

CASE REPORT

Telemedicine allows for effective communication between a medically complex cancer patient and his virtual hospital medical team

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Abstract

Good physician–patient communication is key for effective hospital care. We describe a patient diagnosed with an acute pulmonary embolism and bacteremia who was treated in a virtual hybrid hospital-at-home program. Constant communication with the virtual and in-home healthcare teams enabled a unified knowledge of the patient's wishes.

KEYWORDS

clinical decision–making, hospital-at-home, physician–patient communication, virtual hybrid

1 | INTRODUCTION

The quality of the patient–clinician interaction determines the effectiveness of medical treatment and is contingent on the patient and doctor developing a shared knowledge of the illness and treatment.¹ Moreover, the doctor–patient connection shapes the meaning of treatment to a considerable extent. Better process results, such as better treatment adherence, higher patient satisfaction, and fewer patient litigation, are linked to a better doctor–patient relationship.² In both physical and psychological illnesses, the doctor–patient connection is linked to improved physical health outcomes and psychological outcomes.^{3–7} Additionally, not only clinical outcomes are enhanced with optimal communication but also more adherent patients. According to a meta-analysis, doctors who are good communicators had twice as high odds of having adherent patients.⁸ Advanced Care at Home (ACH) is a virtual hybrid hospital-at-home program for delivering acute and

post-acute care.⁹ This case shows that the capability of complex medical decision making between multiple medical teams and the patient is possible in the ACH model of care resulting in proper conflict management and strong rapport building that is necessary to meet the patient's aspirations and needs during the home hospitalization.

2 | CASE PRESENTATION

A 39-year-old gentleman with a history of sarcoma, neurofibromatosis, and a malignant peripheral nerve sheath tumor with metastasis to his lymph nodes, brain, lung, and soft tissue had been in his usual state of health until 1 week before admission when he reported worsening dyspnea and pleuritic chest pain. Due to these symptoms, he sought assessment in the emergency department where he was found to have tachypnea and tachycardia on examination. Baseline laboratory studies revealed elevations in

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lactic acid (5.0 mmol/L), procalcitonin (0.48 ng/ml), and C-reactive protein (31.5 mg/L). A computed tomography angiography (CTA) was ordered which revealed a pulmonary embolism (PE) in the left lower lobe pulmonary artery's lateral basilar segment. Furthermore, a comparison to a previous examination revealed both an airspace infiltrate in the right lower lobe concerning for pneumonia as well as new pulmonary nodule enlargement with involvement of the left lingular nodule and hilar lymph nodes concerning for an extension of his metastatic disease.

The patient was admitted to the brick-and-mortar (BM) hospital and discussion for treatment of both the new acute conditions as well as the worsening metastatic cancer began. The patient and his spouse both agreed that they wanted to start treatment for the PE and pneumonia, but they were unsure if they wanted any further treatment for the cancer. They wanted to see how he responded to the immediate treatment and make decisions based on that. The patient was resistant to an extended stay in the hospital, and he inquired if there were any other care settings that could appropriately regulate his care while decisions were being made.

Because of this, the ACH team was consulted one hospital day 1 to see if the patient fit the program's eligibility requirements. It was determined that the patient met criteria to safely transfer into the ACH program,⁹ so he was consented and transported home for further treatment of his acute conditions. After arriving home with medical transport, his virtual connection with his medical team was set up and in-home care delivery by the vendor-mediated supply chain began. The case was discussed with the on-call oncologist, who recommended treating the PE with IV heparin as well as the pneumonia with broad-spectrum IV ceftriaxone, vancomycin, metronidazole, and doxycycline. Radiation therapy was brought up as a treatment option for the pulmonary nodule, but after a long virtual discussion with the radiation oncology service, the patient decided to forego this treatment as he

was considering a transition into hospice care. Later that night, both sets of blood cultures came back positive for a pansensitive strand of *Streptococci pneumoniae*.

On hospital day 2, infectious diseases (ID) was consulted to review the blood cultures and make treatment recommendations. The ID team conducted a virtual consult with the patient and suggested a 14-day course of IV antibiotics with ceftriaxone, as well as weekly laboratory monitoring while on antibiotics. All antibiotics except ceftriaxone were stopped. Anticoagulation was converted to twice-daily subcutaneous enoxaparin. The Internal Medicine and the Oncology team conducted interdisciplinary rounds with the patient, and he stated that he did not make any concrete decisions yet about escalations of care as he wanted to continue to talk it over with his spouse and family. During that interview, the patient stated that he wished to avoid returning to the BM hospital at all costs.

As care continued throughout the ACH hospitalization, daily discussions were held using real-time audio/video technology about the prognosis and possible treatments, as well as the possibility of escalation of the existing treatment if necessary. Although wanting eventual hospice care for his metastatic disease, after discussions with the Internal Medicine, Oncology, and Infectious Diseases teams, he and his wife elected to transition into a post-acute phase of care in order to complete a full course of IV antibiotics for the pneumonia and bacteremia, continue anticoagulation for the PE, and receive home physical therapy for strengthening and mobility in order to spend further quality time with his family and settle his affairs. The patient continued working with physical and occupational therapy with virtual oversight from the ACH team and arrangements were made to transition into home hospice care moving forward. After all patient questions were answered by the medical teams, he was discharged 15 days after ACH admission with longitudinal oversight by the hospice care team (Figure 1).

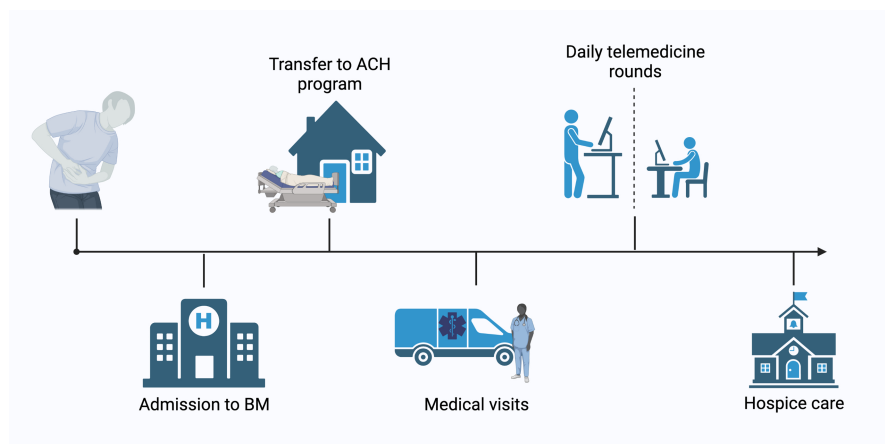


FIGURE 1 Patient gets admitted to the brick-and-mortar (BM) where he is diagnosed and start on treatment. He is later transfer to the ACH program. The patient and family had daily telemedicine rounds with the healthcare team and medical home visits with the common objective of improving his health condition, be comfortable and prepare him for hospice care transfer. Created using [BioRender.com](https://www.biorender.com).

3 | DISCUSSION

Here, we have a complex case of a patient with multiple acute medical diagnoses on top of incurable, worsening metastatic cancer. Due to the complexity of both the short- and long-term treatment options and prognosis, it was essential to have strong communication between the primary virtual hospital care team, the virtual subspecialty consultants, and the patient. Contemporary medical practice is built on the foundation of the doctor–patient connection. Even if medical practitioners are unable to treat a patient's disease, they may always provide some comfort, alleviate pain, and give patients hope and happiness.¹⁰ Patients and doctors may have differing perspectives on a patient's experience and position when it comes to cancer communication. This can have a negative impact on health results as well as the doctor–patient relationship.¹¹ In order to overcome these barriers, we had to ensure that our patient had access to critical medical information from multiple specialists, which could be difficult to obtain in the home setting without the right setup.

Oncologists must figure out how to transmit information in a way that is sensitive to patients' emotional states while yet being adequately informative to allow for informed decision-making.¹² Patients cannot make educated decisions unless they first obtain and comprehend essential information about their disease and treatment management, such as diagnosis and expected disease development.¹³ Many researchers have looked at how cancer communication happens and how it influences treatment results, such as patient decision-making, satisfaction with care, and knowledge of the care goals.¹¹ Prognosis communication has gotten a lot of attention recently. Only a few research have looked into the link between telemedicine and the nature and content of physician–patient contact.¹⁴

One key question was would a patient with a complicated medical history presenting with multiple new acute diagnoses want to both deal with treatment decisions on these and also enter a novel model of care, the ACH home hospital. Engaging in care from both virtual physicians and in-home providers while also trying to make complex medical decisions on essential aspects of the care plan can be overwhelming for some patients. Telemedicine is often preferred, especially in young patients, with high education and that often use computers; however, medical personnel should keep in mind that senior patients may not feel at ease.¹⁵ Additionally, a set of categories has been described in the literature which provides a valuable framework for considering how telemedicine might influence communication and doctor–patient interaction. These categories are not mutually exclusive and consist of technical components and interpersonal components.

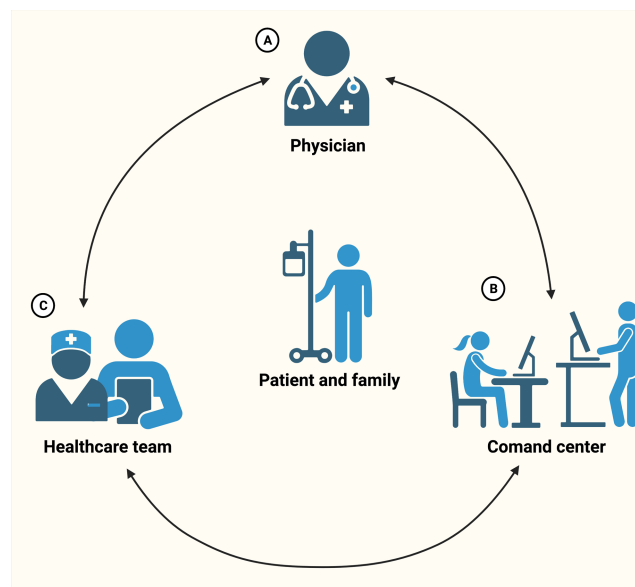


FIGURE 2 Despite the limitations of telemedicine by limiting contact with the patient, this case report demonstrated effective communication between the advance care at home (ACH) team constituted by (A) the attending physician guiding the care of the patient (B) the command center and (C) the healthcare team comprise of physician assistants, nurses, occupational therapist, and physical therapists. Created using BioRender.com.

The technical components are largely concerned with the communication technologies (hardware, software, standards, and support services) that are employed, as well as the clinical processes that are enabled by those technologies (including case finding, diagnosis, treatment, and follow-up). Interpersonal components are primarily focused on the relationships that exist between system personnel, providers, and patients, as well as how those relationships are structured.¹⁴ Both must be taken into account in virtual hospital-at-home models in order to give the best communication experience to our patients.

In the Mayo Clinic ACH program patients in Florida, Arizona, and Wisconsin receive high-acuity, inpatient-level care in the comfort of their own homes while being supervised a single telemedicine command center located in Florida. The command center performs virtual rounds, engages in virtual interdisciplinary subspecialty consultations, and then uses a smart supply chain located local to the patient to give in-home care (Figure 2). This case shows that this model can have very effect communication the ACH team and the patient, even in complex situations.

4 | CONCLUSION

Communication is a critical component that has a significant impact on patient outcomes. Despite the fact that telemedicine typically limits the senses with which a

patient can interact, this case report is an example of how complex and intimate conversations about goals of care in can be conducted in the virtual hybrid hospital-at-home model. Because this was possible, this young patient and family enjoy more days together at home than they would have spent in a brick-and-mortar hospital setting, improving his overall quality of life.

AUTHOR CONTRIBUTIONS

Ricardo A. Torres-Guzman, Francisco R. Avila, and Karla Maita involved in patient history, data collection, case presentation, and literature search. Margaret R. Paulson, Antonio J. Forte, and Julie E. Butera served as clinical care providers and involved in literature review, paper writing, formatting, and re-editing. Michael J. Maniaci involved in literature review, paper writing, formatting, re-editing, and submission.

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Figures 1 and 2 were created using BioRender.com.

CONFLICT OF INTEREST

None of the authors have any conflicts of interest to report.

DATA AVAILABILITY STATEMENT

Access to data is restricted to keep the patient's privacy. However, if deemed necessary, data will be provided by the corresponding author upon reasonable request after approval from the needed institutional committee.

ETHICAL APPROVAL

This study conforms to all standards of the Mayo Clinic Ethics Committee.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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