A proposed scoring system for fast triage of COVID 19 patients using basic clinical parameters: Simple Clinical Parameter (SCIP) Score

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ABSTRACT

Introduction : Globally healthcare systems are jeopardized due to the COVID-19 pandemic. A fast and simple triage is very important for effective utilization of health care resources. We propose a new tool is for severity assessment of patients at the initial point of care.

Objective: To propose a scoring method for fast triage of COVID 19 patients in predicting the level of care required by the patient

Methods: The SCIP score is for patients who have been tested positive for COVID-19. This scoring system is useful to segregate the patients into different level of care based on values of clinical parameters like Pulse rate (PR), Respiratory rate (RR) and arterial blood oxygen saturation. The risk score ranges from 1 to 10. Lower the score more severe is the disease and hence more intense care is warranted.

Result: Preliminary observation of SCIP scoring criteria is based on ten patients. On retrospective analysis it was observed that the level of care required by the patients was in correspondence with the score obtained by the SCIP formula.

Conclusion: SCIP scoring system is an easy and rapid tool which may be helpful in early detection of severity and taking fast decision in the time of crisis due to COVID 19. Validation in more number of patients is required to establish the findings.

KEYWORDS: COVID 19, Triage, SCIP Score, Respiratory Rate, Pulse Rate, Oxygen Saturation

INTRODUCTION

Corona virus disease 2019 (COVID-19) is a global health emergency with a massive influx of patients to the Emergency Departments and has been the cause of healthcare system crisis. Hospital beds, oxygen supply, intensive care facilities, medical and paramedical staff are not enough to cater such large number of cases.

Long queues at laboratories for blood and radiological investigations lead to delay in diagnosis and treatment. Mismatch between demand and supply of already compromised health care system necessitates method for fast triage of patients not dependent on any laboratory report. Several triage methods are available based on clinical and laboratory parameters. [1–3] However, a fast and simple triage is mandatory to screen patients who will benefit from early hospitalization, from those who can be managed as outpatients.

COVID 19 patients commonly present with symptoms ranging from mild to severe. Fever, cough and dyspnoea are very common. [4] Pulse rate, respiratory rate and arterial blood oxygen saturation are very important parameters and hence will be useful for triage.

We propose a new SCIP scoring system as a method of triage for patients who have been tested positive for COVID-19. This scoring system is totally based on routine clinical parameters and not dependent on any laboratory report.

MATERIAL AND METHOD

SCIP Score can be useful to establish a scoring system to segregate the patients into different level of care. This tool is for severity assessment of patients who are confirmed positive for COVID 19 on the basis of rapid antigen test (RAT) or reverse transcriptase polymerase chain reaction (RTPCR) test on nasal and pharyngeal swab specimens. The severity is judged by calculating the score using formula containing the values of clinical parameters like Pulse rate (PR), Respiratory rate (RR) and arterial blood oxygen

saturation (SpO_2) measured using pulse oximeter.

SCIP score = SpO2 x 100 / PR X RR

According to the scoring criteria patients may be classified under different levels of care i.e. requiring hospitalization either in intensive care unit (ICU) with oxygen or in critical care unit for close monitoring or in ward under medical supervision and outpatient management of low risk patients under home isolation Table 1. The risk score ranges from 1 to 10. Lower the score more severe is the disease and hence more intense care is warranted. Table 2

The illustration of triage method using SCIP score is depicted here.Figure 1
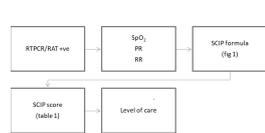
Figure 1: Flow chart for Triage of COVID 19 patients using SCIP score

RTPCR — Reverse transcriptase polymerase chain reaction, RAT — rapid antigen test, SpO_2 — arterial blood oxygen saturation, PR- pulse rate, RR- respiratory rate

RESULT

Our preliminary observation of SCIP scoring criteria is based on ten patients (8 male and 2 female) with the mean age of 42.1+ 11.9 years, who presented to a private clinic in second week of April 2021 Table 1. Patients presented with flu like symptoms and were diagnosed as COVID 19 on RTPCR and/or rapid antigen test. Patients were managed based on their clinical status and various laboratory parameters as per the clinical guidelines for COVID 19 management and were advised appropriate level of care. [5]

We did SCIP score calculation on these patients retrospectively and matched their score obtained with the level of care given to them. On analysis, it was observed that the level of care required by the patients was in correspondence with the score obtained by the SCIP formula)**Table 2.**

SCIP score	Level of care
1 to 2.99	Intensive care unit (ICU) with oxygen
3 to 4.99	Critical care unit (CCU)
5 to 6.99	Ward
7 to 10	Out Patient Department (OPD)

Table 1: SCIP score based triage

DISCUSSION

Health care system of whole world is overwhelmed with COVID19 cases. The number of patients coming to health care facilities is huge. Not all patients need hospitalization. Not all hospitalized patients need intensive care. Unavailability of basic laboratory investigation facilities and high demand for available laboratory facilities necessitates to develop a method of triage that is totally based on routine clinical parameters and not dependent on any laboratory report. A simple, easy and fast point-of-care triage system is required to utilize available resources and to avoid the collapse of healthcare systems.

Keeping this in mind we have proposed Simple Clinical Parameter (SCIP) score formula. It is not dependent on any laboratory investigation and is very easy to use. The score was developed using patient variables like Pulse rate (PR), Respiratory rate (RR) and Arterial blood oxygen saturation.

The normal oxygen levels in a pulse oximeter usually range from 95% to 100%. Oxygen saturation decreases with an increase in the severity of COVID 19 disease. Increase PR and RR is indicative of excessive work load on heart and lungs in order to maintain required oxygen saturation. Hence, these three variables were taken to calculate SCIP score.

Preliminary findings of this study revealed that none of the patient's score lied outside the calculated range obtained by proposed SCIP formula.

Many scoring methods have been proposed for triage of COVID-19 patients. [1–3], [6–10] However, they have their own set of limitations.

One of the scoring systems, which allow fast-track triage at the moment of diagnosis for COVID-19 using four variables: sex, SpO2, diabetes, and age is available. [9] However all patients may not have co-morbidity like diabetes thereby limiting usefulness of this scoring system. Other triage methods have used several variables like epidemiology, history, demographics, medical history, clinical feature, routine blood test, radiographic imaging findings, and co-morbidities. [1], [2], [6–8] Another scoring system involves use of parameters like altered smell/taste, inflammation, infiltrate, elevated LDH and lymphocytopenia as a triage tool. [3] However, most of these tools involve multiple components, are complex and therefore take time to provide results. In comparison SCIP scoring system does not depend on any laboratory investigation as getting blood investigation done is invasive and radiological imaging (Chest X Ray, CT scan) involve patient exposure to ionizing radiation. Moreover, delay in getting reports due to high demand slows down the decision-making. Artificial intelligence-driven screening tools for COVID-19 are also being proposed. [10] Early detection method using artificial intelligence is promising but need training and expertise.

Sr no.	Patient initials	Age (years)	Sex	SpO2 (%)	Pulse rate (per minute)	Respiratory rate (per minute)	Level of care	SCIP Score
1	RP	62	Male	95	80	18	Ward	6.6
2	SP	35	Male	96	84	16	OPD	7.1
3	MP	42	Male	78	110	32	ICU	2.2
4	AP	32	Female	98	74	16	OPD	8.2
5	NP	36	Male	94	118	20	CCU	3.9
6	RS	55	Male	89	104	28	ICU	2.9
7	AM	38	Male	93	112	22	CCU	3.7
8	TS	35	Male	95	92	20	Ward	5.1
9	VP	28	Male	97	82	16	OPD	7.3
10	LK	58	Female	90	102	20	CCU	4.4

Table 2: SCIP score matched with level of care given to patients

CONCLUSION

In the epidemic phase of COVID-19, triage of patients is a real challenge for point-of-care medical and para-medical staff. The strengths of the SCIP scoring system are its simplicity in terms of use of only 3 basic clinical parameters, easy reproducibility and rapid results. Hence, Simple Clinical Parameter (SCIP) score is the need of an hour to ensure optimal distribution of scarcely available resources to cater the huge demand without wastage of time.

SCIP scoring system based on routine clinical parameters is helpful in early detection of severity and taking fast decision amidst pandemic and humanitarian crises, particularly in developing countries with limited resources where laboratory for blood and radiological investigations are either not available or overwhelmed, if available.

LIMITATIONS OF SCIP SCORING SYSTEM

Level of care for patients with any co-morbidity with SCIP scores in the range of 7 to 10 may vary. Also, application of SCIP scoring system in more number of patients is required to validate the findings.

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