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Surgical Residents in the Battle Against COVID-19

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PERSPECTIVES: In times of public health crises, medical residency program leaders are responsible to maintain the wellbeing of their residents and ensure uninterrupted training. COVID-19 caused significant impact on healthcare industry, depleting resources and manpower, which led to disruption to graduate medical education and residency training. Surgical residents were affected by the pandemic both by reduced operative opportunities in most training centers and inducing stress and concerns about safety and wellbeing among residents. Spread of the SARS-CoV-2 was naturally accompanied with a gradual decrease in numbers of healthcare personnel which consequently increased the burden on residents. During these times of crisis and uncertainty, it is crucial that residency programs find alternative learning opportunities and deploy pre-designed, dynamic operational strategies to ensure high quality surgical services while optimizing resident safety and wellbeing. The COVID-19 crisis was a natural call for the essential need to add another dimension to residency competencies, which is Crisis-based learning and practice. Times of public health crisis are opportunities to reflect on the medical practice from an interdisciplinary and interprofessional perspective and train the residents to function as part of a larger, globally responsible team. It also calls upon adopting innovative instructional and learning strategies such as utilizing digital and online learning tools to complement learning. A holistic approach to the crisis was taken by the surgical residency program at the University of Illinois in Chicago, which addressed the issue from a resident, hospital, and public health standpoints. An operational strategy was introduced to optimize resident safety, maximize learning opportunities, support other non-surgical services, and promote online teaching and learning. This strategy is meant to serve as a dynamic reference for surgical residency programs and as an infrastructure for dealing with this and any upcoming healthcare crises in an efficient and resident-centered way.

KEY WORDS: COVID-19, Pandemic, Leadership, Resident well being, Crisis, Surgical residency, Resident safety, Operational strategy

COMPETENCIES: Systems-Based Practice, Practice-Based Learning and Improvement, Patient Care

A CHALLENGE

Besides being a major threat to public health, COVID-19 created a multidimensional crisis posing significant socio-economic and operational challenges to healthcare industry.1 Resident physicians have been directly affected by the spread of the disease and the scarcity of resources, which is a relevant issue to all staff who are in physical contact with the problem, given the highly contagious nature of the disease and the speed of dissemination, and efforts must be taken to provide logistical, physical, and emotional support to these residents.2 SARS-CoV follows an exponential spread pattern and is often transmitted by asymptomatic carriers which makes it harder to control.3,4 Rigorous steps were taken to limit the viral spread, which were more challenging to apply to healthcare personnel given their crucial role on the frontlines and the inevitability of direct or indirect contact with COVID-19 patients. Surgery residents, among other healthcare workers, were often excluded from curfews and stay-home orders, increasing their exposure and turning them into potential vectors for carrying and transmitting the disease.5

AN OPPORTUNITY

The role of residents during healthcare crises and as future leaders is often underestimated, which warrants us to clearly identify residents’ roles and responsibilities amidst this one-in-a-century crisis. Healthcare leaders are responsible for designing dynamic operational strategies...
The COVID-19 experience is another, yet atypical, learning opportunity for surgical residents that challenges them to function as part of larger multidisciplinary teams and demonstrate commitment to public health, patient care, and interprofessionalism. The pandemic exposed an essential, yet missing domain of the competencies outlined by the ACGME, which is Crisis-Based Practice. Although crises of such caliber are rarely encountered by residents, the stress they exert when they occur warrants special attention toward future planning and curricular development.

**AN EXPERIENCE**

At the University of Illinois in Chicago’s general surgery program, we analyzed the nature of the crisis, anticipated upcoming developments, and designed a call-based operational strategy in order to maximize the efficiency of the surgical services, minimize resident exposure, optimize resident safety, and provide support to nonsurgical critical care services during the pandemic. Surgical residents are particularly trained on airway management, respiratory critical care, and creating vascular access, among other skills that make them an asset during times of crisis and increased volumes of critical care patients. At our program, a resident-based committee led by the administrative chiefs formulated a comprehensive and dynamic operational strategy to take place during these times of uncertainty. This strategy aims to maximize the unique learning opportunities for our residents while maintaining appropriate physical distancing, minimize resident exposure to patients yet providing high-quality patient care, and creating a pool of back-up residents to serve as replacement for residents who may require home or institutional isolation. This pool serves as a reserve to decrease the impact of the crisis on our manpower and contribute to prolonging the endurance of our healthcare system, which is further hindered by the inevitable build-up of potential physician fatigue and burnout.

**THE FORMATION**

Our surgery residents serve primarily in 2 major Chicago hospitals. At Hospital A, 17 residents cover general surgery, vascular surgery, pediatric surgery, oncological surgery, transplant surgery, and colorectal surgery. Among these residents are 6 interns, 6 junior, and 5 senior residents. At Hospital B, 14 residents cover general surgery, vascular surgery, cardiothoracic surgery, breast surgery, trauma surgery, and night float, including 3 interns, 4 junior, and 7 senior residents. During the peak of the pandemic, elective surgeries were postponed and surgeries were restricted to emergent procedures with a subsequent reduction in the inpatient census and outpatient services. This reduction increased the availability of residents to provide other essential services and spared residents for acute care, consult services, and emergent operations. A new strategy was designed in which residents serve in a weekly semicall fashion. This strategy is somewhat similar to hockey basic formations and changing players “on the fly.” During the pandemic, the basic weekly formation at Hospital A includes 3 interns, 3 juniors, and 1 senior resident. The interns and juniors are each divided into long-call, short-call, and a night float. The senior is responsible primarily for operative cases and technical support to junior residents, who in turn are in charge of bedside procedures, consultations, and support to interns, who are in charge of inpatient care and serving as first-line responders to surgical pager. The remaining 10 residents stay at home as per the State recommendations to contain the pandemic and to serve as a stand-by backup pool. At Hospital B, all surgical services during the pandemic are covered by 3 interns, 3 juniors, and 4 seniors, creating a resident backup pool of 4 residents. Among working residents are 2 junior and 2 senior residents who are fixed to cover the trauma surgical service on a 24-hour call basis every other day, whereas 1 junior serves as a night float, 3 interns serve as a short-call, long-call, and night float residents, while 2 senior residents cover all operative cases during the day. Given the reduction in trauma census during the pandemic, trauma residents helped manage overflow medical ICU patients who are transferred to the trauma ICU to relieve medical ICU staff who dedicated their efforts for critical COVID-19 patients. Figure 1 demonstrates the regular vs. the COVID-19 resident formations at Hospital A and Hospital B.

In comparison to the strategy formulated by general surgery residency program at the University of Washington, which is based on functional units covering inpatients, outpatients, and operating rooms separately, our model was based on individual residents functioning in a call-based fashion. Our model also differs in that our residents were excused from outpatient clinic services given the reduced numbers of patients during this phase of the pandemic. This allowed our residents to focus on inpatient surgical services, operative cases, and increased their availability to provide support to other nonsurgical services. Further dedicated studies will be needed to compare the efficiency of these different models.

**THE PERIPHERY**

During the crisis, our surgery department endorsed policies to ensure safe practice and well-being of our surgical residents, such as securing the appropriate personal
protective equipment with the necessary training for the proper use of these equipment. Junior residents were scheduled for a crash course for vascular access and other essential critical care skills. We formed a dedicated line team composed of a vascular surgery attending, the junior resident on long call during the day and the night float resident during the night, who alternated weekly with the medical ICU and anesthesia teams to cover all vascular access needs around the hospital. This team was trained to triage line needs based on urgency, and to efficiently allocate resources, such as line kits and portable ultrasound machines on different units in order to achieve vascular accesses in timely fashion. The model suggested by the department of vascular surgery at the University of Massachusetts can further serve as a reference for the development of the line team and optimize its function. Educational meetings were held using online and virtual learning tools, and interestingly, our didactics have increased with the increased popularity of virtual tools, introducing an additional weekly coffee hour to discuss selected surgical topics moderated by chief residents and attendings. Also, believing in the importance of public awareness to fight the pandemic, residents were encouraged to share their personal experience on social media platforms within HIPAA standards, in order to increase public awareness about the difficulties encountered by healthcare providers on the frontlines and the public role in decreasing the burden on healthcare services.

THE COME-BACK

The staged return into regular schedule beings as early as the beginning of the crisis in order to facilitate smooth and uninterrupted function. This is achieved by weekly assessing the staffing needs of different surgical services based on inpatient census, volume of consultations, and operative load. This is continuously assessed by chief residents with ongoing feedback from junior residents on the COVID-19 schedule. For example, our residents on transplant service returned to regular schedule earlier than other residents given the observed steeper increase in inpatient census and operative load. It is also essential to establish a platform of communication, such as email or group messaging system, in order to organize communication and encourage ongoing feedback. The key is to individually assess different surgical service and tailor fit resident distribution based on the individual needs of different surgical services, and the availability of a sustainable and supportive system with flexibility to redistribute residents as needed and on short notice.

CONCLUSION

This review aims to provide a simple overview of our initial experience in dealing with COVID-19 and to create a reference for other programs in face of the challenge. This review reflects on the importance of having a disaster management strategy within all residency programs since delay in planning can cause dramatic impact on residents’ educational experience and overall well-being. These operational strategies must be coordinated among different programs within an institution and among different institutions in order to facilitate cooperation in times of crisis. It also emphasizes on the importance of changing the culture of residency and creating an interdisciplinary and interprofessional practice as well as
introducing Crises-Based Practice as a new domain of competency in surgical education.

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