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COMMENTARY

Optimizing Supportive Care in COVID-19 Patients: A Multidisciplinary Approach

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Abstract: Within just a few months, SARS-CoV-2 has evolved from a virtually unknown pathogen to a leading cause of morbidity and mortality worldwide. As COVID-19 infection can affect multiple organ systems, treating many manifestations and complications requires clinical expertise across the healthcare professional spectrum. Therefore, interprofessional and multidisciplinary collaboration should form the cornerstone of every hospital's COVID-19 management approach. In this manuscript, we discuss the non-microbial management strategies for our COVID-19 inpatient population. Specifically, through an inter-professional and collaborative approach to care delivery, we provide rationale and guidance on prone positioning, oxygen strategies, early mobilization, identifying and treating co-infections, anticoagulation and ensuring appropriate psychological support for patients and their families. It is our hope that these recommendations help supporting clinician management decisions to best care for hospitalized COVID-19 patients in the region and worldwide.

Keywords: COVID-19, interprofessional collaboration, anticoagulation, ventilation, prone positioning, supportive care

Background

Within just a few months, SARS-CoV-2 has evolved from a virtually unknown pathogen to a leading cause of morbidity and mortality, disrupting healthcare systems worldwide. As hospitals globally experience large influxes of patients with COVID-19, interdisciplinary collaboration and task sharing are being adopted to increase efficiency and provide optimal patient care. To date, the efficacy of antiviral therapies remain controversial,[1] and supportive measures have been the mainstay of treatment. As COVID-19 infection can affect multiple organ systems,[2] treating the many manifestations and complications requires clinical expertise across the healthcare professional spectrum. Therefore, interprofessional and multidisciplinary collaboration should form the cornerstone of every hospital's COVID-19 management approach.

The United Arab Emirates (UAE) is a small country strategically located between Asia, Europe and Africa, making it a busy business and tourist destination. With a population of approximately 9 million, there have been over 56,000 confirmed cases and 337 COVID-related fatalities to date.[3] Sheikh Khalifa Medical City (SKMC) is a tertiary care academic medical center serving the city of Abu Dhabi, the capital of the UAE. As the largest government hospital in the emirate, SKMC is a regional referral center and one of the nation's front line institutions for COVID-19 treatment. We have managed over 4500 patients hospitalized with

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COVID-19. In this manuscript, we review the non-microbial treatment modalities implemented in our hospital. The guidance provided is based on current knowledge from the burgeoning COVID-19 literature and clinical experience from managing our large inpatient population. We believe that providing these supportive measures through a multidisciplinary approach can optimize patient outcomes during this pandemic.

Strategy 1: Daily Multidisciplinary Meetings

Our multidisciplinary team (MDT) consists of pulmonologists, infectious disease specialists, internists, rheumatologists, intensivists, nephrologists and hematologists, as well as nursing supervisors, infection control nurses, case managers, respiratory technicians, physiotherapists and clinical pharmacologists. Daily MDT meetings take place to discuss patients and formulate comprehensive management plans. Involving physiotherapists and case managers early helps disposition planning for patients who may need rehab services upon recovery. This huddle also serves as an opportunity for clear and direct communication between the primary team and the critical care team for early identification and intervention for patients at high risk of deterioration.

Strategy 2: Identify and Treat Co-Infections

In one case series, approximately 2% of patients presenting with COVID-19 had other respiratory infections, including influenza and bacterial pathogens.[2] As the fall and winter months approach, the prevalence of co-infection is likely to increase. Routine influenza nasopharyngeal swabs and respiratory panels on admission will identify co-infection and enable timely diagnosis and management. Further, in accordance with Infectious Diseases Society of America (IDSA) viral pneumonia guidelines, empiric antibacterial therapy is given to patients presenting with severe COVID-19 pneumonia, as well as to those who either fail to improve with antiviral therapy or deteriorate after initial improvement.[4] Working within the hospital's antimicrobial stewardship program will help avoid the indiscriminate use of broad-spectrum antibiotics. It is also important to recognize that other infectious diseases may have overlapping presenting features or symptomatology with COVID-19, especially in endemic regions. Co-infection with tuberculosis or dengue for example may result in delayed diagnosis and treatment and can further spread infection.[5] Close collaboration with infection control and infectious disease specialists can help minimize these risks.

Strategy 3: Encourage Early and Frequent Prone Positioning

Managing patients with acute respiratory distress syndrome (ARDS) with prone positioning has been shown to increase the number of recruited alveoli, decrease pleural pressure, and improve alveolar shunting and tidal volume.[6] Other studies confirm that early prone positioning decreases mortality.[7] These observations initially led to prone positioning for the management of ventilated COVID-19 patients.[8] Recent literature suggests that its use in patients on high flow nasal cannula (HFNC) or non-invasive ventilation (NIV) may decrease the need for intubation.[9] Benefits of prone positioning for the non-ventilated patient include improved VQ matching to reduce hypoxia, decreased atelectasis, and improved secretion clearance.[9] As such, we advise early and frequent prone positioning for all hospitalized COVID-19 patients with dyspnea, hypoxia or who require supplemental oxygen support (Table 1). Our physiotherapists and nurses have been instrumental in proning the large numbers of patients.

Strategy 4: Avoid Hypoxia

There has been considerable debate about the use of the high-flow oxygen and noninvasive positive-pressure

Table 1 Prone Positioning

Protocol	Procedure
Move patient closer to nursing station O2, cardiac and blood pressure monitoring must all be continued Patients should have call button within reach Vitals signs and O2 sats should be checked prior to proning Reassess in 20 minutes to monitor patient position and clinical response Reassess patient every 1–2 hours to monitor clinical status.	30 minutes to 2 hours lying fully prone (bed flat) 30 minutes to 2 hours lying on right side (bed flat) 30 minutes to 2 hours sitting up (Adjust head of bed 30–60 degrees) 30 minutes to 2 hours lying on left side (bed flat) Repeat the cycle

Abbreviation: O2 sats, oxygen saturation.

ventilation as therapeutic modalities in COVID-19-induced lung disease.[10] Further, these are aerosol-generating procedures, which increase the risk of cross-infection in emergency departments and high dependency units.[10] To provide quality care for the growing numbers of hospitalized patients, we developed a hypoxia management pathway that involves multidisciplinary management by an internist, pulmonologist, intensivist and respiratory technician for all patients who require high flow oxygen or non-invasive ventilation.

Strategy 5: Anticoagulation

A striking feature of COVID-19 is that patients presenting with mild symptoms can deteriorate rapidly. Several studies have shown that hemostatic abnormalities, including thrombocytopenia and elevated D-dimer levels, are associated with disease severity and a higher risk of respiratory failure, often leading to mechanical ventilation and death.[11] The mechanism is likely multifactorial and includes stasis, consumptive coagulopathy, complement activation due to excessive inflammation, platelet activation and endothelial dysfunction,[12] leading to microthrombi and thrombosis. Autopsy reports from Germany and other European countries have confirmed a high incidence of thromboembolic disease (VTE) in COVID-19 patients.[13] As such, it is critical to anticipate and manage COVID-19-induced coagulopathy. The use of therapeutic anticoagulation for critically ill COVID-19 patients without evidence of VTE remains controversial, and appropriate thromboprophylaxis doses also remain unclear. In our institution, anticoagulation decisions are patient-centered, guided by best available evidence, and decided by a team consisting of hematologists, internists and clinical pharmacologists.

Strategy 6: Encourage Early Mobilization and Rehabilitation

With prolonged hospitalization, particularly for patients requiring intensive care, it is likely that a substantial number of patients will require post-acute or rehabilitation services. Historical data suggests that 30% of sepsis patients require inpatient rehabilitation services after their acute illness.[14] In an effort to minimize disability and optimize chances of returning patients to their premorbid level of function, our physicians and nursing teams encourage early mobilization and work closely with occupational and physical therapists to implement early rehabilitation programs for COVID recovered patients. Though there is limited data on the effects of early rehabilitation in COVID-19, recent studies on patients admitted with chronic lung disease showed that early pulmonary rehabilitation improved one year mortality rates.[15]

Strategy 7: Use an Evidence-Based Approach to Prescribing Therapeutic Modalities

When faced with many critically ill patients and a highly contagious novel pathogen, many physicians have prescribed treatments as off-label or compassionate use.[16] Yet, effective treatments can only be identified through large randomized control trials. Our hospital is currently involved in several clinical trials of potential COVID-19 treatments, including hemoperfusion and convalescent plasma. The use of other immune modulating therapies, such as steroids or IL-6 inhibitors (monoclonal antibodies like Tocilizumab), is tightly controlled and prescribed only after consultation with a rheumatologist and infectious disease specialist.

Strategy 8: Provide Psychological Support

During hospitalization for COVID-19, patients follow strict infection control measures with limited healthcare staff interaction and are quarantined from family and visitors. They often endure pain and breathlessness with minimal support and face the threat of dying alone. Previous studies of SARS patients revealed significant short-term and long-term psychological distress.[17] Perceived social support during hospitalization was shown to help mitigate distress and promote psychological wellbeing.[18] During the pandemic, all healthcare staff should provide regular updates to patients and families and use virtual technology to facilitate communication between patients and their families. Our psychology and psychiatry team also offers telehealth consultations to patients and assists with difficult family conversations as needed.

Conclusion

The COVID-19 pandemic has created a unique situation where healthcare silos have been broken down. It is only through multidisciplinary and interprofessional collaboration and sharing of resources and expertise that hospitals can best care for the large surges of patients. While the search continues for effective treatments and a successful

vaccine, optimizing supportive care through a multidisciplinary approach remains the mainstay of therapy.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest for this work.

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