

Covid 19 severity index: A Predictive score for hospitalised patients

Dr J Soundhariyan¹, Dr V.Nooka Raju M.D², Dr Y.Gayathri devi M.D³, Dr B.Padmaja M.D⁴,

¹Department of pulmonary medicine, Government hospital for Chest & Communicable diseases, Andhra medical college, Visakhapatnam, India

²Department of pulmonary medicine, Government hospital for Chest & Communicable diseases, Andhra medical college, Visakhapatnam, India

³Department of pulmonary medicine, Government hospital for Chest & Communicable diseases, Andhra medical college, Visakhapatnam, India

⁴Department of pulmonary medicine, Government hospital for Chest & Communicable diseases, Andhra medical college, Visakhapatnam, India

Abstract :

Background :

COVID 19 is a viral infection causing Multi-organ inflammatory disease predominantly affecting lungs. It has lead to huge mortality all over the world and huge morbidity among patients causing respiratory failure leading to O2 dependency and long term O2 therapy .

Till date in world 21.9 crore people are affected by this deadly virus & about 45.5 lakhs people have died & In India upto 3.39 crore people are affected ; with about 4.5 lakhs people who have succumbed to this disease.This study aims to find the effectiveness of COVID 19 severity index in predicting the prognosis & mortality in hospitalised patients of COVID -19 .

Materials & methods:

In this hospital based prospective observational study , 170 patients who were hospitalised between May 2021 to August 2021 were observed & data collected .the variables were scored and grouped into 4 groups (≤ 5 , 6-7, 8-19 , 20-25). The outcomes recorded were the number of patients requiring O2 , Mechanical ventilation , discharge & death.

Results :

Group 1 patients required less O2 & Mechanical ventilation and were successfully managed in ward while group 3 & 4 patients required Mechanical ventilation & required Icu admission with greatest mortality observed among group 4 patients .

Conclusion:

Covid - 19 severity index is a reliable score for triaging patients for ward & ICU admissions & for predicting the prognosis & mortality of patients hospitalised with COVID -19 pneumonia .

Key word: COVID -19 ; Prognosis ; Mortality ; Severity index

Date of Submission: 04-10-2021

Date of Acceptance: 18-10-2021

I. Introduction :

COVID 19 is a viral infection causing Multi-organ inflammatory disease predominantly affecting lungs. It has lead to huge mortality all over the world and huge morbidity among patients causing respiratory failure leading to O2 dependency and long term O2 therapy

Till date in world 21.9 crore people are affected by this deadly virus & about 45.5 lakhs people have died & In India upto 3.39 crore people are affected ; with about 4.5 lakhs people who have succumbed to this disease.This study aims to find the effectiveness of COVID 19 severity index in predicting the prognosis & mortality in hospitalised patients of COVID -19 .

II. Materials & Methods :

It is a prospective study carried out in hospitalised patients with COVID - 19 in Department of Pulmonary Medicine at Govt Hospital for Chest & Communicable diseases , Andhra medical college , Visakhapatnam from May 2021 to August 2021 .A total of 170 patients were included in the study

Study design : Prospective cross sectional observational study

Study location : Tertiary care teaching hospital based study done in Department of Pulmonary Medicine , Govt hospital for Chest & Communicable Diseases ,Andhra Medical college , Visakhapatnam , Andhra pradesh

Study Duration : May 2021 to August 2021

Sample size : 170 patients

Subjects & Selection methods : The study population was drawn from consecutive Covid - 19 patients who got admitted in Govt Hospital for chest &communicable diseases , Visakhapatnam .

The suspect patients who were admitted & confirmed to be COVID -19 positive by nasopharyngeal RTPCR / TRUNAAT were included & treated and scoring were given to different variables . After scoring was done , Patient was followed up & scoring adjusted according to the progression at various intervals of hospital stay . The final scoring of each patient was compared with the outcomes and analysed.

INCLUSION CRITERIA :

1. Covid -19 swab positive Patients
2. Age > 18 years
3. Covid -19 Radiological positive patients

EXCLUSION CRITERIA :

1. Age < 18 years
2. Covid - 19 negative by both swab & radiology

PROCEDURE METHODOLOGY :

After written informed consent were obtained . Data of patients visiting the hospital were collected . Data such as Age , sex ,Dyspnea , Comorbidities , Chest Xray , SPO2 ,Respiratory Rate , Pulse , Systolic BP ,Temperature , O2 requirement and among investigations , D-dimer , platelets & lymphocyte count were obtained.

Each variable was scored using the following table

TABLE NO : 1 SCORING SYSTEM

PARAMETERS	0	1	2	3
Age (Years)	≤60	61-64	≥65	
Gender	Female	Male		
Diabetes	No	yes		
Copd	no	yes		
Heart failure	no	yes		
Chest Xray	Normal /without B/L infiltrates	B/L infiltrates		
Respiratory Rate (breaths/min)	12-17	18-20	21-24	≥25
Spo2	≥96	94-95	92-93	≤91
O2 Requirement	no			yes
Systolic Bp(mmHg)	90-200			≤90 ≥200
Pulse(beats /min)	51-90	41-50 91-110	111-130	≤40 ≥131
Temperature (C)	35.6-37.9	38-39 35.1-35.5	≥39.1	≤35
Dyspnea	no		yes	
D -Dimer(ng/ml)	≤1000	>1000		
Lymphocytes (/mm3)	>20%	17-20%	≤17%	
Platelets (/mm3)	≥100000	<100000		

III. Result :

Outcomes were recorded as

1. Patients didn't require O2 during hospital stay
2. Patients required O2 during hospital stay
3. Patients required High flow Nasal O2 / Ventilator (Non invasive/ Invasive)
4. Patients discharged
5. Patients died

Patients were divided into 4 groups based on their scores

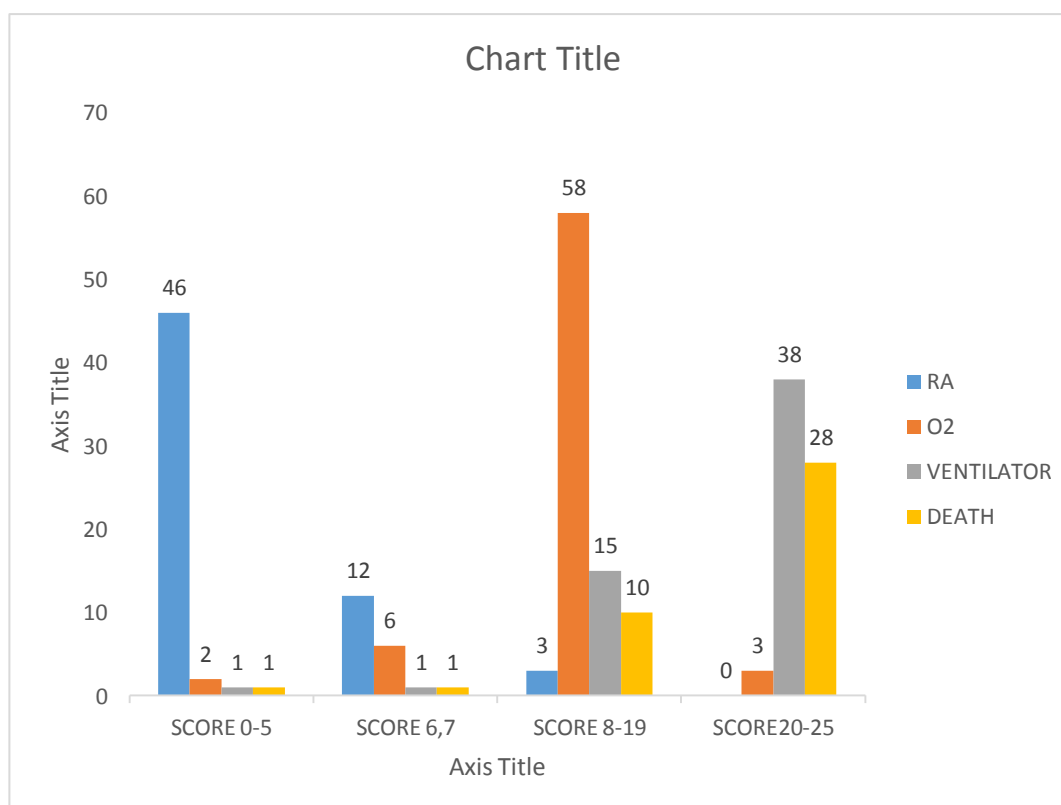
1. Scores ≤ 5
2. Scores 6,7
3. Scores 8-19
4. Scores 20-25

Table 2 shows

1. GROUP 1 with patients with Scores ≤ 5 ; Out of total 170 patients , 49 patients had scores ≤ 5 , Out of 49 patients , 46 Patients didn't require O2 , 2 patients required O2 out of which 1 required ventilator who finally died
2. Group 2 with patients with scores 6,7 ; Out of 19 patients ; 12 patients didn't require hospitalisation , 6 patients required O2 , 1 required ventilator who finally died
3. Group 3 patients with scores 8-19 ; Out of 61 patients ; 3 patients didn't require hospitalisation , 58 patients required O2 , Out of which 15 required ventilator out of which 10 died
4. Group 4 patients with scores 20 - 25 ; Out of 41 patients ; 3 patients required o2 ; 38 patients required ventilator out of which 28 patients died

TABLE NO 2 : COMPARISON OF OUTCOMES OF PATIENTS IN 4 GROUPS

SCORE	NO OF PATIENTS	ROOM AIR	O2	VENTILATOR	DEATH	DISCHARGE
0-5	49	46	2	1	1	48
6-7	19	12	6	1	1	18
8-19	61	03	58	15	10	51
20-25	41	0	3	38	28	13
	170	61	69	55	40	130



As The score increases , the number of patients requiring O2 & mechanical ventilation & no ; of deaths increases

IV. Discussion :

Covid 19 pneumonia is a severe disease known to have caused huge mortality in these 2 years worldwide .The prognosis depends on various factors and it is necessary for the treating physician to adequately triage the patients to different wards & Icu

In the results shown above it is evident that the first 2 groups can be managed with o2 and can be kept in general wards with the number of patients requiring O2 is higher in the second group than the first. The third & fourth group has to be managed very aggressively since the number of patients requiring mechanical ventilation & death are increased in these 2 groups . The fourth group has to be treated much more intensively since the percentage of mortality when the score crosses 20 is 68%. Till now there are many scores developed for the prognosis prediction of pneumonia such as CURB -65 , NEWS -2 ,Q-SOFA . The CURB - 65 score is also more easier & useful tool for predicting prognosis but it doesn't include comorbidities which also proves to be a major determinant in COVID-19 disease progression^[1] .

NEWS - 2 & Q-SOFA also predicts mortality in the Emergency department but these too did not include comorbidities and are very useful if used longitudinally^[1]. COVID GRAM & ISARIC 4C scores contains additional variables , includes comorbidities & are somewhat better in predicting long term prognosis^[2] . Pneumonia severity index is a good predictor of mortality but not much useful in determining the level of care . CALL score is also useful for quick assessment but doesn't take into account of patient 's vitals . MuLBSTA score & Smart cop are useful in predicting ICU admission^[3] . A - Drop score is another modified score of CURB -65 score has been useful in predicting mortality^[4] . Our study - COVID -19 severity index has shown to predict hospital mortality and also useful to categorise patients for level of care and has shown similar results to study on covid -19 severity index by I Huespe et al .our study contains the 4th group with score > 20 having highest mortality & scores < 5 are included in one group compared to two groups in the original study^[5] .

V. Conclusion :

Covid 19 severity index is a reliable score for triaging the patients of Covid 19 & also a predictor for prognosis & mortality of patients hospitalised with COVID -19 Pneumonia .

References :

- [1]. Patrick Bradley¹ , Freddy Frost² , Kukatharmini Tharmaratnam³ , Daniel G Wootton⁴ ; BMJ Open Res 2020;7:e000729
- [2]. Marcello Covino MD, Giuseppe De Matteis MD, Maria Livia Burzo MD, Andrea Russo MD, Evelina Forte MD, Annamaria Carnicelli MD, Andrea Piccioni MD, Benedetta Simeoni MD, Antonio Gasbarrini MD, PhD, Francesco Franceschi MD, PhD, Claudio Sandroni MD ; JAGS 69:37-43, 2021
- [3]. Marta María García Clemente, Julia Herrero Huertas, Alejandro Fernández Fernández, Ana Isabel Enríquez Rodríguez, Liliana Pérez Martínez, Santiago Gómez Mañas, Marta Iscar Urrutia, Francisco Julián López González, Claudia Janeth Madrid Carbajal, Pedro Bedate Díaz, Miguel Arias Guillén, Cristina Bailón Cuadrado, Tamara Hermida Valverde, Int. J. Clin. Pract. . 2020;00:e13705. □
- [4]. Guohui Fan, Chao Tu, Fei Zhou, Zhibo Liu, Yeming Wang, Bin Song, Xiaoying Gu, Yimin Wang, Yuan Wei, Hui Li, Xudong Wu, Ji uyang Xu, Shengjin Tu, Yi Zhang, Wenjuan Wu, Bin Cao European Respiratory Journal 2020 56: 2002113
- [5]. I. Huespe, a, b I. Carboni Bisso, a S. Di Stefano, a S. Terrasa, a N.A. Gemelli, a, □ and M. Las Herasa ; j.medin.2020.12.001.

Dr J Soundhariyan, et. al. "Covid 19 severity index: A Predictive score for hospitalised patients." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(10), 2021, pp. 28-31.