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My Thoughts / My Surgical Practice

A hybrid remote surgery clerkship curriculum during the COVID-19 pandemic: Lessons learned and future perspectives

Early in the COVID-19 pandemic, medical educators recommended to conserve clinical education despite the threat of an infectious agent.[1–3] The Surgery clerkship committee at our institution had a similar outlook and developed a 6-week remote curriculum (following 6-weeks of a traditional clerkship rotations) for third-year medical students in response to the California "Shelter in Place" order. The success of the remote clerkship curriculum (RCC) mirrors that of others,[4,5] and suggests that the adoption of specific elements of e-learning in traditional Surgery clerkships be considered by surgical educators and clerkship directors hereafter.

The benefits of electronic learning (e-learning) were increasingly recognized in medical education prior to the COVID-19 pandemic. Personalized instruction and feedback, greater access to information, interactivity, engagement with content, and flexibility of learning style enhance the effectiveness of instruction.[6] The pandemic accelerated the use of online educational technology in undergraduate and graduate medical education.[1] Evaluating the impact of these changes on undergraduate surgical learning is critical to establish new principles and practices that may be used to complement conventional in-person teaching and contribute to the advancement of medical education.[4] The aim of this editorial is to define our initiatives, to describe lessons we learned while developing the RCC, and to empower those committed to effective surgical education post-pandemic.

The RCC included daily didactics and small group discussions, in which 8–9 students gave pre-assigned verbal presentations of surgical patients to faculty or resident preceptors. Surveys were administered longitudinally to assess student perceptions of satisfaction, educational experience and mistreatment in prior, non-Surgery clerkships and in the hybrid traditional/remote Surgery clerkship. Students' perceptions of mistreatment were compared among RCC and historical Surgery clerkship cohorts.

Small group sessions were found to be a vital component of the RCC. Comparing survey data from this experience with that of prior, non-surgery clerkships, students felt more confident verbally presenting patients after the RCC. In addition, students reported high levels of satisfaction and perceptions of educational value, and that they learned more effectively in the remote curriculum than in person. Remote learning is not a replacement for experiential learning in clinical rotations; however, its effectiveness does provide a channel to augment clinical learning and its environment. Although logistical challenges certainly exist when scheduling remote case-based discussions during experiential, traditional clerkship schedules, their positive effects on educational value has led us to explore them in the current in-person curriculum. For example, virtual small group sessions may be incorporated into pre-clerkship orientation blocks or protected clerkship didactic time. The perceived effectiveness of clinical instruction was improved by remote learning formats that promoted active participation, learner engagement, and preceptor assessment.

The RCC was also associated with reduced rates of intimidation and mistreatment reported by students in the Surgery clerkship. Abuse and mistreatment of students and residents in a variety of specialty settings have been frequently cited in centers throughout the U.S., and are associated with burnout and suicidal ideation.[7] In the RCC cohort, students were substantially less likely to report mistreatment over the 12-week rotation (6.7%) than historically (22.1%), and the proportions of students who reported feelings of intimidation by residents and by faculty were substantially lower than they had anticipated prior to the clerkship. This may result from less time spent in-person in clinical settings and relatively greater exposure to educators who elected to teach the RCC. However, students in the RCC cohort did spend 6 weeks of their rotations in person, during which time the settings and circumstances were identical to those of the historical curriculum. The structured teaching time built into the RCC, as well as personal interactions via teleconferencing, likely contributed to consistency and continuity of feedback between students and preceptors, enriching their relationships. With traditional clerkship schedules returning peri- and post-pandemic, positive transformations in the learning environment like these promote supportive culture, well-being, and decreased burnout.[8]

Building upon the outcomes and lessons learned from our remote clerkship experience, as students returned to the wards for their clerkship, we assigned them faculty mentors. Students and mentors engaged in video teleconferences at the beginning of the clerkship, mid-clerkship for formative feedback, and at the end of the clerkship for debriefing and career guidance. Student-faculty relationships are likely enhanced with the assignment of a formal mentorship relationship, and bidirectional access is improved with web-based teleconferencing. We hypothesize that these efforts will improve conditions in the learning environment and levels of satisfaction among students, trainees and faculty in Surgery.

We took note of several opportunities to improve the RCC during a period of limited exposure to direct patient care. A remote curriculum may incur prolonged time in virtual environments and a diminished sense of community than traditional in-person rotations. These shortcomings may be addressed in the future through student participation in telehealth encounters. Moreover, virtual hands-on skills sessions, distribution of home kits for suturing and knot-tying, and other forms of simulation such as mock page evaluations and virtual operating room

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experience may contribute to the depth of clinical learning and allow for real-time assessment and feedback.[4,9,10] In addition to direct patient care, skills acquisition, operative experience and practicing of techniques are fundamental to the Surgery clerkship and benefit students with interests in procedural specialties.

Students in the RCC also felt they contributed less to surgical teams, an acknowledgement of restriction from direct patient care during that time. Inadequate exposure to overnight call or surgical sub-internships among students with career interests in surgery is associated with higher risks of attrition and decreased preparedness for residency.[11] These circumstances may persist in peri-pandemic clerkship schedules when students become ill or are quarantined due to COVID-19 exposure. A library of recorded didactics from the RCC is now offered to these students, and interactive video-based operative curriculums may be used to deliver remote operating room experience while providing exposure to the surgical specialty and engagement with faculty.[4,9,10] Although some aspects of undergraduate medical education improved in the RCC, future remote curricula will require refinement to foster technical skills acquisition, prepare students for residency, and interfere minimally with traditional in-person clinical learning.

Following 6-weeks of traditional Surgery clerkship rotations, our remote Surgery clinical curriculum during the COVID-19 pandemic preserved students' perceptions of safety, healthy learning environment, and quality of education. Post-pandemic, the Surgery clerkship stands to improve by maintaining remote learning elements that support the student-mentor relationship, promotion of understanding and retention of knowledge, and processes of evaluation and feedback in clinical education. To that end, we recommend integrating remote case discussions, operative video-based education, and student-surgeon feedback sessions via video teleconferencing on a regular basis.

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Declaration of competing interest

The authors have no related conflicts of interest to declare.

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