Respiratory Therapists in an ICU Recovery Clinic: Two Institutional Experiences and Review of the Literature

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Post-intensive care syndrome is an increasingly recognized complication of critical illness, with patients reporting new problems in physical, mental health and/or psychosocial, and cognitive function for months to years after their acute illness. As a way of diagnosing and treating post–intensive care syndrome, many centers around the world have established ICU recovery clinics, which take a multidisciplinary approach to care after the ICU. Dyspnea and pulmonary dysfunction are frequently encountered concerns in the post-ICU population. Despite this, few ICU recovery clinics have described how respiratory therapists (RTs) can contribute to treating these symptoms. We reviewed the literature with regard to the roles of an RT in post-ICU follow-up, described our institutional experiences with having RTs as part of our ICU recovery clinics, and identified additional ways that RTs might contribute to a post-intensive care syndrome diagnosis and treatment. Although RTs can provide invaluable experience and contributions to an ICU recovery clinic, there are few articles in the published literature on the ways in which this can be accomplished. We, therefore, provide analogies to other multidisciplinary clinic models as well as our own experiences. Future studies should focus on examining the impact of respiratory therapy diagnostic testing and interventions in the ICU recovery clinic on both patient and provider outcomes. *Key words: Respiratory therapy; ICU Recovery; ICU follow up clinic; post-intensive care syndrome (PICS); ARDS; mindfulness.* [Respir Care 2021;66(12):1885–1891. © 2021 Daedalus Enterprises]

Introduction

Post-intensive care syndrome is a constellation of new or worsening deficits in physical health, mental health, and cognitive functioning that persist after an ICU admission.[1] Unfortunately, this syndrome is common[2] and can negatively impact quality of life.[3] ICU recovery clinics, staffed by intensive care clinicians, have increasingly been recognized as a way to diagnose and treat symptoms of post–intensive care syndrome.[4,5] These clinics are generally multidisciplinary, with team structures mimicking the makeup of an ICU team.[6] Respiratory therapists (RTs) may care for patients as part of this multidisciplinary team, but little guidance exists with regard to their role in a recovery clinic,

which makes the inclusion of RTs into a clinic challenging. In this review, we discuss the current literature that supports the value of recovery clinics, analogies to other evidence-based RT-based therapies, and our own institutional experience with adding an RT to our clinic. With this description of our experiences and literature review, we aim to assist other centers that may be considering establishing a recovery clinic and are considering the addition of an RT as well as to stimulate additional research on the impacts of an RT as part of the recovery clinic team.

See the Related Editorial on Page 1929

Review of the Literature

Evidence for ICU Recovery Clinics

As provider awareness of the long-term consequences of an ICU stay has grown, there has been a push to find a way to better diagnose and treat post–intensive care syndrome.[7] Recovery clinics have existed in Europe for > 20 years, and they are becoming increasingly common in the United States, with several new clinics having been inspired by the coronavirus disease 2019 (COVID-19) pandemic.[8,9] The measured benefits of a recovery clinic to patients include reduced symptoms of depression, anxiety, and posttraumatic stress disorder as well as better mental health-related quality of life.[4] A pilot randomized control trial of a recovery clinic program demonstrated that those patients seen in a recovery clinic had a longer time to readmission to the hospital compared to those not offered a recovery clinic program.[10]

Recovery clinics also have the potential to provide a host of indirect benefits, recently described in article from the Society for Critical Care Medicine's THRIVE initiative (an effort to improve patient and family support after critical illness). In describing the initiative's findings, Haines et al[11] outline how recovery clinics can create new roles for survivors in the ICU, generate ideas for quality improvement, improve provider knowledge of post–intensive care syndrome and empathy for patients, and improve morale. For example, we recently recognized nerve compression injuries in patients in our ICU, which prompted changes in prone positioning practices.[12]

The quality of care provided by a recovery clinic is unique in that the providers who staff the clinic are familiar with the diagnoses and interventions common in the ICU. They bring a knowledge and experience base to the follow-up of patients who are critically ill and that primary care providers may not be able to provide. Patients with post–intensive care syndrome can benefit from the care of critical care clinicians who have unique insights into the link between ICU interventions and post-discharge symptoms. Recovery clinics may also be beneficial to intensivists; burnout is a frequent complication encountered by nurses and physicians who work in the ICU, with studies that reported symptoms of burnout in up to 70% of critical care providers.[13,14] The potential to interact with patients as they recover has the potential to reduce the mental and psychological strain of coping with patients who are critically ill and those who are dying.[11] The benefits of reduced burnout may also be important for RTs, for whom burnout is an increasingly recognized problem.[15]

ICU Recovery Clinic Team Composition

Recovery clinics generally include a multidisciplinary team, although its makeup varies from center to center (Table 1).[16,17] When feasible, recovery clinics aim to replicate the multidisciplinary model used in the ICU so that providers familiar with the diagnoses and interventions common in the ICU are caring for these patients in the outpatient setting. In almost every center, patients are seen by a critical care physician or advanced practice provider (nurse practitioner or physician assistant); other team members may include a pharmacist, case manager, social worker, physical therapist, occupational therapist, speech language pathologist, dietitian, and RT. The frequency with which RTs are a part of a recovery clinic is not known; however, from published reports of recovery clinics, RTs are somewhat infrequently a part of the ICU recovery team (Table 1).

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Table 1. Published ICU Recovery Clinic Multidisciplinary Team Compositions

Study/Clinic	Year	Location	Other Clinic Roles	RT in the Clinic?
Bakhru et al[17]	2019	Winston-Salem, NC	PCCM attending physician, with or without a fellow, pharmacist	No
Sevin et al[16]	2018	Nashville, TN	Nurse practitioner, case manager, pharmacist, PCCM attending physician, neuropsychologist	No
Modrykamien[47]	2012	Omaha, NE,	Intensivist, nurse, pharmacist	No
Mayer et al[48]	2020	Lexington, KY	Intensivist, pharmacist, advanced practice provider, social worker, physical therapist	No
Crocker[49]	2003	Nottingham City, United Kingdom	Intensivist, nurse, physiotherapist, occupational therapist	No
Jones and Griffiths[50]	2000	Prescot, United Kingdom	Intensivist	No
Hall-Smith et al[51]	1997	London, United Kingdom	Intensivist, critical care nurse	No
Cutler et al[52]	2003	Worksop, United Kingdom	Nurse (anesthesiologist, dietitian, and pharmacist as needed)	No
Waldmann[8]	1998	Reading, United Kingdom	Nurse, "help with pulmonary function testing"	Unknown
Daffurn et al[53]	1994	Liverpool, United Kingdom	Intensivist, critical care nurse	No
UPMC Mercy	2018	Pittsburgh, PA	Intensivist, nurse practitioner, pharmacist, physical therapist, occupational therapist, speech pathologist, dietitian, social worker, and case manager	Yes

RT = respiratory therapist
PCCM = pulmonary critical care medicine.

RTs in the ICU Recovery Clinic

There are few articles in the published literature that describe the ways in which RTs can participate in a recovery clinic. As mentioned above, there exists a great variety in recovery clinic staffing without clear descriptions of roles. One exception is that of critical care pharmacists, who are usually included and can help patients seen in a recovery clinic with medication reconciliation, screening for unnecessary medications, vaccine administration, and uncovering medication interactions and untoward adverse effects.[18]

Most other roles in the recovery clinic are less well defined, with information generally being shared among programs via word of mouth; conferences; and networks, such as the Society for Critical Care Medicine's THRIVE initiative or the Critical and Acute Illness Recovery Organization.[19] The role of respiratory therapy in particular has a paucity of information other than the generally accepted role of performing in-clinic spirometry.[20] Although many published descriptions of recovery clinics are available (Table 1), few actually mention an RT. Some of this deficiency may be due to a lack of available data from more recently established recovery clinics, which are likely to be focused on sequelae of COVID-19 and respiratory failure (eg, as opposed to shock, neurologic injuries, sudden cardiac death).

ICU to Clinic Connection. The philosophy that underlies the recovery clinic is that follow-up with intensive care providers can help patients more effectively make the transition from critical illness to recovery. One approach to these clinics has been to replicate the multidisciplinary model of patient care that is used in the ICU. There is little doubt that RTs are a critical part of the ICU patient care team. They have key roles to play in the ICU, both in RT-led ventilator weaning protocols and in participation in multidisciplinary rounds.[21,22] RTs also are responsible for nebulized medication administration, airway clearance maneuvers, assisting with prone positioning of patients, tracheostomy care and use of speaking valves (Passy-Muir, Irvine, CA), titration of oxygen via various devices, and use of positive airway pressure devices and interfaces.

RT-led ventilator liberation protocols have been shown to be an effective way of reducing patient-ventilator days.[23] RTs possess a unique skill set and have immediate experience with the treatment most emblematic of a critical care unit: mechanical ventilation. Their hands-on knowledge and practical experience of patients with respiratory failure gives them unique insights into the potential for post-ICU complications. They also directly interact with patients in the ICU and their families, and can help bridge the gap from in-patient to out-patient care.

Analogy to Other Multidisciplinary Clinics and Rehabilitation. Despite the limited information available on the role of RTs in the recovery clinic, some analogies may be drawn from the ways in which RTs participate in other multidisciplinary clinics. Perhaps the best-known example is in cystic fibrosis clinics, where RTs not only obtain in-clinic spirometry but also provide instruction on the use of airway clearance therapies and inhaled medications.[24] Pulmonary transplantation clinics similarly use a multidisciplinary model, sometimes incorporating RTs in the diagnosis and management of chronic respiratory insufficiency.[25]

Although COVID-19 has recently brought increased focus to the phenomenon of post–intensive care syndrome and the need for post-hospitalization rehabilitation, RTs have been active in the realm of pulmonary rehabilitation for decades.[26] Even though pulmonary rehabilitation is most frequently thought of as a program for patients with COPD, it can also be an effective intervention for patients with a variety of lung disease, including post-ARDS fibrosis.[27,28] During pulmonary rehabilitation, RTs not only assist patients with safe and supervised exercise but often can provide effective coaching on dyspnea reduction[29] and self-management of chronic respiratory disease.[30] Pulmonary rehabilitation programs have also demonstrated mortality reductions in patients with chronic pulmonary disease.[31]

Role of the RT in the Recovery Clinic: Our Experience

The ICU recovery clinic at the University of California San Diego (UCSD) was initially established in 2015 without an RT. In October of 2020, an RT (LH), joined the University of California San Diego clinic because of her interest in post-ICU care and a shared clinic space, and we began collecting data on dyspnea levels. Two RTs (AN, JM) are at the University of Pittsburgh Medical Center recovery clinic, and they also provide similar services; an RT has been part of the University of Pittsburgh Medical Center recovery clinic team since its establishment (see the supplementary materials at http://www.rcjournal.com).

In both clinics, patients are screened for symptoms of post–intensive care syndrome by using a variety of standardized assessments. Screening at the University of California San Diego includes evaluation for symptoms of depression, anxiety and posttraumatic stress disorder by using the Patient Health Questionnaire-9,[32] Generalized Anxiety Disorder-7,[33] and Posttraumatic Stress Disorder Checklist – Civilian Version.[34] Symptoms of posttraumatic stress disorder, depression, and anxiety are all important to identify because these conditions can exacerbate or cause dyspnea and exercise intolerance.[35] At the University of Pittsburgh Medical Center, screening for anxiety and depression is done by using the Hospital Anxiety and Depression scale.[36]

Posttraumatic stress disorder is screened for by using the Impact of Event Scale.[37] Both clinics also use the modified Medical Research Council dyspnea scale to quantify subjective shortness of breath.[38] The modified Medical Research Council dyspnea scale is a single-item instrument and can be either administered by the RT directly or completed as part of the initial packet, and reviewed by the RT and the physician. Disease-specific dyspnea screening tools (such as the COPD Assessment Test) can also be administered by RTs in the recovery clinic as appropriate, based on the patient's underlying conditions.

Potential Respiratory Therapy Activities in the Recovery Clinic

Despite the paucity of data on the role of the RT in a recovery clinic, RTs can perform a variety of tasks well suited to the goal of treating post–intensive care dyspnea and respiratory failure. Below are some of the ways in which RTs participate in our recovery clinics as well as potential areas of future development, expanded from RT activities in other settings.

Objective Testing. One of the most frequently described tasks for RTs in a recovery clinic is in-clinic spirometry. By providing the team with an up-to-date assessment of the patient's pulmonary function, the RT can significantly contribute to the management plan for patients in the recovery clinic. Particularly for patients recovering from ARDS, spirometric testing often reveals residual pulmonary dysfunction.[3] If available, lung volume testing and diffusing capacity assessment can also be beneficial in characterizing post–critical illness pulmonary function. In addition to in-clinic spirometry, RTs can also administer exercise tests (or assist physical therapists with assessments), such as the 6-min walk test. In a recovery clinic, a reduced 6-min walk distance in a patient with normal lung function may prompt an additional workup for cardiopulmonary or musculoskeletal causes of reduced exercise capacity, which otherwise might have been missed.

Medication Administration. After an ICU admission, patients may have a new lung disease managed with an inhaler or nebulizer therapy. They may also have preexisting lung disease but new challenges in cognitive or physical function that make respiratory medication use more difficult. Incorrect use of inhalers is a frequently encountered problem,[39] and education on the better use of inhalers can improve patients' respiratory symptoms and quality of life.[40] Previous investigations (and personal experience) have shown that RTs can successfully provide quality

education to patients and family members on how to use inhalers, spacers, and/or nebulizers; spacers can also be provided to patients in the recovery clinic.[41] As in a general pulmonary clinic, many patients recovering from critical illness require supplemental oxygen. Patients may have known underlying lung disease or may be entirely new to the need for oxygen. RTs in the recovery clinic cannot only evaluate for the need to continue oxygen therapy (eg, by using room air arterial blood gases or rest and exercise testing) but can also instruct patients and their caregivers on how to safely use supplemental oxygen. By providing this teaching as a part of the recovery clinic, RTs help patients avoid the burden of extra clinic visits.

Airway Clearance. In addition to education about the use of oxygen, RTs can also provide instruction on airway clearance techniques. Although the best evidence for the positive impact of airway clearance is in patients with bronchiectasis due to cystic fibrosis, airway clearance techniques have also shown some benefit in patients with non-cystic fibrosis bronchiectasis, including patients with postinfectious bronchiectasis.[42] Not all patients who leave the ICU will develop post–infectious bronchiectasis but, for those who do, RT teaching on airway hygiene may be an important component of their care in the recovery clinic.

Positive Airway Pressure Devices. RTs can also assist patients who use nocturnal noninvasive ventilation, troubleshooting issues that may arise and ensuring that patients are using their devices appropriately.

Smoking Cessation Counseling. Smoking (or e-cigarette) assessment and cessation counseling can also be provided by RTs, with clinicians prescribing nicotine replacement therapy as needed. This is particularly important for patients with e-cigarette or vaping product-associated lung injury because these patients have a markedly increased risk of disease recurrence with relapsed vaping.[43]

Dyspnea Management. Another unique role for RTs in the recovery clinic is dyspnea management strategies. After leaving the ICU, many patients will have new symptomatic pulmonary disease. They may also develop dyspnea related to feelings of anxiety and posttraumatic stress disorder. To improve these symptoms, our RT (LH) at the University of California San Diego offers coaching in mindful breathing exercises to patients, particularly those who were admitted to the ICU with a primary respiratory diagnosis or who screened positive for dyspnea. Although studies are mixed on the effect of mindfulness interventions for dyspnea reduction,[44] because of the frequent co-occurring psychiatric manifestations of post–intensive care syndrome, the recovery clinic population may be uniquely positioned to benefit from this intervention. RTs can also provide education on other, more traditional breathing techniques (such as pursed-lip breathing for COPD).[45]

Anecdotally, not only is RT involvement in the recovery clinic beneficial to patients, but it may also be of benefit to the RTs involved. In our experience, patients are frequently grateful to interact with an RT in the clinic. This is particularly true of the mindful breathing exercises; we observed a patient who was tearful and deeply moved afterwards, feeling that her experience of dyspnea (despite a normal pulse oximetry value) had finally been validated. Experiences such as this have the potential to improve RT morale and even to reduce burnout. Before the COVID-19 pandemic, we encouraged patients in the recovery clinic to return to the ICU and interact with the clinical teams who cared for them during their illness. However, these visits were not routine and, with visitation restrictions imposed by the pandemic, ceased entirely. With the addition of the recovery clinic, we have been able to more routinely share patient recovery narratives with our ICU teams. This has potential to improve moral distress and burnout in providers, including nurses, RTs, physicians, and others.

Financial Considerations

Financial support for recovery clinics is an evolving field, with many clinics relying on a mix of grant funding, volunteerism, and billing. As part of the recovery clinic, RTs can provide multiple billable services, as described above, including inhaler teaching, in-clinic spirometry, exercise testing, and arterial blood gas sampling.[46]

Discussion

As described above, little systematic research has been published on the role of the RT in a recovery clinic. Future investigations should assess the impact that RTs have on patient-centered outcomes, such as dyspnea scales, quality-of-life scores, or even exacerbations of pulmonary disease. In addition to more-detailed research on the impact of having RTs involved in recovery clinics, improvements in respiratory therapy educational practices are needed. Currently, most RT training curricula include little to no information on post–intensive care syndrome. Future investigators should also examine the optimal ways to teach future RTs about post–intensive care syndrome and their potential role in its management. Involvement in recovery clinics may also be a way to reduce burnout in RTs by improving their awareness of some of the positive outcomes after the ICU.

Summary

RTs have a broad skill set that makes them uniquely suited to caring for patients in their transition from the ICU to home. The RT is a key member of any recovery clinic,

both in the assessment and management of dyspnea and pulmonary disease. Future research should be directed at quantifying the impact of RTs on outcomes in the ICU recovery population.

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