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Diagnosis of a Case of Suspected COVID-19 Using Telemedicine Technology in the Emergency Department

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Statistical Analysis C
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Manuscript Preparation E
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Conflict of interest: None declared

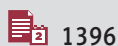
Patient: Male, 67-year-old
Final Diagnosis: COVID-19
Symptoms: Fever
Medication: —
Clinical Procedure: —
Specialty: Disaster Medicine • Infectious Diseases

Objective: Management of emergency care

Background: Coronavirus disease 2019 (COVID-19) is an ongoing worldwide pandemic infection. Healthcare workers must utilize appropriate personal protective equipment (PPE) and infection control prevention techniques given the high risk of transmission and potential morbidity associated with COVID-19. We present a case report highlighting the strengths and potential applications of telemedicine technology in a patient's evaluation during an ongoing emerging, novel infectious disease.

Case Report: A 67-year-old male presented to the Emergency Department (ED) with complaints of fever. His presentation coincided with a recent declaration of a pandemic caused by COVID-19 and a known exposure. Telemedicine evaluation was performed using InTouch Provider® software (InTouch Health, Goleta, CA, USA). The treating clinician was able to interact with the patient entirely through observations via web camera. COVID-19 nasopharyngeal swab polymerase chain reaction testing was ordered and was performed by a dedicated triage nurse. The patient was deemed stable for discharge given his normal vital signs and well appearance. Approximately 72 hours after discharge from the ED, the patient was contacted with positive COVID-19 swab results.

Conclusions: We present the first known case report highlighting use of telemedicine to diagnosis COVID-19 in a patient present in the ED. With the appropriate systems in place, this method of evaluating the patient helped to limit clinician exposure, decrease risk of transmission to key personnel, and assisted with preserving PPE supplies. Use of telemedicine affords multiple benefits in the effective diagnosis, evaluation, and potential prevention of spread of COVID-19.

MeSH Keywords: Coronavirus Infections • COVID-19 • TelemedicineFull-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/926251>

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Background

Coronavirus disease 2019, also known as COVID-19, was first reported in human patients in late 2019 in Wuhan, China. Subsequently, the virus achieved a foothold rapidly worldwide, with the World Health Organization (WHO) declaring a pandemic in March 2020 [1]. Given the high risk of transmission, morbidity, and mortality associated with COVID-19, healthcare providers must utilize appropriate personal protective equipment and infection control prevention techniques [2,3]. The use of telemedicine technology in diagnosis of COVID-19 has not previously been reported in the literature, and we present a case report highlighting the strengths and potential applications of this method of patient evaluation in the setting of an emerging, novel infectious disease.

Case Report

A 67-year-old male presented to the Emergency Department (ED) with a chief complaint of fever for the past 4 days. The patient reported that he was on a private flight 6 days prior to his ED visit. He subsequently learned that another passenger on the plane tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). He reports a highest temperature measured of 102°F (38.9°C). The patient denied any cough or shortness of breath. He did report generalized myalgias and malaise. After communicating with the local Department of Health, the patient was instructed to report to the ED for further testing. He drove himself directly to our ED.

Given that this patient's presentation coincided with a recent declaration of a pandemic caused by COVID-19, he was immediately placed in a triage room dedicated for evaluation of this emerging infection. The patient was masked immediately upon his arrival and throughout his visit. A nurse with full personal protective equipment (PPE) including N95 face mask, eyewear, gloves, and gown performed initial triage while simultaneously initiating telemedicine evaluation using InTouch Provider® software (InTouch Health, Goleta, CA, USA), interfacing via a smart tablet device in the room. After logging in, the physician provider (present in the main ED central work area) utilized the web camera, headset, and microphone at his workstation to begin remote evaluation of the patient during the nurse's triage process. The free-standing smart tablet device (Figure 1) remained stationed in the triage room throughout the encounter, and the physician and patient could see and hear one another using this video webcam interface.

The nurse obtained the following full set of vital signs: temperature of 37.4°C, blood pressure of 151/81, pulse of 57 beats per minute, respiratory rate of 16 breaths per minute, and oxygen saturation of 98%. The physician continued his patient



Figure 1. Photo of InTouch Provider® Freestanding Smart Tablet Mobile Workstation: Smart tablet device with audio-video interface is positioned on a mobile workstation on wheels and can be positioned at any location within the Emergency Department.

assessment utilizing the InTouch Provider® Freestanding Smart Tablet Workstation and InTouch Provider® software (InTouch Health, Goleta, CA, USA). Review of systems was otherwise negative, and the patient reported no significant medical history other than mild chronic leukopenia with total white blood cell counts ranging from 3.0 to $4.5 \times 10^9/L$ over the last 8 years. The patient reported no medication use other than over-the-counter acetaminophen for fever.

The treating clinician was able to interact with the patient through observations via web camera, observing body movements, assessing speech, and visualizing respiratory breathing pattern. Physical examination revealed no acute distress upon general evaluation. The patient's eyes appeared normal without conjunctival irritation or jaundice. Bluetooth® stethoscope technology was incorporated into the examination: the triage nurse applied the stethoscope to the patient's chest and back as the physician "auscultated" remotely through the headset. No adventitious breath sounds, or obvious abnormal cardiac murmurs were noted. Facial and upper extremity skin tone appeared normal without cyanosis or plethora. Mood and affect appeared normal.

Given the presenting complaint, symptoms, and known exposure, COVID-19 nasopharyngeal swab real-time reverse transcriptase-polymerase chain reaction (RT-PCR) was ordered. (This RT-PCR swab was analyzed utilizing Cepheid's GenXpert® system.) The triage nurse collected the swab, while the physician performed the evaluation entirely using the telemedicine platform. The patient was informed that he would be contacted with results of his COVID-19 testing, but was deemed stable for discharge given his normal vital signs and well appearance. He was instructed to self-quarantine and follow further instructions from the Department of Health on duration of quarantine if the results of his COVID-19 test returned positive. He was told to return immediately for any shortness of breath, coughing, or breathing difficulty. Approximately 72 hours after discharge from the ED, the patient was contacted with positive COVID-19 swab results. He reported low-grade fever that was ongoing but no new symptoms. He was cleared and considered recovered from COVID-19 approximately 2 weeks after his initial ED visit; no repeat testing was performed.

Discussion

To the best of our knowledge, we present the first known case report highlighting use of telemedicine to diagnosis COVID-19 in a patient present in the ED. With the appropriate systems in place, this method of evaluating the patient helped to limit clinician exposure, decrease risk of transmission to key personnel, and assisted with preserving PPE supplies. Although the triage nurse still had contact with the patient, this individual was designated in that role for the entirety of their shift and had limited physical movement within the ED. In the setting of the COVID-19 pandemic, one of the ED triage rooms at our facility was dedicated for "screening" and was used exclusively for patients presenting with possible COVID-19 symptoms. Others have reported use of "fever clinics" for similar purposes during this outbreak, [4] but a full description of the physical setup of such clinics is limited and no use of telemedicine technology is discussed in these reports. One commentary suggests the use of telemedicine in order to "forward triage" patients even prior to their arrival in the ED [5]. This proposed method may help sort and screen patients with symptoms concerning for COVID-19 to help protect other patients in the ED, providers, and the general community from being exposed.

The InTouch Provider® software (InTouch Health, Goleta, CA, USA) was installed at all workstations in our ED. Providers were trained in real-time while on duty and via electronic communications from hospital leadership and the department of information technology. User interface and navigation was straightforward and similar to other smart device applications. Communication remained remarkably clear using

built-in speakers (tablet device) on the patient-end and headset on the provider-end. Bluetooth® stethoscope technology required a temporary pause in all communication while the provider's headset exclusively received sound transmitted by the Bluetooth® stethoscope. In this way the physician could focus on any transmitted heart or lung sounds. Use of such telemedicine cart systems has been described in recent international literature as a means of limiting healthcare workers exposure [6]. Overall, this method of evaluation was well-received by the patient in our case after explaining the need to help prevent exposure and potential spread of COVID-19. Other reports have opined, however, that patients may not be satisfied without a face-to-face encounter with the treating provider [7].

In efforts to ensure that hospitals have capacity during the COVID-19 pandemic and to provide additional access to patients, the Centers for Medicare and Medicaid Services issued changes to expand coverage for care using telehealth services in April 2020 [8]. While the primary intention of this governmental initiative was to expand at-home care, we report use of telemedicine technology on hospital grounds to care for an active COVID-19 patient. Also, our department's use of telemedicine systems preceded this rollout of expanded coverage by approximately one month. As use of telemedicine expands, we anticipate that it will be a key player during future pandemics and disasters. By instituting remote consultations, this modality can help during times of crisis when provider coverage may be limited as a result of a contracted workforce secondary to ill or quarantined healthcare providers unable to present for work [9]. Furthermore, remote care provided via telehealth can help reduce the risk of disease transmission to all of the healthcare workforce within the hospital [10]. Our case highlights utility of telemedicine in potential high-risk clinical scenarios where infection control and PPE shortages [11] are paramount concerns.

Conclusions

Clinicians should consider telemedicine as an adjunct in the evaluation of COVID-19 or other emerging infections. After carefully screening patients virtually, providers may be able to confidently diagnose and treat patients remotely while limiting exposure risks, decreasing PPE usage, and limiting patient traffic through the ED. Patients that require advanced medical care (along with invasive measures) should be treated in the usual manner based on standard of care measures in line with local guidelines of their institution.

Conflicts of interest

None.

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