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Current Strategies to Screen and Manage Patients for Health Care System During The COVID-19 Pandemic

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1. Abstract

Investigation The novel corona virus disease 2019 (COVID-19) pandemic has been responsible for more than thirty million deaths worldwide. While the country and world engage the pandemic of COVID-19, it remains vital for our health care system to continue caring for all patients while mitigating their exposure to potential sources of infection. Methods: There is an urgent need for a reasonable patient screening and disposal process, which aims to detect asymptomatic patients and suspected patients of COVID-19, to minimize the incidence of nosocomial infections and to prevent hospitals from becoming epidemic. Based on these experience of managing this surge, we produced this review to support other healthcare services in preparedness and training of hospitals during the current coronavirus outbreak. Results: We suggested a response plan to screen and manage patients for health care system during the COVID-19 pandemic.

2. Introduction

The novel corona virus disease 2019 (COVID-19) pandemic has been responsible for more than thirty million deaths worldwide. On January 30, 2020, the outbreak was declared as a "public health emergency of international concern" (PHEIC) by World Health Organization (WHO). While the country and world engage the pandemic of COVID-19, it remains vital for our health care system to continue caring for all patients while mitigating their exposure to potential sources of infection. The current literature and our own experience in the field have provided some measures for improving clinical practice and patients screening which aims to detect asymptomatic patients and suspected patients of COVID-19. Doing so would minimize the incidence of nosocomial infections and to prevent hospitals from becoming epidemic foci.

3. Strategy 1: Implementation of Telemedicine

Implementation of telemedicine for the delivery of urgent and ongoing healthcare has rapidly scaled upwards. Telemedicine tools include simple phone calls, video visits and use of e-mails or text messages. In addition to reducing the potential risk of infectious disease transmission, telemedicine visits have achieved similar health outcomes compared with in-person patient visits in several primary care studies. This telemedicine focused on confirming the indications for the surgery, discussion of increased risks imparted by the COVID-19 pandemic, evaluation of health status changes, and information regarding COVID-19 testing. Amidst the COVID-19 pandemic, however, facilitating healthcare access in a safe setting became a priority as cities promoted social distancing. Rapid adoption of telemedicine ensures access to, and continuity of, patient care while limiting unnecessary exposure to infectious illnesses such as COVID-19 [1]. Telemedicine during the coronavirus epidemic has been the doctor's first line of defense to slow the spread of the COVID-19, keeping social distancing and providing services by phone or videoconferencing for mild to focus personal care and limited supplies to the most urgent cases [2]. Nowadays, some institutions are already working on implementation guide for rapid integration of an outpatient telemedicine

program during the COVID-19 pandemic [3].

4. Strategy 2: Dedicated COVID-19 Call Center

Emergency Medical Services (EMS) can also play a significant role in designing and implementing an effective approach. Eli Jaffe et al. opened a dedicated COVID-19 call center [4]. Their goal is to contain viral exposure by keeping suspected patients in quarantine at home and away from the public. In their opinion, upon excluding medical emergency, if the call is concerning COVID-19 and fulfills either the clinical or epidemiological criteria, it is transferred to the COVID-19 call center. If the case is suspicious of COVID-19, a physician then decides whether to send a paramedic with personal protective equipment to the home to collect samples for testing. Patients are instructed to stay in home quarantine during this time. Once the COVID-19 is confirmed, patients are transported by paramedics on a dedicated negative-pressure hooded bed in an ambulance to the hospital. What is noteworthy is that the suggestion from China has been to build dedicated COVID-19 units and hospitals that allow other hospitals to function normally. Chen Wang and colleagues describe how these large temporary hospitals were built to isolate, treat, and triage patients with mild to moderate COVID-19 [5]. The most critical and crucial factor is the patient himself, who recognizes early symptoms, suspects COVID-19, and seeks medical help immediately. To facilitate this process, government must actively encourage testing for citizens with suspected symptoms.

5. Strategy 3: Triple Negative Results in Out-Patient Clinics

Unlike other respiratory virus infections, COVID-19 has shown many cases with mild or no presenting symptoms, who are highly infectious during asymptomatic period [6]. The currently accepted reference standard for testing COVID-19 is with real-time reverse transcriptase polymerase chain reaction (RT-PCR) of viral nucleic acid. However, given the reported limited sensitivity of this test on initial patient presentation (70%), some studies have suggested supplementation with chest Computed Tomography (CT), recent studies have suggested that radiologists with experience or artificial intelligence may be able to distinguish COVID-19 from other pneumonias with up to 80-90% accuracy [7]. The classic CT findings of COVID-19 include bilateral, round, ground glass opacities in a peripheral distribution, “crazy paving”, and vascular engorgement [8]. Unlike other viral pneumonias which primarily affect the airway resulting in tree-in-bud nonduality in a bronchial distribution, COVID-19 affects the TypeII pneumocyte and results in a unique CT appearance that lends increased specificity. Despite of its advantages, CT may share certain similar imaging features between COVID-19 and other types of pneumonia, thus making it difficult to differentiate. Recently, artificial intelligence (AI) using deep learning technology has demonstrated great success in the medical imaging domain due to its high capability of feature extraction [9]. In Europe, the utility of image examination as a triage tool for COVID-19 has been posited given the delay between specimen collection and RT-PCR result [10].

Recent study described an increase in COVID-19 incidence in oncology population, attributing it to the maintenance of visits to the hospital without performing any COVID-19 screening [11]. As the cost of in-hospital transmission is unbearable, our experiences and lessons suggested that prompt actions should be taken immediately to decrease or eliminate potential in-hospital transmission. Therefore, there is an urgent need for a reasonable patient screening and disposal process. Minimizing community transmission relies on a robust means of systematic testing of patients, given asymptomatic SARS-CoV-2 carrier rates of at least 30% [12]. Fuzheng Guo et al. described a screening and management process for patients who present to the out-patient clinics in China [13]. Their process aims to detect asymptomatic patients and suspected patients of COVID-19. According to them, all patients without symptoms or history of contact must undergo both, RT-PCR testing and SARS-COV-2 antibody testing (IgM and IgG). SARS-COV-2 antibody detection is an effective supplement to RNA testing to identify patients with COVID-19 [14]. Furthermore, it is suggested that patients with negative results of RT-PCR and antibody testing should undergo chest computed tomography. Patients can get admitted to the hospital when all three results were normal; if not, patients will be directed to the Respiratory Clinic for further evaluation or transferred to a specialized hospital by ambulance with strict isolation measures. Of course, inpatients must be accommodated in single rooms considering the possibility of false negative results on examination.

6. Strategy 4: Restrict contaminated areas at the ED

Unlike the out-patient clinics, patients in the Emergency Department (ED) are often unable to wait for results due to their illness and require urgent and rapid medical treatment. Timely and major reorganization of acute care service is challenging. The ED is currently serving as the front line for initial detection, evaluation, and management of COVID-19 patients. Therefore, the staff working in EDs are presently facing unprecedented challenges. To avoid contamination and to protect health care workers, a unique patient diversion strategy at the Emergency Department (ED) has been designed by the National Taiwan University Hospital [15]. The patient diversion strategy was composed of 1 pretriage unit, 3 special clinics, and 2 tents. Their design separated patients at risk of COVID-19 infection from uninfected patients to restrict contaminated areas. In their strategy, the physician’s personal protective equipment is very important, included an N95 mask covered by a surgical mask, a hair cap, a goggle, a facial shield, gloves, a gown, and shoe coverings. Yang Shen et al. also shared the experiences and lessons in emergency responses and management [16]. They

suggested that negative pressure operating room was the priority choice for all emergent surgeries without RT-PCR nucleic acid tests. Regular positive pressure theatres were available for elective surgeries, with full personal protection equipped for all staff.

In Italy, the working group divided the hospital (Emergency Medicine) in COVID and not-COVID areas. Healthcare workers do not move from one area to another. In not-COVID areas, patients and works use surgical mask, gloves and gowns as personal protective equipment. In COVID areas, FFP2 or FFP3 masks, eye protection, a double pair of gloves and a second gown are recommended during the aerosol-generating procedures. In a word, the emergence of COVID-19 pandemic occurrence requires synergic cohesion of the working group in order to define the principal risks for patients and healthcare workers, highlighting the preventive measures in term of personal protective equipments. A clear plan enacted by effective leaders and motivated faculty and staff will ensure timely care, minimize transmission of disease.

7. Conclusions

The COVID-19 has gained global attention and turned into pandemic as it affected about thirty million in 114 countries by September, 2020. The lives of infected individuals, family and friends, health care system, and the society are at stake due to the perpetuated potential effects of the COVID-19. Ever since the COVID-19 outbreak, scientists, clinicians, and health authorities across the globe are trying to screen and manage patients, to minimize the incidence of nosocomial infections and to prevent hospitals from becoming epidemic foci. Based on these experience of managing this surge, we produced this review to support other healthcare services in preparedness and training of hospitals during the current coronavirus outbreak. We suggested a response plan to screen and manage patients for health care system during the COVID-19 pandemic (Figure 1).

Although the COVID-19 crisis is likely to be prolonged, there is still uncertainty about its severity worldwide. While time will tell eventually, health care system should not delay. Decision makers at all levels should begin to take actions as soon as possible.

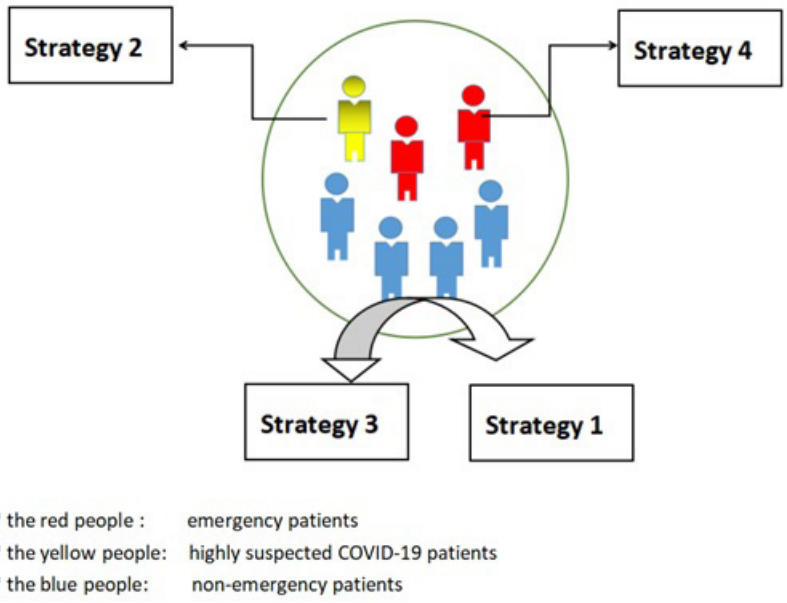

Figure 1: Flow chart to screen and manage patients for health care system during the COVID-19 pandemic

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