

EDITORIAL

TELE-ICU IN THE AGE OF COVID-19: BUILT FOR THIS CHALLENGE

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The rapid spread of a virus, never seen before and poorly understood, is a worst-case scenario that requires healthcare to work across a range of organizational, treatment, and operational borders to contain it. Telemedicine's role during the current coronavirus pandemic remains two-fold: to connect clinicians with patients and to support frontline bedside teams, each accomplished regardless of location. The challenge of the pandemic highlights specific areas in which tele-ICU is built to be the future of critical care: leveraging technology to connect ICU experts to patients in need, applying national best practice protocols in tailored treatment plans, managing ventilators at a high level, responding instantly to advanced cardiac life support needs with situational awareness, and providing the flexibility to innovate to address new needs as they arise.

The standard of critical care within the medical community is facing a transformation that will evolve not within generations or years but in months or weeks. Trained with a particular set of skills, critical care physicians are prepared for high-intensity life or death situations and urgent treatment to avoid further patient deterioration. Part of this training is the study of the past to prepare for the future. When there is no past, as with the coronavirus, intensivists must quickly adapt to the immediate needs of patients. Tele-ICU deployed at scale is unique in that it connects a team of highly trained critical care specialists with ICUs across the country, ensuring the gold standard of care to a greater number of patients while enabling rapid learning.

Protocol

As a large provider of tele-ICU critical care currently caring for patients in 25 states, Advanced ICU Care is uniquely positioned among clinical providers to develop and share best practices for care during the COVID-19 crisis. A network of nearly 100 partner hospitals nationwide enables us to operate in a large, collaborative system in caring for more than 80,000 patients a year. This provides the ability to also develop and share local learnings and best practices. Our protocols for the care of COVID-19 patients are informed by cases and situations from several of the US epicenters, first hand experiences of our clinicians in conjunction with the bedside teams at our partner hospitals as well as data from the first cases shared out of Wuhan China.

One of the disproportionate impacts of COVID-19 that

has been widely reported has been its effect on the geriatric population (1). This trend is being seen across the US as well. As such it is important to recognize the comorbidities of the geriatric population along with the geriatric syndromes most commonly associated with the aging population. These are reflected in existing and developing protocols.

Table 1

Age Cohort Distribution of Suspected COVID-19 Patients
(Advanced ICU Care through mid-April, 2020. n = 1790)

Age Cohort	Suspected COVID -19 Cases	US Population
0-10	0.3%	14.12%
11-19	2.2%	14%
20-29	4.0%	14%
30-39	7.6%	15%
40-49	17.8%	15%
50-59	17.8%	11%
60-69	26.4%	7%
70-79	27.1%	6%
80+	14.7%	3%

Ventilation Management

During a typical influenza season, ICUs will see an influx of patients with nearly 30% requiring intubation. This does not include non-invasive ventilation (2) and other forms of oxygenation, which are generally preferred so long as they are effective. After studying the earliest cases of COVID-19 seen in Wuhan it has become increasingly clear that the use of non-invasive ventilation in treating COVID-19 was associated with deterioration to invasive ventilation while placing healthcare workers at increased risk of becoming infected (3), as the procedure can enable the virus to be aerosolized which can facilitate the further spread of the disease. The significant increase in intubated patients who require additional monitoring and management can overwhelm an already task-saturated bedside team.

Ventilation management is a core competency of all intensivists. Understanding how to properly utilize a ventilator takes time to learn and knowing how to increase oxygenation levels appropriately becomes as much art as it is science.

This is one of the many areas where tele-ICU support can make a significant difference. A critical care specialist with years of training and experience is able to virtually enter the room with a bedside nurse, respiratory therapist (RT), or provider and walk them through various modes and methods of ventilation, providing real-time support while evaluating for the patient's response to vent changes. After being placed on a ventilator, patients can be assigned to a tele-ICU Respiratory Therapist (RT) who safely performs virtual rounds using high-definition audio/visual equipment, gathering information and providing a constant and clear flow of that information to ensure appropriate patient vent management with minimal virus exposure for bedside clinicians.

Advanced Cardiac Life-Support

Tele-ICU can be a significant benefit to a hospital team during an Advanced Cardiac Life Support situation ("code"). As time is of the essence, the ability to deliver an intensivist to the room via A/V technology within seconds, much sooner than a bedside provider might be able to get there, can initiate life-saving treatments when seconds matter. Typically, running a code involves an "all hands on deck" approach, with care team members running into the room to be led in response by an on-site physician. When faced with the realities of COVID-19 patient isolation and PPE requirements, code leadership by a tele-ICU intensivist has allowed the number of staff responding on-site to be reduced to essential personnel only. The tele-intensivist provides the bedside clinicians with an additional set of eyes as well as a clinician that is removed from the inherent chaos of the situation. An Intensivist's experience can provide needed expertise and leadership during this critical time.

Isolation Requires Reinvention

With patients isolated on such a grand scale due to COVID-19, we are finding new clinical considerations that tele-ICU adapts to address them. Paramount among these is a widely-observed increase in patient loneliness, as clinicians are strapped for time, slowed by the need to don personal

protective equipment (PPE), and dissuaded by frequent patient visits due to the risk of virus exposure. Beyond providing clinical expertise and 24/7 monitoring, tele-ICU stands with the bedside team as first line of care for patients. As the pandemic spreads in the U.S., we quickly worked with client teams and technology suppliers to enable local use of the tele-ICU A/V equipment. Access that had been utilized by tele-ICU clinicians is now being shared with physicians and nurses within the hospital to visit patients virtually to decrease the frequency and need to physically enter an isolation room. Collaboration between tele-ICU and bedside teams has helped to minimize the use of PPE and limit unnecessary exposure of the bedside team to the contagious virus. Tele-ICU nurse practitioners have increased their video check-ins to provide additional support to the patients and provide human connection and emotional support to patients during a time of significant stress. Even hospital chaplains, social workers, and housekeeping have leveraged the tele-ICU technology to provide essential services to patients while maintaining minimal physical contact. Standard workflows are being modified to make room for more physician to physician conversations and consultations and adjusting to the immediate needs that are arising during the outbreak while providing best practices to help stem the tide of this wave.

There will be many lessons learned during the COVID-19 pandemic that will inform the future of medicine. Telemedicine and particularly tele-ICU were built for this challenge and will play a significant role in creating a new model of care for years to come.

Disclosure: Dr. Srinivasan reports other from Advanced ICU Care, during the conduct of the study; other from Advanced ICU Care, outside the submitted work.

References

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