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RESPONSE TO COVID-19/COMMENTARY

Telemedicine in Rheumatology at the Advent of the COVID-19 Pandemic

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In late 2019, a hematologist from the University of North Carolina received a phone call from space—it was a request to evaluate an astronaut on the International Space Station who was suspected of having deep venous thrombosis (DVT). Guided by radiologists back on earth, the astronaut self-performed a tele-ultrasonography of his left internal jugular vein. Ultimately, he was diagnosed with a DVT and treated remotely [1]. Several months later, a global pandemic was declared, and practicing rheumatologists began receiving an equally important if less extraordinary alert: "Your patient has connected to video visit."

The COVID-19 outbreak affected the delivery of rheumatology services at an unprecedented level. Consequently, guidance for social distancing, and in some cases self-quarantine, prompted the expeditious uptake of remote assessments. Before the COVID-19 pandemic, tele-rheumatology was proposed to patients who needed specialist care but lived in remote areas; it was also considered a tool to address concerns for an aging workforce and a way to resolve deficits in rheumatology specialists in the USA and other countries [3, 15]. Although telemedicine has been in the pipeline for several healthcare organizations across the globe, the pandemic dramatically accelerated its use. Given that the risk of COVID-19 infection is likely to persist, consideration is required about to how to best integrate tele-rheumatology into current models of care delivery.

Remote management of rheumatologic conditions comes in many forms: from synchronous methods of videoconferencing to asynchronous methods such as "store and forward". Additionally, remote patient monitoring systems can be a way to report patient outcomes—such as swollen joints or level of pain—between in-person visits. When examining diagnostic agreement between assessments conducted in-person versus videoconference, a systematic review found supportive evidence of reliability, especially in dermatology, where almost half of the studies were drawn from [12]. A limiting factor in such studies, however, is familiarity with baseline diagnostic variation among providers, especially when complex conditions are being assessed. In rheumatology, visits conducted via telephone versus videoconference achieved different diagnostic agreement (71% vs 97%) when compared with in-person visits (gold standard). Telephone visits were more frequently marked as requiring an in-person follow-up (75% vs 6%) and were associated with lower patient satisfaction (56% vs 90%) [11]. These findings suggest an inherent value in visualizing the patient despite the additional technical requirements. During videoconference, a patient's nonverbal cues—such as body stance, facial expressions, body language, and interaction with surrounding environment—could add valuable insight into the assessment, as well as improve the ability to perform elements of the physical exam. At the same time, maintaining visual contact with the patient enhances the communication process and helps build trustful doctor-patient partnerships. Technological limitations, including quality of image and network capabilities, can influence reported results of similar studies depending on year of study conduction.

The evidence for the effectiveness of tele-rheumatology [13] comes mainly from observational studies of patients

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with inflammatory arthritis (60% of 1430 patients); data is scarce for the management of patients with connective tissue diseases (4%). Most patients in these studies were seen for follow-up visits rather than initial diagnosis of disease (60% vs 34%). In the studies in which tele-rheumatology was not effective, video quality [8] and difficulty recognizing synovitis were cited as limiting factors that delayed treatment with disease-modifying agents [10]. In randomized controlled trials of patients with stable, controlled rheumatoid arthritis (RA) who were followed in-person or via videoconferencing, no differences in disease activity measures were found [14], and high satisfaction rates were noted for both groups [4]. In patients with RA, the use of tele-rheumatology services was predicted by higher disease activity scores by Routine Assessment of Patient Index Data 3 (RAPID 3), more frequent clinic visits in the prior year, and familiarity of patient and provider with telemedicine [6]. In a study of a rural population with inflammatory arthritis, distance of travel and out-of-pocket patient costs predicted satisfaction with in-person visits; both the distance traveled and the associated costs decreased after the introduction of tele-rheumatology without a change in level of satisfaction (between in-person versus tele-rheumatology visit) or RAPID 3 measurement (before and after introduction of tele-rheumatology) [16]. Other studies have also reported that through the use of tele-rheumatology, patients were able to avoid time off work and reduce their travel distance [5].

For patients with stable RA, data on the effectiveness of tele-rheumatology is promising, but questions remain from both the patient and provider perspectives. In a retrospective study of tele-rheumatology visits in a rural setting, 19% of participants were deemed inappropriate for this kind of treatment due to underlying conditions [9]. Therefore, it remains to be determined if patients with active rheumatological disease, connective tissue diagnoses, or other complex or obscure rheumatological conditions are equally well-served by remote visits, and the ideal balance between in-person and videoconferencing visits. Another important group to consider is new patients, who may require a more thorough physical exam to inform differential diagnoses. Other questions regarding the application of tele-rheumatology will pertain to frequency of in-person visits (apart from emergencies and procedures), mitigation of disparities in the care of patients (e.g., between those with and without access to videoconferencing technologies), and medicolegal and governance factors. Furthermore, in the long term, the implementation of such changes will have financial implications depending on healthcare models.

From the provider's perspective, and especially for newly minted fellows-in-training, tele-rheumatology will be called to prove its educational role and equivalence to in-person visits. A hybrid of in-person and videoconferencing visits may be required to familiarize new fellows with the nuanced techniques and findings of a rheumatological physical exam. This training will take place under the careful guidance of the attending physician and may be further supported by educational modules that address the remote assessment of the rheumatological patient. A point for consideration is that in many studies, patients who use videoconferencing services do so by visiting a local clinic, where a facilitator (who can range from to nurses and physical therapists to general practitioners) assists with physical exam and other aspects of the meeting. This is different from the outpatient care provided during the COVID-19 pandemic, in which patients connect with their providers from home, without the presence of a facilitator. In such cases, more time may be spent explaining the physical exam maneuvers, correcting the lighting, and improvising positioning of a mobile device to achieve optimal view for comparison of contralateral joints. This limitation may require revisiting physical exam maneuvers to determine which sequence works best to remotely facilitate diagnosis. Finally, wider application of tele-rheumatology will provide a fertile ground for more frequent use of remotely collected patient reported outcomes, before or in-between visits, that would ideally integrate seamlessly in the workflow and reflect in the electronic health record [7].

At Hospital for Special Surgery (HSS), implementation of tele-rheumatology was rapid. The technology had already been developed, and there was a plan to gradually introduce it in the next year. However, at the outset of the COVID-19 pandemic, the first wave of rheumatologists was trained and went live within a matter of weeks (outpatient visits were limited to only those with urgent issues). Our information technology team assisted patients with downloading the necessary Zoom application and logging on before their scheduled visit with the physician. This support enabled rheumatologists to continue delivering care to a large portion of our patients in a time-efficient manner. The use of telemedicine dramatically increased—from 0% in February of 2020 (prior to shutting down of in-person medical office operations in mid-March of 2020) to approximately 70 to 80% of scheduled follow-up visits in April and May (Fig. 1).

As New York City entered its reopening phase in June 2020, and medical offices resumed some of their previous non-urgent in-person visits, the use of telemedicine decreased to 28% of total encounters. Some of the issues that were encountered with adoption of telemedicine were (a) education of providers and support staff on the use of applications on which televisits are conducted; (b) time devoted for creation of telemedicine visit templates for scheduling, patient assessment, and billing purposes; (c) provision of necessary equipment, such as cameras, and installation of relevant software; (d) patient education on use of telemedicine technologies and troubleshooting of connectivity issues; and (e) lack of access/technological savviness in use of a smart phone, tablet, or computer. Nevertheless, access to telemedicine allowed patients to keep in contact with their physicians and limited delays of care. The convenience of launching the Zoom application from a smart phone or tablet is likely to encourage a segment of the population, presumably younger, working patients, to continue to use tele-rheumatology in the future, even after the COVID-19 pandemic has passed. Within the National Health Service (NHS) of the UK, COVID-19 brought about a surge in telephone outpatient clinic appointments within a couple of

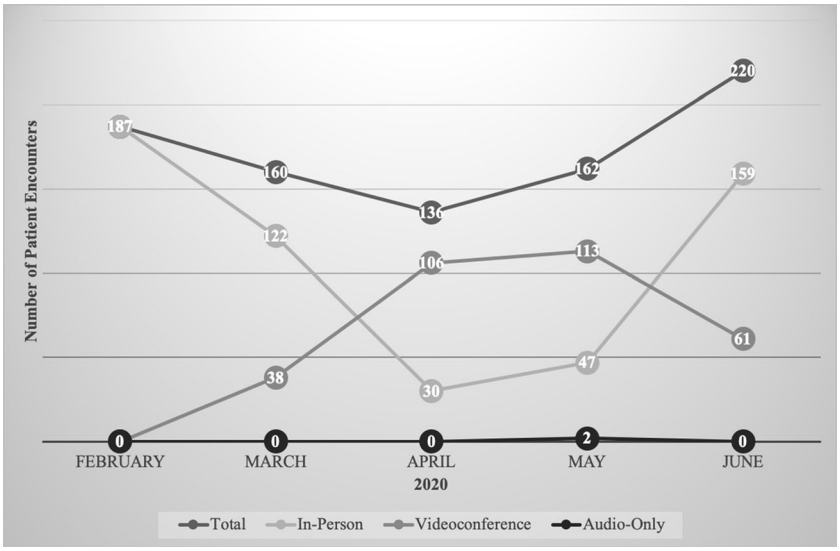

Fig. 1. Use of telemedicine by typical private attending physician at Hospital for Special Surgery.

weeks of lockdown. This was to ensure minimization of exposure for the vulnerable patients with rheumatic diseases. By May 2020, there has been further accelerated development of tele-consult videoconferencing with increasing availability in most NHS institutions.

Despite the fact that some in-person rheumatology visits were re-instated by June 2020, the need for telemedicine services is expected to remain widespread. Certain factors (apart from provider and patient preference) govern the provision of care via telemedicine and will determine its future use. In March of 2020, the Centers for Medicare and Medicaid Services (CMS) announced that it would offer the same reimbursement for telemedicine as for in-person visits and subsequently included audio-only telephone visits. This was an important step to expand the use of telemedicine in a world of stay-at-home orders. Prior to the pandemic, telemedicine was limited by regulations and restrictions in geography, coverage, and payment [2]. However, commercial health insurance generally followed the lead of CMS in reimbursement of telemedicine services (variability exists at state and payor level). Additionally, to facilitate access to care, state-mandated licensure requirements for delivering care through telemedicine were modified allowing, in most cases, out-of-state physicians to provide care or apply for emergency temporary licensure in the state of interest. Finally, regulatory requirements in the Health Insurance Portability and Accountability Act of 1996 (HIPAA) were loosened in order to ease communications with patients through available platforms such as Skype. When the nationwide health emergency period ends, the management of such waivers will determine the future of telemedicine, along with the needs of society. Additional insight into the course of telemedicine will be provided by research supporting its effectiveness in managing a wide variety of diseases (including rheumatological) and better understanding of how such technology bridges or deepens disparities in care.

Although the COVID-19 pandemic has resulted in significant turmoil to many sectors globally, videoconferencing and telemedicine services have been on the rise. On the bright side, it was proven that large, international, collaborative groups can emerge from the pandemic to tackle pertinent research questions and overcome regional and institutional silos. It is important that both qualitative and quantitative outcome data are collected and reported to allow for optimization of delivery of tele-rheumatology care, which may become a standard method of rheumatology outpatient services in the future.

Compliance with Ethical Standards

Conflict of Interest: Elena Gkrouzman, MD, Dee Dee Wu, MD, Hannah Jethwa, MD, and Sonya Abraham, MBBS, declare that they have no conflicts of interest.

Human/Animal Rights: N/A

Informed Consent: N/A

Required Author Forms Disclosure forms provided by the authors are available with the online version of this article.

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