity of the inflammatory process during SASR-CoV-2 infection.[12]

Limitations of the study

Sample size was a small and single-center study.

CONCLUSION

Elderly-old patients tend to have more prone for complications than young-old patients during hospitalization. Careful nursing, observation, and systemic treatment are very important in elderly patients.

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