Epidemology and clinical profile of SARS-C0V-2

Afaq Ahmad Khan[1], Santosh Govind Rathod[2*]

[1]Assistant Professor,Department of Clinical Hematology, SKIMS, Srinagar,India
[2]Senior Resident, Department of Clinical Hematology, SKIMS, Srinagar,India

Abstract

In this retrospective study, we included all confirmed cases of covid-19 and analyzed for epidemiological, demographic, clinical and laboratory data. Of the 57 confirmed cases, there were 35(61.40%) male and 22(38.60%) female patients. The average age of patients was 34.29 years. (SD 13.49) Of the 57 cases, 33 (57.9%) were symptomatic and 24(42.10%) were asymptomatic. The most common presenting clinical symptoms was fever in 28(49%) , sore throat in 6(10.52%) , dry cough in 4(7.02%) , body aches in 4(7.02%) , loose motion in 2(3.5%) and shortness of breath in 4(7.02%) .Of these 57 patients, five (8.77%) had bilateral pulmonary infiltrates on chest X-ray. Of the 57 cases four, (7.02%) had hypertension, one (1.75%) had diabetes mellitus, one (1.75%) had Bronchial Asthma, two had pregnancy (3.5%) and one (1.75%) had stroke as comorbid condition. Of the total 57 patients, 28(49.12%) had Lymphocytopenia, 14(24.56%) had Leucopenia, and seven (12.28%) had thrombocytopenia.
Keywords: SARS-COV-2, Corona virus, ARDS, Respiratory disease. Covid-19.

Introduction

On Dec 8, 2019, there was an outbreak of atypical respiratory disease of unknown etiology in Wuhan, Hubei province, China. [1,2] The most cases were from local seafood market, Hunan. On Jan 7 2020, Chinese health authorities confirmed that novel corona virus is causative agent for the cases. Later on, it was named as SARS-COV2. [3,4] Within a span of three months, this virus spread from China to other parts of the world including more than 200 countries. Corona virus is enveloped, positive sense, single stranded RNA virus. This virus infects humans and animals including mammals and birds. There are six species of corona virus which cause human diseases including 229E, OC43, NL63, HKU1. These four species cause mild common cold like symptoms. [5] Severe acute respiratory syndrome–COV in china (2002-2003) and Middle East respiratory syndrome-COV in Middle East (2012) have caused outbreak of pneumonia in the past. [6] The present SARS-COV-2 has high homology with SARS -COV. It happens to be zoonotic in origin. Frequent spill over and cross species infection are responsible for causing corona infection in humans. SARS-COV-2 primarily affects respiratory system but other organs of the body may get involved as well.Typical clinical presentation of SARS-COV-2 includes fever, cough, sore throat and dyspnea. It has unusual clinical symptoms like myalgias, headache, loose motion and vomiting. The average incubation time of this virus is 4 to 5 days. This virus has wide spectrum of clinical presentation ranging from minimal symptoms to hypoxia with ARDS. Recent epidemiological studies have shown that mortality is higher in older patients with co morbid conditions and incidence is much lower in females. Currently various supportive treatments are being used like remdesivir, lopinavir-rotinavir, hydroxychloroqine and Azithromycin. [7]So many countries went for lock down and social distancing to control spread of virus. In this present study we sincerely analyzed epidemiological, demographic and clinical profile of patients suffering from covid 19 infection.

Correspondence
Dr. Santosh Govind Rathod
Senior Resident, Department of Clinical Hematology, SKIMS, Srinagar, Jammu & Kashmir, India
E-mail: Drsgrathod2007@gmail.com

Method

This study was conducted in Sub district hospital Mangaon which is located on Mumbai Goa high way.In this retrospective, observational, single center study, we included all confirmed cases of SARS-COV-2 from 1.1.21 to 31.1.21. All cases were confirmed by RT-PCR and cases were analyzed for epidemiological, demographic, clinical,and radiological and laboratory data. All patients were categorized into four categories.1) Asymptomatic: covid test positive without clinical symptoms and signs and chest radiograph normal 2) mild:symptoms of acute upper respiratory tract infection. 3) moderate: pneumonia with no obvious hypoxia, chest X-ray with lesion. 4) severe: pneumonia with hypoxemia (spo2<92%) 5) critical: ARDS,Shock,multiorgan failure.Patients were treated and discharged according to Indian council of medical research guidelines.We obtained institutional ethical committee clearance and informed consent from patients.

Result

In the present study, a total of 57 patients were included. Of these, 35(61.40%) were males and 22(38.60%) were females. The mean age in this study was 34.29(SD 13.29) years. (Table 1)

Of these 57 patients, 33(57.9%) were symptomatic and 24(42.10%) patients were asymptomatic. Of these 57 patients, the most common presenting clinical symptoms was fever in 28(49%) cases, sore throat in 6(10.52%) cases,dry cough in 4(7.02%) cases, body aches in 4(7.02%) cases, loose motion in 2(3.5%) cases and shortness of breath in 4(7.02%) cases.(Table no.2) Of these 57 cases, four (7.02%) had hypertension, one (1.75%) had diabetes mellitus, one (1.75%) had bronchial asthma, two had pregnancy ((3.50%) one (1.75%) had stroke as comorbid condition. (Table 3) Of these 57 patients, 24(42.10%) were asymptomatic, 28(49.12%) were of mild grade, 4(7.01%) were of moderate grade, one(1.75%) of severe grade.(Table 4) Of these 57 patients, 56 patients recovered very well. Mean number of days from onset of symptoms to admission were 3.36 (SD+1.2). Mean number of hospital stay days were 11.10 (SD+1.5). On admission of these 57 patients, five (8.77%) had bilateral pulmonary infiltrates on chest X-ray. (Fig.1) Mean saturation on room air (spo2) was 96.94 %(SD+2.83) and respiratory rate was 18.40 (SD+2.30). In our study, mean blood urea was 24.5 mg %, mean serum bilirubin was 0.5806 mg%, mean leucocyte count

8452/mm, mean hemoglobin 12.6 gm % (SD+2.5) and mean neutrophil to lymphocyte ratio was 2.5.(0.8-11) Of the total 57 patients, 28(49.12%) had Lymphocytopenia,14(24.56%) had Leuco-penia,and seven(12.28%) had thrombocytopenia.

The treatment protocol of SARS-COV-2 in our center consisted of pharmacotherapy and respiratory support modalities. Drugs used were hydroxychloroqine, azithromycin, lopinavir and indinavir, oseltamavir and ceftriaxone. In this present study, hydroxychloroqine was used in 57 (100%)patients, azithromycin used in 33 (54.38%) patients, oseltamavir used in 33(57.90%) patients, lopinavir and rotinavir combination,Antibiotic,intravenous fluid and oxygen in one (1.75%) patient. In our study, one patient of age 65 years with hypertension, stroke as co morbid condition presented with bilateral pulmonary infiltrate with hypoxemia (spo2 <90%) . He was treated with standard protocols and non-invasive ventilation but on day 12 died. In our study there were two antenatal patients, who were treated symptomatically.They responded well and recovered uneventfully. In our study, there were two-pediatric patients of asymptomatic category who recovered very well without complicati-ons.Revised guidelines were used in discharging these patients. Asymptomatic, mild and moderate cases were discharged after 10 days of symptom onset when they had no fever for 3 days. There was no need for testing prior to discharge, and they were advised to isolate at home and self monitor health for further 7 days. For severe cases, criteria for discharge are clinical recovery and patient tested negative by RT-PCR (after resolution of symptoms).

Table 1:Age wise distribution of SARS-COV-2

Age group	Number of cases	Percentage%
0-9	1	1.75
10-19	5	8.77
20-29	19	33.33
30-39	15	26.31
40-49	10	17.54
50-59	4	7.01
60-69	3	5.26
total	57	100

Table 2:Symptom wise distribution of SARS-COV-2

Symptoms of patient	Number of cases	% of patient
Asymptomatic patients	24	42.10
Fever	28	49.12
Sore throat	6	10.52
Dry cough	4	7.01
Body aches	4	7.02
Gastro intestinal symptom	2	3.51
Shortness of breath	4	7.02
total	57	100

Table 3:Co morbid condition in SARAS-COV-2

Co morbid condition	Number of cases	% of cases
Hypertension	4	7.02
Diabetes mellitus	1	1.75
asthma	1	1.75
stroke	1	1.75
pregnancy	2	3.50
malignancy	0	0
HIV	0	0
Renal disorder	0	0

Table 4:Severity wise distribution of SARS-COV-2

Category	Number of cases	% of patient
asymptomatic	24	42.1
Mild	28	49.12
moderate	4	7.00
severe	1	1.75
critical	0	0

Table 5:Showing comparison with previous study published.

Author	Study location	Age range	Median age(y)	No. 0f patients	Fever (%)	Rinorrhea (%)	Cough (%)	Fatigue (%)	Headache (%)	Diarrhea (%)	Dyspnea (%)
Zhaoet,al 2020	Guangxi, china	11-68	45	28	18(64)	2(7)	12(43)	7(25)	4(14)	NA	3(11)
Yu et al, 2020	Guangzhou, china	33-62	50	91	70(77)	NA	57(63)	19(21)	11(12)	5(5)	5(5)
Chen et al, 2020	Wuhan, china	26-79	56	29	28(97)	NA	21(72)	12(41)	2(7)	4(14)	17(59)

| Study	Location										
Liu et al, 2020	Shenzhen, china	10-72	63	12	10(83)	NA	11(92)	NA	0(0)	2(7)	NA
Tian et al, 2020	Beijing china	1-94	48	262	215(82)	NA	12(46)	69(26)	17(6)	NA	17(7)
Wang et al, 2020	Wuhan, china	42-68	56	138	13(99)	NA	82(59)	96(70)	9(7)	14(10)	43(31)
Liu et al, 2020	Wuhan, china	43-66	55	109	90(83)	NA	76(61)	62(57)	NA	12(11)	NA
Xu et al, 2020	Zhejiang, china	32-52	41	62	48(77)	NA	50(81)	32(52)	21(34)	3(5)	NA
Chen et al, 2020	Wuhan, china	21-82	56	99	82(83)	4(4)	81(82)	NA	8(8)	2(2)	2(2)
Yang et,al 2020	Wuhan, china	NA	60	52	51(98)	3(6)	40(77)	NA	1(6)	NA	1(2)
Present study	Sub District Hospital, Mangaon India	8-65	34	57	28(49.12)	NA	4(7)	NA	NA	2(4)	4(7)
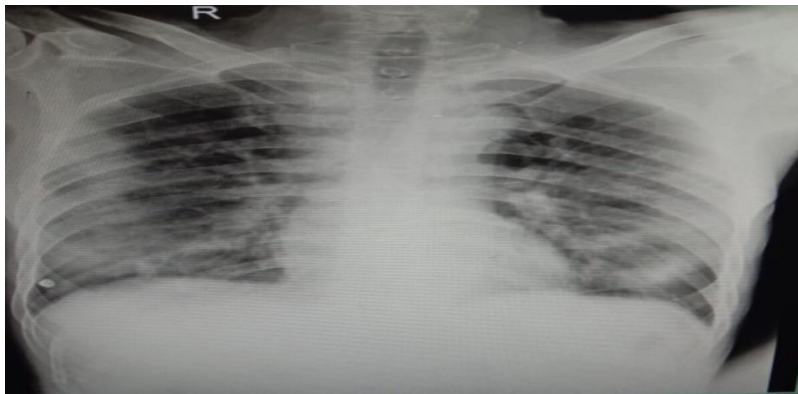
Fig 1:Chest X Ray

Discussion

This is a descriptive study on the epidemiology and clinical characteristics of the SARS-COV-2, involving 57 patients. The two highly pathogenic viruses, SARS-CoV and MERS-CoV, cause severe respiratory syndrome in humans and four other human corona viruses HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-HKU1 cause mild common cold like symptoms. [5] Severe acute respiratory syndrome– COV in china (2002-2003) and Middle East respiratory syndrome-COV in Middle East (2012) caused outbreak of pneumonia in the past. [6]The present SARS-COV-2 has high homology with SARS -COV. In SARS-CoV-2, human-to-human transmission is through aerosol droplets and fomites. In this present study, we have observed a more number of men than women in the SARS-COV-2 infection.The reduced susceptibility of females to viral infections could be explained by the protection from X chromosome and sex hormones, which play important role in innate and adaptive immunity.[8] Another possible explanation for this is protective measures, as more than 50% women practices measures such as hand washing, face mask use and avoid crowded places. [9] In the present study, most common presenting clinical symptom was fever, followed by sore throat, dry cough, body aches and shortness of breath. We compared our study, clinical symptomatology with published study and found our results similar to published data. [10] (Table 5)In the present study, 16% of patients infected by SARS-COV-2 had chronic underlying diseases, mainly cardiovascular and cerebrovascular diseases and diabetes. In the present study, case fatality was 1.75%, consisting mainly of older adult males with chronic comorbidities. Old age and presence of comorbidity might be associated with increased mortality as immune response is weak in this patient population. With ageing, continuous antigenic stimulation and thymic involution lead to shift in T cell subset distribution from naïve T cell to central memory T cells, effector T cell subset and memory T cell.[11]This leads to increased suscept-ibility and severity of disease. Angiotensin converting enzyme2 (ACE2) was identified as functional receptor of SARS-COV-2. This receptor is highly expressed on lung epithelium, heart, ileum, kidney and endothelium. [8] Spike glycoprotein of SARS-COV-2 attaches to ACE2 receptor on lung epithelial tissue and endothelial cells and causes damage to respiratory mucosal surface and pulmonary vessels.[8]In SARS-COV-2, innate immunity and adaptive immunity play an important role in fighting this infection. In the present study absolute value of lymphocytes reduced in nearly about fifty percent of patients. This shows that SARSCoV-2 acts on lymphocytes, especially T lymphocytes. Severity of disease has direct correlation with viral load. In severe cases of SARS –COV-2, there is exhaustion of T cells. [8] In severe cases, there is cytokine storm in the form of increased IL-6, IL-10, granulocyte-colony stimulating factor, TNF – Alfa, IL-8 in the serum which attract more neutrophils, lymphocyte, and cause tissue damage; this results in, rapid progression of disease toward ARDS, multiorgan failure and death. [8] The low absolute value of lymphocytes should be used as surrogate marker in the diagnosis of new coronavirus infections in the hospital.

Conclusion

Overall, population is highly susceptible to infection with low fatality. Mortality is high among the old age patients with co morbid conditions. Use of facemask, personal hygiene and social distancing should be practiced to prevent the further spread of infection in society.

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