ANNALS OF SURGERY OPEN
OPEN

Medical Education and the Momentum for Virtual Care

Integration of Learners Into Telemedicine

Amy L. Strong, MD, PhD,* Lesly A. Dossett, MD, MPH,* and Gurjit Sandhu, PhD*

Accelerated by social distancing requirements to minimize the spread of coronavirus disease 2019, telemedicine has now become a key mode for delivering clinical care. Telemedicine visits have seen an annual compounded growth of 49% from 2005 to 2014 and 260% from 2015 to 2017, with an estimated 200 million visits for general medical care to be performed virtually in 2020.[1,2] Congress has also supported these initiatives with multiple executive orders to expand provisions to allow the use of telemedicine services for all Medicare beneficiaries. Telemedicine can increase access to care for underserved patients with limited subspecialty care, reduce unnecessary travel expenditures, and curtail in-office wait times.[3,4] While the benefits of telemedicine are clear, barriers to incorporating learners into telemedicine platforms have emerged. In-person clinics and observation have been the backbone for experiential learning, simultaneously integrating medical students and residents into the care of patients. However, with telemedicine visits independently facilitated by faculty, these encounters vastly limit salient opportunities for medical education. Harmonizing the benefits of telemedicine encounters with clinical education will require deliberate curricular modeling to meet the educational requirements of our learners.

EXCHANGING SEQUENTIAL CARE FLOW FOR INCREASED AUTONOMY WITH TELEMEDICINE VISITS

Clinic workflow has historically involved a resident conducting the initial patient evaluation and discussing the patient with faculty, after which both the resident and faculty see the patient together. In this model, the educational value occurs during the independent resident evaluation, the resident-faculty discussion, and the faculty-patient counseling.[5] Translating this model to a telemedicine context would have the resident perform an initial telemedicine visit followed by a presentation and medical decision-making discussion with the faculty in a virtual conference room. Subsequently, the faculty and resident would join the visit and counsel the patient. This model supports resident education through their elicitation of a history, meaningful dialogue with faculty, and observation of the faculty and patient exchange, all the while providing appropriate patient care. In this scenario, faculty are likely able to work with 2 trainees simultaneously. While one resident is seeing a patient independently for the initial interview, another resident could be presenting to the faculty member and observing the faculty-patient dialogue regarding the surgical plan, risk and benefits of the surgery, and expected outcomes. While this model maintains the fundamental educational values of clinic, it poses possible barriers to optimal scheduling and may be limited by electronic devices, platform license limits, and bandwidth.

While the previous model can be successful, this is not feasible with variable learner to faculty ratio. With more learners, there is greater potential for increased wait times among patients while the faculty member debriefs with residents and sees the patient. These delays would negate efficiencies appreciated by patients, and virtual wait could be perceived as a lost connection. An alternative model would have patients participate in 2 sequential visits. Residents independently evaluate patients in a morning "resident clinic," followed by the educational conference between the resident and faculty where all patients are discussed. The resident and faculty then discuss the plan with the patient in a second, shorter follow-up visit in the afternoon. As residents demonstrate increasing competence in this model, they would assume more leadership for the visit, and faculty would scale back their supervision. The educational aspect of this model allows residents to hone in on their skills to diagnose the problem and develop a care plan while maintaining autonomy under appropriate supervision. Exploring these models still requires consideration of patient preference with respect to participation in resident clinics, along with documentation and billing practices. If education and inclusion of learners in patient care is integral to the mission of teaching hospitals, these challenges must be addressed. As modalities for patient care interactions evolve, it will be essential that transformations in care team models be made explicit to patients and virtual workflows be accounted for fairly.

DEVELOPING PATIENT RAPPORT AND TRUST THROUGH THE DIGITAL SCREEN

While patients and healthcare professionals today are more electronically savvy and comfortable with technology than ever before, studies show a preference for in-person care due to concerns regarding impersonalization, highlighting the need for developing a good rapport digitally.[6] Rapport is defined as a sense of organic connection and has been shown to be developed through both verbal and nonverbal cues, such as facial expression, gestures, and posture, and by other linguistic elements of speech, such as pitch, pace, tone, and volume.[7] Therefore, focused verbal communication along with keen attention to nonverbal cues will be essential in developing rapport with patients during telemedicine visits. Furthermore, the visual setup may also contribute to rapport building in a telemedicine encounter, such as having the physician in the center of the screen, in professional attire, and with a nondistracting ambient background.[8] Trust developed

*From the *Department of Surgery, Michigan Medicine, Ann Arbor, MI.*

Disclosure: The authors declare that they have nothing to disclose.

Reprints: Gurjit Sandhu, PhD, Department of Surgery, Michigan Medicine, 1500 E Medical Center Dr, 2207 Taubman Center, SPC 5346, Ann Arbor, MI 48109. E-mail: gurjit@med.umich.edu.

Annals of Surgery Open (2020) 1:e009

Received: 20 July 2020; Accepted 22 July 2020

Published online 11 August 2020

DOI: 10.1097/AS9.0000000000000009

during the encounter is essential to minimize discomfort with disclosing abnormal physical findings, which allows for correct diagnosis and appropriate care planning in a telemedicine platform. These presentations identified during telemedicine visits could be confirmed during an in-person physical examination. For surgical decision-making, physical examinations could be performed during a follow-up in-person visit or in the preoperative holding area for routine cases. In cases where radiological findings and pathology results have limited utility, and the physical examination is essential in determining surgical plan, an in-person visit may be necessary to determine the surgical approach. During this time, the learner could be alerted to key examination findings associated with the diagnosis and improve patient rapport through in-person interactions. Where the physical examination would not provide additional information, the preoperative holding area is a suitable area to perform the physical examination and confirm the surgical approach.

INTEGRATING AVAILABLE TECHNOLOGY TO COLLECT OBJECTIVE PATIENT INFORMATION

In the current digital area, advanced technology has allowed for remote data collection, yet integration of these data into electronic medical records, in conjunction with learner education to interpret the data, has been slow. Heart rate monitors have produced satisfactory results in accuracy and have been integral in remotely monitored cardiac telerehabilitation.[9] However, integration of this into electronic medical records to monitor progress has been limited. Other wearable devices with Bluetooth capabilities that allow for continuous, rather than intermittent, recording of physical activity and caloric expenditure can be integrated into the patient's chart to allow healthcare professionals to monitor patient's overall health and fit for surgery. Similarly, patient-reported data such as weights, blood pressure, heart rate, and blood glucose level can provide additional metrics of a patient's overall health. Optimizing the integration of these wearable devices into the electronic medical record will allow for more care to be delivered remotely, with the potential for postsurgical patients recovering at home with in-home monitoring. Learners will need to be educated on how to interpret the vast data, understanding the sensitivity and specificity of each available measurement tool.

NECESSITY OF FORMAL CURRICULUM TO INCORPORATE TELEMEDICINE

As more patients will be seen remotely, indications for telemedicine will become increasingly complex and medical education should require virtual care to be on par with in-person visits. Today's medical trainees are the first generation normalized into digital technology culture and are comfortable processing electronic information. However, this is not enough to guarantee high-quality telemedicine care. Formal curricula are needed to provide a foundation in policy and practice associated with remote patient monitoring and to amplify the benefits that telemedicine brings to healthcare systems. The objectives, competencies, and milestones for telemedicine should cover universal principles such as privacy, professionalism, and engagement of patients. Integration of telemedicine into core competencies will allow medical students and residents to directly compare and contrast telemedicine with traditional medicine, recognizing when to use it and develop best practices.

SPECIAL CONSIDERATIONS FOR INCORPORATING MEDICAL STUDENTS INTO TELEMEDICINE VISITS

With demonstrated value in telemedicine, medical students' proficiency in virtual patient care is essential. Medical school curricula could address professionalism during telemedicine encounters, the role of nonverbal communication, and establishing patient rapport for accurate diagnosis through observation. For hands-on experience, medical students could provide prenatal counseling through telemedicine visits, which were performed at Michigan Medicine through telephone encounters during the coronavirus pandemic.[10] Longitudinal care clinics could also allow medical students to evaluate objective data collected through wearable devices and discuss alternative care plans with faculty. For experience with deductive reasoning to formulate diagnoses, medical students could participate in simulated telemedicine visits.

CONCLUSION

While not a replacement for in-person visits, telemedicine visits maintain a patient-centered approach and support the continuum of care from preventative to palliative care with the benefits of increased access, efficiency, and convenience. However, dedicated space in medical education curricula devoted to telemedicine still requires consideration. Evidence is needed to inform best practices for guiding participation by medical students and residents in the digital age. Assessment tools will need to be developed to evaluate learner performance during telemedicine visits to allow meaningful and timely feedback. While the coronavirus disease 2019 pandemic will continue to bring new challenges and uncertainty, telemedicine will certainly be part of patient care and integration of learners into this process is essential to the future of medical care.

ACKNOWLEDGMENTS

The authors are grateful for the insights provided by William Palazzolo, PA-C, on the technological and clinical requirements for telemedicine visits, as well as for his steadfast commitment to advancing virtual care.

REFERENCES

1. Barnett ML, Ray KN, Souza J, Mehrotra A. Trends in telemedicine use in a large commercially insured population, 2005-2017. JAMA. 2018;320:2147–2149.
2. Coombs B. Telehealth visits are booming as doctors and patients embrace distancing amid the coronavirus crisis 2020. Available at: http://www.cnbc.com/2020/04/03/telehealth-visits-could-top-1-billion-in-2020-amid-the-coronavirus-crisis.html. Accessed May 5, 2020.
3. Albert SM, Shevchik GJ, Paone S, Martich GD. Internet-based medical visit and diagnosis for common medical problems: experience of first user cohort. Telemed J E Health. 2011;17:304–308.
4. Vyas KS, Hambrick HR, Shakir A, et al. A systematic review of the use of telemedicine in plastic and reconstructive surgery and dermatology. Ann Plast Surg. 2017;78:736–768.
5. McGee SR, Irby DM. Teaching in the outpatient clinic. Practical tips. J Gen Intern Med. 1997;12(Suppl 2):S34–S40.
6. Hopp F, Whitten P, Subramanian U, Woodbridge P, Mackert M, Lowery J. Perspectives from the Veterans Health Administration about opportunities and barriers in telemedicine. J Telemed Telecare. 2006;12:404–409.
7. Matusitz J, Breen GM. Telemedicine: its effects on health communication. Health Commun. 2007;21:73–83.
8. Elliott T, Tong I, Sheridan A, Lown BA. Beyond convenience: patients' perceptions of physician interactional skills and compassion via telemedicine. Mayo Clin Proc Innov Qual Outcomes. 2020;4:305–314.
9. Batalik L, Filakova K, Batalikova K, Dosbaba F. Remotely monitored telerehabilitation for cardiac patients: A review of the current situation. World J Clin Cases. 2020;8:1818–1831.
10. Callan W. How hundreds of medical students are staying useful during COVID-19 2020. Available at: http://www.michiganradio.org/post/how-hundreds-medical-students-are-staying-useful-during-covid-19. Accessed May 4, 2020.