Commentary

Pro/con ethics debate: Should mechanical ventilation be continued to allow for progression to brain death so that organs can be donated?

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Abstract

Organ transplants continue to redefine medical frontiers. Unfortunately, current demand for organs far surpasses availability, waiting lists are long and many people die before the organ they desperately need becomes available. One proposed way to increase organ availability is to admit patients to the ICU with severe neurological injuries, for a trial of therapy. If the injury is irretrievable, discussions would then focus on extending ventilation for potential brain death/organ donation if a prior wish to donate is known or if the substitute decision maker consents. The following debate discusses the ethical dilemmas of waiting for brain death.

Keywords brain death, ethics, organ procurement, transplant

The scenario

The patient is a previously healthy 17-year-old boy who was transferred by air ambulance from a regional community hospital after nearly drowning. During a boat ride in a lake, the boy fell out of the boat and became entangled and submerged under water for an undetermined period of time. The boy was pulled to shore, where cardiopulmonary resuscitation was begun immediately because of absent vital signs. The boy was brought to the community hospital after cardiorespiratory arrest for approximately 20–30 min. Vital signs were absent when the patient arrived. The patient was given one round of resuscitation medications, after which a heart rate and cardiac output were restored. The patient was transferred to a tertiary care paediatric hospital.

On arrival at the referral hospital, the patient had no spontaneous movements, no motor response to pain, fixed and dilated pupils, and absent corneal, gag and cough reflexes. Spontaneous respiratory efforts were detected. There was a delay in the arrival of family members who were out of country at the time. After 24 hours of mechanical support, his neurological condition was unchanged.

Given the severity of hypoxic ischaemic brain injury and the patient's dismal prognosis, the family was counselled to withdraw mechanical support. They requested organ donation but were informed that he was not eligible as he did not fulfil brain death criteria in view of the presence of spontaneous respiratory efforts. They agreed to withdrawal of support. The patient died 10 min after withdrawal of mechanical ventilation.

Questions

The outcome after out-of-hospital cardiac arrest in children and adults is well known. Did the present child justify intensive care unit admission and why?

Twenty-four hours after admission to the intensive care unit (ICU), the family of this teenager requested organ donation. When the patient has expressed a prior wish or families are motivated toward organ donation, is there an option to continue mechanical ventilation for 24–48 hours to observe for progression to brain death in anticipation of organ donation? What are the risks and benefits associated with this option? What are the ethical issues raised by this?

ICU = intensive care unit; PVS = persistent vegetative state.

Con: no, mechanical ventilation should not be continued to allow for progression to brain death so that organs can be donated

Michael Parker

The number of organs available for transplantation falls well below the number of people who require a transplant [1]. In the United Kingdom, for example, there were 5354 people on the national transplant waiting list at the end of March 2000 [2]. In practice, because of the recognized shortage of available organs, patients are only placed on this waiting list if they have a reasonable chance of receiving a donated organ. This means that the actual number of those who could benefit from a transplant is much greater than the number of people on the list.

A range of different ways has been proposed for increasing the number of donors. One of the most controversial of these is the use of 'elective ventilation' of patients in deep coma and close to death who have no possibility of recovering but do not (yet) fulfill the criteria for brain death [3]. In elective ventilation, patients are ventilated for a few hours to allow preparations for the removal of organs after death to take place. There is evidence that this could increase the number of available organs significantly. The practice was used in Exeter, UK between 1988 and 1994 (when it was declared unlawful), and led to a 50% increase in the number of organs suitable for transplantation there [4]. The case described in the present scenario is an example of the kind of situation in which elective ventilation might make available organs that would otherwise be lost.

One way of analysing the ethical implications of elective ventilation is to consider the foreseeable harms and benefits of its use. It might seem from this consequentialist perspective, initially at least, that emphasis ought to be placed on increasing the number of organs available for transplant. A more complete consequentialist analysis would of course have to consider other possible harms and benefits. One potential harm that is surely going to be relevant to any such analysis is the small possibility that, rather than dying following elective ventilation, patients may end up in a persistent vegetative state (PVS) [5]. The chances of this happening are small, but from the point of view of a consideration of the patient's best interests it is not only be the size of the risk that will be of importance, but also its seriousness.

Another set of factors important in any consequentialist account will concern the opportunity costs of elective ventilation. In the case presently described, the procedure will require an intensive therapy unit bed for up to 2 days. The question of whether this bed, or the equivalent resource spent elsewhere, would save more lives is surely important and not easy to answer without a full consideration of the health economic implications.

The most common objection to the use of elective ventilation is not consequentialist, however, but based in respect for patient autonomy. Elective ventilation involves carrying out an invasive procedure on a living patient to which the patient has not consented. Furthermore, ventilation is not being carried out in the interest of the patient. The only purpose of the intervention is to provide organs for others and this is, in effect, treating patients merely as a means for the benefit of others and not as ends in their own right.

One possible way of dealing with this objection would be to argue that there are grounds to believe that this is what the patient would have wanted. This is an argument often used by those in favour of a presumed consent model for transplantation. In the case of the patient who is brain dead, this argument has at least some force. A recent poll in Scotland, for example, found that a slight majority of those asked were in favour of a change to presumed consent. More broadly, opinion polls, in the UK at least, consistently reveal that around 70% of those asked would want their organs used on their death [6]. Nevertheless, even if we were to accept this as a justification for moving to a presumed consent model for brain death, we would not be justified in making the same assumption in the case of elective ventilation.

It is entirely unclear in the case of elective ventilation whether, if asked whether they would be willing to take the risk of ending up in PVS in order to provide organs for others, most or even many people would answer in the affirmative. Indeed, what evidence there is appears to point in the opposite direction. Many existing advance directives posit PVS as one of the states that patients would most wish to avoid [7]. This is of course an empirical question requiring further research. Nevertheless, if we are to take patient autonomy seriously, we should not carry out invasive procedures on incompetent patients that we do not consider to be in their best interests without compelling evidence to believe that this is what they would have wanted. In the present case, we have no such evidence.

Whether from a consequentialist perspective or one based in the principle of respect for patient autonomy, any move to the use of elective ventilation must be based in both good empirical and health economic analysis and in informed public debate. In the meantime, what evidence there is would seem to point in the direction of caution and would indicate that, in the case under consideration, ventilation should not be allowed to proceed.

Pro: yes, mechanical ventilation should be continued to allow for progression to brain death so that organs can be donated

Sam D Shemie

Is it medically appropriate and/or ethical to extend ventilation in anticipation of brain death for the purposes of organ donation? To clarify the challenges presented by this case, each of the following issues must be discussed individually: admission of severely brain-injured patients to the ICU, extension of ventilation, anticipation of brain death, and brain death for the purposes of organ donation.

Admission of severely brain-injured patients to the ICU

The decision to admit severely brain-injured patients to the ICU is complex and is influenced by many factors. Severity of injury and potential for salvage are clearly dominant factors. Distinguished from adult practice, acutely brain-injured paediatric patients are rarely denied admission on the grounds of poor neurological prognosis. Paediatric death outside ICUs is an unusual event, with 85% of deaths at the Hospital for Sick Children occurring in the ICU setting (S Shemie, unpublished data). In general, practitioners outside the ICU are not comfortable with paediatric death, with grounds for prognosticating, and with withdrawal of established mechanical ventilation. A trial of ICU therapy is initiated to collect and confirm the facts upon which prognostications are based and to allow families time to adjust and be counselled.

Severely brain-injured adults with artificial ventilation already established, in contrast, may be evaluated in the emergency room and, based on the perception of bad prognosis, be denied access to ICU services. Although based in large part on a poor anticipated prognosis, resource limitations (lack of available ICU nurses/bed space) must be acknowledged as a profound influence on these triage decisions.

Studies predicting neurological outcome after cardiac arrest suggest that the most reliable predictors are apparent in the range of 24 hours [8] to 72 hours [9] after arrest. One can credibly advocate that a short-term trial of ICU therapy is warranted in any acutely brain-injured patients in order to confirm facts to avoid expedited decisions that occur in emergency rooms. In addition, there are evolving neuroprotective therapies that may benefit patients which traditionally have been perceived to have irretrievable outcomes. This is well supported by the improvements in neurological outcome with the use of hypothermia after cardiac arrest [10]. In the face of advancing techniques of successful neuroprotection, there is concern for the potential self-fulfilling prophecy of the selecting out of severely brain-injured patients by preventing access to ICU care.

Extension of ventilation

Limitation of life-sustaining technology has become standard practice for ICU-based end-of-life care, with the majority of deaths in neonatal, paediatric and adult ICUs being preceded by the withdrawal and/or withholding of some form of life support [11,12]. However, there are inconsistencies in these practices with variation over time, between centres and between clinicians [13]. The criteria for what may be considered futile therapy remains undefined and, for the same acuity of illness, withdrawal practices may vary [14].

Observers of end-of-life discussions in ICUs have concluded that although life support technologies are traditionally deployed to treat morbidity and to delay mortality in ICU patients, they are also used to orchestrate dying. The tempo of withdrawal influences the method and timing of death. Decisions to withhold, to provide, to continue or to withdraw life support are socially negotiated to synchronize understanding and expectations among family members and clinicians [15].

Ethical principles dictate that we must act in the interests of the patient first and foremost. In the complex realities of bedside ICU care, however, life support is manipulated in many ways that are not strictly in the primary interest of the patient. This is seen during the family's (or subspecialist's) adjustment phase of understanding the disease and accepting the terminal phase of illness; this communication process may take days to weeks, and sometimes months. There may be conflict or disagreement with the recommendations of the ICU team, resulting in prolongation of life support. This may be under the guise of acting in the interest of the patient but is, in reality, acting in the emotional interests of the family. There are compassionate reasons to extend ventilation; waiting for extended family to arrive from overseas, or not to have the patient die on a special day (e.g. Christmas or a birthday). It is often difficult to separate the interests of the family from the interests of the patient, and this reality is exaggerated in the paediatric sphere.

Can one ethically justify extension of ventilation? Certainly, there is clinical precedence for this practice, many reports of which are aforementioned. A majority of Canadian paediatric intensivists are in favour of extending ventilation for organ donation. For example, in response to the survey question 'in the setting of acute brain injury, would you extend the duration of life support for brain death to potentially occur', 68% of respondents said yes, 21% were unsure and only 11% of respondents said no [16].

The issue at stake here, however, is the patient's interest. Is it being compromised by the extension of ventilation? Is it beneficial, harmful or neither? Suffering is an exaggerated concept in comatose ICU patients who have lost

consciousness. Whether they spiritually suffer or their dignity is compromised is at best subjective and uncertain. The issue of benefit versus harm rests between the benefit of actualizing the donation of organs from an individual or family who have expressed this intent and the harm of extending ventilation.

Anticipation of brain death

Neurological prognosis after devastating brain injury is able to distinguish between extremes of outcomes. Prognostic criteria for outcomes after cardiac arrest, particularly those presenting with asystole to the emergency room, have been well defined in paediatrics [17] and in adults [8]. Bad outcome, however, is defined as death or vegetative survival, and there has been no clear predictive data that distinguishes between brain death and vegetative survival [18]. Clearly, any intervention that may convert a patient destined to die after withdrawal of ventilation into a vegetative survivor is concerning. This has been anecdotally cited by ICU practitioners as the primary issue of concern regarding the extension of ventilation in severely brain-injured ICU patients.

Experience in clinical ICU practice dictates some guidelines where the risks of extending ventilation are minimized. The temporal changes in neurological function after brain injury give information about its anticipated evolution. A deteriorating neurological course may be anticipated if the signs of neurological function (motor score, brain stem reflexes) are deteriorating over time. A comatose patient who decorticates to pain on admission to ICU with intact brain stem reflexes may proceed to lose any motor response to pain, followed by gradual loss of brainstem reflexes (e.g. unilateral fixed and dilated pupil) over the ensuing 24 hours. This scenario may increase the chance of proceeding to brain death, and minimizes the risk that extending ventilation would allow recovery of vegetative brainstem function. Conversely, a patient may present with a Glasgow Coma Scale of 3, with no response to deep pain on arrival at the ICU, and then at 24–48 hours may develop decerebrate posturing. This scenario reflects an evolving improvement in neurological function. It is not one where extension of ventilation is safe and may increase the chances of vegetative survival.

Brain death for the purposes of organ donation

There remains a perception that extending ventilation to allow for brain death for the purposes of organ donation is an act against the interests of the patient. It may in fact serve the interest of the patient if the expressed wishes were known and the risks are small. Consent decisions are primarily influenced by prior knowledge of the deceased individual's wishes [19]. It is well established that the act of organ donation aids in the grieving process for family members [20]. Donation decisions are a function of attitude toward donation and the religious, cultural, altruistic, normative, and knowledge-based beliefs that comprise the attitude. For the individual expressing intent to donate, there is actual and spiritual sustenance that is derived from the decision to give. If the surrogate decision makers are aware of the patient's to wish to donate, it may be in the patient's interest to pursue any reasonable avenue to fulfil the desire to donate.

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