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The Hospital Course of a Successfully Treated Patient with Respiratory Failure

Beginning to End!

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The successful treatment of a patient with acute respiratory failure is a complex undertaking that requires clinical competence, evidence-based interventions, seamless coordination of care transitions, and transparent open communication among all members of the health care team. Many of the processes of care in these critically ill patients are reassuringly consistent across services, across hospitals, across health systems, and even across the country. Although the clinical course of such complicated patients can be extremely unpredictable, we are fortunate that the professional, technical, and psychosocial aspects of care for these patients can be relatively orderly, evidence-based, and transparent. **Key words:** *acute respiratory failure*, *care transitions*, *communication*, *continuum*, *critical care*, *emergency department*, *health care team*, *ICU*, *post-acute care*

WHEN a patient with new-onset acute respiratory failure hits the door of the emergency department (ED), what exactly happens? What can the patient and his or her family expect? What can the staff expect? Whether it is a trauma patient, a burn patient, or a critically ill medical patient, many of the processes from initial evaluation to endotracheal intubation are surprisingly and reassuringly consistent across services, across hospitals, across health systems, and even across the country. Although the clinical course of such critically ill patients can be extremely unpredictable, we are fortunate that the professional, technical, and psychosocial aspects of care for these patients tend to be relatively orderly, evidence based, and transparent. To better understand the processes that lead to a successful outcome, let's dig a little deeper into the specifics that we should expect to see at each stop along the way.[1,2]

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THE ED

When a patient suffers from a severe burn, acute trauma, or an acute exacerbation of a cardiac, pulmonary, or cerebrovascular illness, the first stop is usually the ED. Whether it is by ambulance or by private vehicle, when a new patient hits the door of the ED, the first important task is appropriate triage. If it is an ambulance arriving, the ED nursing staff has usually already been in contact with the paramedics and is prepared to place the patient with respiratory failure immediately into a critical care, trauma, or resuscitation suite.

Once the patient has been identified as a seriously or critically ill patient with respiratory failure, multiple protocols for nursing, ancillary staff, and providers are

usually activated rapidly. Rapid evaluation of the patient with a respiratory problem will often simultaneously include a rapid history (if possible to obtain), a rapid physical examination based on the "ABC" critical factors ("ABC" for airway, breathing, and circulation), an electrocardiogram, a chest radiograph, an arterial blood gas (ABG) study, and routine "STAT" laboratory values (generally including a complete blood cell count, chemistries, troponin, and coagulation parameters).

During this initial assessment or after a review of the chest radiograph and blood gas, a decision may be made at that point to proceed with endotracheal intubation for (1) hypoxemic respiratory failure, (2) hypercapnic respiratory failure, (3) or both, or for (4) airway protection. Although some patients may arrive in the ED already endotracheally intubated on a ventilator, the decision to intubate is usually made in the first few minutes after arrival in the ED. Once the decision has been made to place the patient on ventilatory support, a whole host of care processes begin.

First and foremost, it is important to try to provide a safe, high-quality, controlled environment for endotracheal intubation whenever possible. This includes appropriate hemodynamic monitoring, appropriate sedation, and the use of advanced equipment such as a fiber-optic bronchoscope or glidescope to ensure the precise placement of the endotracheal tube. Most hospitals now utilize advanced best practice protocols for rapid emergency endotracheal intubations. Once the decision is made to place the patient on the ventilator, a request is made to notify the intensive care unit (ICU) to prepare for the patient's arrival. Although trauma and other surgical patients may make a stop in the operating room on the way, the ICU should be immediately notified that a new critically ill patient with respiratory failure on a ventilator will need its care. It is typical in most institutions, if time allows, for the ICU nurse and the critical care provider to make their way to the ED to evaluate the patient there before the patient is actually transported to the ICU. It is during these early critical minutes that ventilator settings and orders, sepsis protocols, and many other evidence-based standardized order sets may be appropriately initiated. It is interesting to note that during this time that seems to be absolute chaos in the ED to the untrained eye is precisely the time and the place when some of the most important standardized diagnostic and treatment plans for the patient are begun.

Perhaps, the most important piece of the initial evaluation and care plan for a new patient with acute respiratory failure is simply *communication*! Most experienced nurses and care providers know how critical it is to keep family informed of exactly what is going on in this rapidly changing environment. Excellent communication with the family is also the key to establishing the trust and rapport with family members that will be necessary to rely on when discussing lifesaving decisions that often must be made very quickly and with very little warning both in the ED and later in the hospital stay. In addition, utilizing additional team members (such as an ED social worker, the chaplain, and the case manager) can provide a great deal of additional support to the family while easing the time burden of the very busy frontline nursing and physician staff.

The patient has been placed on the ventilator, initial orders have been instituted, and the patient is now ready to move to the ICU. What happens next? The transport itself needs to be considered. A critical care transport, even if just down the hallway, can be quite an adventure with a critically ill patient on a ventilator! Among all the intravenous catheters, the monitor, and the airway/ventilator paraphernalia, we will also see an RN, a respiratory therapist, a transport specialist, and often 1 or 2 others (including physicians, physician assistants, and advance practice nurses) who may accompany our patient from the ED to the ICU. It can be quite the complex entourage.

THE ICU

An ICU, it is often said, is a place dedicated to "diagnosis and stabilization." Upon arrival in the ICU, our newly intubated patient with acute respiratory failure will often experience a 2-fold approach: (1) medical management directed at stabilization of vital signs, and (2) human interventions directed at patient comfort and reassurance. This is a very difficult thing for nursing, respiratory therapy, and medical providers to accomplish. While addressing respiratory compromise (hypoxemia, hypercapnia, respiratory distress, discomfort, or "bucking" the ventilator) and potentially life-threatening changes in hemodynamics (sudden elevations or decreases in blood pressure and/or heart rate, sudden swings in neurologic or mental status, or cardiac arrhythmias), the staff of the ICU must also try to calm and reassure the patient and try to make the environment seem less threatening, less scary, and quieter—a Herculean task to say the least!

It is usually just after the arrival in the ICU when many of the more practical aspects of critical care begin to take place: central venous catheter and/or arterial line placement, ensuring that lifesaving medications are received in a timely manner, and with regard to the ventilator, addressing any necessary ventilator changes that the patient's respiratory dynamics, changing situation, or blood gas results may dictate.

In addition, plans for additional diagnostics (such as computed tomographic scans, magnetic resonance images, ultrasound scans, or others diagnostic procedures) and any additional subspecialty consultations are planned out and requested. Last but not least, the ICU team must be continuously aware of the emotional stress and sensitive to the numerous questions that both the patient and his or her family are likely to present.[3]

THE ICU: "THE MORNING AFTER"

The morning after ICU admission is often the most important time for the medical team and the family to individually and jointly evaluate the patient's complex medical, social, and psychological conditions. Although a definitive diagnosis may or may not be available at this point in time, often enough information is known for the medical team to present some coordinated information regarding diagnosis and prognosis—albeit they may be limited at this early stage. Likewise, the family and/or the patient him- or herself will have had a little more time to get past the shock of the prior day or evening's events and begin to more rationally digest the gravity of their situation.

In these instances, discussions of patient's wishes regarding life-sustaining treatments tend to be more detailed and more specific. Perhaps, the patient and/or his or her family has decided that they want a "trial" of ventilator care for a few days or a week, and if they are not making "progress" at that point in time, they would consider ventilator withdrawal. Perhaps, a lost or unknown advance directive or "POLST" (Physician Orders for Life Sustaining Treatment) form has been found and brought to the hospital. Not uncommonly, family members of an elderly comatose patient on a ventilator will decide at this time that their loved one would not have wanted advanced life support measures and request removal of the endotracheal tube and all aggressive measures with a change in direction to "terminal" or "comfort" care. The "morning after" in the ICU is always a busy, emotionally intense, and rapidly changing place!

So let's assume for a moment that it is the "morning after" in the ICU, and our new patient on ventilator is going to press on in hopes of a meaningful, quality recovery with lots of quality life in the future. In this scenario, the all-important "multidisciplinary team rounds" may take place. After physicians and other providers have rounded early in the morning and after the nursing staff and the respiratory staff have given their reports and sign-outs, many units hold a "team meeting" or "team rounds" on their sickest patients. In the ICU, this type of "team

rounds" or meeting will usually include the pulmonary/critical care physician or his or her designee, a trauma surgeon if indicated, the bedside RN, the respiratory therapist, and the charge nurse. In a few advanced ICU models and in most long-term acute care hospital (LTACH) settings, this meeting will also include physical therapy (PT), occupational therapy (OT), speech or communication therapy (CT), the dietitian, the social worker and/or the case manager, and often a psychologist and/or a chaplain. These multidisciplinary team meetings are usually scheduled 24 to 48 hours after the patient is admitted and are usually repeated every few days in the rapidly changing ICU or LTACH setting.

In addition to the exchange of critical medical information as reported by the providers, the nursing staff, and respiratory therapists, the patient's social worker and/or case manager will discuss options for further care needs beyond the ICU, as well as any new or pressing patient or family desires with regard to the type of or aggressiveness of the care to be delivered.

Finally, in the advanced ICU and LTACH models that support full-time PT/OT/CT, the therapists will report on the patient's physical/occupational/speech/communication status, needs, and concerns for ongoing therapy in the post-ICU and/or post–acute care environments so that both current and future needs can be addressed and planned for.[3]

THE REST OF THE ACUTE HOSPITAL STAY

Some of our patients with acute respiratory failure who require ventilator management will die quickly in the ICU or even in the ED. Some patients (usually their families) will request the withdrawal of ventilator support in the first hours or days of an ICU stay—this is especially common in elderly patients with a poor prognosis due to their underlying disease and is yet another example of why completing advance directives and "POLST" forms, where available, are critically important. Such advance planning, especially with the specifics in "POLST," can be extremely helpful to both caregivers and family in taking the "guess work" (and often the inappropriate use of "heroic measures" that the patient did not want) out of the equation.

For our patients on the ventilator who do not die early in their course in the ICU and do not change over to "comfort" or "terminal" care, we continue aggressive management. The pulmonary/critical care physician and/or the trauma surgeon will begin to do frequent evaluations of the patient's ability or "chance" to "wean" from the ventilator once the patient has been stabilized and his or her oxygenation requirements have been reduced down to a reasonable range (generally to an FIO_2 of $\leq$50%).

In years past, assessments for readiness to "wean" from the ventilator were usually done once each morning, one adjustment to the ventilator was made, and the patient would be reevaluated the next day. Best practices now dictate more frequent measurements (generally gathered from ventilator data by respiratory therapists)—often multiple times a day—to assess readiness to wean from a ventilator. Instead of 1 adjustment per day to the ventilator settings, newer "vent weaning protocols" rely on the relationship between the physician and the ICU or LTACH respiratory therapists to make multiple adjustments to the ventilator settings in "real time" throughout the day and night to dramatically shorten the time that the patient is dependent on the ventilator. Many patients, who just a few years ago were on the ventilator for weeks, are now routinely weaned from the ventilator in a few days to a week.

For the patient who is successfully weaned from the ventilator in a few days or a week or so, the rest of the hospital course is often a bit easier and more predictable than the ICU portion of the stay. Most patients, upon being extubated or "weaned" from the ventilator, are transferred in a few hours or by the next morning to either a telemetry unit or the medical ward, depending upon their monitoring needs. On the telemetry and medical wards, these patients are continued

on aggressive medical and respiratory therapy and usually have PT and OT hours increased. Once they are off of the ventilator, the speech/communication therapists focus on issues ranging from hoarse voices and vocal cord paralysis to dysphagia and risk for aspiration. Meanwhile, the dietitians get busy adjusting the patient's diet to an advancing oral regimen from what was likely either an "NPO" (nothing per oral) or tube-feeding regimen while on the ventilator. As one can clearly see, the ancillary staff and therapists' workload increases dramatically once a patient has been liberated from a ventilator!

But what about the patient who does not easily "wean" from the ventilator? What are our options in that scenario? There are a small, fixed, but substantial number of patients who simply cannot be liberated from the ventilator in a few days or a week. Once a patient has "failed" multiple "weaning attempts" over at least a 7-day period, they are said to suffer from "ventilator-*dependent* respiratory failure." This represents a very special and very difficult subset of patients. Many of these "ventilator-dependent" patients will wean successfully from the ventilator if given the time and the care. Years ago, it was estimated that only 35% to 40% of ventilator-dependent patients with respiratory failure were liberated from the ventilator, but with advances in ventilator weaning protocols and care, today upward of 80%+ of these patients are routinely weaned from the ventilator, with an average wean time of just a few weeks![4]

Most of these ventilator-dependent patients receive a tracheostomy between 7 and 14 days into their course of care. The tracheostomy is needed to prevent the dangerous complications associated with pressure placed on the trachea from an endotracheal tube over extended time periods. Most of these ventilator-dependent patients receive a surgically placed feeding tube at or around the same time that they receive their tracheostomy. Some of these patients will remain in the ICU at the short-term acute care hospital after their tracheostomy is placed to continue ongoing weaning trials. However, some clinicians recognize that the ICU is first and foremost for diagnosis and stabilization of new critically ill patients and that some of our ventilator-dependent patients may do well in a specialized unit such as an LTACH.[5]

While short-term acute care hospitals are generally designed to cater to patients who are in the hospital for a few days, LTACHs are designed to care for patients who need "extended" acute care for weeks on end. Most importantly, many LTACHs have designed specific treatment protocols for ventilator-dependent patients with respiratory failure, or what has recently been called "the chronically critically ill," in hopes of liberating them from the ventilator and returning them home in as fast, comfortable, and efficient manner as possible. Data from LTACHs over the past several years have been very encouraging with regard to wean rates for ventilator-dependent patients with respiratory failure—with success rates often topping 80%.[4]

In addition to ICU-type care with physicians, nurses, and respiratory therapy, the LTACH model incorporates the "rehab" version of therapy modalities with aggressive PT, OT, and CT interventions provided in a multidisciplinary fashion even while the patient may still be on a ventilator. Whether our patient with respiratory failure remains on the ventilator in the ICU in the short-term acute care hospital or is transferred to the LTACH, it is vitally important that all therapy modalities (PT/OT/CT) as well as the dietitian, the psychologist, the social worker, and the spiritual care team be intimately involved in the patient's and family's journey. The longer the patient remains in our care, the more important it is to ensure that his or her care is truly "multidisciplinary" and involves the patient and his or her family at every step of the process. Fortunately, "best practice" and "evidence-based" protocols are now including these multidisciplinary aspects of care within the patient's overall plan of care. This "holistic approach" to the critically ill is likely to continue to improve outcomes and quality of life for these patients in the years to come.[3,6]

MOVING DOWNSTREAM

Whether a patient is liberated from the ventilator in the ICU of the short-term acute care hospital or in an LTACH, the patient's needs for ongoing acute care, therapies, nutritional support, psychological counseling, and spiritual care are often directly proportional to the length of time that patient has had to spend in the hospital. The patient who takes the longest to wean is likely to have the greatest needs in all of these other areas, and we must be very diligent in our excitement to "get 'em off the vent" that we do not "short change" their care on the back side of the health care "episode of care." Specifically, once the patient is off the ventilator, we must all make a concerted effort to develop an extensive and formal treatment plan involving all of the modalities listed earlier, with a realistic and compassionate time frame for the patient's progress through the different levels of post–acute care.[3,7]

Some recent ventilator-weaned patients, although traditionally it has not been the majority, may be appropriate for acute inpatient rehabilitation services. However, many may not be able to tolerate the 3 hours of therapy required to participate in most inpatient rehabilitation programs. Some patients may benefit from skilled nursing facility (SNF) care, with therapies as a transition, before becoming strong enough to return home. Some may require skilled therapies to achieve a group home or assisted living status. Still others may decide that this process was something that they would never want to repeat again and will, accordingly, opt for palliative care or hospice care. Both home health and geriatric psychiatric services are also very important resources to consider in this very special patient population. Finally, proper outpatient follow-up, especially with the individual subspecialist who knows the patient well (such as a particular pulmonologist or pulmonary group), is particularly important in designing a successful transition to the home environment after an episode of acute respiratory failure.

SUMMARY

A "successful discharge" can be measured and defined in many different ways.[3] For a patient with acute respiratory failure who finds him- or herself on a ventilator, whether due to a burn, trauma, or a medical illness, the world has been turned upside down. That upside down landscape that includes all of those incredibly stressful "life or death" issues and emotional turmoil is no better for the patient's family either. As medical professionals, but more importantly as caregivers, we have the opportunity to truly mix science with compassion when we meet and care for the sickest of our patients and their families.

With regard to the science part of our care, we must strive to incorporate best practices from evidence-based medicine whenever and wherever that information is available—which means keeping up with the latest guidelines and protocols that may benefit our patient care at each level of care whether that is in an ICU, an LTACH, the ED, an SNF unit, our office, or wherever that patient may be. At the same time, we must continue to strive to emphasize the human side of what we do—and how it affects each life that we touch. By rendering the best of care with the best compassion we can muster, we give each of our patients the best chance for a quality outcome—quality of body, mind, and spirit.

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