

Palliative withdrawal ventilation: why, when and how to do it?

Abstract

Palliative extubation consists of the withdrawal of mechanical ventilation when the absolute priority in care delivery is to afford comfort and allow for natural death to occur. It may be considered when all attempts at weaning from ventilation have failed and when maintenance of ventilatory support becomes futile and is a complex procedure that demands clearly defined and meticulous planning, as well as trained staff. However, despite the relevance of adequate planning and execution, the literature provides little information on how to perform palliative extubation properly. Most of published works are focused on specific aspects of the procedure, like communication skills, or the choice of drugs. Nevertheless, just a few articles provide detailed information about the whole process.

Considering the complex technical, ethical, emotional and scientific implications of palliative extubation, we reviewed the available data from the literature and developed a protocol whose main aim is to define and clarify this procedure to improve the quality and safety of the care provided to this population of patients. The protocol was implemented following approval by the ethics committee of our institution and the Technical Chamber for Palliative Care, Regional Medical Council of the State of São Paulo, Brazil.

Keywords: palliative extubation, palliative ventilatory withdrawal, end-of-life care

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Introduction

Technological advances in advanced life support in the intensive care unit (ICU) over the last few decades have enabled the recovery of many severely ill patients. Such patients did not have any chance of survival just a few years ago or, at minimum, would be compelled to live with serious sequelae and significant impairments to their quality of life. These technological advances also resulted in an evident change in the profile of patients admitted to the ICU. The number of chronically ill patients and patients with an irreversible clinical condition is increasing, and questions surrounding life prolongation through the available technological resources are becoming more prominent. Within this context, life-prolonging procedures are increasingly seen as futile treatment that causes unnecessary additional suffering and, in practice, do no more than prolong the process of death. The idea of limiting therapeutic efforts has emerged with the intention of delivering care more consistent with the true possibilities of these patients. This approach involves withdrawing or not starting life-prolonging procedures and/or treatments for patients with an irreversible condition that causes unbearable suffering. The sequence of cessation of life-prolonging procedures may vary, but as a rule, ventilatory support is the last to be discontinued (palliative extubation), as it tends to be a stronger determinant of immediate death.¹

Palliative (or compassionate) extubation consists of the withdrawal of mechanical ventilation when the absolute priority in care delivery is to afford comfort and allow for natural death to occur. Palliative extubation may be considered when all attempts at weaning from ventilation have failed and when maintenance of ventilatory support becomes futile. It is also an option when the patient's quality of life is unacceptable and without any hope of improvement or when it becomes clear that support is causing unnecessary suffering.² These

notions should be reinforced such that palliative extubation not to be seen as a way to accelerate death and should not be performed when the assessment of the irreversibility of the patient's condition is incomplete or inadequate. Direct patient benefit is always the essential goal of palliative extubation, thereby avoiding subjecting patients to suffering incommensurate with their actual situation.

Palliative extubation is a complex procedure that demands clearly defined and meticulous planning, including clear communication among all the actors involved.² Inadequate planning may result in significant suffering for patients and may cause symptoms such as severe pain or dyspnea following extubation in addition to significantly increasing the risk of difficult bereavement for the attending family members. However, despite the relevance of adequate planning and execution, the literature provides little information on how to perform palliative extubation properly.³⁻⁵ Even the main published guidelines include scarce statistical data and are primarily based on the clinical experience at institutions and address ethical and legal aspects, which certainly do not result from conventional scientific evidence.⁶

Considering the complex technical, ethical, emotional and scientific implications of palliative extubation, we reviewed the available data from the literature and developed a protocol whose main aim is to define and clarify this procedure to improve the quality and safety of the care provided to this population of patients. The protocol was implemented following approval by the ethics committee of our institution and the Technical Chamber for Palliative Care, Regional Medical Council of the State of São Paulo, Brazil.

Preparation for extubation

The step prior to the actual extubation is perhaps the most important in the entire process. All the published studies on this subject unanimously stress the relevance of effective communication among

staff, patient and family and emphasize that this is the most crucial aspect of the preparatory step.⁶ Heterogeneity in values, expectations and beliefs may behave as an unsurmountable barrier in some cases, for which reason clear communication is the foremost aspect in this stage of the process.

The main aim of this stage is to achieve a consensus among staff, patient and family. When necessary, participation of a physician trusted by the patient or consultation of the institutional ethics committee may be useful.⁷ Honest and proper communication and a compassionate approach allow a consensus on the most adequate plan of care to be reached in up to 96% of cases.⁸

Initial multidisciplinary team meeting

The aim of the first meeting is to establish the irreversibility of the patient's clinical condition, rule out possible additional therapeutic options, and achieve a consensus as to the indication for palliative extubation.² The meeting should be attended by the staff members who provide care to the patient, particularly physicians, nurses, psychologists and physical therapists.

Review of the diagnosis, therapeutic interventions previously performed, and the patient's clinical progression is essential to the understanding of his or her clinical situation and to define the next steps. Particular attention should be paid to the respiratory status (parameters needed to sustain life) and expectations after extubation. This information is helpful during the subsequent meeting with the patient's family to avoid unrealistic expectations. It is worth observing here that palliative extubation does not necessarily result in immediate death. A prospective study conducted at the University of California found a median of 54 minutes between extubation and death, although some patients died much later, after a period of up to 165 hours.⁹ In another study performed at the University of Washington, the median time from extubation to death was 35 minutes, and some patients died after 890 minutes.¹⁰ Some clinical parameters have been associated with survival shorter than 60 minutes after palliative extubation: pH 7.32 or lower, respiratory rate equal to or lower than 10 breaths per minute, systolic arterial pressure lower than 84 mmHg, PEEP >10cm H₂O, peak inspiratory pressure >35cm H₂O, FiO₂ > 70%, use of vasopressors and no analgesia.⁹ The time to death tends to be longer among female and older patients.¹ Although these parameters are not precise, they may be helpful to the medical staff during talks with patients and their families so that the decision to perform palliative extubation is as conscious as possible.

Documenting the discussions and participants in such meetings in the medical records provides relevant support to the palliative extubation process and serves as the basis for the following steps.

Meeting with the family and/or patient

The main aims of the first family meeting are to clarify the patients' clinical situation and his or her true perspectives and to establish a consensus of objectives among all the actors involved. According to current recommendations, all staff members involved in the patient's care, particularly physicians, nurses, physical therapists, psychologists, chaplains and social workers, should participate in this meeting, in addition to all close family members responsible for decision making. When the patient is conscious and able to make decisions, the meeting should be preferably held at the bedside, including the patient in the decision-making process. The full diagnostic and therapeutic process should be reviewed with the patient and family.^{2,11,12} The patient's values, beliefs and explicit desires stated while conscious should be

understood and taken into account, and this time of active attention to their desires should be considered as a crucial part of the meeting.

Next, the available options should be clearly presented, including palliative extubation, which should be explained in full detail. Providing room for all involved actors to state their doubts is relevant to avoid placing any undue pressure on the decision to be made. Doubts regarding the meaning of palliative extubation (e.g., difference from euthanasia) should be prioritized and exhaustively clarified. While from the ethical point of view, withdrawal of advanced support is equivalent to not providing any support, several studies found that withdrawal of therapeutic measures is emotionally more challenging and uncomfortable to the family and staff than the decision not to start some procedure. In addition, each family needs their own time to make this type of decision.^{13,14} Adequate choice of words is also relevant during meetings. Avoiding terms such as "discontinuation" and "withdrawal" of ventilatory support and medical care is advisable, as the family might interpret them as abandonment or disregard.⁶ By contrast, one should reinforce the positive aspects of palliative care (care, support, comfort and relief of suffering). Whenever needed, additional meetings may be held to afford time for the family to understand the process and make the decision more calmly.¹⁵

It is worth observing that communication with the patients and their family is not restricted to these formal meetings. Care in the words used, empathetic attitudes and consistency in the content of talks should pervade all occasions in which a staff member is called by the family, who then should clarify their doubts and be sympathetic to their distress. A continuous compassionate attitude facilitates the process of decision making and significantly reduces the risk of posttraumatic stress among family members.

Once the decision to extubate is made, the details should be established in a meeting with the family (and the patient when possible) including the following: probable date and time of extubation; people who would like to be present; special rituals, music or prayers the family would like to perform before the procedure; and how children will be told and involved in the process.¹⁶

Documenting the discussions and participants in such meetings in the medical records is crucial for the following steps of the process. The staff's intention (to relieve the patient's symptoms and suffering) should also be clearly recorded, as should accounts for the possible need to administer medication (opioids and benzodiazepines in particular) in doses above the standard ones according to the principle of double effect. Lack of proper records involves risk of misunderstanding by other healthcare professionals and family members or of performing procedures incommensurate with the patient's condition.

Preparatory procedures

Once the decision is made together with the family, the staff should start the practical procedures, suggested in Table 1. A preparatory multiprofessional meeting might be needed to answer the questions or address the discomfort of the team members, ensuring that all members have full certainty as to the strategy adopted.¹¹ The desirable level of consciousness during the postextubation period (conscious and calm, asleep, profoundly sedated) should also be established in this meeting.

The date and time of extubation should be scheduled at the end of the multiprofessional meeting for the involved professionals to duly prepare. The family should be informed of the schedule as soon as possible so that they have time to prepare themselves.

Table 1 Recommended practical preparation before palliative extubation^{17,18}

Review procedures which might be withdrawn and whenever possible discontinue the ones that cause discomfort (tubes, lines, monitors, etc.) and the ones inconsistent with the patient's actual condition (vasopressors, antiarrhythmic agents, etc.).

Observation: Vasopressors may eventually be discontinued only after the procedure once their role in ensuring the circulation of the medication to be administered is fulfilled.

Discontinue neuromuscular blockade (at least 2 hours before the procedure; among patients with multiple organ failure the action of these drugs may continue for up to 18 hours).

For patients under dialysis, remove as much volume as possible before extubation. Discuss definitive discontinuation of dialysis after extubation, including removal of catheters that may cause discomfort.

Discontinue futile routine measures (sample collection for tests, checking vital signs, etc.).

Reinforce in the medical records that life-prolonging measures should not be started (resuscitation, antibiotics, hemodialysis, vasoactive drugs, etc.).

Review the need for artificial hydration and nutrition, which should be discontinued preferentially 24-48 hours before extubation, except when they afford some comfort to the patient.

Start medication to reduce pulmonary secretions (if the patient is not already receiving then) 12 to 48 hours before extubation: scopolamine 1.5 mg per hypodermoclysis or intravenous route for 24 hours (0.25 mg every 4 hours or continuous infusion). Patients with excess secretions or poor response to scopolamine may be given propantheline gel 15 mg/ml to the retroauricular region 3 times per day or 0.5% atropine (eye drops) 1-2 drops sublingually every 6 hours.

Maintain an intravenous line (or hypodermoclysis when intravenous lines are unviable).

Intensify respiratory physical therapy before extubation and raise the head of the bed to 35-45°.

Prepare the equipment to drain secretions and nebulization and Guedel cannula for use during extubation.

Gather family.

Palliative extubation procedure

Surroundings

Ensuring peaceful surroundings is important. Unnecessary equipment should be removed to make room for the family and staff (when necessary provide additional chairs). Removing soft ties, mitts and other devices that hinder contact between the patient and his or her family may help reduce stress during extubation. Monitors and alarms should be turned off whenever possible, as well as television sets, radios and other devices, except when requested otherwise by the patients or their families.

Family involvement

Family members should be invited to be present during extubation. They should be informed that they will be requested to step out of the room for a moment when the cannula is removed to allow the physical therapist and nurse to suction and clean the patient (when the family requests to remain in the room they should be informed about what they will see). Allowing for rituals, prayers, etc., that are a part of the patient and/or family's beliefs is important. The presence of a psychologist, chaplain and/or social worker to provide support to the family throughout the procedure is highly advisable.

Table 2 Administration of opioids and benzodiazepines per intravenous route (preferentially) or hypodermoclysis (only when the intravenous route is unfeasible) as premedication for palliative extubation¹⁶

Patients receiving continuous fentanyl infusion	Give a bolus (25-50% of the hourly dosage) and next increase the infusion rate by 25%. For instance, if the patient receives continuous fentanyl infusion at 100 mcg/h, give a bolus of 25 to 50 mcg and then increase the infusion rate to 125 mcg/h.
Patient receiving continuous morphine infusion	Give a bolus (100% of the hourly dosage) and increase the infusion rate by 25%. For instance, if the patient receives continuous morphine infusion at 4 mg/h, give a bolus of 4 mg and then increase the infusion rate to 5 mg/h.

Premedication

The literature on the administration of medication before palliative extubation is scarce, and there are insufficient empirical data to support a precise indication of drugs and corresponding doses.⁵ As a rule, most institutions administer opioids and/or benzodiazepines as a function of the patient's needs based on subjective criteria and the staff's experience. In our institution, we routinely administer medication before extubation to avoid respiratory distress and/or pain as much as possible. Even when the patient seems comfortable before extubation, we recommend administering additional doses of opioids before the procedure to prevent discomfort. This approach is particularly useful for patients who exhibit signs of discomfort/agitation during routine nursing procedures or suction.

For patients receiving continuous opioids, we recommend administering a bolus of the same medication and then increasing the infusion rate by 25% (Table 2). For patients not receiving opioids, morphine or fentanyl infusion may be started (Table 2). We further recommend considering a combination with a benzodiazepine (midazolam) for control of anxiety, which may develop with extubation (Table 2).

Table Continued...

Patient not receiving opioids (2 options)	1. Begin with morphine 5-10 mg IV (bolus) followed by infusion at 2-5 mg/h. In case of discomfort, give a bolus (50% of the hourly dosage). Titrate dosage every 10 minutes and increase the rate of infusion by 25-50% as needed. 2. Begin with fentanyl 50-100 mcg IV, followed by continuous infusion at 25-100 mcg/h. In case of discomfort, give a bolus (50% of the hourly dosage). Titrate dosage every 10 minutes and increase the rate of infusion by 25-50% as needed.
Patient receiving continuous midazolam infusion	Give a bolus (50% of the hourly dosage) over 2 minutes and increase the infusion rate by 25%.
Patient not receiving benzodiazepines	Give midazolam in a bolus of 1-2 mg IV over 2 minutes and start infusion at 1-2 mg/h. In case of discomfort, give a bolus (50% of the hourly dosage) up to every 15 minutes and increase the infusion rate by 25%.

It should be observed that there is no evidence indicating that administration of benzodiazepines and/or opioids affects the time to death after extubation. Therefore, there is no reason to restrict their use for patients exhibiting discomfort.¹⁰

One should check before the onset of the procedure that the medications that may be needed (opioids and benzodiazepines) are prepared and easily accessible for immediate use.

Ventilator withdrawal

There are two possible methods for discontinuation of mechanical ventilation: terminal weaning and immediate extubation. Terminal weaning involves gradual decrease of the ventilator settings to the minimum over 10 to 60 minutes, then ventilatory support is discontinued. Immediate extubation consists of discontinuation of mechanical ventilation without any previous decrease in the ventilator settings.¹⁹ However, a recent prospective study comparing both methods found that immediate extubation was associated with a higher incidence of airway obstruction, respiratory distress and pain. For this reason, we recommend terminal weaning as a preferential method.²⁰

The first step in terminal weaning is to decrease the alarm settings (or turn them off when possible). FiO₂ is gradually reduced over 1-5 minutes to 30% and PEEP to 5.¹⁸ If the patient experiences discomfort at any time, the medication (opioids and/or benzodiazepine) should be adjusted before further reduction of the ventilator settings. Next, the tracheal cannula is removed and wrapped in a towel. For patients with tracheostomy, we do not recommend removing the cannula but merely disconnecting it from the ventilator. The same recommendation may apply to patients with significant hemoptysis, for whom maintaining the cannula may be useful to provide comfort.¹⁸ Following support withdrawal, possible residual secretions should be suctioned.

Having some staff members (particularly a physician, psychologist, nurse or physical therapist) remain with the patient and family for 30 to 60 minutes after his or her condition stabilizes is highly advisable. This behavior helps the family to remain calm while they adapt to the new situation and enables rapid adjustment of the medication.

Documentation in medical records

Documenting all the steps described above in the medical records is indispensable and should include the patient's progression immediately after extubation (instability, stability or death). The names of the people present should be recorded whenever possible.

Post extubation period

Sedation

Maintain the level of sedation previously established at the multiprofessional meeting. When needed, the continuous intravenous

infusion of midazolam is maintained as per the institutional guidelines for palliative sedation (Table 2).

Monitoring symptoms

Monitoring signs of respiratory distress, pain and/or anxiety should be an absolute priority (Table 3) and medication administered immediately. We recommend giving an IV bolus of morphine (50% of the hourly dosage) followed by an increase of the infusion rate by 25%, an IV bolus of fentanyl (50% of the hourly dosage) every 10 minutes and then an increase in the infusion rate by 25%, or an IV bolus of midazolam (50% of the hourly dosage) every 15-30 minutes and then an increase the rate of infusion by 25%.

Table 3 Signs of discomfort (pain, respiratory distress and/or anxiety) exhibited by patients after palliative extubation¹⁸

Heart rate > 120 bpm
Systolic blood pressure > 160 mmHg
Respiratory rate > 30 bpm (or doubling of baseline)
Sustained facial grimace
Sustained motor movement or agitation
Intercostal retractions or sustained abdominal breathing

Informing the family about episodes of abnormal breathing and involuntary movements that do not necessarily indicate suffering is important, as well as on the availability of measures to provide relief for occasional discomfort.

Patient transfer

Patients who are stable 24-48 hours after extubation may be transferred from the ICU to a private room in wards where the family may be closer and enjoy more privacy.¹⁸ In addition, the ward environment tends to be quieter and less noisy.

Transfers should always be discussed previously with the family, who should be allowed to state their desires. When they understand this is an irreversible situation whose outcome is death, a transfer to a private room makes many families feel insecure. Transfers may be anticipated or delayed depending on the family's decision.

Family support

The availability of continuous psychological, social and spiritual support for the family, also after death, is crucial for the success of palliative extubation and is considered a standard of excellence within the context of high-quality palliative care.⁶ Contact between staff and family a few days after death is highly recommended, as is psychological follow up for an indefinite period of time as needed.

Staff support

The staff may also have significant emotional needs after a procedure of palliative extubation that often pass unnoticed or are not adequately addressed. Multiprofessional meetings after a procedure may help identify emotional needs through mutual exchange of personal impressions about the process. The perceptions of the success of a procedure are often highly divergent among the involved professionals. Clear and respectful communication among staff members may help them identify eventual flaws and formulate measures to optimize future procedures while sustaining their commitment and increasing their emotional well-being.

Conclusion

The palliative extubation procedure is well-established as an ethical and compassionate option for patients in an irreversible situation that causes significant suffering. However, inadequate execution, due to flaws in communication or in technical aspects, can make an already extremely delicate situation associated with suffering even worse. Rigorous execution of all the procedures described above significantly reduces the level of stress of patients and their family and avoids misunderstandings, discomfort and additional suffering by all the actors involved.

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Conflicts of interest

The authors have no conflicts of interest to disclosure.

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