able to keep up with the surge of COVID-19 patients [3], and witnessing hospitals around the world struggle with the use of their daily allotments with some even rationing their PPE to units or departments. Implementing and constructing this cost-effective approach can assist healthcare facilities in reducing their use of PPEs and not be burdened with a possible shortage in the future.

Acknowledgments

Connie Cai Ru Gan, MPH
Centre for Environment and Population Health, Griffith University, Queensland, Australia
E-mail address: connie.gan@griffithuni.edu.au.

Yu-Chi Tseng, MD
Department of Emergency Medicine, Hsinchu MacKay Memorial Hospital, Hsinchu, Taiwan
E-mail address: ER.Dr.Jason@gmail.com.

Kuan-I Lee, MD, Director
Emergency Department, Taichung Tzu Chi Hospital, Tzu Chi Medical Foundation, Taichung, Taiwan
Corresponding author at: Taichung Tzu Chi Hospital, Tzu Chi Medical Foundation, Taichung, Taiwan.
E-mail address: leeguanto2002@tzuchi.com.tw.

10 April 2020

https://doi.org/10.1016/j.ajem.2020.04.044

References

[1] 'Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19)', World Health Organization, Interim Guidance. [Online]. Available: https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPPE_use-2020.1-eng.pdf; Feb. 2020.
[2] World Health Organization. Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care. World Health Organization; 2014.
[3] Mason DJ, Friese CR. Protecting health care workers against COVID-19—and being prepared for future pandemics. JAMA Health Forum Mar. 2020;1(3):e200353. https://doi.org/10.1001/jamahealthforum.2020.0353.

COVID-19: New York City pandemic notes from the first 30 days

1. Introduction

The COVID-19 pandemic has evoked dramatic global disruption as health and governmental agencies struggle to manage this historic medical event. As of April 4, 2020, over 200 countries and territories have been affected, with over 1,000,000 cases and 60,000 deaths worldwide [1]. The United States currently is the country with the highest prevalence of COVID-19 cases, with New York City (NYC) serving as the epicenter of this pandemic [2].

Emergency medical services in NYC face unprecedented challenges in patient acuity, bed management, and hospital operations, while experiencing high levels of provider stress and fatigue. While robust literature on emergency medicine responses to natural disasters and pandemics exists [3], the unique challenges of the pandemic in NYC will likely be experienced by other emergency departments (EDs) across the country, as the disease continues its anticipated trajectory. Here, we report an overview of our experiences and response, as a NYC ED at the center of this pandemic.

The volume and acuity of suspected COVID-19 cases in our ED accelerated rapidly over the course of four weeks. New York Presbyterian Hospital-Columbia encompasses an adult and pediatric academic quaternary medical center, in addition to community sites in upper Manhattan and Westchester, with a collective annual volume of approximately 250,000 visits. For the month of March, we have seen approximately 850 cases of COVID-19 with the majority arriving from March-15th-30th^{thz}. Faced with rapid acceleration of volume and acuity, broad challenges have included: optimization of physical space and staffing, the development of management strategies for high numbers of patients requiring respiratory support, minimizing transmission risk to other patients and healthcare staff, determining best strategies for redeployed non-emergency medicine physicians and staff, and finally, frontline staff fatigue and well-being.

2. Strategies and general approaches

2.1. Taking a "comprehensive healthcare" approach

Our strategy included integration of ED, hospital, city, state, and national leadership to coordinate the delivery of efficient care during this pandemic. With the support of institutional leadership we orchestrated a multi-departmental response to the crisis. To accommodate the anticipated ED volume and acuity, flexible approaches to staffing from within and outside our ED were implemented. Due to low pediatric volumes and cancellation of elective procedures/surgeries, we harnessed an influx of available critical care beds, physicians, and support staff. We designated an incident commander to help lead efforts and support clinical staff 24 hours per day. In collaboration with the hospitalist service, transfers of care (e.g. "sign out") to admitting teams were done in the ED, with redeployed off-service clinicians managing admitted patients to allow emergency clinicians to treat new patients. In collaboration with ambulatory care providers, "cough and cold" clinics were established outside of the ED to rapidly evaluate low acuity patients with viral symptoms, helping to reduce ED volumes. In addition, they performed a medical screening exam, facilitating transfer to specialty clinics for isolated low acuity complaints (e.g. orthopedics, gynecology). Finally, patient bedding was adjusted to reduce transmission risk, with suspected COVID-19 patients placed into isolation rooms and positive cases cohorted together.

2.2. Coordinating care with other critical care services to optimize patient care and reduce provider risk

The volume of patients requiring high-risk aerosolizing procedures during COVID-19 has been significant. Recognizing the high volume of emergent airways, we developed protocols with the anesthesia service to assist with ED intubations that included the use of HEPA viral filters and appropriate PPE. Additionally, a COVID-19 "SWAT" team consisting of surgical chief residents and attendings was organized and available to perform procedures such as central lines and arterial lines. Given the increased need for difficult goals of care conversations, we involved palliative care, social services, and ethics consultations early and often for critically ill patients, including pre-intubation.

2.3. Consider remote/telemedicine opportunities for low acuity patients and follow-up care

Telemedicine has played a critical role in our COVID response, providing another pathway for determining need for acute care, while also decreasing ED patient volume and potential viral exposure. Telemedicine has also allowed us to extend our footprint of care into the home, through a follow-up program involving video visits with oxygen concentrators and pulse oximeters distributed to patients during their index ED visit.

2.4. Staff morale/health

Protecting healthcare workforce is paramount in fighting COVID-19. The concern for illness, fatigue, low morale, and clinical error is high [4]. It is important to allow for increased flexibility and surge staffing during this time period. We had a number of support resources available, including mental health experts, spiritual care, virtual wellness rounds, and frequent staff huddles. Concerns about exposure risk were high amongst our providers, and an emphasis on PPE and supplies has been paramount.

The COVID-19 pandemic has placed immense burdens on healthcare systems globally. We hope our early experiences in confronting the pandemic will provide valuable information for other EDs and health care systems around the country during this ongoing crisis.

Stefan Flores, MD*
Nicholas Gavin, MD, MBA, MS
Marie-Laure Romney, MD, MBA
Christopher Tedeschi, MD, MHA
Erica Olsen, MD
Anisa Heravian, MD
Liliya Abrukin, MD, MPH
David Kessle,r MD, MSc
Angela M. Mills, MD
Bernard P. Chang, MD, PhD
*622 West 168th Street, Department of Emergency Medicine, Columbia
University Medical Center, VC 2nd Floor Suite 260, New York, NY 10032,
United States of America*
*Corresponding author.
E-mail address:* sk3283@cucmc.columbia.edu (S. Flores).

14 April 2020

https://doi.org/10.1016/j.ajem.2020.04.056

References

[1] Lipsitch M, Swerdlow DL, Finelli L. Defining the epidemiology of Covid-19—studies needed. N Engl J Med 2020;382:1194–6.
[2] Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). Int J Surg 2020;76:71–6.
[3] Meyers L, Frawley T, Goss S, Kang C. Ebola virus outbreak 2014: clinical review for emergency physicians. Ann Emerg Med 2015;65(1):101–8.
[4] Chang BP, Carter E, Ng N, Flynn C, Tan T. Association of clinician burnout and perceived clinician-patient communication. Am J Emerg Med 2018;36(1):156–8.

Creating a COVID-19 surge clinic to offload the emergency department

The spread of COVID-19 has strained or overwhelmed emergency department (ED) capacity across the world. Facing an emerging COVID-19 outbreak in our city, we feared that the same situation could overwhelm our ED resources [1]. Therefore, we sought to create an area adjacent to our existing ED where patients not requiring emergency level care could be evaluated, tested for COVID-19, and safely discharged home. Here, we describe the creation and operation of a Surge Clinic in our indoor ambulance bay.

Our hospital is a large quaternary-care academic referral center and Level-1 trauma center. Our ED sees approximately 110,000 patients annually. Our ambulance bay normally accommodates seven ambulances and directly connects to the ED. It also contains a decontamination space.

The hospital's Department of Emergency Medicine (EM), Ambulatory Management (AM), the Department of Medicine (DOM), and the Center for Disaster Medicine (CDM) collaborated to develop the COVID-19 Surge Clinic. EM provided the physical space, guidance and infrastructure for triaging appropriate patients to the Clinic, and initial clinician staffing. AM directed much of the overall Clinic planning, identified clinical and administrative directors, and performed scheduling of patient appointments. The DOM provided second phase physician and nursing staff for the Clinic, established a referral system to direct outpatients to the Clinic, and drafted patient care guidelines. CDM provided strategic planning for the Clinic's interface with the COVID-response of the health system and facilitated infection control recommendations.

Transforming the ambulance bay into a functional Clinic required close and rapid collaboration with hospital leadership, the environmental services department, buildings and grounds staff, infection control experts, and a materials management team. Fig. 1 illustrates the resultant physical space and flow.

Patients arrive to the Surge Clinic via one of two pathways. ~75% of patients have appointments scheduled through referrals from primary care offices, triage phone lines, or the hospital's occupational health service. These patients proceed directly to the Clinic on arrival without ED triage evaluation. The second source of patients (25%) are walk-ins to the ED are the second source of patients (25%). All patients arriving to the ED are given masks and evaluated by a greeter nurse who asks about COVID-related symptoms and uses specific criteria (developed collaboratively by the EM, AM, and DOM) based on symptoms and comorbidities to determine who is appropriate for the Clinic versus the ED. Those immediately excluded from clinic consideration include patients with chest pain, shortness of breath, or pre-syncope, as well as those with significant co-morbidities such as immunocompromising illness, significant pulmonary conditions, or any type of end-stage organ disease. Vital signs are obtained only if deemed necessary for assessing stability for the Clinic. All patients triaged to the Clinic receive a medical screening exam consistent with EMTALA requirements.

The Clinic registration desk is located 6 ft from the patient arrival area with a separating physical barrier, protecting registration personnel and limiting their needs for personal protective equipment (PPE). Appropriate PPE must always be worn by staff in all other Clinic areas. Waiting room chairs are separated by 6 ft and cleaned by environmental services staff between patients. The Clinic has four clinical spaces separated by temporary plastic walls and three portable restrooms with a handwashing station for patients. There is also a small discharge area. All patients are discharged with their tests pending and subsequently receive a phone call with results and guidance.

The waiting area and patient flow are monitored by a nurse. The evaluation spaces use a two-clinician model, generally a physician and advanced practice provider. One clinician performs the history and physical, including vital signs. The other documents the encounter and orders any needed laboratory testing while standing at a computer 6 ft away to minimize cross-contamination of surfaces and reduce unnecessary clinician exposure. The only tests available in the Clinic are Influenza/RSV, Strep, and COVID-19; a nurse collects specimens as ordered, and the patient is sent to the discharge area. The clinicians then clean their clinical area, doff their PPE, and re-don PPE in preparation for the next patient. This workflow minimizes the amount of PPE used per patient. In the discharge area, a nurse or nurse case manager provides education on in-home self-isolation and the plan of care, and provides the patient with a discharge packet including a mask for travel