

# Changes in the Emergency Department Dynamics during COVID-19 Pandemic

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**Submission:** 10-03-2021,  
**Decision:** 04-05-2021,  
**Acceptance:** 04-05-2021,  
**Web Publication:** 29-11-2021

## ABSTRACT

In the past 20 years, several viral epidemics such as the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002 and 2003, H1N1 influenza in 2009, and Middle East Respiratory Coronavirus in 2012 have been recorded. The COVID-19 pandemic caused by SARS-CoV-2 has infected millions across the globe and has been a unique public health challenge with its increased rates of contagion and transmission. This outbreak was likely to have started from a zoonotic transmission event associated with a large sea-food market that also traded live wild animals. An exponential increase in the number of nonzoonotic cases in late December 2019, pointed toward the risk of human-to-human transmission. This led to a faster spread of infection and made the outbreak difficult to contain. The situation was unique in the busy Emergency Department (ED) of our institution, where regular emergency care could not be halted but had to be modified to accommodate COVID-19 confirmed and suspect patients. The ED needed to develop standard operating protocols to isolate and manage these patients, without putting other patients and health-care workers at risk of infection. This is a story of evolving practices in the ED of a leading tertiary care center of South India.

**KEYWORDS:** COVID-19 pandemic, Emergency Department dynamics, Emergency Department, personal protective equipment, severe acute respiratory syndrome coronavirus 2

## INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), originated in Wuhan province of China from a so-far unidentified, animal reservoir and has spread to most countries in the world.<sup>[1]</sup> It was initially labeled as a Public Health Emergency of International Concern and then as a pandemic by the World Health Organization (WHO) on March 11, 2020.<sup>[2,3]</sup>

As knowledge of this virus and its ways was scarce, the WHO and Centers for disease control and prevention provided advice based on other similar pandemics.<sup>[4,5]</sup> The public was advised frequent hand washing with an alcohol-based hand rub or soap and water, avoid touching eyes, nose, mouth, and practicing respiratory hygiene.<sup>[4,5]</sup> Social distancing and staying safe at home were emphasized.<sup>[4,5]</sup> However, the situation was quite different in our busy Emergency Department (ED),

where emergency care could not be halted but had to be modified to isolate and resuscitate COVID-19 patients.

The ED is where the critically ill are brought for stabilization and patients with infections and other emergencies come for appropriate assessment and early management. Hence, necessary modifications had to be made and tailored to prevent the spread of infection within the ED and simultaneously provide appropriate care for those with other conditions. This is a practice story in the ED of a tertiary care hospital (Christian Medical College, Vellore) in South India.

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**How to cite this article:** Chandy GM, Hazra D, Rupali P, Prabhakar Abhilash KP. Changes in the emergency department dynamics during COVID-19 pandemic. Med J DY Patil Vidyapeeth 2022;15:468-71.

## Access this article online

### Quick Response Code:



**Website:**  
www.mjdrdpv.org

**DOI:**  
10.4103/mjdrdpv.mjdrdpv\_188\_21

## THE INITIAL CHANGE IN DYNAMICS

The encounter with patients with probable COVID-19 started in late March 2020, when most suspect patients were either foreign nationals or returning travelers from abroad. As numbers were small and the patient group was very well defined, a small part of the ED was demarcated to be an isolation area for this purpose. The treating doctors, staff, and paramedics were in personal protective equipment (PPE) but the rest of the ED where patients with other emergencies were managed continued to function as usual. This had to change as the numbers of patients with symptoms and with travel history gradually increased over time, and we had to open up a separate resuscitation bay for those presenting critically ill with features of severe acute respiratory infection.

By mid-April, multiple areas within our state reported local transmission of COVID-19, and these were termed “containment zones.” All patients from these containment zones were triaged in an isolated COVID-19 suspect area with the treating team in PPE. By this time, our ED was structurally partitioned into a COVID-19 suspect zone and a green zone where other emergencies were managed.

## DEFINITIONS AS PER GUIDELINES

The definition of suspect COVID-19 infection included patients with influenza-like illness (ILI) features, i.e., fever and at least one sign/symptom of respiratory disease (e.g. cough and shortness of breath) and a history of travel to, or residence in a country/area or territory reporting local transmission of COVID-19 disease during the 14 days before symptom onset or contact with a confirmed COVID-19 case.<sup>[6,7]</sup> Atypical presentations such as reduced alertness, diarrhea, fatigue, difficulty ambulating, delirium, and loss of appetite are commonly seen in older people and the immunocompromised.<sup>[8]</sup> There may also be an overlap of symptoms of COVID-19 and those seen due to physiological adaptations in pregnancy or a tropical infection like malaria such as fatigue, breathing discomfort, fever, and gastrointestinal symptoms.<sup>[7,9]</sup>

## SEGREGATION AT TRIAGE

A senior ED registrar and a nurse were posted in triage where segregation into the two zones was done based on the history of symptoms and exposure. In the initial months, the following was enquired at triage.

- Recent domestic or international travel in the past 2 weeks
- Contact with symptomatic or a suspect case in the past 2 weeks
- Contact with any health-care facility

- Residence in a containment zone.

During the first few months without proven community transmission, triaging was mainly based on symptoms of ILI and high-risk exposure. Based on this, patients were segregated into the COVID-19 suspect zone or the green zone. Each of these zones had a separate triage system where these patients were categorized into priority 1, 2, and 3 and managed accordingly.

## WERE WE ADEQUATELY PREPARED FOR THE STORM?

Staff safety, empowerment, and training toward the management of COVID-19 patients were given utmost importance. All staff in the COVID-19 suspect zone, including ED physicians, nurses, paramedics, attenders, and security guards were provided PPE to mitigate the risk of disease transmission. However, due to difficulties in procuring adequate PPE during the lockdown period with regard to availability and the prohibitive cost of PPE in early April, the ED team in the green “non-COVID zone” was provided with an N95 mask, plastic gown and visor with a strict emphasis on hand hygiene, and social distancing with colleagues during breaks.

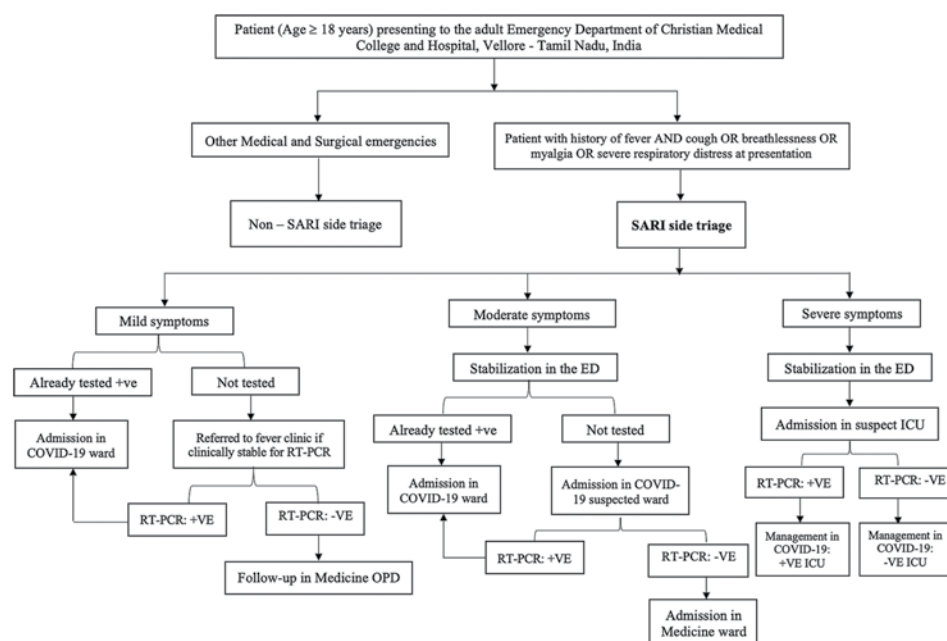
## PERSONAL PROTECTIVE EQUIPMENT

At the outset of the pandemic, our ED worked toward procuring adequate and good quality PPE for protection. Uncertainty in the availability of PPE during the lockdown period prompted us to innovate and create our indigenous PPE stitched from reusable umbrella cloth material after sterilization and disinfection. Initially, this came in handy as the disposable PPE was in short supply. Our paramedic students spent their free time during lockdown stitching cloth masks and head covers using disposable surgical gown material for our use.

Infection control measures included separate donning and doffing areas, provision of work scrubs, and shower facilities after the shift. These administrative and infection control measures inspired confidence among our ED staff and allowed emergency care to proceed unimpeded.

## EMERGENCY DEPARTMENT TO WARD: TRANSFER FOR STABLE AND UNSTABLE PATIENTS

Patient disposition from the ED has been elaborated in Figure 1. Those requiring urgent surgical intervention were operated without delay in COVID-19 suspect theaters equipped with negative pressure ventilation and approved by the hospital infection control committee.



**Figure 1: Patient disposition from the Emergency Department**

A nasopharyngeal swab was performed before admission as inpatients.

## EMERGENCY DEPARTMENT COVID ZONE WORK

Working in the COVID zone with full PPE is a harrowing experience with little time to think about food and water. The 8-h shift duration necessitates physical and mental preparedness to endure the ensuing challenge. We often encountered situations when many critically ill patients deteriorate and require urgent intervention at the same time. These arduous shifts end with a meticulous handing over to ensure continuity of care. Despite being tired, doffing had to be done with utmost precision as per the recommended infection control protocol.

## THE WORKFORCE

Given the high patient turnover, severe symptomatology requiring aerosol-generating procedures, and limited space, the chance of an ED staff contracting an infection remains high. As patient load in other departments had decreased and COVID-19 patients were predominantly being admitted in the hospital, physicians, nurses, and technicians from other departments were deployed to work in the COVID-19 zones of ED, intensive care units, and medical wards.

## MOTIVATION AND SUPPORT SYSTEMS

The hospital we work in has a close-knit social network. We are each other's support system and this worked exceptionally well during the prepandemic period.

However, during this pandemic, social gathering, interpersonal interaction, etc., had to be curtailed and this has taken a toll on the support system inbuilt into our society. Online counseling facilities were made available for those who find respite in them. Strong departmental framework and interaction also provided some means to tide over difficulties faced by the frontline workers.

## ALL'S WELL THAT ENDS WELL

The SARS-CoV-2 pandemic poses an enormous burden on society, economy, and health-care systems worldwide, with various measures being taken to control its spread. We witnessed our ED and hospital rise to the occasion to cater to the needs of the community through this pandemic and hope that we would be able to plough through this period successfully until our society returns to near normalcy.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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