

WHAT THE AMERICAN JOURNAL OF CRITICAL CARE JUNIOR PEER REVIEWERS WERE READING DURING THE FIRST YEAR OF THE PROGRAM: CARING FOR PATIENTS WITH COVID-19

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The Junior Peer Reviewer program of the *American Journal of Critical Care* provides mentorship in the peer review process to novice reviewers. The program includes discussion sessions in which participants review articles published in other journals to practice and improve their critical appraisal skills. The articles reviewed during the first year of the program focused on caring for patients with COVID-19. The global pandemic has placed a heavy burden on nursing practice. Prone positioning of patients with acute respiratory failure is likely to improve their outcomes. Hospitals caring for patients needing prolonged ventilation should use evidence-based, standardized care practices to reduce mortality. The burden on uncompensated caregivers of COVID-19 survivors is also high, and such caregivers are likely to require assistance with their efforts. Reviewing these articles was helpful for building the peer review skills of program participants and identifying actionable research to improve the lives of critically ill patients. (*American Journal of Critical Care*. 2022;31:e26-e30)

The Junior Peer Reviewer (JPR) program of the *American Journal of Critical Care* (AJCC) provides mentorship in the peer review process to novice reviewers. The JPR program includes several discussion sessions in which the participants critically appraise articles published in other journals. The articles reviewed are chosen not only for their usefulness in helping participants develop peer review skills but also for their applicability in clinical practice. Here we summarize the articles reviewed by the JPRs in the first year of the program and their relevance to clinical practice in the intensive care unit (ICU).

Since December 2019, the global pandemic of SARS-COV-2 infection and COVID-19 pneumonia

has affected more than 501 million people and led to more than 6.1 million deaths.¹ The initial meetings of the JPR cohort occurred in early 2020 as COVID-19 began to reach the United States,² and the articles reviewed during the first year of the program focused on evidence relevant to critical care clinicians caring for patients with acute respiratory distress syndrome (ARDS) associated with COVID-19.

Review of Guérin et al,³ “Prone Positioning in Severe Acute Respiratory Distress Syndrome” Relevance

Acute respiratory distress syndrome is a severe, life-threatening form of inflammatory lung injury resulting in profound hypoxemic respiratory failure.⁴

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“ Identification of perceived barriers and facilitators related to implementing proning in ARDS patients may be an essential avenue for future research by nurse scientists. ”

The syndrome is classically defined using the following constellation of findings: acute onset of lung injury, bilateral opacities on chest imaging, lung disease not fully explained by cardiac pathophysiology, and a ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (P_{aO_2}/F_{iO_2}) of 300 mm Hg or less.⁵ Acute respiratory distress syndrome is further separated into clinical severity categories based on the degree of hypoxemic respiratory failure as measured by the P_{aO_2}/F_{iO_2} ratio: mild (>200 mm Hg but ≤ 300 mm Hg), moderate (>100 but ≤ 200), and severe (≤ 100).⁵ A variety of inciting injuries are linked to the development of ARDS, including primarily pulmonary (eg, pneumonia, aspiration, chemical inhalation) and nonpulmonary (eg, sepsis, blood transfusions, pancreatitis) injuries.⁶ Most recently, the public health significance of ARDS has been made visible by the high rates of the condition in severely ill patients

with COVID-19 pneumonia.² Given the COVID-19 pandemic and guidelines suggesting that prone positioning is a therapeutic maneuver associated with reduced mortality, we discussed the landmark prospective, multicenter, randomized controlled trial evaluating the utility of prone positioning in patients with severe ARDS (Proning Severe ARDS Patients [PROSEVA]).³

Summary

The PROSEVA trial enrolled 466 patients with moderate to severe ARDS (P_{aO_2}/F_{iO_2} ratio of <150 mm Hg) and randomized them to treatment in the supine position or treatment using intermittent prone positioning (for at least 16 hours consecutively); the primary end point of the clinical trial was 28-day mortality. Involving 26 ICUs across France and Spain, the trial randomized 237 participants to the prone group and 229 patients to the supine group. Baseline characteristics of the groups were similar except that the level of organ dysfunction (as captured by the Sequential Organ Failure Assessment score), use of vasopressors, and use of neuromuscular blockade were higher in the supine group. Prone positioning, mechanical ventilation titrations, and other adjunctive therapies for ARDS were prescribed with strict protocols across all centers. The analysis showed a significantly lower rate of all-cause 28-day mortality in the prone group (16.0% in the prone group vs 32.8% in the supine group; adjusted hazard ratio, 0.42 [95% CI, 0.26-0.66]). There were no significant differences in complications from the treatment other than a higher rate of cardiac arrest in the supine group compared with the prone group.

Discussion

We highlighted the strengths and weaknesses of the study, focusing mainly on its potential impact on nursing practice. The study's strengths included the use of standardized proning and ventilatory adjustment protocols to ensure standardization across institutions. The study was adequately powered, and the intention-to-treat analysis improved the validity of its conclusions. The supplemental online material, including instructional videos, may help in the implementation of proning at institutions with less experience. Despite the study's strengths, however,

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“Patients requiring prolonged mechanical ventilation benefit from an environment that promotes interdisciplinary collaboration, provides protocolized treatment inclusive of psychological and spiritual support, and fosters a culture of quality improvement.”

we were skeptical that the study population was representative of the population with moderate to severe ARDS in general, given the low mortality rate in both groups, particularly the proning group. There was much discussion of the fact that the study centers involved in the trial had substantial experience with the intervention, limiting the external generalizability of the results. Although the study explored differences in complications (such as unintentional extubation), it did not examine the change in workflow for nurses or other patient-centered outcomes such as decubitus ulcers or other long-term complications associated with prone positioning.

Application

Additional studies since PROSEVA have favored proning in severe ARDS, resulting in the strong recommendation for its use in clinical practice guidelines by several international critical care societies.⁷ Proning has become a mainstay of treatment recommended for severe ARDS associated with COVID-19.⁸ Given the robust discussion among the JPRs, nurses' perceived barriers and facilitators related to implementing proning in ARDS patients and differences in short- and long-term outcomes after proning for ARDS may be essential avenues of future research by nurse-scientists.

Review of Rak et al,⁹ “Effective Care Practices in Patients Receiving Prolonged Mechanical Ventilation”

Relevance

Patients with acute respiratory failure often require mechanical ventilation to improve oxygenation and ventilation.¹⁰ Advances in the use of mechanical ventilation in the ICU, both at the bedside and at the organization and system level, have led to improved outcomes for patients with acute ventilatory needs.^{9,11} However, approximately 5% to 10% of patients with acute ventilatory needs progress to requiring prolonged mechanical ventilation (>21 days).⁹ Despite improvements in acute ventilatory care, patients requiring prolonged ventilation have dismal outcomes and place a heavy burden on the health care

system's resources.⁹ Growing evidence suggests that an increasing number of patients with COVID-19-associated ARDS may require prolonged mechanical ventilation,¹¹ leading the *AJCC JPRs* to discuss a recently published ethnographic study to determine care practices in patients receiving prolonged mechanical ventilation.⁹

Summary

Rak et al⁹ examined care practices at 8 long-term acute care hospitals between 2016 and 2017 to determine the relationship between care practices and patients' ability to remain free of mechanical ventilation and survival rates. A thematic content analysis based on 329 hours of direct observation, 196 interviews, and 39 episodes of job shadowing was used to gather qualitative data on effective care practices related to prolonged mechanical ventilation. High-performing (low-mortality) hospitals actively promoted interdisciplinary care and team meetings, fostered a culture of quality improvement, had lower nurse-to-patient ratios, promoted patient access to psychological and spiritual support, and developed treatment protocols. Effective care practices included ventilation care, mobilization, nutrition, and managing pain, agitation, and delirium.

Discussion

The JPRs acknowledged that reviewing a qualitative study differs greatly from reviewing a quantitative study. We appreciated the intense and exhaustive qualitative data collection and ethnographic design of the study. Ethnographic studies are observational and require interviews with participants to collect data, allowing for potential bias due to the cultural views of the research team.¹² Rak et al⁹ made multiple good-faith efforts to ensure the trustworthiness and transferability of the results. We voiced concern that the generalizability of the study was limited by its inclusion of only long-term acute care hospitals, especially given that the authors themselves acknowledged that patients requiring prolonged ventilation may be cared for in several different types of facilities.⁹ We generally agreed that the study provided

“ The need for caregivers will increase as more patients survive during the pandemic; the post-ICU care clinic is an appropriate venue to address caregivers’ needs. ”

reliable insight into care optimization practices for patients requiring prolonged mechanical ventilation.

Application

Given the high use of ventilatory support during the COVID-19 pandemic, we believe that it is inevitable that the number of patients requiring prolonged mechanical ventilation will increase. Unfortunately, these patients often have poor outcomes despite the heavy use of resources and high health care costs. Rak et al⁹ provide a point of departure for developing novel care models for this population. Future research may focus on implementing and evaluating care strategies and models to improve outcomes and reduce costs.

Review of Cameron et al,¹³ “One-Year Outcomes in Caregivers of Critically Ill Patients”

Relevance

Admission to the ICU and the resultant effects (eg, physical incapacity, cognitive dysfunction, inability to return to work) are burdensome for patients and their families both during the hospitalization and beyond.¹³ More than half of patients who survive an ICU admission requiring prolonged mechanical ventilation need assistance from a caregiver 1 year after discharge.^{13,14} Assistance from a caregiver (usually a close friend or family member) benefits the discharged ICU patient yet may have negative emotional, health, and financial consequences for the caregiver (eg, decreased quality of life, posttraumatic stress disorder).¹⁴⁻¹⁷ These adverse caregiver outcomes negatively affect the patient’s rehabilitation potential and compromise the sustainability of continued home care.¹³ As the COVID-19 pandemic progresses, it is becoming clear that care strategies and posthospital recovery difficulties place stress on ICU patients and their caregivers,¹⁸ leading the JPRs to examine the report by Cameron et al¹³ on caregiver outcomes.

Summary

Cameron et al¹³ recruited caregivers (defined as uncompensated family members or friends responsible for coordinating or providing care for patients after hospital discharge) of patients discharged from 10 Canadian university-affiliated hospitals to determine

characteristics associated with caregiver health outcomes during the first year after discharge. Participants completed self-administered questionnaires at 7 days and 3, 6, and 12 months after ICU discharge. Of the 280 participants enrolled in the study, 238 completed at least 1 assessment, 196 completed at least 3, and 154 completed all 4. Most participants were women caring for a spouse, and the mean age was 53 years. A large percentage of caregivers reported high levels of depressive symptoms (67% at 7 days, 49% at 3 months, and 43% at 6 and 12 months). For some participants, depressive symptoms decreased over time; for others, they did not. Caregivers experienced fewer adverse effects if they were older, were caring for a spouse, and had a higher income, good social support, and a sense of control. No reported patient factor was associated with caregiver outcomes.

Discussion

We highlighted several limitations of this study. One crucial question that was raised regards the lack of reporting on patient discharge location—a question with important implications, as patients discharged to rehabilitation centers will be cared for (at least some of the time) by trained and compensated staff members, lessening the burden on the studied caregivers and potentially decreasing the reported impact on caregiver well-being. Additionally, there was no baseline mental health evaluation for caregivers; therefore, some caregivers’ depressive symptoms could have been related to a baseline condition rather than due entirely to providing care. Finally, the generalizability of the findings may be limited owing to a mismatch of demographic characteristics and the requirement for imputation techniques where data were missing. Despite these limitations, we believe that the study conclusion regarding high levels of depressive symptoms in caregivers is valid.

Application

The use of uncompensated caregivers in the health care system is substantial, with estimates of the value of unpaid labor as high as \$642 billion annually in the United States.^{13,19,20} The need for informal caregivers after discharge from the ICU will undoubtedly increase as more patients survive

to discharge throughout the COVID-19 pandemic¹¹; the cost to the mental well-being of these caregivers may be high.^{13,17,21,22} Cameron et al¹³ suggest family-centered models of care to address the needs of caregivers across the illness continuum; additionally, the JPRs identified the post-ICU care clinic as a possible venue to address caregiver strain and believe that additional research is needed to better understand and improve the mental health of caregivers.

Conclusion

The purpose of the AJCC JPR program is to provide mentorship to novice peer reviewers in the practice of scientific peer review. Participants in the program conduct a critical review of evidence and its application to practice. The COVID-19 pandemic has placed a heavy burden on nursing practice. We believe that reviewing these articles facilitates rapid identification of interventions and strategies to improve the care and outcomes of critically ill patients and their caregivers.

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None reported.

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