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COMMENTARY

The pivotal role of pharmacists during the 2019 coronavirus pandemic

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ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has affected over 3 million people worldwide with an estimated mortality rate of 5%. Owing to the diversity of training and the variety of positions within the pharmacy department, pharmacists are uniquely positioned in the hospital setting to play a pivotal role during the pandemic. The purpose of this article is to highlight the experiences and impactful interventions made by pharmacists practicing in a community teaching hospital at the center of the COVID-19 surge in New York City. Although often underrecognized, pharmacists are well-equipped to develop treatment plans based on the evolving literature that positively affect the patient outcomes by responding to inpatient emergencies, and optimizing the medication orders to conserve and maintain a healthy supply of medications for the hospital.

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The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread rapidly on a global scale. As of May 8th, 2020, COVID-19 has affected over 3 million people and has resulted in more than 270,000 deaths worldwide.^{1,2} Curtailing the spread and providing treatment for COVID-19 has required the dedicated and combined efforts of a multidisciplinary health care team. Each member of the patient care team brings their expertise to the table; the intensivist recommends the safest way to intubate a patient, the clinical nurse manager ensures that all the staff in the unit are equipped with the appropriate personal protective equipment (PPE), and the respiratory therapist coordinates the availability of viral filters and ventilators. Owing to the diversity of training and the variety of positions within the pharmacy department, pharmacists are uniquely positioned in the hospital setting to play a pivotal role in emergency management. The purpose of this article is to highlight the experiences and interventions of pharmacists at New York City Health & Hospitals/Queens, a 253-bed community teaching hospital staffed by medical

residents, school of medicine faculty, and pharmacy specialists in infectious diseases and critical care to serve as a model for other institutions in the future.

Staying up to date

The data supporting specific pharmacologic treatment modalities are continuously evolving with the growing knowledge of the disease. The pharmacist's knowledge of research design and their ability to critically analyze the literature makes them highly qualified to recommend and modify therapies on the basis of the best supporting evidence. During the early stages of the COVID-19 surge, critically ill patients presented to our institution before any formal treatment recommendations were established. These critically ill COVID-19 positive patients were initiated on a regimen of chloroquine and lopinavir/ritonavir on the basis of in vitro and anecdotal data.^{3,4} Gautret et al.⁵ demonstrated a significant reduction in viral carriage in patients treated with a combination of hydroxychloroquine and azithromycin when compared with the control patients. Cao et al.⁶ published a study highlighting the lack of benefit observed with lopinavir/ritonavir beyond the standard of care. After the pharmacists in our institute presented these data during patient care rounds, all COVID-19 positive patients in the institute were transitioned to treatment with regimens consisting of hydroxychloroquine and azithromycin. All these COVID-19 patients

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were continued with routine treatment using a combination of hydroxychloroquine and azithromycin till any evidence demonstrated lack of clinical benefit and potential risks of using the 2 medications.^{7,8} Our treatment for COVID-19 consisted mainly of supportive care and occasional usage of investigational therapy such as the antiviral remdesivir or the interleukin-6 inhibitor tocilizumab.^{9,10} However, future treatment regimens are liable to change, given the dynamic nature of the pandemic low quality of existing literature and the large number of ongoing studies. One of the most important things to take into consideration when implementing additional treatment modalities in the era of social media is the underlying quality of evidence. One example was the request to use ivermectin for the treatment of COVID-19 on the basis of an Internet blog post quoting a 5000-fold reduction in viral concentrations at 48 hours.¹¹ However this claim was based on a single in vitro study with no correlation to safety and dosage efficacy in humans and thus, was determined to be not in the best interests of the patients or the hospital. As members of various hospital committees such as pharmacy and therapeutics, critical care, and antimicrobial stewardship, pharmacists are able to use their knowledge of the literature to play a direct role in the decision-making process for institutional treatment algorithms and therapy restrictions. As the pandemic continues to evolve, pharmacists should stay well-versed in the emerging literature to ensure that patients receive optimal pharmacotherapy.

Responding to inpatient emergencies

There is much debate regarding the provision of decentralized pharmacy services during the COVID-19 pandemic out of concern for the safety of pharmacists. Despite the increased health risk, critical care pharmacy services, consisting of direct patient care rounds and response to inpatient emergencies, were provided. According to the Society of Critical Care Medicine, efforts must be taken to minimize exposure of health care workers and maximize the chances of success during endotracheal intubation by having the most experienced health care professional in airway management perform the procedure.¹² This principle should be extrapolated to inpatient cardiac arrests, with experienced pharmacists using their knowledge of advanced cardiovascular life support and pharmacology to manage the medications during inpatient cardiac arrests. This principle is supported by previous data demonstrating decreased patient mortality when a pharmacist is integrated in the cardiopulmonary resuscitation team.¹³ During the early weeks of the COVID-19 surge in New York City, the critical care pharmacist responded to approximately 4 cardiac arrests a day, fully gowning up and entering the room with the other members of the resuscitation team in an effort to reduce contamination in the rest of the unit and to play an active role in therapy management. During these emergencies, the pharmacists were able to alleviate the strain of low nurse-to-patient ratios by serving as responders in-charge of the medications. In addition to cardiac arrests, pharmacists played a crucial role in rapid sequence intubation by facilitating the most appropriate selection and dosage of sedatives and paralytics.¹⁴ During the COVID-19 surge, our department prepared custom rapid sequence intubation kits consisting of etomidate, propofol, and rocuronium for storage in automatic dispensing

cabinets in adequate numbers to ensure availability of in the event of simultaneous intubations.

Optimizing medication orders

Minimizing the number of entries into COVID-19 positive patient rooms is an essential strategy to decrease the risk of transmission and decrease the use of PPE. Pharmacists are well positioned to assist their nursing colleagues in this effort by having medication orders synchronized to the extent possible without compromising on the efficacy of the therapy or safety of the patient. Certain critically ill patients with COVID-19 pneumonia required high dose sedative and continuous paralytic infusions to maintain appropriate oxygen saturation. To meet this demand, pharmacists utilized their knowledge of drug compatibility and stability to create custom orders of larger volumes in the electronic medical record for providers, effectively decreasing the number of bag changes performed by the nurse. A variety of investigational drug therapies have been initiated for the management of COVID-19 at our institution. Our infectious diseases clinical specialist was able to coordinate with our informatics team to facilitate the safe use of these agents by developing order sets and custom orders in the electronic medical records.

Ensuring adequate supply

A major concern during the pandemic is the availability of enough medication to treat critically ill patients. The pharmacists in-charge of procurement worked diligently through coordinated effort with the critical care and infectious diseases pharmacy specialists and pharmacy leadership to maintain adequate supply of medications anticipated to be used for the management of COVID-19 patients. These medications included, but were not limited to, anti-infective agents, neuromuscular blocking agents, nonbenzodiazepine sedatives, analgesics, and vasopressors. Strategies to mitigate the risk of local drug shortages included frequently monitoring the institution's distribution center supply, reaching out to other institutions regarding their current purchase patterns, and dealing directly with generic manufacturers and their representatives. In addition to acquisition, pharmacists also served as key members in multidisciplinary meetings with hospital leadership to develop a protocolized approach to the treatment in an effort to conserve drug supply. For instance, our institution experienced a shortage of cisatracurium, a neuromuscular blocking agent commonly used to promote ventilator synchrony in patients with acute respiratory distress syndrome.¹⁵ In accordance with the Surviving Sepsis Campaign guidelines for managing critically ill patients with COVID-19, bolus dosing of paralytics was encouraged wherever possible, before committing to continuous infusion while preparing guidelines to use rocuronium and vecuronium as alternatives.¹² In the event of a fentanyl shortage, a guideline outlining alternative treatment regimens was prepared, with intermittent intravenous push-doses of longer-acting opioids such as hydromorphone.

Conclusion

Pharmacists are well-equipped to develop treatment plans based on the evolving literature, positively impact patient outcomes by responding to inpatient emergencies, and optimize medication orders to conserve and maintain a healthy supply of medications for the hospital. As the COVID-19 pandemic continues to progress, it is critical to recognize and use the multifaceted services provided by pharmacists to facilitate optimal patient care and support their health care colleagues.

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