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Correlation of HRCT with D dimer ferritin LDH and CRP

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ABSTRACT
Coronaviridae is a family of viruses with a positive-sense RNA that possess an outer viral coat. When looked at with the help of an electron microscope, there appears to be a unique corona around it. This family of viruses mainly cause respiratory diseases in humans, in the forms of common cold or pneumonia as well as respiratory infections. These viruses can infect animals as well. All the parameters like D-dimer, ferritin, LDH and CRP was found to be elevated in patients of HRCT severity score of 15-25 to wide extent when compared to severity of 1-7 and 7-14, and males were prone to high infection when compared to females because of their life style like smoking, alcohol, tobacco.

Keywords: Biomarker, coronavirus, COVID-19, HRCT, D DIMER, FERRITIN

INTRODUCTION

Coronaviridae is a family of viruses with a positive-sense RNA that possess an outer viral coat. When looked at with the help of an electron microscope, there appears to be a unique corona around it. This family of viruses mainly cause respiratory diseases in humans, in the forms of common cold or pneumonia as well as respiratory infections. These viruses can infect animals as well (1, 2). Up until the year 2003, coronavirus (CoV) had attracted limited interest from researchers. However, after the SARS (severe acute respiratory syndrome) outbreak caused by the SARS-CoV, the coronavirus was looked at with renewed interest (3, 4). This also happened to be the first epidemic of the 21st century originating in the Guangdong province of China. Almost 10 years later, there was a MERS (Middle East respiratory syndrome) outbreak in 2012, which was caused by the MERS-CoV (5, 6). Both SARS and MERS have a zoonotic origin and originated from bats. A unique feature of these viruses is the ability to mutate rapidly and adapt to a new host. The zoonotic origin of these viruses allows them to jump from host to host. Coronaviruses are known to use the angiotensin-converting enzyme-2 (ACE-2) receptor or the dipeptidyl peptidase IV (DPP-4) protein to gain entry into cells for replication (7–10).

In December 2019, almost seven years after the MERS 2012 outbreak, a novel Coronavirus (2019-nCoV) surfaced in Wuhan in the Hubei region of China. The outbreak rapidly grew and spread to neighboring countries. However, rapid communication of information and the increasing scale of events led to quick quarantine and

screening of travelers, thus containing the spread of the infection. The major part of the infection was restricted to China, and a second cluster was found on a cruise ship called the Diamond Princess docked in Japan (11, 12).Aim and objective of this study.

- To correlate the CT severity with laboratory findings (D-dimer, ferritin, LDH and CRP)
- To correlate the co-morbidities and the number of days of hospital stay with those of non co morbidities patients.
- To compare the relation between the CT severity and the co morbidities discharge.
- To study gender-based severity and there co relation with the co morbidities.
- To study the severity in men with co morbidities.
- To access the significance of CORADS in the diagnosis.
- To access age base infection.

MATERIALS AND METHODS

Study Design

A retrospective observational study.

Study Site

The study will be conducted in max care multispeciality hospital, hanamkonda Warangal,Aravinda hospital hanamkonda, Warangal. And Ajara hospital Warangal.

Duration Of Study

The study will be conducted for the period of 5 months.

Sample Size

A total of 250 covid-19 positive patients were selected for the study

Inclusion Criteria

Patients who were tested positive with either RT-PCR or rapid antigen method.

Patients who had undergone HRCT chest and investigations like (D-dimer, ferritin, LDH, CRP)

Patients who are admitted in the hospital.

Exclusion Criteria

Patients who have not confirmed as viral pneumonia.

Patients who are under home isolation.

Source Of The Data

Patient consent form.

Patient profile form.

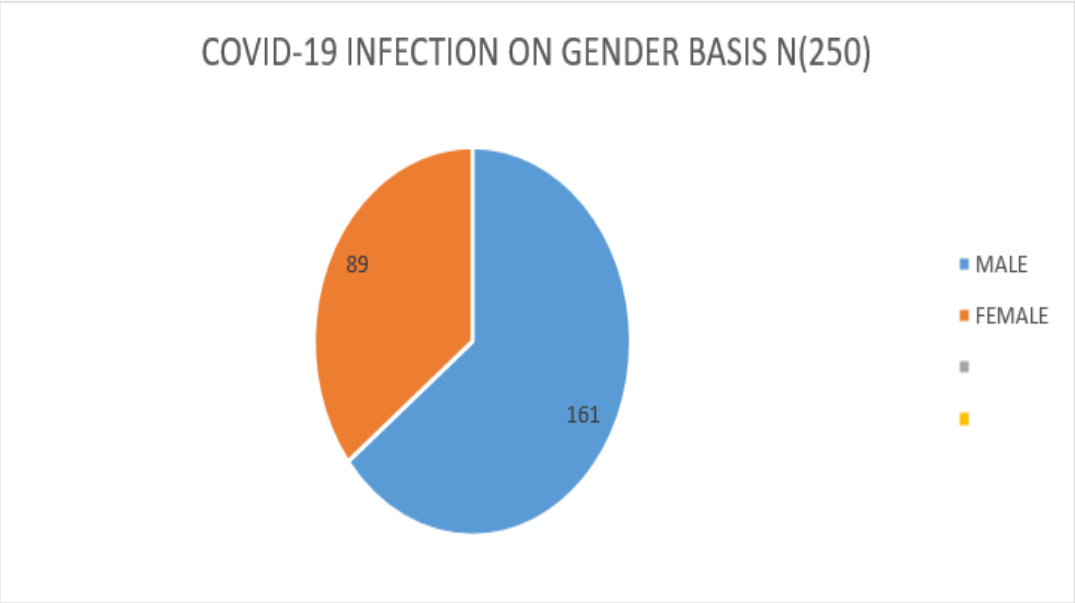
i. Demographics.
ii. Daily vitals follow up.
iii. Daily treatment follows up.
iv. Laboratory parameters.
v. HRCT severity.
vi. Discharge medication.

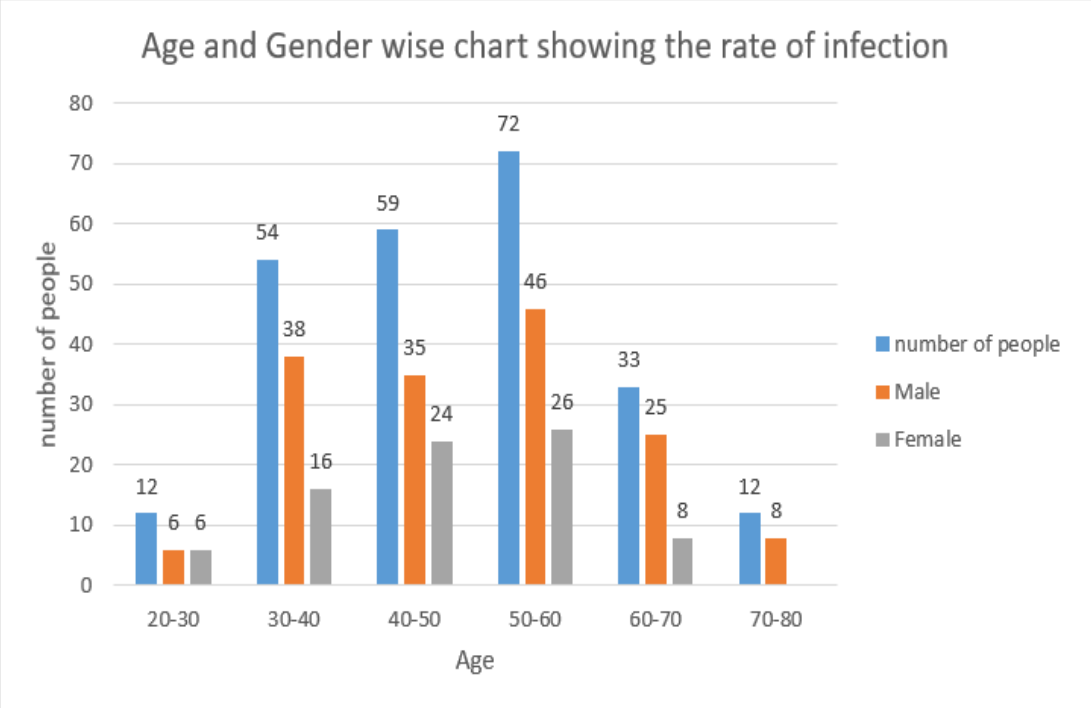
Study Procedure

A group of 250 patients who were confirmed as Covid -19 by RT-PCR or rapid antigen was selected who are in the medical supervison.All the date from the date of diagnosis till the date of discharge was collected with complete follow up of daily vitals, treatment patterns, laboratory parameters, past history (medical, surgical, drug) and social history was also collected. Evaluated for the co relation of the HRCT with the laboratory parameters like D-dimer, ferritin, LDH and CRP.

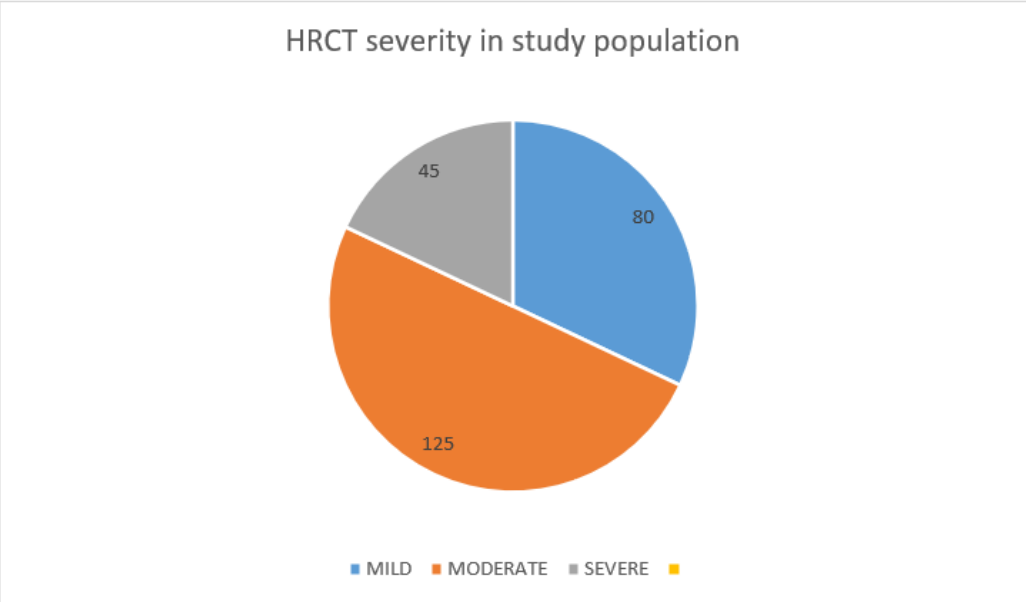
RESULTS

In about n=250 covid-19 cases, about 161 cases was found to be men and 89 were found to be women as shown in the below chart.

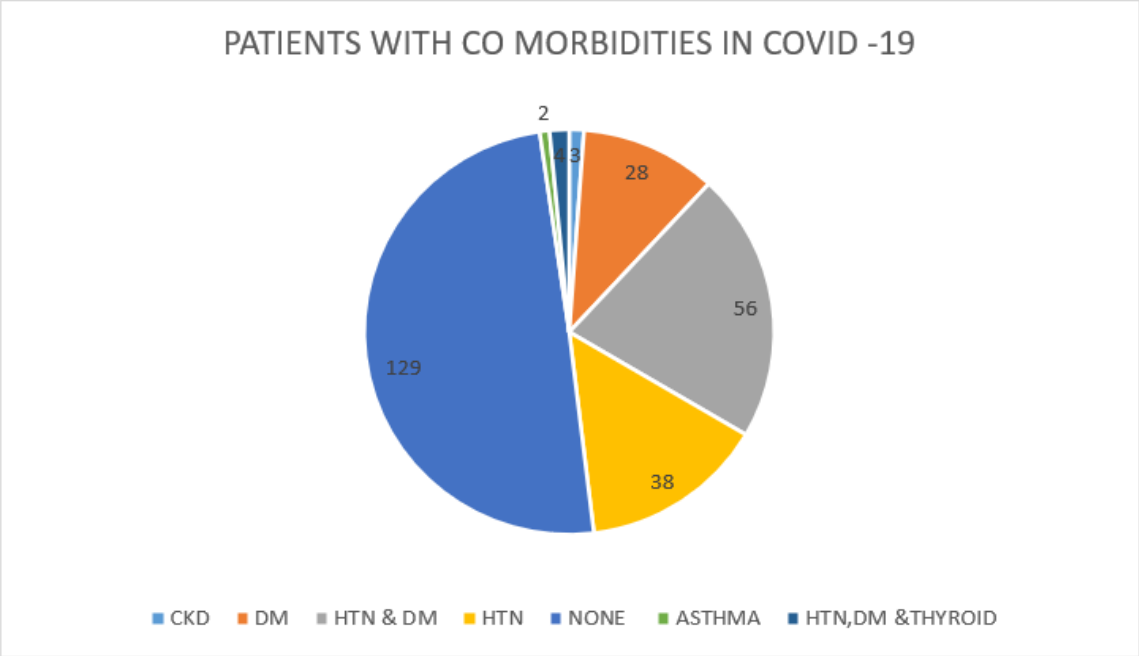




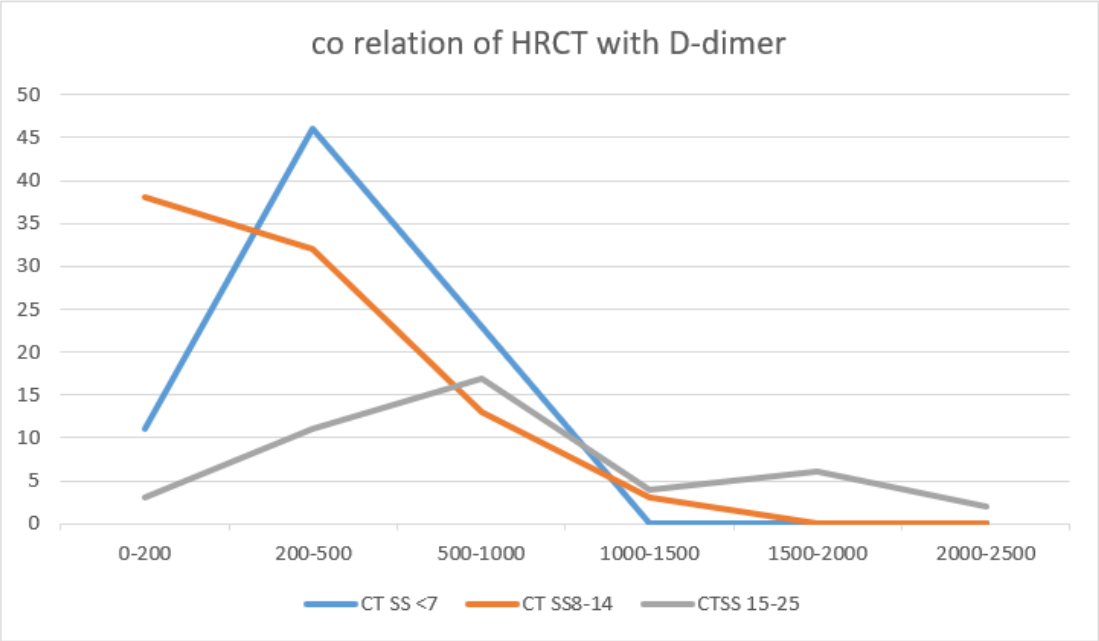
Graph showing the age prevalence in the infection of the covid-19, it is shown that people of age 30- 70 years are known to prone to the infection due to their comorbidities, social life style.



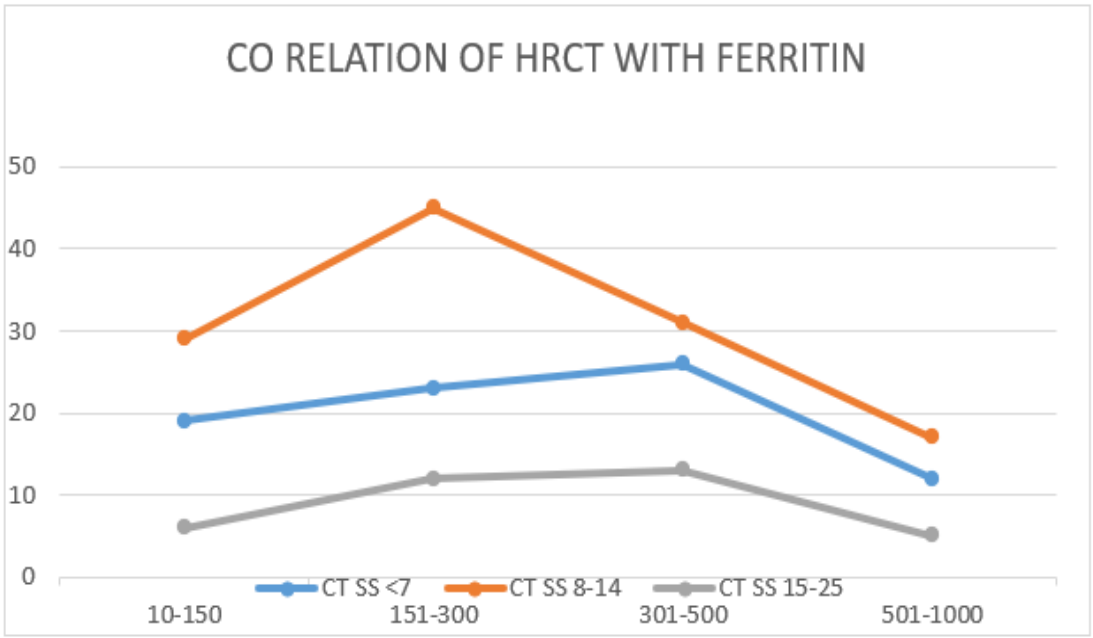
High resonance computer tomography was helps in concluding the severity and the extent of bilateral lung involvement in the infection and is stated CT severity score with 1-7 as mild, 7-14 as moderate and 15-25 is considered as severe infection.



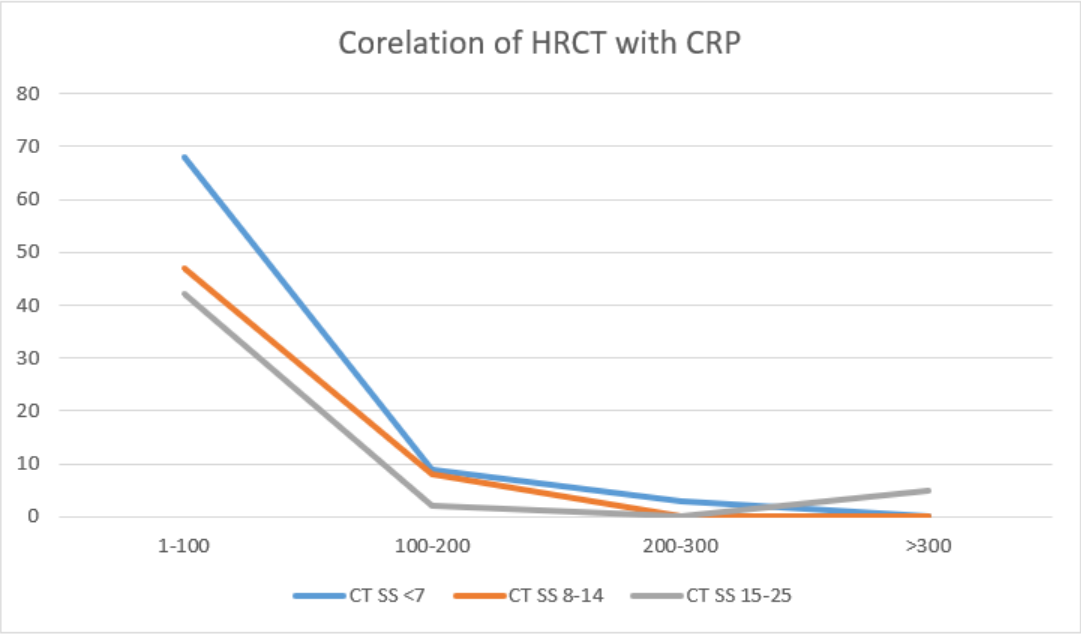
Comorbidities like hypertension, diabetes, chronic kidney injury, asthma, thyroid may lead to mortality or may end up with serious complications like multi-organ damage. mostly patients with diabetic and hypertension were known to have a serious infection or more prone to get complicated.



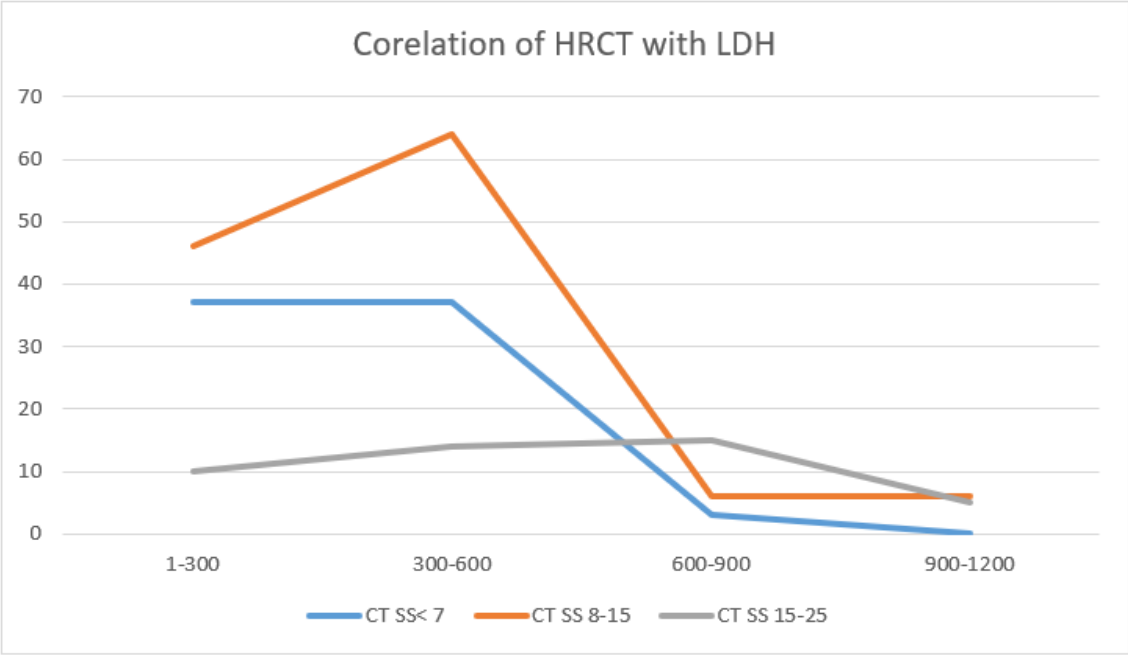
D-dimer level are found to be elevated from 0-500ng/ml in mild infection cases and where as in moderate infection was found to be around 1500ng/ml. and in severe cases there is an elevated above 2000ng/ml and there is fluctuation in the ranges due to the acute infection phase in severe cases.



Graph indicating the levels of ferritin in various patients with HRCT of 1-25 CT severity



Graph indicating the levels of CRP in covid-19 patients with HRCT severity ranging from 1-25 and the most people with severity score 1-7 have ranges from 1-100 mg/l. and in patients with severe infection CT severity 15-25 ranges between 200mg/l and above.



Graph showing correlation of HRCT with LDH these values are found to be elevated in the patients with mild to moderate infection.

DISCUSSION

D-dimer, ferritin, C-reactive protein, lactate dehydrogenase these act as a biomarker in the evaluation of severity of SARS CoV-2 infection the normal values of these parameters:

S.NO	NAME	NORMAL RANGE
1	D-dimer	<250ng/ml
2	Ferritin	24-336 micrograms/l
3	Lactate dehydrogenase (LDH)	140-280 U/L
4	C- reactive protein	<10mg/l

Elevation in these parameters is an indication of inflammation, necrosis and may lead to microvascular damage which further leads to hypoxia and multi-organ dysfunction. usually in patients with mild severity ranging from CT severity of 1-7 D-dimer was known to have significant elevation, CRP was also found to elevated to above 100 in 68 (n=250), ferritin was also found to be elevated and in about n=250, 89 was found to be female and 161 was found to be male, and various co morbidities like hypertension, diabetes mellitus, chronic kidney injury, asthma, in a group of 250 people with covid-19, 28 were found to have diabetes mellitus which has high risk of getting complicated, 56 having history of hypertension and diabetes mellitus, 38 having hypertension, asthma in 2 and all hypertension, diabetes and thyroid on about 3, and the remaining do not have any co morbidities. CRP was found to be elevated to more than 30mg/l in acute infection. And later subsides to the normal range, and elevated levels of D-dimer may lead to the pulmonary embolism, and DVT deep vein thrombosis, hence anti-coagulant therapy should be started with no contraindications, and monitoring of PT-INR. And potent anti-inflammatory drugs like tocilizumab and steroids like dexamethasone, methyl prednisolone are indicated.in patients having comorbidities like hypertension and diabetes have high risk of hospitalization stay ranging from 8-25 days. And additional supportive treatment is also needed.

CONCLUSION

All the parameters like D-dimer, ferritin, LDH and CRP was found to be elevated in patients of HRCT severity score of 15-25 to wide extent when compared to severity of 1-7 and 7-14, and males were prone to high infection when compared to females because of their life style like smoking, alcohol, tobacco.

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