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Cardiothoracic Education in the Time of COVID-19: How I Teach It



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COVID-19 has changed the way we live, work, and socialize. As academic cardiothoracic surgeons, it has also changed the way we must educate. We are placed in the unique position of simultaneously providing for our patients, many of whom suffer from life-threatening oncologic conditions or severe cardiac disease, in the face of viral threats and hospital shortages, while also continuing to educate our surgical trainees during this uncertain time period. While much of the United States waits poised for the surge of COVID patients, our standard operating practices have gone by the wayside, and the trainees' schedules have been disrupted. Elective cases have been re-scheduled, and many providers have been re-distributed to hospital areas in dire need of physicians experienced in caring for critically ill patients. This poses a radical challenge for the continued education of our cardiothoracic surgery residents, who are still required to obtain and master a significant amount of subspecialized knowledge and expertise in the field of cardiothoracic surgery during a relatively short period of time. With the uncertainty surrounding the length of time that hospital operations will be disrupted, we as cardiothoracic surgeons must quickly re-invent the way that we think about and provide surgical education, to ensure that our trainees' needs are being met to the best of our abilities during this unprecedented time.

Many of us have seen our days shift from those of spending time in the operating room and in meetings, to sitting at home on Internet-based conference and video calls. Through social distancing, a safer-at-home mandate, and a mandatory change to our staff and trainee schedules to plan for the COVID-19 patient surge, our standard, hour-long, in-person cardiothoracic resident didactic sessions at The University of Wisconsin have been cancelled for the foreseeable future. These are significant constraints to the ongoing education of our residents during a formative period in their professional development, and it is our institution's responsibility and commitment to adapt our pedagogical practice in order to maintain a high standard of training. This paper details the educational efforts that were quickly instituted at The University of Wisconsin Cardiothoracic Surgical

Residency Program to address the challenges that our trainees face during the COVID-19 pandemic.

Technique

Before COVID-19

The didactic curriculum at The University of Wisconsin Cardiothoracic Surgical Residency Program was recently restructured at the beginning of the 2019 educational year. The reorganized didactic programming, now temporarily suspended due to COVID-19, consists of a 1-hour didactic session every Thursday morning from 6:30 AM to 7:30 AM. During this time, trainees are excused from their clinical obligations, except for extreme emergency situations, in order to facilitate focused educational involvement. All faculty members are required to attend the didactic session. Advanced practice providers, medical students, and rotating resident attendance is encouraged. The program functions on a 4-week schedule. The topic of focus for the week was determined based on a 2-year curriculum utilizing the Thoracic Surgery Directors Association Curriculum as a model. The first 3 of 4 weeks are facilitated by residents, who prepare case-based PowerPoint presentations that engage participants in a dialogue around the essential concepts and complexities of that week's material. The fourth week is focused on dedicated American Board of Thoracic Surgery board preparation, with 30 minutes spent performing Self-Education, Self-Assessment in Thoracic Surgery questions and 30 minutes engaged in mock oral scenarios with faculty members.

In addition to our weekly scheduled didactics, our residents participate in a formalized and rigorous simulation curriculum that has been spearheaded by one of our associate program directors. Once monthly, our residents are excused from their clinical responsibilities to participate in an intensive simulation experience designed to improve technical skill and simulate emergency scenarios that may be infrequently encountered.¹ Combined, the restructured educational programming for our residents has been carefully cultivated and executed to provide them with formative training outside of the wards and operating room.

Post COVID-19

With the advent of social distancing, working remotely, and an institutional commitment to minimizing health-care workers' exposure to COVID-19, our cardiothoracic

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surgery trainees' education and daily routines have been greatly disrupted. Importantly, the in-person didactic curriculum described above has been suspended as a result of social distancing and gathering requirements, the operating room schedule has been modified with elective cases being postponed with only urgent or emergent cases being scheduled, and clinic visits have largely shifted to telehealth appointments. As a training program, we have quickly been forced to reconfigure and adjust the curriculum to meet our trainees' needs.

We have chosen to leverage technology, extra time out of the hospital, and relationships across institutions to create an educational platform for our cardiothoracic residents that will allow them to continue to grow as cardiothoracic surgeons during this uncertain period. Our weekly hour-long didactic session has been shifted to a Zoom (Zoom Video Communications, Inc, San Jose, CA) conference meeting. Zoom offers a simple set up for video conferencing that works across various platforms, without requiring that participants have pre-installed software on their available device. The conference was restructured to accommodate the new format. Because we thought a large group discussion could be cumbersome on the digital platform, the structure of this meeting has changed from topic-driven PowerPoint presentations to more accurately simulated "mock oral" engagements on 1 cardiac/congenital and 1 thoracic topic weekly, while still maintaining overall continuity with the assigned Thoracic Surgery Directors Association Curriculum. The focus is determined by our residents at the beginning of the week to give them time to prepare for the Thursday session. The day of the didactic session, 1 cardiac and 1 thoracic faculty member are tasked with conducting the Zoom conference meeting to minimize interruption, focus participation, and facilitate a targeted discussion. Both residents join the Zoom session in its entirety to learn from observing their colleague move through the scenarios. At the conclusion of the session, verbal feedback is provided. Additionally, a standardized score card of the trainees' performance on the mock oral is filled out and provided to the program director as well as the trainee for documentation.

With respect to our simulation curriculum, again because of social distancing and work restrictions, the ability for us to convene in the simulation laboratory monthly has been postponed until further notice. With minimal case volume for our trainees due to operating room restrictions, there is a clear concern about technical decline due to lack of practice during COVID-19. As a result, we have provided each of our trainees with The Chamberlain Group pocket vessel anastomosis simulation kit and have scheduled weekly "friendly competitions" with trainees, judged by time to complete anastomosis, quality of anastomosis, and economy of motion as evaluated by a faculty member, who observes

the resident performing the simulation via Zoom video conference. We are currently leveraging our relationships with a variety of simulation experts to provide additional at-home simulation experiences for our cardiothoracic trainees so that we can implement them into our post-COVID-19 curriculum.

Comment

Although early in implementation, this educational strategy has allowed us to continue to engage all faculty in resident education, as well as provide structure and meaningful educational material to our residents despite the challenges surrounding the COVID-19 pandemic. We recognize the stress on all of us, but specifically to our residents who are attempting to master a complex, technically challenging specialty in a short period of time.

While we all hope that the curve will flatten soon and we can return to our standard mode of practice, for the foreseeable future we must make rapid adjustments to our status quo to be sure that our trainees are safe and educated. COVID-19 has demonstrated the impact of video conferencing and remote telehealth. We have been in communication with colleagues across the country at a variety of academic training institutions, and in the near future plan to roll out a multiinstitutional, collaborative effort of "mock oral" cardiothoracic examinations for our trainees. Utilizing as an assessment tool the mock oral score card from The University of Wisconsin, we will then pair trainees and faculty across different institutions, creating a mock oral experience for the trainee that has higher stakes and is closer in feel to the American Board of Thoracic Surgery oral board exam. Even beyond COVID-19, we feel that this specific multiinstitutional "mock orals" platform will continue to be leveraged among the collaborating institutions nationwide for the educational benefit of our trainees, a silver lining in the face of uncertainty.

In conclusion, cardiothoracic surgery training requires time, effort, and dedication from faculty as well as the trainee to be beneficial. Our specialty is highly technical and demanding, and can be difficult to master. During the uncertain time period of COVID-19, we cannot forget our cardiothoracic surgical trainees, and must do our best to educate them and remember our commitment to their success as future colleagues. If designed thoughtfully, the educational methods we develop to adapt to these challenging times may be used for years to come to improve the efficiency, versatility, and quality of cardiothoracic surgical education.

Reference

1. Fiedler AG, Lewis EE, Hermsen JL. Cardiopulmonary bypass: how I teach it. *Ann Thorac Surg.* 2020;109:645-648.