



**ORIGINAL RESEARCH PAPER**

**General Medicine**

**ASSESSMENT OF DISEASE SEVERITY AND PROGNOSIS IN COVID-19 PATIENTS BASED ON LUNG INVOLVEMENT IN TERTIARY CARE HOSPITALS IN CHENNAI**

**KEY WORDS:** COVID-19, SARS-CoV-2, Viral pneumonia, ARDS

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**ABSTRACT**

**Background:** Corona virus disease 2019 (COVID 19) is caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) infection. This disease, which is quickly spreading worldwide, has high potential for infection and causes rapid progression of lung lesions, resulting in a high mortality rate. This study aimed to assess the severity and prognosis in COVID-19 patients based on lung involvement (CT-Chest).  
**Methods:** All lab confirmed cases of Covid 19 (RT-PCR positive) 369 patients admitted in Government Kilpauk medical college who were on follow up from October to November 2020, in Chennai were included. All patients underwent complete laboratory data including imaging studies-X-ray and CT-chest.  
**Results:** Among 369 of the admitted patients, 67% were males, 38% in 20-40 years 36% in 40-60 years of age. Among that 280 (75.9%) had non severe disease, 89 (24.12%) had severe disease. Regarding disease outcome 38 (10.3%) died and 331 (89.7%) are alive. Compared to the patients with the stages of COVID-19:  
 Asymptomatic (no lung involvement) - 28.4%  
 Mild – Stage I (score I to II – 5 to 25% area involved) - 36.3%  
 Moderate – Stage II (score II to IV – 25 to 50% area involved) - 22.5%  
 Severe – Stage III (score IV to V - more than 50% area involved) – 12.7%  
 12.7% of patients need ICU admission & mechanical ventilation and 10.3% of patients succumbed to death.  
**Conclusion:** From this study we have assessed the patient severity by using CT chest in covid 19 RT-PCR positive patient. According to this study patient had more severe lung involvement needs mechanical ventilation and ICU admission.

**INTRODUCTION:**

Covid-19 is mainly a respiratory disease caused by SARS-CoV-2 (corona virus). The disease can spread via respiratory droplets when patient coughs or sneezes. Virus enters into respiratory system and binds with ACE II receptors in type II pneumocytes in the respiratory system and increases the inflammatory mediators and cytokines. This causes interstitial edema and increases the work of breathing and hypoxia. The clinical presentation of COVID-19 is asymptomatic to severe disease. Common symptoms include fever, cough, fatigue, loose stools, breathlessness. Rarely patient presents with anosmia, loss of taste, vomiting, abdominal pain, stroke and chest pain. ACE II receptors also present in the kidney, cardiovascular system, gastro intestinal system so the patients may also develop ARDS, AKI, thromboembolic events, shock were reported. In this context one of the most common complication is ARDS. Clinically severity assessed by saturation, pulse rate, respiratory rate. Laboratory markers such as NLR, deranged electrolytes, CRP levels associated with worse prognosis. Severity also assessed by imaging techniques such as Xray chest, CT chest, ultrasound chest.

SPO<sub>2</sub> < 90% in room air, CT Chest findings (score IV to V - more than 50% area involved)

**CT CHEST FINDINGS:**

**Typical:** Ground glass opacity, Consolidation, Interstitial thickening, Crazy-paving

Ground glass opacities with or without consolidation usually of multi-focal, bilateral involvement, are noticed in the peripheral or sub pleural distribution, posterior part or lower lobe predilection.

**Atypical:** Pleural effusion, lymphadenopathy, fibrosis, bronchiectasis, Nodules, Pericardial effusion, hallow sign, calcification, cavitation, pleural thickening, bronchial wall thickening.

According to CT Chest results, 4 stages in Covid 19 patients.

- (1) Early stage - 0-4 days,
- (2) Progressive stage - 5-8 days,
- (3) Peak stage - 8-13 days,
- (4) Absorption stage - after 2 weeks of symptoms.

**STAGES OF COVID-19:**

1. Asymptomatic: No symptoms, SPO<sub>2</sub> > 96% in room air, CT Chest findings (no lung involvement)
2. Mild – Stage I: Mild clinical symptoms - Fever, respiratory tract and other symptoms, SPO<sub>2</sub> > 94% in room air, CT Chest findings (score I to II – 5 to 25% area involved)
3. Moderate – Stage II: Respiratory distress, respiratory rate >30/min, SPO<sub>2</sub> < 94% – 90% in room air, CT Chest findings (score II to IV – 25 to 75% area involved)
4. Severe – Stage III: Respiratory failure requiring mechanical ventilation, shock and other organ failure,

**METHODS:**

**STUDY DESIGN AND PARTICIPANTS:**

Retrospective study of lab confirmed RT-PCR positive 369 patients in Government Kilpauk medical college were conducted between October to November 2020.

**DATA SOURCES AND COLLECTION:**

Demographic data, encounter data, laboratory measurements, radiological studies, vital signs were collected from the hospital records and documented in a pre structured proforma and statistical analysis was done.

**RESULTS:**

Vital signs and imaging of patients infected with SARS CoV 2.

SATURATION	ALL PATIENTS N - 369	NON-SEVERE N-280	SEVERE N-89
>94 %	299 (81%)	255 (85.3%)	44 (14.7%)
80-94 %	56 (15.1%)	25 (44.6%)	31 (55.3%)
70-80 %	9 (2.4%)	0	9
<70 %	5 (1.3%)	0	5

IMAGING CT-CHEST	ALL PATIENTS N - 369	NON-SEVERE N-280	SEVERE N-89
No lung involvement	105(28.4%)	96(34.3%)	9(10.1%)
1-25 %	134(36.3%)	118(42.1%)	16(17.9%)
25-50 %	83(22.5%)	64(22.9%)	19(21.35%)
50-75 %	39(10.6%)	2(0.7%)	37(41.6%)
>75 %	8(2.1%)	0	8(8.9%)

Oxygen support	ALL PATIENTS N - 369	NON-SEVERE N-280	SEVERE N-89
Without O2	129(34.9%)	127(45.4%)	2(2.2%)
NRM	106(28.7%)	91(32.5%)	15(16.9%)
HFNO	77(20.9%)	59(21.07%)	18(20.2%)
NIV	48(13%)	3(1.07%)	45(50.6%)
Invasive ventilation	9(2.4%)	0	9(10.1%)

(NRM - Non Rebreathing Mask, HFNO - High Flow Nasal O2, NIV - Non-Invasive Ventilation)

Death	38 (10.3%)	2 (5.3%)	36 (94.7%)
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**DISCUSSION:**

In our study which enrolled 369 patients conducted between October and November 2020, in kilpauk medical college were categorised as non severe in 280(75.9%) and severe in 89(24.12%). Patients with severe diseases had co morbidities such as old age, uncontrolled diabetes ,systemic hypertension, coronary artery diseases.

CT chest shows I-25% lung involvement in most of the patients .Among the patients most of them fall into >94% saturation,and without requiring oxygen supplement. 34.9% patients were not requiring oxygen. 28.7% patients were in need of non re breathing mask ventilation. Most of the patients fall in between mild to moderate stages.

According to CT involvement the treatment also varies.This include,use of antibiotics,steroids, antivirals, anti coagulation needed for moderate to severe stages of COVID 19.

Patients with more lung involvement were 35.2% are stage IV needs invasive ventilation among them 15.4% requires ICU admission . Out of them 89.7% discharged as alive,10.3% subccumed to death.

**CONCLUSION:**

From this study,we have assessed the patient severity by using CT chest involvement in covid 19 patients were RTPCR positive. According to this study pt had more severe the lung involvement had low saturation, needs invasive ventilation and ICU admission.More severe the disease had worse prognosis and disease outcome.Therefore assessing CT chest in the early stage of the disease is to halting the disease progression and severity.

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