

Adapting Surgical Clerkship Curricula in Response to the COVID-19 Pandemic

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ABSTRACT

Background: Coronavirus disease-19 (COVID-19) impacted medical education and led to the significant modification or suspension of clinical clerkships and rotations.

Objectives: To describe a revised surgery clerkship curriculum, in which we divided in-person clinical teaching into smaller groups of students and adopted online-based learning to foster student and patient safety while upholding program standards.

Methods: The third-year surgery core clerkship of a 4-year international English-language program at the Medical School for International Health at Ben Gurion University of the Negev, Beer Sheva, Israel, was adapted by dividing students into smaller capsules for in-person learning and incorporating online learning tools. Specifically, students were divided evenly throughout three surgical departments, each of which followed a different clinical schedule.

Results: National Board of Medical Examiners clerkship scores of third-year medical students who were returning to in-person clinical clerkships after transitioning from 8 weeks of online-based learning showed no significant difference from the previous 2 years.

Conclusions: To manage with the restrictions caused by COVID-19 pandemic, we designed an alternative approach to a traditional surgical clerkship that minimized the risk of exposure and used online learning tools to navigate scheduling challenges. This curriculum enabled students to complete their clinical rotation objectives and outcomes while maintaining program standards. Furthermore, this approach provided a number of benefits, which medical schools should consider adopting the model into practice even in a post-pandemic setting.

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KEY WORDS: clerkship, coronavirus disease-19 (COVID-19), medical education, online learning, surgery

As the novel coronavirus pandemic continues to unfold, its social, economic, and political impact has increased and in the process significantly affected how medical education is delivered. The need for social distancing disrupted regular medical school and hospital routines in Israel, beginning in March of 2020 [1]. Further complicating matters, many medical students were prevented from gathering in clinical environments.

On 14 April 2020, the Association of American Medical Colleges (AAMC) published guidelines that suggested medical students should limit their involvement in providing direct patient care in areas of significant, active spread of the virus [2]. This recommendation encouraged many schools to take immediate action, including significantly modifying or suspending clinical clerkships and rotations.

PATIENTS AND METHODS

Historically, the 6-week core surgery clerkship at the Medical School for International Health at Ben Gurion University of the Negev, Faculty of Health Sciences has been structured to include daily morning and early-afternoon clinical teaching and surgical training, as well as late-afternoon didactic, in-person lectures. Each evening throughout the week, medical students also rotate to fulfill on-call responsibilities. The students are divided into three equal groups and distributed among three surgical departments: two at Soroka University Medical Center and one at Barzilai Medical Center.

From the beginning of the COVID-19 outbreak, faculty and hospital administrators recognized the need to explore alternatives to in-person training and capacity building. They organized an ad hoc committee to design new measures to protect students by revising the curriculum while upholding departmental standards. As a result, the clerkship was divided into an in-person clinical and an online learning component.

For the clinical component, students within each department were sub-divided into capsules of no more than five students, who remained together for the entirety of the clerkship. This decision

was dictated by hospital and governmental policies to ease contact tracing and prevent large groups from congregating within hospitals. In our program, 32 students were divided into three separate cohorts. Students at Soroka Surgery Department A maintained a regular 5-day workweek. Students were present on a daily basis but separated into morning and afternoon shifts (capsules). Alternatively, Soroka Department B expanded their workweek to 6 days and the two groups of five students attended clinical shifts every other day for the entire day. Barzilai also extended their workweek to 6 days in which students were required to alternate between attending 3 consecutive days. These modifications were based on the clinical learning opportunities, perceived hospital needs, and preferences of the respective site coordinators.

The online component included pre-recorded and live streamed video lectures. Some of the lectures were dedicated to practicing presentation and clinical skills, such as reviewing patient clinical presentation and care delivery based on the group experiences the previous week. The lectures were supplemented by assigned readings and the adoption of a self-paced web-based module from New York University/Web Initiative for Surgical Education Modules (NYU/WISE-MD), which is comprised of 22 cases/modules with accompanying vignette-based multiple-choice questions and an overview of 16 clinical skills [3].

Based on availability, students with less in-hospital clinical time (Soroka B and Barzilai) had expanded online requirements. Students in Soroka A who had clinical time in the hospital similar to a non-pandemic year were exempt from completing the modules but had access if interested. Proof of completion and results of module assessments for Soroka B and Barzilai were collected via an automated cloud-based tool developed using Google's G Suite applications.

Following the satisfaction of the clerkship program requirements, a surgery National Board of Medical Examiners (NBME) Clinical Subject Examination was proctored remotely, corresponding to the guidelines issued by NBME in response to COVID-19 [4].

RESULTS

The NBME scores of third-year medical students from 2020, 2019, and 2018 were compared using an ANOVA model [Table 1]. There was no significant difference in performance observed in the three cohorts of third-year medical students (2018, 2019, and 2020) ($P = 0.08$).

DISCUSSION

We devised the capsule approach to minimize the risk of exposure to and the spread of COVID-19, while mitigating the reduction in clinical experience. This approach was supplemented with an established online surgical curriculum. Minimizing interaction between capsules allowed the surgical clerkship to

Table 1. The mean and standard deviation of surgical clerkship NBME scores by year

Year	Class size	Equated percent correct score (mean ± standard deviation)	P value
2018	16	66.3 ± 8.2	0.0803
2019	24	6.8 ± 71.9	
2020	32	8.7 ± 68.4	

NBME = National Board of Medical Examiners

proceed relatively uninterrupted in the event of an infection, as only those within the respective capsule would have to be isolated and tested. Predictably, this did occur with one Soroka A capsule wherein a resident responsible for teaching the students tested positive for COVID-19, which required those five students to be tested, without disrupting the remainder of the clerkship. An important, unintended benefit of the capsule approach was that the student-to-physician ratio resulted in more 1:1 teacher learner time, tailored feedback, and an enhanced pedagogic relationship. These reported benefits support long-term adoption of the surgical clerkship model even as social distancing requirements are lifted.

Although grouping students into small capsules and staggering their attendance throughout the week minimized disruptions to their clinical studies, the strategy was not without its limitations. For example, those students who rotated in departments that required them to be in the hospital every other day noticed more discontinuity in patient care compared to students who were present daily in the hospital. In addition, due to the types of surgical procedures scheduled on particular days of the week and the subsequent availability of respective surgeons, students within the same department but in different capsules reported having different clinical exposures and learning opportunities. Hence, when trying to ensure equitable learning opportunities across capsules, operational preferences between surgical departments added another layer of complexity. A potential solution would be for the department to alternate which capsules start the beginning of every week to allow a more even distribution to surgical case exposure.

With respect to the online portion of the clerkship and in response to the COVID-19 pandemic, New York University generously provided a limited-time complimentary UWISE license. This permission proved critical to offering an asynchronous (anytime, anywhere) learning opportunity that accommodated the number of scheduling conflicts among the three departments and each capsule. The asynchronous model not only provided the flexibility for smaller numbers of students within each capsule while maintaining clinical exposure and opportunities but also was a form of learning appreciated by a large proportion of medical students and thus should be continued with the return a clerkship even without social distancing restrictions [5]. Ideally, with more lead-time to coordinate before the rotation, more at-

tention toward aligning core concepts between the clinical and online learning pathways could optimize the value of the online component. This strategy could help to reinforce the concepts learned in both tracks. Moreover, NBME scores, which have been found to be a good indicator of overall clinical clerkship performance, remained consistent when compared with the previous cohorts, thus indicating that these changes to the clerkship have not negatively impacted the overall quality of learning [6]. It has previously been shown to be beneficial in similar surgical residency program interventions [7].

CONCLUSIONS

While the COVID-19 outbreak has had an undeniable impact on medical training worldwide, institutions that quickly adopted contingency plans minimized disruption to clinical teaching activities. Specifically, our capsule model reduced the risk of exposure to and the spread of coronavirus, while allowing students to return to the hospital with a modified schedule. Finally, the lack of a significant difference between this year's clerkship exam scores and the past 2 years demonstrated that students were continuing to meet their educational competencies and maintaining program standards. While there is a time cost required to address logistical complexities associated with the adoption of this model, we feel it is outweighed by the advantage of resuming clinical rotations and minimizing the disruption to education.

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People forget years and remember moments.

Ann Beattie (b. 1947), American novelist and short story writer

Capsule

Valsartan in early-stage hypertrophic cardiomyopathy: a randomized phase 2 trial

Hypertrophic cardiomyopathy (HCM) is often caused by pathogenic variants in sarcomeric genes and characterized by left ventricular (LV) hypertrophy, myocardial fibrosis and increased risk of heart failure and arrhythmias. There are no existing therapies to modify disease progression. Ho et al. conducted a multi-center, double-blind, placebo-controlled phase 2 clinical trial to assess the safety and efficacy of the angiotensin II receptor blocker valsartan in attenuating disease evolution in early HCM. In total, 178 participants with early-stage sarcomeric HCM were randomized (1:1) to receive valsartan (320 mg daily in adults; 80–160 mg daily in children) or placebo for 2 years (NCT01912534). Standardized changes from baseline to year 2 in LV wall thickness, mass and volumes; left atrial

volume; tissue Doppler diastolic and systolic velocities; and serum levels of high-sensitivity troponin T and N-terminal pro-B-type natriuretic protein were integrated into a single composite z-score as the primary outcome. Valsartan (n=88) improved cardiac structure and function compared to placebo (n=90), as reflected by an increase in the composite z-score (between-group difference +0.231, 95% confidence interval (+0.098, +0.364); $P = 0.001$), which met the primary endpoint of the study. Treatment was well-tolerated. These results indicate a key opportunity to attenuate disease progression in early-stage sarcomeric HCM with an accessible and safe medication.

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