Awake Self–Prone Positioning: Implementation During the COVID-19 Pandemic

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**BACKGROUND** Prone positioning is a well-known beneficial intervention for patients with acute respiratory distress syndrome. As the COVID-19 pandemic emerged, hospitals rapidly adapted prone positioning for acutely ill patients into a new process: awake self–prone positioning. Could a large health care system safely and rapidly implement awake self–prone positioning in COVID-19 units to prevent respiratory failure from progressing among a surge of inpatients?

**REVIEW OF EVIDENCE** The team extensively reviewed the literature. Using evidence from 22 case reports, peer-reviewed standards, and studies, they developed an awake self–prone positioning guideline.

**IMPLEMENTATION** The guideline was implemented in April 2020 in critical care and COVID-19 units. Multimodal education included a concise guideline and real-time support from intensive care unit nurses, clinical nurse specialists, and nursing professional development specialists.

**EVALUATION** Awake self–prone positioning was a new procedure, and relevant data were obtained from the electronic medical record. From March 18 to August 5, 2020, 1000 COVID-19–related admissions occurred; 272 patients had a high-flow nasal cannula, 111 (41%) of whom had documentation of awake self–prone positioning.

**SUSTAINABILITY** This guideline is now an established part of COVID-19 care and has been integrated into practice in units caring for patients with the disease.

**CONCLUSIONS** Nurses adapted quickly to using awake self–prone positioning as a plan of care for hypoxic patients. This practice may help hospitals adjust care delivery for these patients and effectively maintain patients in non–intensive care units. (*Critical Care Nurse*. 2021;41[5]:23-33)
The outbreak of the novel coronavirus first identified in Wuhan, China, in 2019, rapidly evolved into a pandemic, challenging health care systems throughout the world. The virus was renamed severe acute respiratory syndrome coronavirus 2, the cause of COVID-19. The first case was reported in the United States in January 2020.

A main complication of COVID-19 is the development of acute hypoxemic respiratory failure, which is characterized by significant hypoxemia ($P_{A,O_2}$/fraction of inspired oxygen [$F_{I,O_2}$] $\leq$ 300 mm Hg) and an increased respiratory rate and other signs of respiratory distress without related causes such as chronic obstructive pulmonary disease or immediate postoperative or postextubation status. Before the COVID-19 pandemic, most patients with acute hypoxemic respiratory failure would have been treated in critical care units. Because of the large volume of patients, which increased as the pandemic progressed, the need also increased for treatment modalities that could safely be performed in both critical care and non–critical care areas. Prone positioning has long been used as a beneficial intervention for patients with acute respiratory distress syndrome (ARDS). As the COVID-19 pandemic progressed, providers in hospitals rapidly adapted their knowledge of prone positioning for acutely ill patients to a new process termed awake self–prone positioning (ASPP).

As the COVID-19 pandemic progressed, providers rapidly adapted their knowledge of prone positioning for acutely ill patients to a new process termed awake self–prone positioning (ASPP). Could a health care system with 1100 beds safely and rapidly implement ASPP in both inpatient units and COVID-19 intensive care units (ICUs) to prevent the progression of respiratory failure among a surge of inpatients?

Review of Evidence

The team searched for evidence by reviewing the literature about the use of ASPP to manage patients with COVID-19. We evaluated each source using the levels of evidence described by the American Association of Critical-Care Nurses (Table 1). Because the literature evolved rapidly, we needed to frequently update the compilation of sources.

Prone Positioning

Prone positioning for treating ARDS was first described in the literature more than 40 years ago; it is recommended for 16 hours daily in patients with ARDS who have a $P_{A,O_2}/F_{I,O_2}$ ratio less than 150 mm Hg. With this technique, a bedside team orchestrates careful repositioning—for example, from the supine (on the back) to the prone (on the abdomen) position—of a critically ill patient with ARDS, who may have an artificial airway, be receiving mechanical ventilation, or be sedated. Prone positioning improves oxygenation by recruiting collapsed alveoli from the former dorsal lungs; improving management of secretions; and shifting perfusion toward healthy, open alveoli, thereby improving ventilator-perfusion matching. In addition, it reduces lung strain, leading to a more even distribution of inflation and ventilation, which minimizes ventilator-associated lung strain.

Awake Self–Prone Positioning

Prone positioning without intubation was described in the literature before COVID-19, particularly for patients with acute hypoxemic respiratory failure; the intervention helped improve $P_{A,O_2}$ in patients with a $P_{A,O_2}/F_{I,O_2}$ ratio more than 100 mm Hg. In March 2020, Sun et al published a sentinel case analysis that used the term awake prone position in describing a triad of critical care management techniques for patients with COVID-19 with signs of respiratory distress. Patients who met criteria (respiratory rate > 30/min, oxygen saturation [$S_{P,O_2}$] < 93% on room air, or heart rate > 120 beats/min) were...
Table 1  Studies on prone and awake self-prone positioning using AACN levels of evidence

<table>
<thead>
<tr>
<th>Source</th>
<th>Design and patients; LOE rating</th>
<th>Key findings</th>
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</thead>
<tbody>
<tr>
<td>Bryan, 1974</td>
<td>Review; level E</td>
<td>Expanding dependent portions of the lung by PP to facilitate ventilation of normally dependent portions of the lung; early historical mention of the physiology of PP and potential benefits</td>
</tr>
<tr>
<td>Caputo et al, 2020</td>
<td>Observational study of 50 patients; level C</td>
<td>Although further studies are needed to determine the effect of PP on mortality, early ASPP seemed to improve SpO₂ in patients with COVID-19. Median SpO₂ improved to 94% after ASPP. Thirteen (24%) patients failed to improve and maintain adequate SpO₂, requiring intubation within 24 hours of arrival to the ED. ASPP can be conducted safely in a busy ED, excluding patients who are not capable of turning themselves.</td>
</tr>
<tr>
<td>Coppo et al, 2020</td>
<td>Prospective feasibility study including 54 patients with COVID-19 receiving oxygen or NIV and who performed ASPP for 3 hours; level C</td>
<td>ASPP of a minimum of 3 hours was achievable in 47 (83.9%) patients, who statistically improved during PP. On average, oxygenation improved by &gt; 50% when patients changed from supine to PP (PaO₂/FIO₂ ratio increase 104.9 mm Hg). Secondary outcomes looked at the safety and feasibility of ASPP and predictors of responders vs nonresponders. The 23 patients who were responders, with improved oxygenation in the PP, which was maintained when they returned to the supine position (50%), had lower platelets and higher C-reactive protein and lactate than nonresponders. Responders also had ASPP initiated earlier. ASPP was thought to be feasible and effective in improving oxygenation in awake patients with oxygen.</td>
</tr>
<tr>
<td>NIH COVID-19 Treatment Guidelines Panel, 2020</td>
<td>Peer reviewed standards; level D</td>
<td>NIH COVID-19 treatment guidelines, including ASPP for persistent hypoxemia despite increasing oxygen in patients in whom intubation is not indicated. Conversely, ASPP is not recommended as rescue therapy for refractory hypoxemia as a measure to avoid intubation and mechanical ventilation.</td>
</tr>
<tr>
<td>Damaria et al, 2020</td>
<td>Retrospective review of 10 patients with COVID-19 with increasing oxygen requirement who performed ASPP; level C</td>
<td>Patients alternated between prone and supine every 2 hours during the day and to maintain PP at night. SpO₂ improved immediately and at 1 hour after PP; from 94% to 98%; respiratory rate decreased from 31 to 22 breaths/min. No adverse events occurred with ASPP. Two (20%) patients required intubation; all 10 (100%) patients were discharged from the hospital by day 28.</td>
</tr>
<tr>
<td>Dhont et al, 2020</td>
<td>Review discussing pathophysiological pulmonary abnormalities in patients with COVID-19; level E</td>
<td>Because lung mechanics are well preserved, without airway resistance or dead-space ventilation early in the disease, patients may not appear to be in distress and need to be closely monitored. The term happy hypoxemia was used to describe the discordance between the severity of hypoxemia and the mild respiratory distress experienced by some patients with COVID-19.</td>
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<tr>
<td>Ding et al, 2020</td>
<td>Prospective observational study of 20 patients with ARDS; level C</td>
<td>Patients were placed in PP with NIV or HFNC. Eleven (55%) patients avoided intubation; 9 (45%) were intubated. Eight patients in the nonintubated group had a significantly increased PaO₂/FIO₂ ratio using an HFNC with PP vs an HFNC alone (130 ± 35 mm Hg vs 95 ± 22, P=.02). The PaO₂/FIO₂ ratio was also improved with NIV and PP (166 ± 12 mm Hg vs 95 ± 22 mm Hg, P=.13); these patients demonstrated improvement in PaO₂ with a PaO₂/FIO₂ ratio &gt; 100 mm Hg.</td>
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<tr>
<td>Elharrar et al, 2020</td>
<td>Single-center prospective study of 24 awake, nonintubated patients with hypoxemic ARF and COVID-19 who performed ASPP; level C</td>
<td>Fifteen (63%) patients tolerated ASPP for &gt; 3 hours, with an increase in PaO₂ from 73.6 mm Hg to 94.9 mm Hg, P=.006. No statistical difference was found in PaO₂ before and after supination (P=.53). None of the patients experienced complications related to ASPP.</td>
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<tr>
<td>Emory Healthcare, 2020</td>
<td>Organizational standards describing an ASPP guideline for patients with COVID-19 who do not receive ventilation; level D</td>
<td>Recommend screening patients once per shift. Criteria include hypoxic patients with COVID-19 and high-risk patients under investigation who have an HFNC and increasing oxygen requirements, who are able to understand and cooperate, and who can independently reposition. Repositioning occurred every 2 hours; patients were prone for a minimum of 1-2 hours a day. Position choices are left lateral, right lateral, sitting upright, and prone.</td>
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### Table 1 Continued

<table>
<thead>
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<td>Froese and Bryan,15 1974</td>
<td>Case report evaluating the diaphragm in both awake and anesthetized subjects, and examining the early historic use of PP; level E</td>
<td>Greater displacement of the dependent portion of the diaphragm occurs in supine and lateral positioning. In the supine position, ventilation was directed to the dependent portions of the lung. A method of expanding dependent portions of the lungs by placing the patient in the PP was theorized as a possible solution.</td>
</tr>
<tr>
<td>Gattinoni et al,16 2013</td>
<td>Review discussing the benefits of PP and clinical recommendations on the process for implementing PP; level E</td>
<td>In addition to improving gas exchange, PP distributes stress and strain more evenly through the lung parenchyma, thereby helping protect against ventilator-induced lung injury. Lung inflation and stress and strain seem to be more physiologically homogeneous in the prone vs the supine position.</td>
</tr>
<tr>
<td>Johnson et al,17 2017</td>
<td>Review discussing data and clinical trials regarding the effects of PP on gas exchange and mortality; level E</td>
<td>PP improves gas exchange mainly by improving ventilation-perfusion matching and reducing low ventilation/perfusion areas. Mortality is unclear. Ventilation heterogeneity is reduced because of uniform alveolar size, alveolar stress, and improved pleural pressure gradient. PP leads to a more uniform blood flow, with greater blood flow to the dorsal lung regions. Cardiac compression on the left lower lobe is relieved with PP, secretions are better removed, and hemodynamics are improved.</td>
</tr>
<tr>
<td>Massachusetts General Hospital,18 2020</td>
<td>Organizational standards for an ASPP guideline; level D</td>
<td>Criteria include COVID-19 and hypoxemia, and the ability to independently change position. ASPP should be maintained for a minimum of 1 hour and occur as often as can be tolerated.</td>
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<tr>
<td>Ng et al,19 2020</td>
<td>Study of 10 patients with COVID-19 receiving oxygen and protocolized to ASPP compared with a cohort of 100 patients not performing ASPP; level C</td>
<td>Patients performing ASPP and receiving oxygen had a low intubation rate (10%; 1 patient); a similar hospital population of 20 patients with COVID-19 who were receiving oxygen had an intubation rate of 60% (12 patients). ASPP is considered a low-risk and low-cost treatment that could delay or reduce the need for ICU care.</td>
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<tr>
<td>Papazian et al,20 2019</td>
<td>Peer reviewed standards; level D</td>
<td>Fifteen recommendations and a therapeutic algorithm for management of early-phase ARDS in adults were approved with strong agreement. One recommendation supported PP for 16 consecutive hours in patients with ARDS with PaO2/FIO2 &lt; 150 mm Hg to reduce mortality. Decisions for recommendations were supported by a review of randomized controlled trials and meta-analyses, which showed that mortality was significantly reduced when PP lasted at least 12 hours. Recommendations include safety optimization—departments should have a written procedure and specific training.</td>
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<tr>
<td>Paul et al,21 2020</td>
<td>Case report describing ASPP for 2 nonintubated patients; level E</td>
<td>Successful implementation of ASPP yielded improved oxygenation for both patients. Patient 1 was able to tolerate ASPP for 2-3 hours per session; SpO2 improved from 92% to 98% and FIO2 titrated to one-half. Patient 2 decompensated after extubation on day 7 and was able to ASPP for up to 2 hours with decreasing oxygen requirements over several days. Both patients were successfully discharged.</td>
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<tr>
<td>Retucci et al,22 2020</td>
<td>Observational study of 26 patients with COVID-19 receiving NIV (via helmet CPAP) in a high-dependency respiratory unit; level C</td>
<td>Patients had either PP or lateral positioning as a standard procedure. PP was done for patients with bilateral lung involvement and lateral positioning was done for patients with unilateral involvement. Positioning was done for 1 hour. Patients who were able to be fully prone were more successful; patients in the PP had a 75% success rate (9 of 12 patients); patients who turned laterally had a 59% success rate (16 of 27 patients).</td>
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<tr>
<td>Rochwerg et al,4 2017</td>
<td>Peer reviewed standards; level D</td>
<td>Hypoxemic ARF was defined and characterized by significant hypoxemia (PaO2/FIO2 &lt; 300 mm Hg) with an increased respiratory rate and other signs or respiratory distress without related causes such as COPD or immediate postoperative or postextubation status. No recommendation provided for ARF without chronic respiratory disease or hypoxic respiratory failure due to uncertainty of evidence. Consider NIV if it will be managed by experienced teams and closely monitored.</td>
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*Continued*
given critical care management, which consisted of a high-flow nasal cannula or noninvasive ventilation, fluid restrictions, and awake prone positioning.25 Although Sun et al did not analyze data to determine statistical significance, they believed this management process contributed to the low mortality and high discharge rates among their patients.

In a pilot study of 50 patients with COVID-19 in an emergency department, Caputo et al7 showed that SpO₂ did improve after ASPP for most patients; ASPP failed (ie, patients required intubation within 24 hours) in 13 patients (24%). Caputo et al also demonstrated that ASPP could be done safely in a busy emergency department when excluding patients who were not capable of turning themselves. A small case series of 10 patients revealed a low intubation rate of 10% (1 patient) among a population of patients receiving supplemental oxygen who performed ASPP; in that series, among a similar hospital population who did not receive ASPP, 60% (12 of 20 patients) required intubation.23

Several other small studies contributed to proof of concept. In a prospective before-and-after study of 24 patients with COVID-19, Elharrar et al24 found that 15 patients (63%) tolerated ASPP for more than 3 hours. They deemed 6 of those 15 patients (40%) to be “responders” because their PaO₂ increased 20% or more between prone positioning and resupination.31 In a retrospective cross-sectional review of 15 patients with COVID-19 who were receiving noninvasive ventilation outside the ICU, Sartini et al23 found that SpO₂ and the PaO₂/FIO₂ ratio improved in 12 patients (80%) who did ASPP, and that it was feasible and safe in patients receiving noninvasive ventilation. In a retrospective review of 10 patients with COVID-19, Damaria et al10 found that 2 patients (20%) required intubation and 100% were discharged from the hospital by day 28. The study protocol alternated patients between the prone and the supine position every 2 hours as tolerated, with reminders given to nurses.30

In a larger prospective feasibility cohort study of 54 patients with COVID-19 who were receiving oxygen or noninvasive ventilation, researchers found that ASPP for a minimum of 3 hours was achieved in 47 patients (83.9%) and that a statistical improvement in oxygenation occurred during prone positioning.8 Although oxygenation improved after resupination in 23 patients (50%), the improvement was not statistically significant.8 In an observational prospective pilot study of 26 patients with COVID-19 receiving helmet continuous positive airway pressure...
pressure in a pulmonary high-dependency unit, Retucci et al.22 found a higher success rate in patients who were able to be fully prone (9 of 12 episodes [75%]) than in patients who turned laterally (10 of 25 episodes [40%]).

From April to July 2020, several guidelines on how to implement ASPP were published and made available concurrently.14,18,26 In addition, COVID-19 treatment guidelines published in July 2020 recommend ASPP for patients with persistent hypoxemia despite increases in supplemental oxygen.9 This recommendation refers to patients for whom endotracheal intubation is not otherwise recommended (Table 2).9 The guidelines do not recommend ASPP as rescue therapy for refractory hypoxemia in patients who require intubation.9 Although the literature has continued to evolve rapidly during the pandemic, with several large randomized controlled studies in development, findings show that ASPP can be safely achieved and may help improve oxygenation in a subset of patients with COVID-19.

**Implementation**

**Development of ASPP Guidelines**

During March and April 2020, the population of patients diagnosed with COVID-19 steadily grew. During these uncertain times, the health care system met with the challenge of providing appropriate and effective care to these patients. As our institution, along with organizations worldwide, searched for evidence to support best practices for treating this viral infection, those directly at the bedside sought guidance from their leaders. Many at the bedside felt anxious about contracting the virus, and the uncertainty about the ever-changing policies and guidelines surrounding COVID-19 and patient care exacerbated those feelings. Nurse and physician leaders worked relentlessly to provide up-to-date, clear guidelines for the institution while continuing to search the literature for any evidence-based interventions to treat COVID-19.

From mid-March to early April 2020, all patients with COVID-19 who required supplemental oxygen were admitted to the medical ICU (MICU) at Christiana Hospital in Newark, Delaware, which became the facility’s primary designated COVID-19 critical care unit. As the number of patients surged, because of limited capacity the plans changed regarding which patients needed to be admitted to the MICU. To ensure beds remained available for unstable individuals, physicians and nurses discussed ways to combat respiratory distress and decompensation in patients with COVID-19 in both ICUs and non-ICU areas. Physicians from pulmonary, critical care, infectious disease, and internal medicine disciplines, along with nurse leaders from the MICU and intermediate care, reviewed available guidelines and research for mention of ASPP by nonintubated patients with COVID-19. In the MICU, the teams began implementing ASPP for patients with COVID-19 who required any supplemental oxygen, and they quickly witnessed improvements in oxygenation for many patients. Although the MICU team has years of experience in placing critically ill patients with ARDS into the prone position, ASPP is a different process. The guidelines for prone positioning of patients with ARDS and those for ASPP for patients with COVID-19 contain several differences, but the essential goal of improving oxygenation is the same, and the MICU team adapted easily. The MICU team then shared the intervention with providers and nurse leaders in the designated COVID-19 intermediate care unit and medical floors.

The clinical nurse specialist (CNS), the nursing professional development specialist (NPDS), and the medical director from the MICU promptly identified a need for standardized education on this process for the multiple designated COVID-19 units and interdisciplinary health care team members. Without a tangible reference, many well-intentioned but conflicting recommendations about ASPP began to circulate, resulting in many questions for the MICU team. The NPDS and CNS from the MICU team adapted easily. The MICU team then shared the intervention with providers and nurse leaders in the designated COVID-19 intermediate care unit and medical floors.

**Table 2 COVID-2019 treatment guideline recommendations for awake self–prone positioning (ASPP)**

<table>
<thead>
<tr>
<th>Recommended</th>
<th>Not recommended</th>
</tr>
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<tbody>
<tr>
<td>Trial of ASPP for patients with persistent hypoxemia despite increasing supplemental oxygen requirement and for whom endotracheal intubation is not indicated</td>
<td>Use of ASPP as rescue therapy for refractory hypoxemia to avoid intubation</td>
</tr>
</tbody>
</table>

Adapted from COVID-19 Treatment Guidelines Panel.9
Awake Self-Prone Positioning of Non-Intubated Patients (COVID-19 (++) & PUI)

April 16, 2020

WHY should I encourage my patient to lie in the prone position?
- Reducing mortality requires early intervention to prevent disease progression. Previous studies have focused on the benefits of proning in moderate-to-severe ARDS patients with invasive mechanical ventilation.
- Recently, there has been increasing research on the benefits of awake self-prone positioning of non-intubated COVID-19 positive patients, patients under investigation (PUI), and acute respiratory distress (ARDS) unrelated to COVID-19.
- Awake self-prone positioning can be used as an adjunct supportive therapy to recruit alveoli and improve gas exchange in acute and critically ill patients with hypoxemia secondary to COVID-19 without severe substantial dyspnea. This practice has resulted in favorable outcomes, including improved oxygenation and the avoidance of the need for intubation.

WHO can be placed in awake self-prone positioning?
- Non-intubated patients on units designated for PUI or COVID-19 patients, who require minimal to no assistance with repositioning.
- Be mindful of contraindications.

WHAT does awake self-prone positioning look like?
- In awake self-prone positioning, the patient should lie on her/his abdomen, using the arms and a pillow for support.

WHEN should I tell my patient to return from prone position to supine position?
- Duration of prone positioning can vary. Studies have shown a tolerated duration between 30 minutes to 6 hours, 2-4 times a day. We are encouraging patients to maintain a prone position as long and as often as they can tolerate it.
- Do not forget to document your patient's position and response to awake self-prone positioning in iView.

Awake Self-Prone Positioning of Non-Intubated Patients (COVID-19 (+) & PUI)

April 16, 2020

HOW do I prepare my patient for awake self-prone positioning? ACT! (Assessment, Comfort, Teaching)

Assessment
- Assess for mobility, mental status, and contraindications.
- Assess patient tolerance and document the following prior to proning: 60 minutes for the first 15 minutes of proning; SPO2, FiO2 or L/min, oxygen delivery mode, respiratory rate, and any signs of respiratory distress.
- Ensure ECG leads are properly placed on the anterior chest wall if monitored.
- Consider the following contraindications:
  - Facial, pelvic or spinal injuries
  - Inability to independently change positions
  - Any concern for patient's ability to protect airway (intubation or artificial airway)

Considerations
- Hydromedullary or respiratory instability with position changes.
- Delirium or confusion
- Nausea and vomiting
- Abdominal wounds or devices that may cause pain when proning
- Advanced pregnancy—Consider side lying position in discussion with provider

Comfort
- Minimize interruptions during the prone positioning by implementing comfort strategies:
  - Toiletting prior to proning (bladder and bowel emptying)
  - Prone 1 hour after meals
  - Have the call bell, phone/other electronic devices in view and within reach
- Provide pillows for arm support. Place pillows under hips and/or legs if needed for comfort.

Teaching
- Educate the patient/family on the reason and benefits for prone positioning.
- In order to prevent pressure injuries, encourage patient to adjust themselves as needed if they feel any discomfort due to pressure on skin & bony prominences.
- Encourage deep breathing and incentive spirometry

Where is the evidence?

Figure Awake self-prone positioning of nonintubated patients who have COVID-19 and those under investigation.

Abbreviations: ARDS, acute respiratory distress syndrome; ECG, electrocardiography; PUI, patient under investigation.
A key component of compliance with ASPP was ensuring that the patient was thoroughly educated on the process by using the teach-back method.

Rapid Response Team Assistance With Education

Rapid response team (RRT) nurses work within the MICU at our institution, and they were the first to start implementing the ASPP intervention in patients with COVID-19. The RRT both responds to acute RRT calls and proactively performs rounds among patients. During rounds, the RRT nurses use an early warning score to identify patients at risk of decompensation. While performing rounds on the COVID-19-designated units (non-ICU areas), the RRT nurses met with unit charge nurses to identify any patients who were not captured with the tool used during rounds. This process also provided opportunities for them to discuss ASPP and answer any questions, which strengthened the relationship between the RRT and intermediate care nurses.

As the population of patients with COVID-19 grew at the hospital throughout the disease surge between March and June 2020, the rate of RRT calls from the COVID-19–designated units increased approximately 40%.

Education and Implementation on Non–ICU Inpatient Units

Even though nurse support was provided from the start because of the observed benefits of ASPP, it was not an intervention with which the intermediate-level nurses were familiar outside of an RRT event. As this practice was rapidly unfolding, it was important to provide the nurses with clear and concise guidelines for this new process to meet the needs of these adult learners. In addition, the NPDSs and CNSs in the non-ICU areas also reviewed the literature to acclimate themselves to the benefits of ASPP and how to best support the staff as they implemented the new process. They developed an education plan that included didactic learning followed by hands-on demonstration of this new skill. Staff were educated on where and how to document the patient’s position to capture those who received this intervention.

After the ASPP guideline was created, education was disseminated to non-ICUs. The NPDS and CNS in the non-ICUs presented the education during daily unit-based huddles and provided the information on the nursing communication board. They reviewed the components—why, who, what, when, and how—as presented in the guideline (see Figure). The guideline was available on the system’s COVID-19 intranet site, shared through email, and posted throughout the units. Availability of a written guideline has many benefits, including use as a portable resource that can be accessed any time for reinforcement or clarification. This benefit was particularly useful when nurses implemented this intervention in real time and when the NPDS and CNS were not present. The RRT nurses served as a resource to assist other nurses in identifying appropriate candidates for ASPP. During active RRT calls and proactive rounds, they also educated nurses who had not yet implemented this intervention and helped guide patients through repositioning.

After nurses reviewed the guideline and understood the ASPP process, they began implementing it with patients. Nurses used various methods to instruct patients to get into the prone position, including video communication via an iPad or verbal instructions given either while standing at the doorway of the patient’s room or after entering the room (for patients who needed more assistance with pillow placement). Attempting these alternative methods of communication, nurses were able to limit their exposure to the virus and conserve personal protective equipment. The NPDS and CNS were also available to support the nurses in real time during situations and, when necessary, to prompt the nurses to have a patient attempt ASPP.

As more COVID-19–positive patients were admitted to the intermediate care unit, the nurses became proficient in ASPP. Whenever a patient decompensated, ASPP became part of the plan of care. If an RRT was called for a patient with hypoxia, the patient was typically already in the prone position before initiation of RRT. This intervention helped maintain appropriate patients at an intermediate level of care and lessen demand for the limited number of intensive care beds.
Patient Education

A key component of compliance with ASPP was ensuring that the patient was thoroughly educated on the process by using the teach-back method. Some COVID-19–positive patients are generally asymptomatic early during the course of the disease: despite profound hypoxemia and a left shift of the oxyhemoglobin curve, their lung mechanics are well preserved and they do not experience respiratory distress.12 These patients have been labeled as having “happy hypoxemia,” and they may experience sudden and rapid respiratory decompensation.12 This phenomenon occurred frequently at our hospital, and in some cases the patients were unable to understand the urgency of the situation. To involve these patients in their care, nurses provided additional education on this disease process and why ASPP is important.

Nurses used multiple educational methods to meet the learning needs of each patient. Each room on the COVID-19 intermediate unit was equipped with an iPad, through which the nurse and patient could have a video conversation about ASPP. In addition, written materials with instructions and pictures were provided to patients. Nurses would introduce this education to the patient early during the disease process to ensure the patient understood how to perform ASPP before any emergent situation occurred. If an emergent situation did occur, nurses educated the patient in real time and assisted them with pillow placement to ensure they were comfortable in the prone position.

As the pandemic progressed, the number of Spanish-speaking patients in the hospital system increased, and in-person interpreters were no longer available. Instead, nurses used interpreters through an online system available through the iPads, and all printed materials were made available in Spanish.

Limitations

One of the biggest barriers to ASPP compliance is that the patient controls the duration on the basis of how well they can tolerate the position. Although the guideline recommends that a patient lie in the prone position for up to 4 hours, this duration often was not feasible. A common concern from patients was back, neck, and shoulder discomfort. For some patients, body habitus prevented them from maintaining the prone position comfortably. The prone position should not be avoided because of a large body habitus if the patient is monitored and can tolerate the position.21

As mentioned earlier, a subset of patients were not feeling dyspneic and could not conceptualize the benefits and importance of ASPP. This lack of understanding was especially challenging during mealtimes, when patients could become hypoxic due to resupination. When hypoxia occurred, the nurses reeducated the patient and promoted ASPP soon after the meal. The ASPP guideline recommends waiting 60 minutes after a meal before attempting ASPP to prevent reflux. Occasionally, however, a patient’s condition required immediate intervention. In these instances, even though the head of the bed was not elevated during prone positioning, there were minimal reports of reflux.

When a patient could not tolerate ASPP, they were instructed to attempt a lateral position. On the basis of the patient’s lung impairment, nurses would encourage lateral positioning with the more affected side up. Although limited information describes the benefits of lateral positioning, some patients had better oxygenation levels in, and better tolerated, the lateral position in our study.

Another challenge was the lack of visibility in patient rooms in areas outside the ICU. Although the nurses could coach or assist a patient into the prone position, their view was often obstructed by wooden room doors or by the curtains used in semiprivate rooms. The organization’s guideline recommended keeping the door closed to rooms housing patients with COVID-19; however, nurses had to open the door to visualize patients or to watch noncentralized pulse oximetry waveforms. Providers in the non–ICUs and the infection prevention team collaborated to create a safe method for visualizing patients while minimizing exposure. The guideline was modified to include an option to have the patient’s door open if the patient could be positioned at least 6 ft (1.8 m) from the doorway. Nurses also had the option of using video (via an iPad) to monitor patients; however, this option required the patient to activate the camera, which at times was unsuccessful because patients were unable to operate this technology.
When patients became hypoxic, nurses quickly intervened and were at the bedside for an extended period to assess the patient and provide therapeutic interventions (eg, oxygen titration and chest physiotherapy). Although patients would be placed in the prone position, documentation was not always captured in real time. In addition, the limited amount of time patients were able to tolerate the prone position made accurate documentation difficult, limiting our understanding of whether a patient was able to perform ASPP or whether it had been attempted with the patient earlier during their hospitalization.

Anxiety and fear were noted in patients who experienced symptoms of hypoxemia. Two main factors contributed to their anxiety: the lack of visitors and family support, and concern for the health and well-being of family members who were simultaneously admitted to the hospital or the ICU. When appropriate, family members with COVID-19 who were admitted to the same unit were housed in the same room as a means of reducing this anxiety. In addition, phones with video communication capabilities were provided to patients to help connect them with their families. Patients were offered anxiolytic medications (as appropriate to their clinical condition) when nonpharmacological interventions were unsuccessful.

**Evaluation**

Our institution admitted its first patient with COVID-19 on March 18, 2020. From that date until August 5, 2020, approximately 1000 patients with COVID-19 were admitted. Among them, 272 patients needed a high-flow nasal cannula, 111 (41%) of whom had ASPP documented. As the data for ASPP were obtained from nursing documentation in the electronic medical record, and because such documentation was new for the non–ICUs treating inpatients, we do not know whether it accurately conveys the complete story of a patient’s use of ASPP.

**Sustainability**

The ASPP guideline is an established part of COVID-19 care and has been integrated into practice in the COVID-19 cohort units. As the institution continues to maintain preparedness for further potential surges in the number of patients with COVID-19, it is imperative that both new and experienced staff members be supported in understanding the practice of ASPP. The ASPP guideline will continue to be part of the system-wide intranet site containing all resources for the care of patients with COVID-19 in both ICUs and non–intensive care settings. Drifts in practice, however, are expected with any new process change. Therefore, the NPDSs, CNSs, and RRT team members experienced with COVID-19 will continue to educate and engage providers on the COVID-19 units in the ASPP process.

Since the initial COVID-19 surge, the cohort units have changed. Therefore, the education of staff on the new cohort units is a priority. To this end, NPDSs who have experience with COVID-19 have been instrumental in orienting the NPDSs of the new cohort units and assisting with educating their staff. The RRT team and the unit-based NPDSs are at the forefront of ensuring that staff are educated—whether through nursing communication boards or during unit-based huddles, proactive rounds, or active RRT calls. Physicians, whether they practice in the ICU or a non–intensive care setting, have also engaged in promoting the ASPP process for patients with COVID-19, and discussion has begun about adding ASPP as an ordered intervention in the patient’s electronic medical record.

**Conclusions**

The new practice of ASPP was implemented rapidly when resources were stretched during a surge of the pandemic. Evidence-based practice and implementation of new patient procedures usually take place after high-level literature assessments, multiple interdisciplinary meetings, agreement on the level of evidence, and development of a procedure or policy. These interventions evolved into best practices during a pandemic in order to provide to patients a therapeutic modality that could potentially improve care, would do no harm, and could be provided safely in both ICUs and non–intensive care areas.

Although outcome data related to this intervention are limited, the initial findings seem to be positive. Future research on ASPP by nonintubated patients with COVID-19 is needed to accurately quantify its impact on patient outcomes, including the need for and duration of intubation, length of stay in the ICU and in the hospital, and survival rate. CCN
Financial Disclosures
None reported.

See also

References