Clinico-Epidemiological and Laboratory Correlation of COVID-19 Patients at a Tertiary Care Centre in Hadoti Region of Rajasthan: A Cross Sectional Study

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Abstract:

Objective: To study clinico epidemiological and laboratory parameters of Covid 19 in hadoti region of Rajasthan, India.

Methodology: A prospective cross sectional was conducted on 120 patients, presenting to the Govt. medical college and associated group of hospitals of Kota, Rajasthan. The Covid 19 was confirmed by RT PCR. The data about demography and laboratory parameters were collected after admission of the patient to the isolation ward and analysed.

Results: The mean age was 44.40 ±17.9 years. Male to female ratio being 2.75:1.There was 89 symptomatic and 31 asymptomatic patients. On presentation, the most common symptom was fever 71 (59.16%) followed by cough 61 (50.83%), breathlessness 48 (40%) and myalgia 40 (33.33%). On the basis of SPo2, 16% were Mild cases, 7.5% were Moderate and 5.83% were severe cases. The blood results showed that 26.66% of patients had increased leukocyte count, inflammatory markers were positive in 41.66%. And renal function test was deranged in 10% and varying degree of liver dysfunction with an increase in SGPT (29.16%), SGOT (37.5%) were seen.

Conclusion: The clinico-epidemiological characteristics of Covid-19 patients behaved differently in different geographical location. The common symptoms in our study could emphasize on identifying potential patients in this geographic area. Knowledge about the disease presentation in each geographic area is important in planning the effective management strategies since the features are varied from place to place.

Keywords: COVID-19, Breathlessness, Hadoti Region, Pandemic.

Introduction

COVID-19 is one of the worst forms of global health crisis faced by the entire world. It is wreaking havoc and has crippled the health care systems, even in most developed countries. Following the detection and reporting of pneumonia of unknown aetiology in Wuhan city of China, a novel coronavirus or SARS-nCoV2 was identified as the causative agent by the Chinese authorities on January 7, 2020.

The outbreak was declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) on January 30, 2020. Following this, WHO declared COVID-19, a global pandemic on March 11, 2020. As of now there are over 702,701,106 confirmed cases of COVID-19 including nearly 6,978,672 deaths globally [1]. India found itself in the grip of this

fast-spreading and fast-evolving virus too. With the medical student who had travelled from Wuhan, China, the then epicenter of COVID-19, to India on 30th January 2020, having tested positive, India recorded its first case. The spread of the virus in the country was initially confined to travel related cases and their contacts. Later, due to local transmission, cases increased exponentially without any known travel or contact history, expanding to almost all the states of India.

India became the second most affected country in the world contributing to over 45 million confirmed cases and over 5 lakh deaths till now [2]. Many laboratories confirmed COVID-19 patients remain asymptomatic. Most of the patients develop mild or uncomplicated illness. The most common symptoms of COVID-19 observed in studies from

India are fever and cough followed by breathlessness sore throat and headache [3,4]. Around 14% require hospitalization and supplemental oxygen, while 5% require intensive care unit admission [5]. Literature review shows that studies from India have a Case Fatality Rate (CFR) ranging from 2.36% to 29.4%. Literature search shows that the clinical profile and outcomes of this novel disease are varied in different countries [6-9]. There is an urgent need to document this clinico-epidemiological profile in the local population. Understanding the clinical and epidemiological characteristics of the disease became an important step for effective detection and management of COVID-19. The clinical and epidemiological characteristics of COVID-19 were reported across the world. [10] Very few single centre, small studies are available from south India. These findings cannot be generalized. However most of these reports have variable characteristics suggesting the diversity and novelty of the disease across the India. There are hardly any studies from the Rajasthan (Hadoti region). Therefore, it is important to analyse the clinical and epidemiological characteristics in a local population for better management of the disease.

Material and Methods

This was a single centre prospective cross sectional study done at government medical college and associated hospitals, Kota (Tertiary care centre of Hadoti region) between 10th July 2020 to 13th august 2020. A total of 120 patients were included in this study.

Detailed history regarding Demographic data, clinical manifestations, travel history, comorbidities, smoking were taken after admission of the patient in hospital. Confirmation of COVID 19, was done by RT- PCR kit using nasal or throat swab. The asymptomatic cases were laboratory confirmed cases (RT-PCR positive) not experiencing any symptoms. A symptomatic COVID -19 cases was a laboratory confirmed case that has developed signs and symptoms compatible with COVID-19 virus infection.

Venous sample drawn within 24 hours of admission for Complete blood count, Liver function test, Renal function test, CRP, LDH. Complete blood count measured by an automated Haematology analyzer (sysmax XS-800i, Japan) in central laboratory of Government medical college, Kota, and manually corrected by pathologist to overcome any technical error. Routine biochemical test - Liver function test, renal function test, LDH performed by automated biochemistry analyzer (Erbamannheim EM-200 or Erbamannheim XL-640) in central laboratory of Government medical college, Kota.

Inclusion Criteria: All adult laboratories confirmed COVID -19 patients admitted during the period from 10th July 2020 to 13th august 2020 were included.

Exclusion Criteria: The data of COVID 19 patient under the age of 10 years were excluded from the study.

Statistical Analysis: The statistical analysis was done using the SPSS software version 25.0. The continuous variable results were shown by descriptive statistics and the categorical variables by frequency and percentages. Categorical variables were expressed as percentages and the continuous variables were expressed as mean ± standard deviation. T-test and chi-square test were used for continuous and categorical variables respectively. Group comparisons were done using the chi-square/fisher test for categorical variables. Mann-Whitney U test was used for continuous variables with non-normal distribution. Multivariate logistic regression analysis was done for analysis of different independent laboratory parameters with respect to dependent outcome variable. The p-value <0.05 was considered as significant.

Results

A total of 120 laboratory confirmed COVID-19 patients admitted were included. The maximum number of patients belonged to the age group of 30 - 40 years. The mean age were 44.40 ±17.9 years with age groups ranging from 12 to 85 years. Male were 88 (73.33%); M:F ratio being 2.75:1.(Table-1) There were 89 symptomatic and 31 asymptomatic patients. On presentation, the most common symptom was fever 71 (59.16%) followed by cough 61 (50.83%), breathlessness 48 (40%) and myalgia 40 (33.33%). The other symptoms were Sore throat, Headache and least common was Vomiting. (Table-2)Males (71.91%) were significantly more symptomatic compared to females (28.09%). (Table-3)

A total 56 (46.66%) patients had co-morbid conditions, amongst them the most common was Hypertension, followed by Diabetes mellitus. Smoking history present in 35% and travel history present in 3.33% patients. (Table-4)

Table 1: Epidemiological characteristics of COVID-19 patients

Parameters	n =120	%
Age (Year)		
Mean±SD	44.40±17.9	
Range	12-85	

10-19	4	3.33
20-29	24	20
30-39	27	22.5
40-49	16	13.3
50-59	14	11.6
60-69	24	20
70-79	8	6.6
80-89	2	1.66
Gender		
Male	88	73.33
Female	32	26.66

Table 2: Clinical features of COVID patients

Parameters	n = 120	%
Signs and Symptoms		
Fever	71	59.16
Cough	61	50.83
Breathlessness /SOB	48	40
Myalgia	40	33.33
Sore throat	9	7.5
Headache	6	5
Vomiting	1	0.83

Table 3: Relationship between Gender and status of symptoms

Gender	Total number	Asymptomatic	Symptomatic
Males	**88 (73.33%)**	24 (77.41%)	64 (71.91%)
Females	**32 (26.66%)**	7 (22.58%)	25 (28.09%)
Total	**120 (100%)**	**31 (100%)**	**89 (100%)**

Table 4: Risk factors in COVID patients

Parameters	n =120	%
Co-morbidities		
Hypertension	18	15
Diabetes mellitus	14	11.66
Hypertension & Diabetes	16	13.33
Chronic kidney disease	3	2.5
Ischaemic heart disease	6	5
COPD	4	3.33
Thyroid disorder	1	0.83
Tuberculosis	1	0.83
Smoking history		
Present	42	35
Absent	78	65
Travel history		
Present	4	3.33
Absent	116	96.66

On admission, the maximum number of patients was admitted in the COVID-19 ward followed by intensive care unit (ICU). SPo2 was normal in 82.5% patients, On the basis of SPo2 4.16% were Mild cases, 7.5% were Moderate and 5.83% were Severe cases. ICU was required in 23.33% and ventilatory support was required in 4.16%. 42.5% of total patients needed oxygen support. The adverse effect of treatment was not seen in any patient. (Table-5,6)

Table 5: Management data of COVID patients

Parameters	n =120	%
Oxygen		
Yes	51	42.5
No	69	57.5

Intensive care unit (ICU) admission		
Yes	28	23.33
No	92	76.66
Ventilator support		
Yes	5	4.16
No	115	95.83

Table 6: Mean age of Mild, Moderate and severe cases

Parameters	n	%	Mean age	Standard deviation
Spo2				
Mild	5	4.16	56.8	20.41
Moderate	9	7.5	53.88	13.27
Severe	7	5.83	58	10.15

The laboratory blood investigation was done for 120 patients. The blood results showed that 26.66% of patients had increased leukocyte count and 20% of patients had decreased leukocyte count.

Neutrophilia was seen in 29.16% and Thrombocytopenia was in 30 (25%), Inflammatory markers like CRP was positive in 41.66% and LDH was increased in 31.66% and Renal function test is deranged in 10% and Varying degree of liver dysfunction with an increase in SGPT (29.16%),SGOT (37.5%) were seen. (Table-8)Increased levels of SGPT were seen in 32.95% of males and 18.75% females and increased level of SGOT was seen in 44.31% of males and 18.75% of females.

Increased level of LDH was seen in 29.54% of males and 37.5% of females. Positive level of CRP was seen in 40.90% of males and 43.75% of females. (Table-7)

Table 7: Relationship between Gender and laboratory markers

Laboratory marker	Males	Females
C-Reactive protein (CRP)	36 (40.90%)	14 (43.75%)
Lactate dehydrogenase	26 (29.54%)	12 (37.5%)
SGOT	39 (44.71%)	6 (18.75%)
SGPT	29 (32.95%)	6 (18.75%)

Discussion

This study is focused on analysing and identifying the demographic, clinical and laboratory parameters of 120 COVID-19 patients admitted in a tertiary care centre of Hadotiregion of Rajasthan. The mean age of our patients is similar to the previously published reports in south India [11] and lower compared to other countries reports [12,13]. this may be due to the higher proportion of young population in India. The disease was more in males than females and was consistent with previous studies from India and around the world's [14,15].The most common symptom was fever which is similar to the reports from south India [16]. Higher levels of C Reactive Protein, Lactate dehydrogenase are seen in 41.66%, 31.66% of patients. According to the meta-analysis of 16 studies by Zeng et al. [17] higher levels of inflammatory markers indicate severity of the disease.

Laboratory findings such as Lactate Dehydrogenase are increased in 39.32% of symptomatic and 9.6% of asymptomatic patients. Our study shows that males (71.91%) are significantly more symptomatic compared to females (28.08%). According to a study by Scully et al. [18] the difference in clinical parameters may be due to difference in sex chromosomes, epigenetic modification, transcriptional factors and sex steroid concentration that leads to varying degree of immune response in males and females. Increased levels of SGPT were seen in 32.95% of males and 18.75% females and increased level of SGOT was seen in 44.31% of males and 18.75% of females. Increase liver dysfunction enzymes may be due to higher expression of ACE2 receptors in males. [19,20]

Limitations

The major limitation of the study was the inability to collect some information in details due to the emergency situation and initially all COVID 19 positive patients were admitted in the hospital as per the state guidelines regardless of severity of the disease. With the change in government protocol, only symptomatic patients were admitted and asymptomatic patients were given home treatment thus laboratory investigations done for asymptomatic patients became limited. However, the data in this study permit to assess the early clinical and epidemiological characteristics of Covid-19 in Hadoti region of Rajasthan.

Conclusion

The clinico-epidemiological characteristics of

Covid-19 patients behaved differently in different geographical location. The common symptoms in our study could emphasize on identifying potential patients in this geographic area. Asymptomatic patients should be monitored and investigated for effective control of the disease. Knowledge about the disease presentation in each geographic area is important in planning the effective management strategies since the features are varied from place to place.

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