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Research Article

CLINICAL PROFILE AND THE OUTCOME OF COVID-19 IN PATIENTS WITH HEMATOLOGICAL MALIGNANCY: A SINGLE CENTRE EXPERIENCE

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ABSTRACT

Objective: In the present study, we are reporting the clinical profile; and outcomes of COVID-19 in patients with hematological malignancy at tertiary care hospitals.

Methods: Data from laboratory-confirmed 40 COVID-19 patients diagnosed between January 1, 2021 and July 31, 2021, were analyzed retrospectively. All COVID-19 patients with hematological malignancy (n=40) were included in the study.

Results: In the present study, a total of 40 patients were included. Of 40, 25 (62.5%) were males, and 15 (37.5%) were females. The median age in this study was 43 years (Range, 8–70). Of these 40 patients, acute myeloid leukemia was the most common malignancy 11 (27.5%), followed by acute lymphoblastic leukemia 9 (22.5%) than non-Hodgkin lymphoma 5 (12.5%), plasma cell dyscrasia 4 (10%), chronic myeloid leukemia 4 (10%), chronic lymphocytic leukemia 3 (7.5%), acute promyelocytic leukemia 2 (5%), chronic myelomonocytic leukemia 2 (5%). Mean hemoglobin was (8.04 g/dl), white blood cell count was (10.14×10^9/l), platelet count was (77.7×10^9/l) creatinine was (0.86 mg/dl), bilirubin was (1.24 mg/dl). The overall case-fatality rate was 8 (22.5%).

Conclusion: Patients with hematological malignancy are immunocompromised, and our study reveals that there is an increased case fatality rate among these patients. Hence, physicians should be aggressive in the management of COVID-19 patients with hematological malignancy.

Keywords: Hematological malignancy, COVID-19, Case fatality.

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INTRODUCTION

The majority of Coronaviruses (CoVs) are pathogenic to humans, but very rarely cause serious infections. In the past couple of decades, two strains of CoVs caused severe infections in humans: The severe acute respiratory syndrome coronaviruses (SARS-CoV) and the Middle East respiratory syndrome coronaviruses (MERS-CoV). Recently, a bunch of pneumonia cases with an unidentified cause was observed in Wuhan, China (December 2019). These pulmonary infection cases were caused by the SARS-CoV-2 [1]. The novel pneumonia-like disease had a similar clinical presentation such as SARS-CoV, and MERS-CoV; such as dyspnea, febrile spike, and ground-glass opacities in the computed tomography of the thorax. The severity and mortality of disease are higher in those with comorbidities, active malignancy, or old age. Patients with malignancy are at high risk of severe disease. It has been noted that a mortality rate exceeds 25% [2,3]. Patients with hematological malignancies may be more vulnerable than patients with solid tumors because of the immune system dysfunction they have. However, there are only limited data about COVID-19 in patients with blood cancer, and the majority of this literature is based on a case report, case series. Hence, in the present study, we are reporting the outcome of COVID-19 patients in hematological malignancies.

METHODS

In this retrospective, single-centered study, we included all of the Covid-19 patients with hematological malignancy. All cases were confirmed by reverse transcription-polymerase chain reaction and cases were analyzed for demographic, clinical, radiological, and laboratory data. Institutional ethical committee approval was taken. All data are entered in an excel sheet and the appropriate statistical test is used for analysis.

RESULTS

In this present study, a total of 40 patients were included in the study. Of these, 25 (62.5%) were males and 15 (37.5%) were females. The median age in this study was 43 years. (Range, 8–70). Of these 40 patients, acute myeloid leukemia was the most common malignancy 11 (27.5%), followed by acute lymphoblastic leukemia 9 (22.5%) than non-Hodgkin lymphoma 5 (12.5%), plasma cell dyscrasia 4 (10%), chronic myeloid leukemia 4 (10%), chronic lymphocytic leukemia 3 (7.5%), acute promyelocytic leukemia 2 (5%), chronic myelomonocytic leukemia 2 (5%). Mean hemoglobin was (8.04 g/dl), white blood cell (WBC) count was (10.14×10^9/l), platelet count was (77.7×10^9/l) creatinine was (0.86 mg/dl), bilirubin was (1.24 mg/dl). Among the cases, seventeen patients were in complete remission (42.5%), five patients were in partial remission (12.5%), five patients had stable disease (12.5%), thirteen patients had progressive disease (32.5%). Of these 40 patients, thirty-four were having treatment for the active disease (85%), five patients had no treatment (12.5%), one patient was in follow-up (2.5%). Hypertension was the most frequent comorbid disease associated with COVID-19 patients with hematological malignancy and seen in 8 (20%) patients followed by ischemic heart disease in 4 (10%) patients. Thromboembolic events were seen in 2 (5%) patients. The symptomatology included fever in 22 (55%), cough in 17 (42.5%) of the patients followed by shortness of breath in 13 (32.5%), malaise in 11 (27.5%) of the patients, and disseminated intravascular coagulation in 10 (25%) patients. Thirty-two patients (80%) received azithromycin, fifteen patients (35%) received methylprednisolone and twelve patients (30%) received remdesivir. As per WHO risk stratification, fifteen patients were in the mild category, seventeen patients were in the moderate category. Seven patients were in a severe category. In this present study, *Aspergillus* infection was found in (n=9) patients.

(Fig. 1), bacterial infection with culture positive for pseudomonas found in (n=8) patients. On high-resolution computerized tomography (HRCT) bilateral ground-glass opacity was the most common finding seen in 20 patients. (Fig. 2) followed by acute respiratory distress like the picture in one patient, pulmonary infiltrates in eight patients and eleven patients had normal HRCT findings. The average duration of delay in chemotherapy due to Covid was 26 days. (Range, 12–34). In thirty-two surviving patients, the mean duration of viral shedding was 34 days (range, 12–62) from the beginning of symptoms. The overall case-fatality rate was 8 (22.5%). In acute myeloid leukemia, it was 3 (7.5%) and in acute lymphoblastic leukemia, it was 5 (12.5%).

We did find significant differences among laboratory findings and outcome of Covid-19 patients in hematological malignancy concerning Sr creatinine and SGPT level. However, there was an insignificant difference in median hemoglobin, total leukocyte count, and platelet count with lower values inpatient with fatal outcomes. Interleukin-6, ferritin, D-dimer were insignificantly higher in patients with covid-19 with fatal outcomes. All patients' characteristics are shown in Table 1. Laboratory findings of Covid-19 patients correlating with the outcome are shown in Table 2.

DISCUSSION

In this present study, the median age of the patient was 43 years (8–70) with a male to female ratio of 5:3. The most common blood cancer in our study was acute myeloid leukemia followed by acute lymphoblastic leukemia, non-Hodgkin lymphoma. In this cohort seventeen patients were in complete remission, thirteen patients were in the progressive stage, five patients were in partial remission, five patients were in the stable stage. Thirty-four patients were receiving treatment for active disease. Five patients were not receiving any treatment for the disease.

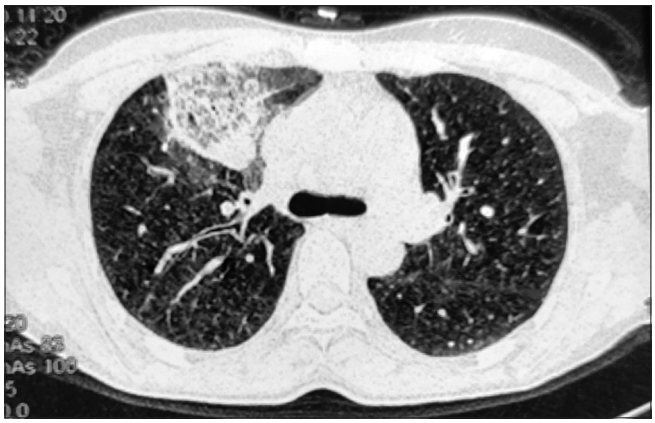

Fig. 1: Bird net sign suggestive of fungal infection

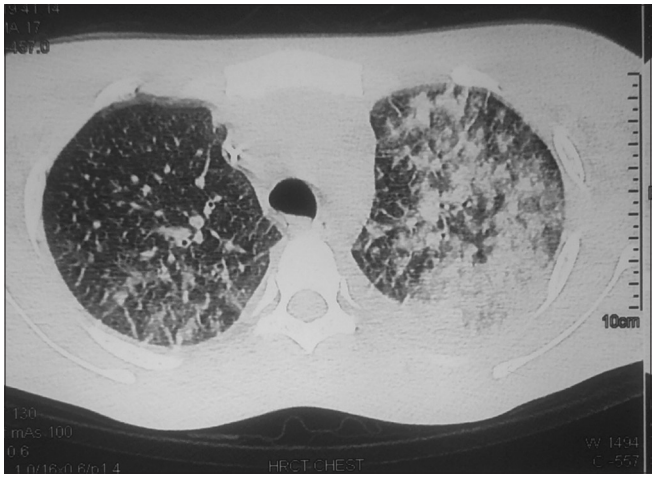

Fig. 2: On high-resolution computerized tomography chest bilateral ground-glass opacity seen

Table 1: Clinical future in Covid 19 patients with hematological malignancy

Patients characteristics	n=40 (%)
Gender	
Male	25 (62.5)
Female	15 (37.5)
Median age (range), year	43 (8–70) y
Hematological malignancy	
Acute myeloid leukemia	11 (27.5)
Acute lymphoblastic leukemia	9 (22.5)
Non-Hodgkin lymphoma	5 (12.5)
Plasma cell dyscrasia	4 (10)
Chronic myeloid leukemia	4 (10)
Acute promyelocytic leukemia	2 (5)
Chronic lymphocytic leukemia	3 (7.5)
Chronic myelomonocytic leukemia	2 (5)
Chronic myelomonocytic leukemia	2 (5)
Hematological malignancy status	
Complete remission	17 (42.5)
Partial remission	5 (12.5)
Stable disease	5 (12.5)
Progressive disease	13 (32.5)
Treatment for hem malignancy	
Active	34 (85)
No treatment	5 (12.5)
Follow up after treatment	1 (2.5)
Comorbidities	
Hypertension	8 (20)
DM	2 (5)
Hypothyrodismatologic	1 (2.5)
Ischemic heart disease	4 (10)
Rheumatoid arthritis	1 (2.5)
No co-morbid condition	24 (60)
Thrombotic events	
Pulmonary embolism	1 (2.5)
Deep vein thrombosis	1 (2.5)
No event	38 (95)
Signs and symptoms	
Fever	22 (55)
Cough	17 (42.5)
Shortness of breath	13 (32.5)
Malaise	11 (27.5)
Myalgia	6 (15)
Headache	5 (12.5)
DIC	10 (25)
Covid 19 treatment	
Azithromycin	32 (80)
Methylprednisolone	15 (37.5)
Remdesivir	12 (30)

DM: Diabetes mellitus

Table 2: Laboratory findings at COVID-19 diagnosis depending on outcome

Parameter (median)	Recovered patients	Deceased patients	p-value
Hemoglobin (g/dl)	8.281 (4–13.5)	7.22 (4.3–9.0)	0.162
WBC count ($\times 10^9$)	12.06 (0.3–74)	3.22 (0.5–8.5)	0.125
SR creatinine mg/dl	0.74 (0–1)	1.28 (0–4)	0.012
Platelet count ($\times 10^9$)	88.9 (4–473)	41 (8–123)	0.152
Il–6 level, pg/ml	12.2 (5.4–376)	41.1 (36.2–54.2)	0.720
Ferritin level, mg/l	378 (150–605)	1310 (830–1890)	0.335
D–dimer level, ng/ml	1052 (490–14500)	2361 (490–14400)	0.63
Sr bilirubin mg/dl	1.25 (0.35–8.00)	1.19 (0.45–2.10)	0.91
SGPT u/l	43.72 (8–140)	131 (43–345)	0.00

IL: Interleukin, WBC: White blood cell, SGPT: Serum glutamic pyruvic transaminase

One patient was in follow-up for treatment. In this cohort, hypertension was the most common comorbid condition followed by ischemic heart disease, diabetes mellitus. In the present study, thrombotic events occurred in two patients. In this present study, fever was the most common symptom followed by cough then shortness of breath, malaise, myalgia. Our findings are similar in line with the study of Infante *et al*. [4].

In the present study, among superadded infections, *Aspergillus* infection was most common followed by bacterial infection due to *Pseudomonas aeruginosa*. On HRCT bilateral ground-glass opacity was the most common finding. The median duration of delay in chemotherapy due to Covid infection was 26 days. In the 32 alive patients, the median duration of viral shedding was 34 days. In one acute myeloid leukemia viral shedding duration was 63 days. In the normal population, viral shedding is 20 days [4]. Viral shedding time is more in Covid pneumonia patients with hematological malignancy.

Overall, the case fatality rate was 22.5%. In acute myeloid leukemia, it was 7.5% and in acute lymphoblastic leukemia, it was 12.5%. The case fatality was high in the severe Covid pneumonia category. A patient needed intensive care unit care and mechanical ventilation.

The case fatality rate in COVID-19 patients along with hematological malignancy varies in the published literature. In the study by Mehta *et al*., the case fatality rate in COVID-19 patients with hematological malignancy was 37% [5]. Martin-Moro *et al*., reported the case fatality rate was 32% in 34 hospitalized COVID-19 patients with hematological malignancy. Their study revealed that there is a positive correlation between hematologic malignancy status at the time of COVID-19 infection, and is related to mortality; patients in remission presented with better outcomes [6]. Aries *et al*. also reported a case fatality rate of 40% in haemato-oncology patients in their small cohort study including 35 patients [7].

Yang *et al*., in their study of 52 COVID-19 patients with solid and hematological malignancies, the rate of serious infection was 36.5% and the case fatality rate of serious patients was 57.8% [8]. The database review from Turkey showed a case fatality rate of 13.8% [9].

The meta-analysis included 34 adult and 5 pediatric studies that revealed initial mortality of 34% for all patients with blood cancers, which was much more for patients aged >60 years [10]. In one of the studies from India, 230 patients had concurrent COVID-19 while receiving active treatment for hematological malignancy. This group was noted to have a mortality of 10% [11]. Our study case fatality rate was quite similar to the above-mentioned studies. In the present study, the mortality rate was high among acute lymphoblastic leukemia compared to acute myeloid leukemia. This is due to, there being more immune dysregulation in acute lymphoblastic leukemia compared to acute myeloid leukemia [12].

CONCLUSION

Patients with hematological malignancy are immunocompromised. The case fatality rate is very high among patients of hematological malignancy with Covid 19 pneumonia when the disease is progressive. There is an increased risk of fungal and bacterial infection in such patients. Patients with hematological malignancy show longer viral shedding due to immune dysregulation. Hence, physicians should be aggressive in the management of COVID-19 patients with hematological malignancy.

AUTHORS' CONTRIBUTIONS

All authors contributed equally

CONFLICT OF INTEREST

Nil.

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Nil.

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