Adapting to the COVID-19 Pandemic at a Quaternary Care Hospital in the Middle East Gulf Region

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INTRODUCTION

The COVID-19 pandemic required institutions worldwide to adapt to a rapidly changing healthcare environment, priorities, and concerns. The Middle East Gulf Region including the United Arab Emirates (UAE) has been affected by the pandemic with close to 70,000 cases to date. Countries and institutions immediately initiated task forces and implemented makeshift services to alleviate the influx of patients and manage the overall crisis. Aside from managing the logistics of the pandemic such as expanding intensive care unit beds, securing ventilators, and repurposing healthcare resources, other unique challenges and services emerged in different regions of the world. In this article, we highlight unique initiatives that have not been previously implemented at the local level at Cleveland Clinic Abu Dhabi (CCAD), a quaternary care center in the UAE in the Middle East Gulf Region. We present the experience and the challenges and reflect on the success and future directions.

IMPLEMENTING CLINICAL GUIDELINES AND DRUG SHORTAGES: MITIGATION STRATEGIES

Challenges and methodology for overcoming them
As expected during a pandemic, evidence emerges in a rapid manner that makes it difficult to keep up with the emerging literature. This is in addition to the problems that arise due to increased demand or disruption of the supply chain such as in the case of drug shortages.

Incorporating the best evidence-based guidance at the level of electronic order entry when feasible is thus essential for the quick adoption of emerging evidence and assisting providers in selecting best therapies or in some scenarios the best alternative therapies when first-line medications are not available due to shortages. Such need becomes amplified when many physicians are deployed from their routine practice site to another in need area and thus would very much benefit from this guidance.

At our institution, this was accomplished through developing local guidelines as well as incorporating these guidelines into electronic order sets. One example of utilizing treatment guidelines for COVID-19 was the incorporation of antiviral and immunomodulator therapy into electronic order sets [Figure 1]. Such a strategy was necessary as literature on effective therapy was changing in almost real time.

Responding to these changes was a challenge and required the coordinated efforts of a clinical task force that was tasked with reviewing emerging literature, analyzing the data, and coming up with the most appropriate interpretations. The ability to rapidly respond required the need of a dedicated informatics team that was able to expeditiously make any necessary changes to the electronic order set.

Another example that arises here is the increased rate of venous and arterial thrombotic events.
observed and reported in COVID-19.\textsuperscript{3,4} The emerging role of cardiac injury and biomarkers and their prognostic ability in this pandemic necessitated developing and sharing guidelines and treatment algorithms on strategies to alleviate the burden of these events.\textsuperscript{5,6}

Tailored anticoagulation algorithms were in turn transformed to order sets that help guide the provider at the bedside. Figures 2 and 3 show an example on how an anticoagulation algorithm was designed and implemented in the electronic health record utilized at our institution.

During the height of the pandemic, it was necessary to use the efficiencies within the electronic medical record (EMR) to optimize the screening of patients who could potentially have a high risk of developing QTc interval prolongation when placed on hydroxychloroquine as part of COVID-19 therapy. A prompt was programmed into the EMR to flag physicians whenever a QTc prolonging agent such as hydroxychloroquine is prescribed to patients with a Tisdale score of 11 or greater [Figure 4]. Using such prompts enhances patient safety and helps prevent QTc prolongation and potential torsade de pointes in at-risk patients, particularly those treated with the combination of azithromycin and hydroxychloroquine.\textsuperscript{7,8}

Another prompt that was programmed for use during the height of the pandemic was a flag that alerted healthcare providers to a patient with COVID-19 that has early signs of clinical deterioration. Various markers were programmed into this prompt including total lymphocyte count, ferritin, lactate dehydrogenase, C-reactive protein, D-dimer, oxygen supplementation, fever, and early warning signs score. This enabled clinicians to rapidly identify patients who may benefit from early initiation of immunomodulator therapy.

Drug shortages, particularly those related to intensive care were prevalent during COVID-19 given the incidence of severe cases that required such care or even mechanical ventilation. It was thus imperative to have strategies in place that ensure the appropriate use of not only commonly used medications such as sedatives and analgesics but also medication-sparing strategies and alternative therapeutic options. Certain medications were touted as beneficial by political figures and media outlets it was thus necessary to have alerts at the level of order entry to remind prescribers of the potential for misuse or hoarding of medications.

Moreover, it was important to limit the spread of the virus that can be increased by the use of certain medications, such as nebulizers in hospitalized patients. At our hospital, it was thus recommended to use inhalers over nebulized therapy in patients with suspected or confirmed COVID-19 to limit the risk of exposure due to aerosolization. Pharmacists were involved in mitigation of emerging drug shortages and aiming to sustain the most evidence-based medications for COVID-19.

The strategies included, but were not limited to, securing compassionate use of certain medications, designing best practice alerts to avoid inappropriate prescribing, switching to alternative generic medications, and switching between therapeutic options. Figure 4
shows other examples of electronic best practice alerts implemented at our institution to prevent inappropriate use as well as safe alternatives when necessary.

**Lessons learned**
It was evident that during the pandemic, it was necessary to have the coordinated efforts of a task force to critically appraise the emerging literature and assimilate this literature into dynamic guidelines that are updated on almost real-time basis. Such a clinical task force needed to be multidisciplinary including infectious diseases specialists, intensivists, hospitalists, and pharmacists. The availability of a dedicated IT team is crucial to be able to rapidly make changes to prompts and alerts in the EMR. Such changes are frequently necessary in the setting of a pandemic and the resultant new information and drug shortages.

Having access to a data analytics team made it feasible to track critical medication consumption in almost real-time respond shortages in by increasing the supply based on actual and projected usage.
TRANSITION TO TELEMEDICINE IN THE HEART AND VASCULAR INSTITUTE AT CLEVELAND CLINIC ABU DHABI

In an effort to reduce patients’ exposure and transmission of disease, to conserve supplies, and to maximize personnel that were needed to provide care to the large number of people with severe COVID-19 illnesses requiring hospitalization, the Heart and Vascular Institute (HVI) at CCAD reduced ambulatory outpatient clinics. In this context, initially, telephone encounters were introduced to maintain the longitudinal care of patients, especially those with chronic illnesses such as coronary artery disease, heart failure, and hypertension among others. Over a period of mere 3–4 weeks, workflow for synchronous audio/video interactions (telemedicine/digital visits/virtual visits [VVs]) was established within CCAD’s software.

CCAD allowed patients to “visit” their doctors on their smartphones via a dedicated application. Patients had to download the hospital’s CCAD Health Portal application and then access a video conference link for a VV. Since March 22, the HVI completed more than 4350 VVs. Such digital visits were valued as an innovative and necessary alternative to in-person care. Given the need of the hour, various medical insurance companies expanded reimbursement for ambulatory visits via telehealth interactive communications (telemedicine/digital visits/virtual visits [VVs]) was established within CCAD’s software.

The US Department of Veterans Affairs achieved 294,000 virtual appointments in the fiscal year 2019, demonstrating the feasibility of broadly using VVs to provide care for chronic illnesses.[14] The Heart Failure Society of America published a scientific statement earlier this year that outlines the benefits and challenges of VVs and enumerates the changes in policy and reimbursement that have increased the feasibility of VVs during the COVID-19 era.[15]

The IT department at CCAD showed relentless determination in training both the physicians and patients. Workflows for telephone and digital health visits with pertinent details of each step were e-mailed across the board to the physicians, and workshops were carried out to enable them to use a dedicated software for audio-visual visits.

Physicians were provided with appropriate devices enabling them to work from home, and workflows were circulated with the instructions for the inclusion of interpreters via conference calls using Skype for business. Clinical operations distributed instructions enabling physicians to flag their individual schedules if appointments were appropriate for a telephone visit, video visit, reschedule, cancel, or keep as an in-person visit.

Across the globe and through technological advances has transformed into an efficient and convenient model of care. It has provided a platform for real-time interactive telehealth communication between patients and clinicians using commonly available home-consumer devices. Early adopters of VVs have described their feasibility, potential to save time and cost, and patient satisfaction related to increased access to care and the convenience of avoiding trips to the office.[8-13]
visit. The schedulers would then inform patients accordingly about the nature of their visit.

In the next step, the IT department would then reach out to the patients flagged for video visit and guide them as how to install the CCAD App (freely available on Google app and Apple store), register themselves, and then guide them through the steps of consent and e-check-in process.

However, even after meticulous measures, multiple obstacles were encountered such as patient’s inability to check-in via App or poor connectivity issues, in which case, the IT team were readily available for assistance. If the issue would still remain unresolved, the encounter would be converted to a telephonic visit. At this point, it is worth mentioning that full physical examination could essentially not be carried out, although a wide majority of patients would help physicians by checking their own blood pressure, pulse, oxygen saturation, and body weight using their personal gadgets at home.

As the current pandemic continues to exit, some patients are still concerned with visiting the hospital, many are high risk, and even healthy people are
encouraged to practice social distancing. Clinicians who could not accept medical practice without physically examining the patients are clamoring for the opportunity to practice virtually.

The pandemic and the need that arises are the reasons we are seeing this accelerated course of evolvement in telemedicine. There is now a willingness to adopt a new technology and workflow not just by patients who want to connect with healthcare safely but also by hospitals that need patients stay healthy to reduce their exposure and allow room for the seriously ill. For some patients, it is rather an opportunity to skip the hustle of travel, take time off from work, or find child care.

With the recent advancements in mobile technology, clarity of regulations and standards, sufficient evidence behind telemedicine and e-Health, and the ever-increasing lifestyle-based chronic disease burden, it is vital that these tools are used effectively for better healthcare outcomes. For clinicians who are embarking on the use of telemedicine, this is hopefully the beginning of an important journey. In this difficult time, we find ourselves needing telemedicine.

**IMPLEMENTING MEDICATION HOME DELIVERY SERVICE**

Before the COVID-19 pandemic, medication home delivery as an improvement project was initiated in October 2018 at our institution in Abu Dhabi to help alleviate the needs of our patients living in the furthest regions of the country. Specifically, the project aimed to help those patients who were driving 3 h or more to pick up a refill of one or two medications. The initial hurdle was the “legality” of the service, as there were no regulations in place under the Department of Health (DOH) at that time.

CCAD pharmacy submitted a novel proposal to the health authorities which outlined a plan for delivery, including how the project would ensure safe and effective care and the benefits to the community and nation at large and especially to those who needed the care the most (elderly and less-mobile).

In August 2019, approval for a pilot study followed by a report on findings was granted. After piloting the program for just over a month, many details and fine-tuning adjustments were identified that would allow for the delivery of 20–30 orders per day during the standard work week.

In January 2020, the health authorities were on the cusp of approval for the medication delivery regulations. Daily conversations between CCAD leaders and the DOH aimed to finalize the approval of the first ever home delivery standards for the UAE in the mid-February 2020. As COVID-19 started to make headlines in March 2020, still no facility had been approved for home delivery of medications in the UAE. Finally, on March 19, 2020, CCAD received official approval to begin delivering medications to where patients reside. In addition, the DOH agreed to cover the fees associated with the deliveries for several months in an effort to keep patients safe and at home.

CCAD leadership aggressively worked to minimize the impact of COVID-19 and implemented many initiatives to protect their patients and caregivers. The medication home delivery service was challenged...
to “convert the ambulatory pharmacy (outpatient) from 1000+ patient visitors daily into a fully delivery pharmacy (or as much was allowed under the regulations). The first 17 orders were sent out with a courier for delivery to patients around Abu Dhabi on March 22, 2020.

The initial service began with a team of five volunteers working 6–7 days per week. The pharmacist would call the patient, explain the importance of ‘staying home’ and offer delivery. At the time, the courier had an online portal where all deliveries had to be manually entered and could be tracked (this later was abolished as it became apparent that the original plans for 2–30 deliveries daily would not be handled the same as 300–500 deliveries daily).

Challenges of the home medication delivery service and ways to overcome them

The ramp up in delivery service was challenged to increase from 20 daily to 300 daily in 2 weeks, with 500–800 by the end of the 1st month. In actual practice, the increase in volume took roughly 3 weeks with our initial courier. The service topped out at 325 deliveries per day for about a week, when the challenges of such volume began to be apparent. Both the online portal and the back-end administrative work (for both CCAD and courier) were significantly more difficult with this volume of work. The courier could not meet the request with properly trained drivers and eventually limited their daily workload to 225 deliveries daily.

Behind the scenes, streamlining of the process and the development of work force plans were being implemented which would allow for more efficient use of resources and hopefully develop a more long-term solution (including a second, larger courier).

Critical pieces of the home delivery puzzle included physical demands, online presence, and telephone support. To really be efficient, a pharmacy-specific contact center was organized under the direction of a lead pharmacist. The comprehensive refill center was created to assist patients in refills as well as answer questions and give advice over the phone. This contact center utilized 2–3 pharmacy caregivers along with approximately 10 additional CCAD staff on loan from other departments. This team managed upward of 500+ phone calls daily during the work week. Without this service, the delivery would not be able to focus on the actual patient care aspect.

Another critical key component was an online request and e-mail dedicated to refills and home delivery. This specialty started with nearly 450 e-mails and another 190 online requests.

As the processes in the contact center and the e-mail service were optimized, the home delivery service became more focused and efficient. In the late May 2020, the additional courier was added to the service to increase possible volume, and the daily delivery volumes spiked at just over 500 deliveries per day.

Lessons learned

As the COVID-19 restrictions begin to soften, and the community begins to resume “normal life,” some key take-aways from the home delivery are applicable to pharmacy in the post-COVID practice domain. Namely, pharmacy resources are wide spread. Delivery is just one aspect involved. Communication is enormously important, both physical communication in-person and via telephone, but also online and through e-mail. Logistics related to staffing, delivery, tracking, finances, and even insurance were challenged and adjusted every day. The benefit of the pandemic-induced challenge is that as a whole, the pharmacy team developed the characteristics and know-how to combat many future challenges.

Whether home delivery will continue at the blistering pace it is on (or not) remains to be determined, Figure 5 depicts the growth of the home delivery service since inception, and as is apparent, the trend to move back toward physical visits in clinic results in a slowing of the delivery volume. However, the challenges that arose in the creation of the delivery service, namely pharmacy specific-contact center, pharmacy e-mail refill center, and even pharmacy counseling, are stronger than ever and will be a strong presence in the pharmacy care model in the region for the long term.

CONCLUSION

The challenges posed by COVID-19 have necessitated rapid adaptations and innovations to continue to deliver quality healthcare. The availability of state-of-the-art institutions with an infrastructure that fosters technology and multidisciplinary approaches in the Middle East Gulf Region is essential to successfully cope with such unprecedented times.

The lessons learned are likely to transcend beyond these times and to have a substantial long-term effect on the perceptions and the delivery of healthcare. Providers and patients are readier to embrace utilities that until recently were perceived as premature or under development.

Future directions

The pandemic has accelerated the identification of gaps and needs at national and institutional levels. The laws and regulations as well as reimbursement models, particularly in developing countries, will need to evolve to facilitate the adoption of new services and recognize the integration of technology in healthcare delivery.

At the institutional level, training plans for providers should be designed to ease their transition to new
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systems as well as deployment to care areas different than their routine practice sites when necessary. Multidisciplinary teams and coordinated efforts now more than ever should be embraced to deliver the best patient care during the time of the pandemic and beyond.

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