Providing palliative care for patients receiving mechanical ventilation in an intensive care unit

Part 2: Withdrawing ventilation

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Mechanical ventilation is often withdrawn from patients in expectation of death in intensive care units (ICUs). This process involves close collaboration between families and loved ones, physicians, nurses, respiratory therapists, and other healthcare providers. Because withdrawal of ventilation has important symbolic meaning to families and healthcare providers alike, it is a critical aspect of quality end-of-life care. This paper outlines the process of withdrawing both invasive and non-invasive mechanical ventilation in a hospital setting. We recognise the clinical significance of home ventilation and respiratory support in the setting of chronic critical illness, though will not address this topic here.

The shift from focusing on recovery to delivering palliation is common in the ICU (1). At some point in the ICU stay, part of the palliation strategy may involve withdrawal of mechanical ventilation. The trigger for considering ventilation withdrawal from an individual patient could be worsening of the acute condition related to ICU admission, progression of an underlying illness such as malignancy, or a lack of therapeutic response within a certain time period. The process of decision-making that guides patients, family members, loved ones, and healthcare providers in this transition to withdraw mechanical ventilation is complex and may proceed at a different pace in certain involved groups. Although ICU mortality prediction models initially may be helpful in placing a patient’s severity of illness in context, they are not particularly specific at an individual level and often ultimately do not affect decisions to limit care among the severely ill (2,3). Furthermore, these models' accuracy and discriminating power become increasingly limited as a patient’s ICU stay lengths (4). Physicians' judgements about severely ill patients' mortality may be comparable in fact to statistical models (5). Recent research has also shown that the strongest determinants of the decision to withdraw mechanical ventilation were not patients' age, burden of organ dysfunction, or overall illness severity, but rather physicians' perceptions that the patient preferred not to use advanced life support and their predictions that patients had a very low likelihood of survival (6). Therefore, we believe that although measures of illness severity have a place in the overall assessment of a patient’s critical illness, basic clinical judgement remains the key determinant of the consideration of ventilation withdrawal.

When coming to the decision to withdraw mechanical ventilation, it is critical to provide families with timely, honest information and to have patience. Family members' specific needs may be gauged with the Critical Care Family Needs Inventory, a short questionnaire (7). Early in the withdrawal-of-care decision process, the ability of the patient to participate in the discussions must be considered. Most patients in this situation are deeply sedated and unable to participate in these discussions. Other patients, however, may be fully cognisant of their environment. It is important in this situation that the patient’s autonomy not be overlooked and that they participate fully in the discussion surrounding withdrawal of care. At this time, ICU team members should attempt to resolve any staff member or family-staff disagreement about the decision to withdraw care, because a unified team will deliver more consistent patient and family care (8). Such conflict between staff and families and among staff members may occur in as many as half of all cases in which withdrawal of care was being considered (9).
WITHDRAWING MECHANICAL VENTILATION

Once the decision has been made to withdraw mechanical ventilation the process should be completed over a time course that will minimise patient discomfort yet is agreeable to family members, loved ones, and the ICU staff. As others have emphasised, there is no ethical difference between withdrawing mechanical ventilation or any other type of life support. What is important about withdrawing mechanical ventilation is that it should not be abruptly stopped as could tube feedings or haemodialysis. Also, mechanical ventilation has a special symbolic meaning for many family members. Clinicians in some medical centres have developed standardised protocols and order forms for withdrawing support in ICUs (10). Below, we outline in greater detail the steps that are important in the process of withdrawing mechanical ventilation.

Preparing the patient and room

Family members generally value being able to touch, hug, and hold their family member after withdrawal of ventilation. Therefore, ICU staff should be allowed to clean the patient, change the patient’s bedsheets and hospital garments, and comb or brush the patient’s hair. Aside from adequate venous access to allow intravenous medications to be given and possibly a bladder catheter, other catheters, monitoring leads, restraints, or feeding and suction tubes can be removed. These do not provide palliation and may be given and possibly a bladder catheter, other catheters, monitoring leads, restraints, or feeding and suction tubes can be removed. These do not provide palliation and may serve only to distract family members.

It is helpful to remove as much of the mobile equipment in the room as possible, replacing it with chairs for family members. Avoiding harsh, bright lighting and excessive noise in the patient’s room is helpful. If possible, attempts should be made to foresee withdrawal of care and move the patient to the least chaotic area of the ICU in the day or two preceding withdrawal. Location of the patient who is about to have the ventilator withdrawn is especially important in certain circumstances, such as when a patient in an adjacent room is requiring vigorous resuscitation.

The ICU staff should ensure that cultural preferences are respected. For example, some families wish to have spiritual services performed before or after withdrawal. Others have specific requests for handling of the patient’s body after death. Pastoral or other spiritual care providers should be notified if the family wishes.

Finally, the staff should establish whether the family would like to be present when the actual withdrawal of ventilation is performed and relax any visitation limitations. Overall, we try to consider that the circumstances of the patient’s death – the appearance of their face, the atmosphere in their room, the behaviour and support of the staff during and after the withdrawal – will be remembered by some family members for decades to come.

Preparing family members for the course of events

We have found that many family members appreciate a detailed explanation of what likely will happen during the withdrawal. It is important to establish whether the patient would prefer to have the endotracheal tube removed or not. It is difficult to predict how patients will appear following withdrawal of the ventilator, especially if the endotracheal tube is removed. Explaining these uncertainties to families and loved ones is important. It is also valuable to help them understand that reflexive gasping or upper airway noises may be heard that are not a reflection of discomfort in most cases – but are also sounds that cannot readily be suppressed pharmacologically. Overall, family member satisfaction in the setting of death and dying is associated with good quality family member–physician communication (11). Because there may be some family member confusion regarding important aspects of patients’ medical situation as well as some reluctance on their part to participate in some of the elements of the decision-making process, patience on the part of the ICU staff is important (12,13).

Sedation and analgesia

Ensuring that patients are comfortable before and during the withdrawal of ventilation is the ICU staff’s primary goal. Some staff members may have concerns about the dosing of sedatives and analgesics required to achieve full comfort, mainly because higher doses may accelerate a patient’s death. Studies document that the use of narcotics and benzodiazepines during withdrawal of mechanical ventilation does not hasten death and that these concerns are unfounded (14). At the time of withdrawal, most patients are already receiving continuous infusions of sedatives such as benzodiazepines or propofol and analgesics like morphine or fentanyl. These medications must be titrated during the process of withdrawal to ensure comfort. Providing nurses with orders permitting their close titration as well as ‘anticipatory dosing’ and bolusing of these medications helps better to match perceived symptoms and appropriate dosing of medication (1).

Issues regarding neuromuscular blocking agents

Some of the most critically ill patients may receive neuromuscular blocking agents to reduce oxygen demand and improve ventilator synchrony. Because clinicians may not always be certain that a paralysed patient is adequately sedated, neuromuscular blocks should be stopped before ventilation is withdrawn and certainly never be administered around the time of withdrawal consideration. If a patient were to receive neuromuscular blocks after the ventilator was withdrawn then any spontaneous ventilatory function would be suppressed, effectively forcing death.
Many believe that mechanical ventilation cannot be withdrawn ethically if neuromuscular function has not returned to baseline. Considering that as many as a quarter of patients who receive mechanical ventilation for a week or more may develop nerve and muscle dysfunction in the ICU (15), clinicians may be challenged in the setting of proposed ventilator withdrawal from the patient who has received neuromuscular paralysis and still shows signs of muscular weakness after medication removal. We believe that, in most cases, close monitoring of the depth of muscle paralysis will allow clinicians to avoid complete or persistent paralysis after neuromuscular withdrawal. A reasonable approach has been suggested by Truog and Burns who argued that it is defensible to withdraw mechanical ventilation from patients who have received neuromuscularic agents and who still manifest signs of neuromuscular weakness if death will likely be rapid after withdrawal or the burden on the patient and the family of waiting for the medications to clear exceeds the potential benefit of uncovering this baseline level of functioning and comfort (16).

**Type of withdrawal**

There are two basic scenarios that clinicians face when withdrawing mechanical ventilation. In the first, a fairly rapid death is expected after withdrawal. In the second, the rapidity of death is uncertain and survival may in fact be possible. In the second scenario, the patient's expressed or perceived wishes may be to not remain ventilated (and not be re-intubated). Such a decision to withdraw the ventilator is clearly difficult to make, and is based on a variety of possible clinical variables (e.g. illness severity, extent of ventilator support, severity of hypoxaemia), patient wishes, family factors, and a host of less tangible factors. This decision point is important because it directs the approach to extubation as well as the use of sedatives and analgesics.

*Withdrawing the ventilator with no expectation for survival*

There is no best way to withdraw mechanical ventilation and little research has been performed on what specific protocols lead to optimal perceived comfort. Nevertheless, the majority of families think that overall their loved ones die in comfort during the process of withdrawal of care in ICUs (17). Before proceeding to withdrawing the ventilator, patients should have no visible pain or anxiety.

After ensuring adequate sedation and analgesia, we then reduce the content of oxygen provided to room air (FiO2 0.21). Next, PEEP is quickly tapered off. Because comfort is the goal, there is no best mode (pressure support, volume assist-control, volume intermittent mandatory ventilation, etc.) for all patients. Instead, we place the ventilator in whatever mode appears to provide a reasonable level of comfort – which is typically the mode in which they were previously supported. During the 5–10 min following FiO2 reduction, we try to adjust the level of sedation and analgesia to relieve any new tachypnoea and agitation. It may be necessary during this time to alter slightly mechanical ventilator settings (e.g. respiratory rate) to improve patient-ventilator synchrony while medications are titrated. After the patient appears comfortable, we titrate the level of either pressure or volume support and the set respiratory rate to zero over the next 5–20 min at a speed dictated by patient response to these changes. At this point, the ventilator is disconnected from the patient, either by removal of the endotracheal tube or by turning the ventilator off and placing the patient on a T-piece with humidified flow-by-air. We try to suction the patient's mouth, posterior pharynx, and endotracheal tube gently once more if the endotracheal tube itself is being removed. Although in our practice we remove the endotracheal tube after turning the ventilator off, there is no definitive data to support whether endotracheal tube removal versus T-piece utilisation improves the quality of death (18–20). It is important to keep in mind the level of ventilatory support the patient is receiving before beginning the withdrawal process. Those who require high inspiratory pressures and PEEP are more likely to experience quicker deaths and also require more aggressive analgesia and anxiolyisis during pre-withdrawal de-escalation of ventilator support than patients currently receiving lower levels of ventilator support. For these ‘sicker’ patients, it is often better to have family members close by if they wish to be involved in the withdrawal process or be present while their loved one dies.

*Withdrawing the ventilator from patients who may survive extubation*

There are many patients who have expressed wishes not to be maintained for prolonged periods on mechanical ventilation but who may be placed on mechanical ventilation in hopes of short-term recovery. Often, when the medical team, family members, or the patients themselves feel that they have benefited maximally from mechanical ventilation. At this time, a decision is made to remove the mechanical ventilator with the understanding that if the patient develops dyspnoea, pain, or agitation they will not be re-intubated and may die from their underlying condition as a result of respiratory failure. In this circumstance, every effort is made to maximise the chances that the patient will be successfully extubated.

The patient ideally should be awake, alert and able to follow commands. The patient should be placed in a position favourable to spontaneous breathing (generally sitting up). Following extubation, the staff should monitor the patient closely so that any dyspnoea or discomfort can be rapidly and effectively addressed. If, over time, the patient's level of discomfort increases, increasing doses of narcotics or benzodiazepines should be given and eventually continuous parenteral drips may be needed. Although
some clinicians may consider using BiPAP in the setting of post-extubation respiratory distress, this modality does not improve extubation success and likely serves in this situation only to delay appropriate pharmacological symptoms control (21).

**Withdrawing non-invasive ventilation**

There is little published experience with optimising the actual withdrawal of NIV. With the case of NIV, the patient’s cognitive function may be intact, allowing them to participate in the decision-making, timing, and course of withdrawal, including the control of symptoms. As with invasive ventilation, pain, agitation, and apparent dyspnoea should be controlled initially, though to a degree appropriate for the planned outcome (rapid death versus possible survival). For patients that are expected to survive, there are many standard protocols for weaning from NIV (i.e., liberation) that typically consist of reductions in pressure support as the prior abnormalities in oxygenation and/or ventilation improve. However, for those who either wish to be removed from the ventilator or are perceived not to want prolonged life support, a more rapid approach should be followed. For these persons, we first titrate supplemental oxygen to room air levels over the course of 10 min, titrating analgesic and anxiolytic medication appropriately. If the patient appears comfortable, we remove the set rate (if applicable) and reduce the inspiratory and expiratory set pressures to zero at a pace dictated by perceived patient comfort (usually 5–10 min). Last, the patient’s mask is removed and the ventilator turned off. Patients who possess better mental status may prefer simply to remove the mask straightaway.

**After withdrawal of mechanical ventilation**

Many patients die quickly after removal of the ventilator. Others may survive for hours or even days; some even longer. In all cases, we allow families and loved ones to spend as much time alone in the room with the patient as they need. In some cases, clinicians may feel that the patient might be best served in a ward room because they are felt to be unlikely to die in the hours or day following withdrawal of ventilation. For these patients, a palliative care ward may be the most appropriate next step. However, in such cases families may be reluctant to leave the ICU because this would disrupt the tight bond that has developed between them, the staff, and the patient.

Palliative care professionals can play a major role in the withdrawal process. This role will vary by breadth of palliative care services offered, the specific clinical setting, and patient’s culture. In some instances, the palliative care professional is an active participant in the family discussions leading up to withdrawal, co-ordinating and overseeing the withdrawal process, and providing support for the ICU staff, patient and family after the ventilator has been withdrawn. Some may manage patients able to be transferred to formal palliative care services if they live on after the ventilator is withdrawn and such a service is available. On the other hand, other palliative care specialists may assist primarily as a family member liaison after ventilation has been withdrawn. Their critical role in ongoing ICU staff support, debriefing, and grief counselling is important, as well. Palliative care professionals also may assist with organ donation and co-ordination of bereavement services. Although important to the process of withdrawal, these services are outside the scope of the current review and will be addressed in a future manuscript.

**SUMMARY**

Providing palliative care for the critically ill patient receiving mechanical ventilation involves maximising comfort and approaching ventilator withdrawal carefully when appropriate. Healthcare workers should give attention to end-of-life care in addition to curative care in ICUs, also seeking to measure and improve the quality of critically ill patients’ end-of-life experiences.

**REFERENCES**


