International Journal of Community Medicine and Public Health
Rameshkumar BR et al. Int J Community Med Public Health. 2024 Jan;11(1):116-119
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20233844

Original Research Article

Clinical characteristics and laboratory profile of symptomatic COVID-19 patients from a tertiary Bangalore rural hospital: the lessons learnt

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Received: 09 November 2023
Revised: 12 November 2023
Accepted: 15 December 2023

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ABSTRACT

Background: Aim of study was to analyse clinical and laboratory features and outcome of COVID-19 patients admitted in second wave of pandemic (April1 to May 31, 2021) (SW) and compare with covid 19 patients in third wave (TW).
Methods: COVID-19 positivity were confirmed in both SW and TW. Demographic features, symptoms and duration were recorded. X ray chest was done at the time of admission and for monitoring. Complete blood count, C reactive protein, renal function tests, liver function tests, LDH and D dimer levels were done. The positive patients were categorized as mild, moderate and severe based on the clinical, imaging and laboratory features.
Results: Among 297 patients screened, 171 patients were diagnosed as positive (57.5%). 107 patients were admitted (62.5%). (M:F ratio - 1.74:1). The most common symptoms for hospitalization were fever, cough and shortness of breath. Though 38 patients had neutrophilia, only 16 of them presented with high NLR ratio. Consolidation on chest X-ray was present in all patients but the degree varied. 38 patients required ICU admission and oxygen support. 18 patients succumbed to disease. Among 140 patients (TW) (December 1 to January 31 2022, 69 (43.1%) were positive. Only 12 patients required hospitalisation. The only symptom was high fever. The NLR ratio ranged from 1-6 and never went beyond 6. All patients were discharged after 2-3 days.
Conclusions: The demographic features, co morbidities, presenting symptom of fever and X ray findings were similar in both waves. But the NLR ratio was never beyond 6 in TW. This was probably due to early reporting and vaccination status of the population and less virulent strain of the virus in TW. The present study confirmed that raised NLR and low levels of oxygen saturation at the time of admission are important predictors of disease severity.

Keywords: Covid 19 patients, Neutrophil-lymphocyte ratio, Second and third covid wave

INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2 appeared in December 2019 caused by Coronavirus Disease 2019 (COVID-19). As the virus is evolving and new variants of concern are appearing, many studies are being done to understand the course of the disease.[1-3] The objectives of present study to summarize the clinical and laboratory features of COVID-19 patients admitted in the hospital in the second wave of pandemic from April1 to May 31, 2021. Also, to analyse the outcome in such patients, including risk factors, the proportion of patients requiring ICU and those with fatal outcomes. In addition, the clinical profile of the same group of patients was compared to Covid 19 positive patients from third wave of pandemic from December 1, 2021 to January 31, 2022 to understand the difference in the presentation, course of the disease and

the laboratory investigations which will help in prognosis of the condition.

METHODS

This is a descriptive study of symptomatic COVID-19 positive patients, from Mithra Multispecialty Hospital in South Bangalore during period of April 1 to May 31, 2021 with follow up till December 31, 2021 (SW). In addition, the study compared the clinical profile of the same group of patients to Covid 19 positive patients from third wave of pandemic from December 1, 2021 to January 31, 2022 (TW).

Data collection

The patients who presented to the hospital who were symptomatic or had contact with the covid positive patients, and in whom Covid 19 testing was positive were included in the study for both SW and TW. The patients who were negative were excluded. Convenience sampling was the method followed for data collection. Demographic features of age and gender and the source of infection were elicited. The type of symptoms and duration were recorded. In all patients, X ray chest was done at the time of admission and for monitoring during the course of stay.[4,5]

The laboratory investigations included complete blood count, C reactive protein, renal function tests, liver function tests, LDH and D dimer levels which were done at admission and to monitor the progress of the patient. The admitted patients were categorized as mild, moderate and severe based on the clinical, imaging and laboratory features. In TW, as per the government instructions all investigations were done except LDH and D dimer. No genomic sequencing was done to confirm the variant in patients in SW and TW. Vaccination details were elicited in TW. Since this is a retrospective study, patient consent not applicable.

Statistical analysis

The data was entered in statistical software and analysed. Mean, and percentages were used for patient categorisation and duration of hospital stay. Pearson's correlation coefficient was used to analyse the correlation between Neutrophil: Lymphocyte ratio (NLR) and C-reactive protein. T test was used to assess the significance of age in relation to NLR and duration of hospital stay. For the significant laboratory parameters like anaemia, leucocytosis, NLR ratio and C reactive protein, mean and standard deviation were calculated.

RESULTS

A total of 297 patients were screened during April 1 to May 31 2021. Among them 171 patients were diagnosed as positive (57.5%). 64 patients who were categorised as mild were treated on OPD basis or short admission for observation. 107 patients were admitted (62.5%) among which 69 were classified as moderate and 38 were considered as severe who required ICU admission. The mean age of the admitted patients was 50.3 years. 32 patients were older than 60 years (Figure 1).

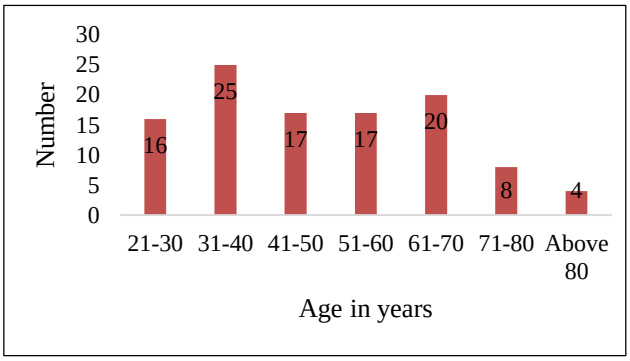

Figure 1: Age analysis.

The male female ratio was 1.74:1. The source of contact was present in 27 patients. Diabetes and hypertension were the common comorbidities. The most common symptoms at hospitalization were fever, cough and shortness of breath. Though 38 patients had neutrophilia, only 16 of them presented with high NLR ratio. The NLR ratio at the time of admission ranged from 6 to 32 and was significantly associated with CRP (mean NLR-10.07±7.5: mean CRP 6.09±2.5: $p<0.05$) (Table 1 and 2).

Chest x ray findings of consolidation was present in all patients but the degree of consolidation varied. The chest radiographic findings of covid classified as typical, indeterminate, or negative. The typical picture included multifocal, bilateral, peripheral opacities with rounded morphology predominantly distributed in the mid and lower zones.

The patients who had mild condition were treated with Doxycycline 100mg bd or Azithromycin 500mg OD for 5 days. Other supportive medications included T. Montek-LC (Montelukast+levocitrazine), T. Zincovit, T. Citrange C (Zinc+Vitamin C+Vitamin D), T. PCT or Dolo 650mg and steam inhalation as per the need.

Total 69 patients were categorised as moderate category. They were treated with inj. methyl prednisolone 40mg and t. ivermectin 12mg, in addition to the above medications. Oxygen support was given on case-to-case basis. 38 patients required ICU admission and oxygen/ ventilator support. All of them were treated with inj. remdesevir, inj. piptaz (piperacillin+tazobactum) and inj. PCT. T. mucinas 600 mg was added as required.

All admitted patients had intravenous fluids as per the requirements. 18 patients (16.8%) succumbed to disease. The age was not a significant risk factor (p value >0.05). The presence of co morbidities considered were diabetes

and hypertension which influenced the course of the disease, but were not an independent risk factor.

Table 1: Summary of salient clinical features and outcome.

Parameter	Second wave	No	Third wave	No	Remarks
Age					
Total screened 297+160= 457	21-94 years	107	21- 84 years	69	One child of 3 years/F has been excluded for analysis in second wave. Four children of 7-8 years (3M and 1F) have been excluded in the third wave
Male: Female ratio	1.74:1	107	2.45:1	69	In both waves in above 70 years age group only males were present
Symptoms					
Fever	74.1%	80/107	1.Fever 2. Cough/sore throat 57.9%	40/69	Symptom of shortness of breath was present in many patients in second wave
Cough	32.7%	35/107			
Headache	7.4%	8/107			
Chest pain	4.6%	5/107			
UTI	0.9%	1/107			
Admission to ICU	38 patients	-	Nil		
Duration of stay in hospital	2-21days	107	2-3 days	12	23 patients had more than 10 days of hospital stay in second wave.
Deaths	18	16.8%	Nil	-	

Table 2: Summary of salient laboratory features*.

Parameter	Mean and SD	Percentage	Number of patients	Range
Anaemia (<10gms/dl)	12.4±2.2	29.9	32/107	Haemoglobin 8.5-16.6gm/dl
Leucocytosis (>11,000cells/cm^3)	11.0±23	14	15/107	Total count 2350- 19380 cells/cm^3
Neutrophilia (>80cells in differential count)	-	35.5	38/107	63-97 cells
NLR ratio (>10)	10.0±7.1	14.9	14/107	2-32
C Reactive protein (>5mg/L)	6.7±2.5	28.9	31/107	0.5-9.4mg/L

*Refer to second wave

In the third wave (TW) 140 patients were screened from December 1 to January 31 2022, out of which 69 (43.1) were positive. Only 12 patients required hospitalisation and the rest were managed on OPD basis. The symptoms were fever, sore throat and cough. The NLR ratio ranged from 1-6 and never went beyond 6. The 12 patients who required hospitalisation were discharged after 2-3 days as it was not severe. Among the 12 patients one had haemoglobin of 10.6gm/dl and one person had leucocytosis count of 12340 cells/cm^3.

DISCUSSION

There was a significant difference in the course of the disease between SW and TW.[6] The reason for the clear differences across waves is not yet known, In SW, 62.5% percent required hospitalisation indicating the severity of the disease. The mortality was 16.8%. In comparison, in TW only 17.3% required hospitalisation in which there was no ICU admission and no mortality was observed. The demographic features, co morbidities, the presenting symptom of fever and X ray findings were similar in both waves. But the NLR ratio was never beyond 6 inTW.[7-11] This was probably due to early reporting and vaccination status of the population and less virulent strain of the virus in TW.

Due to the highly transmissible nature of COVID-19, delayed intervention may have led to rapid spread in the SW of the patients. But it has been suggested that the Omicron variant of COVID-19 had much attenuated pathogenicity with markedly decreased severity and mortality.[12,13] This reduced pathogenicity may be due to the weakened intrinsic viremia or the strengthened acquired immunity by previous infection or/and sufficient vaccination, or both.[14-16] Hence it is possible that early reporting, vaccination status and less virulent strain of the virus would have contributed to the significant difference between SW and TW.

There were limitations of the study both in SW and TW. In TW, with the increased portion of patients with no symptom or no need for hospitalization, clinical data became less available. Second, there was no severe or deceased patient in TW, it was difficult to analyse the possible risk factors associated with severity or mortality.

In addition, patients' course of action and the admissions profile could have differed between SW and TW as different lock down and restrictions were implemented. During SW, CT scan was considered as the ideal diagnostic criterion, but was not available in many patients. No genomic sequencing was done to confirm the variant in patients in SW and TW. Only clinical symptoms, X ray findings and laboratory results were used for diagnosis and management.

CONCLUSION

It is time to learn from the outcomes of disease outbreaks. The present study confirmed that raised NLR and low levels of oxygen saturation at the time of admission were important predictors of disease severity. However, chest radiographic findings can be absent early in the course of COVID-19 pneumonia. Still CXR will continue to play an important, complementary role in the detection of parenchymal abnormalities, assessing the severity especially complications and management of covid patients. The community control measures and the compliance of the population to such measures has played a significant role in the milder course of the disease in the third wave.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Rameshkumar BR, Kumar M, Shetty B, Kannan K, Rameshkumar K. Clinical characteristics and laboratory profile of symptomatic COVID-19 patients from a tertiary Bangalore rural hospital: the lessons learnt. Int J Community Med Public Health 2024;11:116-9.