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Original Research Article

Clinical Profile and Outcome of First Cases of COVID-19 Patients Admitted at a Tertiary Care COVID Center in The South-eastern Region of Rajasthan

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Abstract

Background: The coronavirus disease 2019 also known as COVID-2019 is a global pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The novel virus outbreak was first identified in Wuhan, China in December 2019.

Aim: To report the clinical spectrum, laboratory findings, and outcome in the first cases of COVID-19 patients admitted patients at a tertiary COVID center in Kota, Rajasthan.

Materials and method: This was a prospective study over two months from April to May 2020, comprising a cohort of 95 patients with a positive reverse transcriptase polymerase chain reaction (RT-PCR) report for COVID-2019 infection and admitted at the hospital. Data was collected from 95 patients during the period from admission to discharge from the hospital.

Results: In the group of 95 patients, 63 (66.3 %) were males and 32 (33.7%) were females with a mean age of 32.3 ± 13.1 and 31.4 ± 16.4 years, respectively. At the time of admission 71 (74.7%) patients were asymptomatic and common symptoms observed were cough (16.8%), sore throat (13.7%), fever (11.6%), and shortness of breath (3.2%) respectively. Important observations in laboratory investigations data were thrombocytopenia (n=24, 25.3%), leukopenia (n=23, 24.2%); in chest skiagrams 70 (73.7%) patients had bilateral lesions, zones affected were lower zone (n=43, 45.3%), combined middle & lower (n=22, 23.2%). High-flow nasal oxygen was required in seven cases. Azithromycin and hydroxychloroquine were administered to all patients. Ritonavir & lopinavir were given to 3 moderately severe cases. No mortality occurred in the cohort.

Conclusion: The worldwide pandemic COVID-2019 has affected people in the Kota and Jhalawar districts of Rajasthan and an increasing number of patients were admitted to hospital. In this study, the population predominantly had mild symptoms and all recovered. Chest X-ray findings were usually abnormal even in asymptomatic and mild disease cases. There is a need to develop an effective vaccine & drugs. Preventive measures should be followed sincerely till the end of this pandemic.

Keywords: COVID center, pandemic, Azithromycin, hydroxychloroquine, Ritonavir, lopinavir

Introduction

A viral threat was identified in Wuhan, China in December 2019 which is found to be a new type of coronavirus called novel coronavirus (2019-nCoV, or COVID-19).[1],[2] The coronavirus caused the infectious disease of severe acute respiratory syndrome (SARS-CoV-2).[3] There is a strong possibility that the virus circulated undetected weeks before the first cases of COVID-2019 were identified. Attempts to contain the virus failed and it has rapidly spread worldwide causing a pandemic forcing various governments to impose travel restrictions. Indian government evacuated 654 evacuees in the first week of February 2020 from Wuhan, China.[4] This SARS-Cov-2 virus has a high propensity to spread and can be transmitted from an infected person as droplets/ aerosols from

the mouth or nose when they cough, sneeze, speak, or breathe.[5]

The virus can contaminate a surface or object and people after touching such area can get the infection by touching their mouth, nose, and eyes. The illness caused by it can vary from mild common symptoms such as fever, chills, and sore throat to severe or potentially fatal acute respiratory syndrome. The economic and social disruption caused by the COVID pandemic is devastating and has affected the lives of millions of people. There is an urgent need to find a cure or vaccine to alleviate the spread and effect of the virus and to bring society to normality.

In India, the first case of COVID-19 was reported on January 30, 2020.[6] In the coming months, the government agencies responded promptly to the novel threat, a nationwide lockdown was imposed and international borders were shut.[5] Till the end of April 2020, the country witnessed a surge in the cases of COVID-19.

The Ministry of Health and Family Welfare in its April 2020 update reported that 33,050 have tested positive for COVID-19. The confirmatory diagnosis of COVID-19 can be made by reverse transcription polymerase chain reaction (RT-PCR) test on swabs taken from the throat, nose, sputum, and other respiratory secretions. The improper sampling can give false reports, in that matter knowledge of clinical, radiological, and hematological findings in COVID-19 patients can be helpful to physicians in identifying suspected cases.

The prospective study was conducted over two months, April to May 2020, to study the clinical spectrum, symptoms & signs, laboratory findings, and outcome in first cases of COVID-19 at the tertiary government hospital, in the Kota district of Rajasthan.

Materials and methods:

This prospective study was conducted from April to May 2020 at Government Medical College, Kota, Rajasthan. The inclusion criteria: In the case series a total of 95 COVID-19 hospitalized patients were included in this study, irrespective of age and gender. A written consent was taken from the patients before collecting data for the study. A confirmed case of COVID-19 was taken as a positive report of reverse transcription polymerase chain reaction (RT-PCR) test for SARS-CoV-2 virus in samples of nasopharyngeal or oropharyngeal swabs.[3] The COVID-19 cases underwent routine hospital procedures during admission and were later investigated and treated.

The following data was recorded from the case history and clinical & laboratory investigations of the patients: (i) demographic parameters (name, age, sex, district, and date of admission) of the patients; (ii) complaints and presenting symptoms with duration (iii) presence of any comorbid disease (diabetes, hypertension, coronary artery disease, malignancy, neurologic diseases, chronic obstructive pulmonary disease, bronchial asthma, any chronic disease etc.); (iv) reports of investigations at this institute (complete blood count, serum lipid profile, liver and kidney function tests, electrolytes, chest X-ray, CT-scan etc.); (v) oxygen saturation and mode of oxygen support (use of conventional oxygen therapy, high-flow nasal oxygen, or invasive ventilation); (vi) treatment given; and (vii) prognosis/ outcome from hospital i.e. discharge or any fatality due to any complications. The data was entered in Microsoft Excel software and mean, standard deviation, and percentage were derived.

Results:

Data from 95 COVID-positive adult patients were analyzed in this study. Most of the patients belonged to the Kota district (n=83, 87.4%) and the rest from the Jhalawar district (n=12, 12.6%) of Rajasthan. who had a mean age of 32. 4 years and ranged from 11 to 70 years. At the time of admission, most of the cases were found to be asymptomatic (n=71, 74.7%); in symptomatic most common presenting symptoms were cough (n=16, 16.8%), sore throat (n=13, 13.7%), fever (n=11, 11.6%), and shortness of breath (n=3, 3.2%).

Among the risk factors only one case was a chronic smoker and 10 other cases had previous known comorbid conditions. Coronary artery disease was the most commonly associated comorbid condition in 3 cases (3.2%) and diabetes and hypertension were present in one case (1.1%) each. Conventional oxygen therapy and High-flow nasal oxygen were required in fifteen and seven cases, respectively; and none required invasive ventilation or intubation. The results of various laboratory, ECG, and radiological investigations are summarized in the following tables.

Table 1: Demographic characteristics, symptoms, comorbidities, and oxygen support in COVID-19 patients.

Parameter	Mean±SD	Range
Age in years		
Total n=95	32. 4±14.2	11-70
Males n=63	32.3 ± 13.1	15-70
Female n=32	32.5 ± 16.4	11-70
Symptoms	**N**	**%**
Asymptomatic	71	74.7
Fever	11	11.6
Cough	16	16.8
Sore Throat	13	13.7
Headache	2	2.1
Sputum Production	2	2.1
Shortness Of Breath	3	3.2
Generalised Body Ache	1	1.1
Risk factors		
Smoker	1	1.1
COMORBIDITY		
Diabetes	1	1.1
Hypertension	1	1.1
Chronic asthma	1	1.1
Coronary artery disease	3	3.2
RHD with MS & MR	1	1.1
Previous H/o Tuberculosis	1	1.1
Microcytic anemia	1	1.1
GTCS	1	1.1
Oxygen support		
Conventional oxygen therapy	15	15.8
Non-invasive high-flow mask	7	7.4
Invasive ventilation/ intubation	nil	0

*GTCS – generalized tonic-clonic seizure

Table 2: Results of Laboratory findings in a cohort of COVID-19 patients.

Lab test	Average	Max	min
White blood cell count, × 10^9 per L	5.1	10.27	2.66
<4	23	24.2%	
4-10	72		
>10	nil		
Haemoglobin, g/dl	12.8	16.6	6.6
hematocrit test (HCT) %	39.2	48.7	25.4
MCV	79.9	96	55.3
Platelet count, × 10^9 per L	202.3	710	53
≤150	24	25.3%	
>150	71	74.7%	
PT	14.6	18.3	12
INR	1.3	1.8	1.01
Serum Urea (mg/dl)	25.4	59	13
Serum creatinine (mg/dl)	2.02	101	0.5
Serum bilirubin (mg/dl)			
Total	0.78	1.9	0.2
Direct	0.2	1.1	0.1
Direct	0.2	1.1	0.1
SGOT	35.71	142	10
SGPT	23.4	74	4
ALP	97.72	1023	28
Serum sodium (mmol/l)	140	166	130
Serum potassium (mEq/L)	3.79	5.2	3.1
LDH U/L	473.9	1038	168
CK-MB IU/L (n=84)	41.7	161	10
ECG FINDINGS			
QT interval	389	480	320

	N	%	
<350	4	4.2	
350-450	90	94.7	
>450	1	1.1	
Incomplete RBB	1	1.1	
p-MITRALE	1	1.1	
LAFB	1	1.1	
p-pulmonale	1	1.1	
Poor progression of r wave	2	2.2	
t-wave inversion	1	1.1	

*LDH=Lactate Dehydrogenase, LAFB=Left Anterior Fascicular Block, CK-MB= creatinine kinase MB,

Table 3: Chest X-ray findings, treatment, and outcome in the cohort of COVID-19 patients.

Parameter	N	%
Chest X-ray test	92	100
Bilateral	70	76.1
Unilateral	2	2.2
No abnormality	20	21.7
Zonal distribution		
Upper lobes	0	0
Middle zone	2	2.2
Lower lobe	43	46.7
Middle and lower lobe	22	23.9
Diffuse	1	1.1
Radiographical findings		
Consolidation	50	54.3
Heterogenous Opacities	13	14.1
Hilar prominence	2	2.2
Peripheral lung opacities	1	1.1
Prominent broncho-vascular markings	2	2.2
Haziness	4	4.3
HRCT test	2	
Organizing pneumonia	2	
Treatment		
Azithromycin	95	100
hydroxychloroquine	95	100
Ritonavir and lopinavir	3	3.2
Oseltam	2	2.1
Meropenem	2	2.1
Outcome		
Discharge from hospital	95	100
Mortality	nil	0

In this cohort, 92 patients underwent chest X-rays, and the number of patients who had bilateral involvement was 70 (76.1 %), and only 2 (2.2%) had unilateral involvement. Both the unilateral involvement cases had findings on the left side. Normal chest X-ray was present in 20 (21.7%) patients at the time of diagnosis. Zones of the lungs most commonly involved were lower zone (n=43, 46.7%), combined middle & lower (n=22, 23.9%), only middle (n=2, 2.2%); and none of the radiographs showed abnormal findings restricted to upper zones only. High-resolution computed tomography (HRCT) scans were done in two moderately severe cases of age over 50 years and having bilateral abnormalities in chest X-ray and showed the report of organizing pneumonia. A decrease in SpO2 and tachypnoea were the most common signs noted in patients.

All the patients with mild disease received azithromycin and hydroxychloroquine (HCQ) as per the protocol. Ritonavir and lopinavir were administered to three cases. All patients recovered with symptomatic therapy and were discharged from the hospital after a negative RT-PCR report and there were no deaths.

Discussion:

The emergence of viral diseases represents a serious threat to public health. In recent history several epidemics have been caused by virus outbreaks such as the severe acute respiratory syndrome coronavirus infection (SARS CoV-1) in 2002-

2004[7], the influenza A H1N1 (swine flu) pandemic in 2009[8], the Middle East respiratory syndrome (MERS) caused by a coronavirus in Saudi Arabia in 2012[9], Ebola virus pandemic in Africa in 2013[10], Zika virus epidemic in 2015[11] and the Spanish Flu outbreak in 1918[12].

According to the World Health Organization (WHO), the pandemic affects healthcare infrastructure and disrupts the world economy and socio-economic framework of the affected countries. Hence, there is a need to study the origin, symptoms in humans, modes of transmission, measures to prevent spread, and the development of treatment/ vaccines to control them. The worldwide spread of this virus indicates that it has acquired an efficient ability for transmission in humans, especially airborne routes. Therefore, it is strongly suggested that preventive reliable measures must be practiced like social distancing, self-quarantine, precaution in touching infected surfaces, use of sanitizers, and for healthcare workers use of personal protective equipment (PPE-Kit).

A new type of coronavirus (COVID-19) has spread all over the world from Wuhan, China.[13] We collected data from a cohort of 95 patients with laboratory-confirmed COVID-2019 cases in Kota district in Rajasthan. All these patients were tested with an RT-PCR testing kit for the SARS-CoV-2 virus, and after a positive report, they were admitted to the hospital. In symptomatic patients predominantly presented with fever, dry cough, sore throat, and bilateral consolidation on chest X-rays. A study from Wuhan, China also reported similar findings.[14] And, the most common signs noted were the decrease in SPO2 and tachypnoea. This presentation in patients resembles the previous data on symptoms seen in persons infected with coronaviruses.[14],[15]

Data analysis showed one important result although most of the patients were asymptomatic (n=71, 74.7 %), abnormality in the chest X-ray test (n=92) was still present in a majority of cases (n=72, 78.3%). Thus, chest skiagram findings are important and can be used both as diagnostic and prognostic factors to indicate disease progression. The Chest X-ray findings in our study are similar to other findings by other authors on the pathological lesions seen in bilateral, and middle & lower zone of lungs in COVID-19 patients.[16] There was no case with findings restricted to the upper zone of the lungs and this is in concordance with other studies.[17]

In the cohort, 14 patients were above the age of 50 years and all of them had bilateral opacities in the lungs in skiagrams. There were 10 patients with comorbidity and among these 7 patients had bilateral opacities in the lungs. This indicates that old age and comorbidities could be risk factors for COVID-2019 infection. However, 20 (21.7%) of COVID-19 patients didn't have any abnormality on the chest skiagram. Thus, radiographic findings in chest skiagrams are predominantly important findings in the majority of COVID-19 patients but in others did not have any abnormality and this is in concordance with other studies in radiological abnormalities.[16]

Another important observation seen in the data was leukopenia and thrombocytopenia. Leukopenia was seen in 23 (24.2%) patients and in no case was a higher WBC count (greater than 11,000 per unit microliter) observed. Lower WBC count variations can contribute to increased clinical severity. There is a need to study whether leukopenia can be used as a prognosis indicator in the cases of COVID-2019 infection. People with already lower WBC count are also more likely to develop other infections concomitant with SARS-CoV-2. Lower WBC count could be due to direct invasion of the virus or due to pathogenesis of inflammatory mediated pathway but the exact mechanism needs to be studied. Thrombocytopenia (≤150000 platelets per microliter of blood) was seen in 24 (25.3%) of cases this suggests that there is the presence of consumption coagulopathy. Thrombocytopenia is a well-known indicator of poor prognosis in severe acute respiratory syndrome (SARS) and should be evaluated in the cases of COVID-2019.[18], In similarity, other studies also observed leukopenia and thrombocytopenia in COVID-19 patients.[18] However, due to nil fatality noted in the cohort, a statistical analysis could not be performed to identify potential factors. Other studies from India reported a 2.8% fatality ratio in COVID-19 patients.[6] Creatinine kinase MB is a myocardial injury marker and can be elevated in COVID-19 patients due to cardiac injury.[19] In our lab results mean CK-MB was raised (mean=41.7 IU/L) and similarly higher values were reported by Liang Cao et al, 2020[19] in COVID-19 patients.

Severe acute respiratory syndrome (SARS) caused by SARS coronavirus (SARS-CoV) was first reported in Guangdong, China, in 2002.[20] Earlier in vitro studies reported chloroquine as an effective antiviral agent by inhibiting viral replication for SARS-CoV in cell culture conditions suggesting that the drug can be effective in both prophylactic and therapeutic treatment.[7] Antimalarials Hydroxychloroquine and chloroquine are advocated for use in the COVID-19 (SARS-CoV-2) pandemic.[5],[6],[21],[22] All the patients in this study received hydroxychloroquine and azithromycin as a part of the symptomatic treatment. Studies are needed to find the potential mechanism of these drugs against the SARS-CoV-2 virus. Ritonavir and lopinavir are used in the treatment of HIV infections and have been temporarily proposed as a medication for COVID-19 based on previous reports of its in vitro activity.[23] In this study azithromycin and hydroxychloroquine were

administered to all patients, and Ritonavir & lopinavir in three patients, all patients were fully recovered and discharged after a negative RT-PCR report. Other symptomatic drugs were used accordingly.

The limitations of this study are that the pathogenesis of COVID-2019 is not completely known to date today nor it is clear whether it can spread by urine or fecal route.[5] Also, there are limited studies to date discussing confirmed effective drugs and their role in management. It is also not clear if this virus can cause serious pathogenesis in other systems apart from the respiratory system. There is an urgent need to develop effective drugs that can be used in the treatment or prevention of the potential spread of SARS-CoV-2 infections. Researchers also need to develop a vaccine soon and another limitation of this study is its role in contributing to new and effective treatment development.

The viruses have the tendency to mutate and it is not possible to predict the future variants and their pathogenesis of the coronavirus epidemic, but the threat is there and it should be taken into account by all healthcare organizations. World Health Organisation (WHO) emphasizes precautions taken by the people will have a major role in alleviating the detrimental effects of the pandemic. People should avoid crowded places, travel should be limited on an essential basis only, and the use of masks outdoors is advocated. One important lesson already learned from the epidemic is that even developed countries suffered from a shortage of PPE kits & hand sanitizers, and the lockdown hampered the supply and manufacturing of such essential equipment.

Conclusion

Rajasthan state of India is currently dealing with a rapid surge in the number of COVID-19 cases. The nationwide lockdown and travel restrictions have been imposed by government agencies to control the spread of the pandemic. Most of the people in this study had predominantly milder symptoms. In the laboratory investigations leukopenia, thrombocytopenia and abnormal chest X-ray findings were the most important findings. There is a need to develop effective vaccines and drugs to control the spread of coronavirus. Although in this cohort of initial cases coming to the hospital, all were discharged and no mortality occurred but mortality reports from other parts of the world indicate that the limited duration and number of cases is the limitation of this study. In the future, we might come across variants in different parts of the world. There is a need to strengthen preventive measures, surveillance, and response capacities to deal with potential outbreaks.

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