Extracorporeal membrane oxygenation (ECMO) is temporary life-support technology that provides time to rest the cardiac and respiratory system of critically ill people with acute, reversible medical conditions. Health care providers face emotional and challenging situations, where death may result, when withdrawing ECMO. A deepening of understanding of the ethical issues involved can aid clinicians in handling such difficult situations, leading to a possible mitigation of the moral problems. Toward this end, the ethical issues raised in the consideration of ECMO withdrawal are analyzed with respect to the ethical principles and concepts of autonomy, nonmaleficence/beneficence, medical futility, moral distress, and justice. In particular, these issues are considered in relation to how they affect and can be addressed by staff nurses and advanced practice nurses in the intensive care unit. Advanced practice nurses in particular can represent the voice of nurses to promote a healthier workplace in situations of moral distress related to stopping ECMO life-support technology and in developing clear and consistent guidelines for ceasing ECMO treatment, all leading toward clarification and mitigation of the ethical problems surrounding the withdrawal of this critical technology. (Critical Care Nurse. 2016;36[5]:56-65)

Extracorporeal membrane oxygenation (ECMO) is life-support technology that temporarily supports critically ill people with acute, reversible, life-threatening cardiovascular and/or respiratory conditions, allowing the failing heart and/or lungs to rest, heal, and recover over a period of days, weeks, or potentially months.¹ This mode of technology is lifesaving for many people with acute cardiovascular and/or respiratory conditions that are reversible after organ rest, but ECMO technology
does not guarantee survival. Sometimes, patients receiving ECMO support develop conditions that this technology will not resolve and death becomes inevitable. At this point, ECMO may be perceived as futile treatment. However, the concept of medical futility is one fraught with ambiguity and dispute among various parties and perspectives. This ambiguity then often leads to ethical conflict and moral distress when ECMO providers on the health care team, including staff nurses and advanced practice nurses (APNs), become frustrated and experience conflict between a duty to provide requested treatment and the possibility of providing merely nonbeneficial or even harmful interventions (eg, ones causing deterioration of the body and
decompensation of organ systems, as well as complications indicated in Table 1).2-6

Similar situations have been addressed in medical, bioethical, and legal publications regarding other forms of life-sustaining treatment, particularly mechanical ventilation and artificial nutrition and hydration. However, the ethical and clinical questions of futility in regard to ECMO treatment are unique. First, unlike the question of mechanical ventilation, which has reached the point of often being administered for an indefinite period of time, ECMO therapy may still be a sufficiently recent development to begin a discussion with both medical professionals and the lay public to understand the time-limited nature of such therapy. Second, because of the nature of ECMO therapy, the ethical questions are less about withholding of the treatment than withdrawal. Although legal and ethical consensus holds no formal distinction between these acts, the reality is that they often are perceived and approached differently.

The roles of intensive care unit (ICU) staff nurses, including critical care clinical nurse specialists, can be pivotal in representing nurses in these stressful, often emotional, situations. In addition, involvement of a clinical nurse specialist can protect and support nurses, resulting in a healthier workplace environment. Nurses of all levels continue to function as the primary point of contact and hence of information exchange between the

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**Table 1 Extracorporeal membrane oxygenation: indications, complications, contraindications, and criteria for weaning**

<table>
<thead>
<tr>
<th>Indications</th>
<th>Complications</th>
<th>Contraindications</th>
<th>Criteria for weaning</th>
<th>Respiratory</th>
<th>Cardiac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute reversible heart or lung disease in patients likely to die³</td>
<td>Bleeding</td>
<td>Irreversible organ damage</td>
<td>Improvements in radiographic appearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resuscitation from acute cardiogenic shock</td>
<td>Thromboembolism</td>
<td>Multiorgan failure</td>
<td>Pulmonary compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>Access difficulties (transfusion problems)</td>
<td>Patients who are not candidates for transplant</td>
<td>Arterial oxyhemoglobin saturation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute fulminant respiratory failure</td>
<td>Infection</td>
<td>Patients who cannot be anticoagulated⁵</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridge to long-term mechanical support (eg, ventricular assist devices) and transplant</td>
<td>Cerebral hemorrhage⁶</td>
<td>Brain death</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe respiratory failure³</td>
<td>Neurological devastation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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³ Initial indications at the beginning of use of extracorporeal membrane oxygenation that have since been broadened.
⁴ Not an absolute contraindication.
⁵ Higher risk when used during cardiac arrest.
⁶ Debated for use in adults.

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**Authors**

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health care facility and patients and/or patients’ families. Not only is an understanding of the ethical issues involved here and the means to resolve or mitigate these problems important for all those involved, but nurses, in their role of information exchange, may be able to prevent overuse of this technology in cases of medical futility. Given nurses’ critical roles in ICUs, their contributions to developing new standards are indispensable. But to contribute in this way, an understanding of not just the clinical facts but the ethical issues is necessary. We first discuss the use of ECMO and the clinical circumstances that may lead to the decision to withdraw it. We then explore the concept of medical futility in relation to ECMO treatment and the difficult ethical issues that often result. Finally, based on the foregoing analysis, we offer suggestions for dealing with and mitigating the ethical problems that often arise in circumstances where ECMO may be withdrawn. These are suggestions that we hope will be useful for critical care departments in general and for nurses who face these conflicts with ECMO care, who can and should participate in developing standards for treatment and withdrawal.

Background and Significance

The function of ECMO is to remove venous blood from the patient, pass the blood through a membrane lung in which it is oxygenated and carbon dioxide is removed, and then return the blood to the patient. The use of ECMO began in the early 1970s “as a prolonged form of cardiopulmonary bypass to treat severe respiratory failure.”3,4

ECMO has since expanded as a therapy for a number of cardiopulmonary conditions. Indications for implementation of ECMO, complications of and contraindications for ECMO, and criteria for successful weaning from ECMO are summarized in Table 1.3–6

Patients on ECMO life support are already at high risk for death, resulting in high potential for conflicts regarding continuation of treatment.4

Futility

Disputed Definitions

On the surface, the concept of futility may seem clear and straightforward. That which is futile is that which does not work or does not fulfill the purpose for which it is intended. However, practical and concrete determinations of medical futility are far less clear and certain, admitting degrees of vagueness, ambiguity, and subjectivity.8–13 A brief review of the literature reveals a variety of definitions, conceptualizations, and taxonomies. Many scholars recognize the categories of physiological, quantitative, and qualitative futility.13–15 Physiological futility refers to the determination that an intervention will not achieve its intended purpose in a particular case.10,12,14 Quantitative futility means that the likelihood is low that a treatment will have the desired effect in a particular case.9,11,12,15 Qualitative futility means that the quality of benefit likely to be produced by the intervention is poor.10,12,15 Anderson-Shaw et al16 alternatively refer to descriptive and prescriptive futility. Bernat9 adds the categories of imminent demise futility and lethal condition futility. Mohindra13 refers to goal futility and value futility. This brief review only scratches the surface of the equivocal nature of the term and the variety of taxonomies available in the literature and thus hints of the difficulties involved in understanding and applying this concept.
Many of these categories fall along a distinction of focusing on objective, physical, or physiological standards (eg, physiological, quantitative, and descriptive futility), or focusing on more subjective, experiential, or value-based standards (eg, qualitative, prescriptive, and value futility). This division highlights the need to recognize both the clinical facts and realities but also the less concrete aspects of value and subjective experience. These clinical and value-based components of the concept can lead to good-faith disputes over the effectiveness or futility of a particular intervention in a particular case due to a reasonable variation of values among individuals.

Given the equivocal, uncertain, and variable nature of the concept of medical futility, it is not surprising that disputes and disagreements regarding it occur. Clinicians may judge an intervention with no reasonable likelihood of returning a patient to normal functioning or consciousness as a futile therapy that should be stopped, while the patient’s family may judge the fact that the intervention keeps the patient alive (even if only in a biological sense) as confirmation that the therapy is not futile. Not until these various perceptions and judgments are brought to the surface can a real discussion begin regarding the question of futility and removal of an intervention.

The American Medical Association recommends that all institutions, regardless of size, adopt a policy on medical futility and define steps to consider regarding futile intervention and fair decision-making.16 Having a policy in place creates an honest and open atmosphere in which patients and surrogates can consider their own perceptions of futility in contrast to the policy of the facility. Of course all personnel in the ICU, including nursing staff, should be aware of such policies.

Responding to Cases Involving Potentially Futile Care

The steps to determine medical futility and the decision regarding when to stop ECMO technology include negotiation and case-specific clarification regarding understanding among the physician and the proxy for the patient receiving ECMO of what constitutes futile care.17 According to the American Medical Association, communication and evaluation of understanding medical futility include the following: joint decision-making, negotiation of disagreements, potential to escalate a consultation within institutional ethics committees for resolution, support for potential to transfer care to a different physician or transfer to an alternative institution to resolve conflicts regarding defining futile intervention with medical technology.16

The American Association of Critical-Care Nurses, in a joint policy statement with the American Thoracic Society, the American College of Chest Physicians, the European Society for Intensive Care Medicine, and the Society for Critical Care Medicine, echoes these recommendations with a resolution process including expert consultation, notice of the process to the surrogate, a second medical opinion, hospital committee review, opportunity for transfer to an alternative facility, and opportunity for extramural appeal.18 This process can involve any clinician in the ICU, but given their constant bedside presence, nurses, staff nurses, and advanced practical critical care clinical nurse specialists (hereafter designated as APNs) are most likely well placed to facilitate such communication and evaluation. It is important to emphasize that patients’ families should also be made aware that any decision to withhold or withdraw a particular intervention does not imply that all treatment and care is to be ceased. Not only may patients’ families not fully understand the function and limitations of a technology of ECMO and the ethical and clinical responsibilities and limitations of the health care facility, but physicians may not understand the goals, concerns, and fears of patients’ families and may not accurately assess their comprehension of the clinical and ethical issues involved. Both staff nurses and APNs are well placed to facilitate greater understanding on both sides.

The Ethics of Withdrawal of Technologic Supports

Withdrawal of ECMO technology raises a number of complex ethical issues (Table 2). The ethics of withdrawal of ECMO follows closely the ethics of removal of life-sustaining therapies in general, a topic on which much has been written in the past several decades, although much less has been written about ECMO in particular. A clear understanding of these various issues can aid staff nurses, APNs, and other clinicians in the ICU in navigating difficult situations that may lead to great conflict and inappropriate actions.
Patient Autonomy and Professional Autonomy

Patient Autonomy/Surrogacy. Central to the ethical provision of any medical intervention is the principle of respect for autonomy, as the ethical foundation for the doctrine of informed consent. Autonomy refers to an individual’s rational capacity for self-determination.\textsuperscript{19,20} To ignore or willfully deny a person’s decisions for his or her own being constitutes a reduction of who he or she is as a person, to reduce him or her to something less than a person, even when done for what is perceived as the person’s own good. Thus, according to the principle of respect for autonomy, clinicians have a duty to respect the wishes of patients regarding autonomously chosen medical interventions. This respect would imply also the right of a patient to refuse a treatment.

When a patient lacks decision-making capacity, a surrogate decision maker is used to make the decision that the patient would if she or he could. Because of the often sedated state of patients receiving ECMO, the use of surrogate decision makers in such cases is common. A form of advance directive may also be in place to better ensure that the wishes of the patient are known and followed. Conflicts arise when care providers and patients’ surrogates do not agree, when one side believes, for example, that withdrawal of life-sustaining care is appropriate but the other does not. In such cases, the nurse, whether APN or staff nurse, can serve an important ethical role in clarifying misunderstandings on both sides.

Medical/Professional Autonomy and Standard of Care. The exercise of patients’ autonomy, however, has limits.\textsuperscript{8,21,22} Just as the patient’s autonomy should be respected, so should a clinician’s professional autonomy to practice within accepted standards of care. Ethically, standards of care recognize not only the importance of patients’ autonomy but the principles of nonmaleficence and beneficence as well. In this context, complications can arise as the identification of goods and harms admits some degree of interpretation and a preconceived value system. For example, death is typically perceived as a harm. However, in the ICU, it is not uncommon to perceive the state of some patients such that continued life through technologic means is a harm. In a recent article,\textsuperscript{23} philosopher Ben Bradley argues that death is not an intrinsic harm but a relative or contrastive harm, meaning that the circumstances surrounding a death are fundamentally relevant to a reasonable determination of the death as a bad or good occurrence. The sudden death of an otherwise healthy young man would clearly be bad, whereas the death of a long-suffering

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Ethical issues in withdrawing technologic support</th>
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<tr>
<td><strong>Moral principle or concept</strong></td>
<td><strong>Moral issues and complicating factors</strong></td>
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<tr>
<td>Patients’ autonomy</td>
<td>Lack of capacity, need for surrogate decision-making</td>
</tr>
<tr>
<td>Medical autonomy, standard of care</td>
<td>Negative duty to refrain from harming vs positive duties to prevent and remove harm and to promote the welfare of patients</td>
</tr>
<tr>
<td>Futility</td>
<td>Competing definitions of futility, both among medical professionals and between patients’ families and health care professionals</td>
</tr>
<tr>
<td>Moral distress</td>
<td>Lack of power or authority to do what is perceived as right</td>
</tr>
<tr>
<td>Resource allocation</td>
<td>Fairness of treatment</td>
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patient facing imminent death may in fact be perceived or judged as good in contrast to the alternative of continued suffering and loss of quality of life.

When a staff nurse or APN involved in the care of a patient receiving ECMO judges that the harm of the care outweighs the possible benefit, or that the death of the patient is less a harm in contrast to the prolongation of life through technologic means, an ethical conflict can ensue between the nurse and the physician, surrogate, or others who perceive the situation differently. Such conflict can result in friction among the disputing parties or anxiety within the nurse (moral distress) if the nurse feels unable to voice his or her concerns or effect change. Ideally, of course, such conflict would lead to further communication between parties (facilitated by nurses, ethics consultants/committee, chaplaincy, or other institutional resources), resulting in a possible resolution.

**Withholding Versus Withdrawing Life-Sustaining Treatment**

The principle of patients’ autonomy prohibits the implementation of interventions that a patient or surrogate has not consented to, and professional autonomy permits clinicians to refuse to provide interventions believed to be medically or ethically inappropriate, so the question of the distinction between withholding and withdrawing life-sustaining treatment is worth noting. For many other forms of life-support technologies (eg, mechanical ventilation, artificial nutrition, and hydration), questions of both withholding and withdrawing treatment are relevant. Given the nature of ECMO technology, withholding is a less relevant concern. As noted earlier, a clinician is not ethically required to provide a treatment that he or she reasonably perceives as not medically or ethically appropriate. Thus, withholding a treatment, even contrary to the wishes of a patient or surrogate, is widely perceived as ethically justified. However, the ethics of withdrawal of existing treatment can seem different because it involves an action (removing already functioning technology), as opposed to a refusal to act. Indeed, as noted by Curtis and Burt,

Decisions about withdrawing interventions that clinicians have previously viewed as potentially beneficial often have a different and more powerful impact on patients and families than decisions not to initiate therapies in the first place. 24(p754)

Further, a significant number of clinicians also may perceive these acts differently. 25 However, it is widely accepted among medical ethicists that there is no ethical distinction between withholding and withdrawing life-sustaining treatment. 24,26-28 Despite this broad ethical consensus among ethicists and medical associations, the disparate effects that withdrawal versus withholding of life-sustaining treatment can have on both patients’ families and clinicians need to be taken seriously, particularly regarding the question of unilateral withdrawal.

**Legal Consent and Authority**

A variety of laws and legal precedents exist that determine the legal limits of clinicians’ actions with regard to withholding and withdrawing life-sustaining technology. As with the bulk of ethical discourse regarding these issues, the legal case precedents are primarily cases involving life-sustaining therapy other than ECMO, particularly mechanical ventilation and artificial nutrition and hydration. Since the Cruzan case, the legal right of surrogates, based on the liberty interest of the 14th amendment to the US Constitution, to decide to withdraw life-sustaining treatment has been recognized across the United States. 30 More relevant to the matter at hand, however, is the case of Helga Wanglie, an 86-year-old woman in a vegetative state receiving mechanical ventilation. 31,32 Physicians believed discontinuation of mechanical ventilation was medically and ethically appropriate, whereas the patient’s surrogate (spouse) disagreed. The court ruled in favor of the spouse, Mr Wanglie, remaining his wife’s proxy. More recently, a similar case involving a 61-year-old man in a minimally conscious state, Hassan Rasouli, was decided by the Supreme Court of Canada with a similar result, reinforcing the legal right of patients’ surrogates to decide when to remove life-sustaining care in Canada. 33

In both the Wanglie case and the Rasouli case, health care providers came to the conclusion that life-sustaining treatment was no longer beneficial and would only result in decompensation of organ systems and deterioration of the body. In both cases, the patient’s surrogate (the spouses of the patients) disagreed and believed that any continuation of life provided by life-sustaining treatment

Attention to the concept of justice provides a basis for addressing conflicts and disagreements along these lines and for reaching resolutions.
is beneficial according to their religious viewpoints (one Christian and one Muslim). The Wanglie and the Rasouli cases indicate that a legal difference between withholding and withdrawing life-sustaining treatment is often recognized regarding the question of unilateral withdrawal against a surrogate’s wishes, despite the US Supreme Court’s ruling that there is no legal distinction between withholding and withdrawing life-sustaining treatment. In cases of unilateral withdrawal on the provider’s side, the decision-making authority of the surrogate tends to hold more weight. At the state level, a great deal of variability exists regarding the laws of withdrawing life-sustaining therapy. So, an understanding of specific state laws is important for any professional working in an ICU who may face these issues.

As occurred in the case of Helga Wanglie, if the surrogate disagrees with the decision to withdraw life-sustaining treatment, another facility willing to continue such treatment may be sought. This resolution generally is both ethically and legally acceptable. But also as in the case of Helga Wanglie, if no such willing facility can be found, providers may be ethically justified in discontinuing life-sustaining treatment. However, the legality of such an act may not be as clear. Regardless of the laws of any particular state or jurisdiction, we are of the opinion that unilateral withdrawal against a surrogate’s consent and appeals to courts for resolution, at the very least, are not ideal. Every possibility of reaching consensus between interested parties should be exhausted.

Resource Allocation

For patients whose conditions are irreversible and who are on a clear path of decline, the continued allocation of resources to keep these patients alive can seem wasteful. The resources, it seems, could be better (more justly) allocated toward patients more likely to recover or improve. Further, “We could not afford,” writes ethicist Steven Miles,

A universal health care system based on patients’ demands. Such a system would irrationally allocate health care to socially powerful people with strong preferences for immediate treatment to the disadvantage of those with less power or less immediate needs.

The cost of care perceived as futile may then set patients or patients’ families against taxpayers and payers of insurance premiums, positioning clinicians as “‘stewards’ of limited funds when the wishes of patients are pitted against those of society.”

What a just allocation of resources in health care would be is not an easy question to answer, and it most likely does not admit a singular answer across all modes of health care provision. Uncertainty and dispute over a proper understanding of distributive justice result from the inability to determine an objectively correct material principle (utilitarian, egalitarian, communitarian, or libertarian) of justice. Despite such uncertainty and dispute, attention to the concept of justice provides a basis for addressing conflicts and disagreements along these lines and for reaching resolutions. Recognition and conceptualization of justice in general and distributive justice in particular provides a frame for nurses and other clinicians to express concerns of the waste of resources and to further the ethical discussion regarding any particular case. In their discussion of distributive justice in health care, Beauchamp and Childress introduce the fair opportunity rule as a standard consistent with all material principles of justice. According to this rule, one should not receive or be denied social benefits because of natural or social qualities for which one is not directly responsible. The unfair advantage of socially powerful people that Miles referred to would be addressed by this rule. Beauchamp and Childress also refer to a decent minimum standard of health care that would cut across all material principles of justice. If some patients are being denied this decent minimum because of the continued, possibly futile, treatment of some patients receiving ECMO, this basic standard of justice would not be met.

Moral Distress

Prolonging death with the use of ECMO technology, when for whatever reason (usually a lack of consent) ECMO cannot be withdrawn despite the perception of (some) clinical staff that withdrawal is the appropriate next step, causes moral distress for health care providers. At the heart of moral distress is a sense of powerlessness. Because of internal or external factors, an individual is unable to act in the manner he or she understands to be morally appropriate or obligatory. Although moral distress can be found among individuals within all fields of health care, it was first and is still commonly associated with nurses, possibly because of the hierarchical nature of the health care environment. It is important to
keep in mind that moral distress is not merely emotional distress and is not defined simply by the emotions of anxiety, fear, or sadness that may be associated with it. Rather, moral distress is specifically characterized by a situation that involves a moral wrong or perceived moral wrong and the inability to act in the perceived morally correct manner.36

In a review of studies concerning moral distress and end-of-life care, Browning finds the delivery of care that is perceived to be medically futile to be “the most common phenomenon . . . causing moral distress in critical care nurses.”37(p144) Her study focused on ventilator support as a form of possibly futile treatment causing moral distress. But such findings can clearly be extended to the provision of ECMO as well. In both instances, the perception is of a patient failing to thrive, unable to benefit from the treatment, and possibly enduring suffering. In a study of staff nurses in a medical ICU, Elpern et al found “moderate levels of moral distress overall” but that “high levels (intensity and frequency) occurred when nurses felt they were providing aggressive care to patients who would not benefit.”38(p528) It is not merely the witnessing of the suffering or lack of benefit that causes the anxiety and sadness, but the recognition that this state is morally problematic and feeling that one is not in a position to effect change.

Moral distress, over time, can lead to job dissatisfaction, burnout, loss of nurses from the profession, and even aversion to participation in blood and organ donation.38-40 This last item is the result of witnessing the waste of resources on treatment judged to be futile.38 Such distress, and the consequences associated with it, may be mitigated by providing clinicians in the ICU, including staff nurses and APNs, the resources to act on their beliefs and concerns. These resources would include an understanding of the ethical and legal issues involved to better conceptualize their own feelings and reactions and the ability and opportunity to give voice to these. In addition, awareness of institutional resources such as palliative care consultations, ethics consultations, or an ethics committee may provide nurses with the ability and opportunity to express their concerns with institutional support. Any particular instance of moral distress may or may not be based on a justifiable moral judgment, but the mere ability to voice these concerns can mitigate the power disparities that cause moral distress.

Suggestions for Change

More work must be done to create guidelines for stopping ECMO life support. Attention to the underlying ethical issues involved in withdrawing ECMO support and to the concerns and distress of all involved can go a long way in mitigating the multitude of problems that arise. We hope that the following suggestions will be helpful for staff nurses and APNs in the critical care setting who would like to improve this area of treatment and reduce the incidence of moral distress as they contribute to the process of policy change (Table 3).

Ethics committee consultations can yield recommendations and clarify explanations that support medical decisions among patients’ family members and members of the ECMO health care team, with the primary determinant of care concerning best interest and deterring unwarranted legal action.16 The communicative and informational role of the nurses involved in ECMO care can be pivotal here. APNs can contribute during ethical discussions with the health care team to determine when the lifesaving benefits of ECMO are causing harm to the morale of the ECMO health care team and the specific families. With clear understanding of the ethical issues involved in removal of life-supporting technology like ECMO and a recognition of the particular nursing role of patient advocate, both APNs and staff nurses in the ICU can help to alleviate or mitigate many of the ethical problems that arise when withdrawal is considered or perhaps should be considered. The critical care APN, in particular, may be well positioned to implement institutional change with the ultimate goal to protect the psyche of the nurses and ECMO health care team involved with stopping ECMO life-support technology. The APN can facilitate and organize debriefing sessions for the involved parties that allow health care providers to share and discuss feelings of guilt, stress, and fear related to how the decision of medical futility and stopping ECMO life support was made. Discussions about perceived emotional burdens at the bedside allow nurses to have a voice, cope, share feelings and opinions, and feel supported by coworkers, leadership, and management. Managing
emotions and developing coping strategies support a healthy work environment by validating nurses’ perceptions of stress and anxiety after stopping ECMO life-support technology.41 Nursing participation, especially nurses with sufficient education and training in ethics, can enhance the scope of interprofessional input and disciplinary contribution to case discussions at institutional ethics committee meetings. Participation of nurses is critical to inclusively represent and clarify the nursing perspective during ethical discussions related to ECMO care. Critical care APNs may represent the nursing voice at the ethics committee table when institutional futility guidelines are defined regarding stopping ECMO life-support technology. Toward this end, further ethics training for nurses at all levels would be encouraged. This training could be in general clinical ethics or it could be more specific education in ethics consultation or ethics mediation.

Clarification of “stopping rules” exists for ethically fraught areas like clinical research42 and chemotherapy43 but such rules are unclear relative to discontinuing ECMO.7 For most of these other areas, universal stopping rules may not exist across the discipline, and effective stopping rules may need to be flexible and context-dependent, but in general, the use of stopping rules is common and recognized. In this way, the concept exists in the clinical and academic discourse, allowing potential emendation of stopping rules and consensual standards. Also, the very existence of these rules, with a conscientious application of them and clinical or academic reflection upon them, provides for protection of patients or study participants from harmful or possibly futile treatment. Stopping rules for chemotherapy are important in regard to concerns over the use of “health care resources for ever-decreasing individual patient benefit.”43(p451) APNs involved in creating “ECMO stopping guidelines” will consider the specifics surrounding unique ECMO cases and represent nursing when collaborating with the multidisciplinary health care team and institutional leaders. Critical care nurses at large can also become part of the research team and assist with research and data collection regarding developing policies that determine ECMO discontinuation criteria. The decision to allow death by stopping ECMO life support is an emotional burden for all team members, and clarifying ECMO stopping guidelines is a beginning in the attempt to minimize this emotional burden by clinically determining when ECMO has become a futile intervention preventing death and causing only ongoing harm.

**Conclusion**

When the therapy provided by ECMO becomes perceived as futile, a variety of ethical problems arise, including questions of autonomy and proper decision-making.

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**Table 3** Suggestions for change

<table>
<thead>
<tr>
<th>Suggestion</th>
<th>Problems addressed</th>
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| Ethics committee consultations and other institutional support | Autonomy: clarification of decision-making authority  
Nonmaleficence/beneficence: clarification of harm or good provided by the intervention in question  
Futility: communication and discussion of different perceptions of medical futility  
Moral distress: providing a voice and institutional support for the moral concerns of clinicians  
Justice: airing of concerns of use or misuse of limited resources |
| Emphasis and support of the communicative and informational role of the nurse | Autonomy: clarification to families of the ethical and clinical limits of the facility and the clinicians  
Nonmaleficence/beneficence: clarification to patients’ families of the limits of technology; clarification to physicians of the goals and hopes of patients’ families  
Futility: clarification of differing perceptions of medical futility among disputing parties  
Moral distress: providing a voice for nurses to express moral concerns  
Justice: investigation of the fairness of the implementation of limited resources |
| Advanced practice nurse membership at institutional ethics committee meetings | Moral distress: providing a voice for the nursing perspective in cases involving the withdrawal of extracorporeal membrane oxygenation or other life-sustaining technologies |
| Clarification of stopping rules | Autonomy: clarification of policies regarding decision-making authority  
Nonmaleficence/beneficence: ensuring that harm is minimized and the duty to promote welfare is met  
Futility: policy clarification of the facility view of futility; reduction in ongoing cases involving futile care  
Moral distress: lessening of moral distress through reduction of cases involving futile care  
Justice: addressing the possible misuse or overuse of limited resources |
authority, the determination of harm versus good provided by the treatment, the difficult and uncertain concept of medical futility, issues of social justice related to the possible waste of medical resources, and moral distress on the part of those providing perceived futile care. Clarifying ECMO stopping guidelines will help mitigate many of these problems and minimize moral distress among those involved in withdrawal of ECMO life-support technology. The critical care nurse, in particular, can participate in research data collection and contribute to ethical discussions regarding determining when ECMO life-support technology is no longer beneficial to improve the patient’s condition. The critical care APN has the responsibility to protect the psyche of frontline staff, and management has the responsibility of recognizing and supporting the numerous multidisciplinary ECMO health care providers during this difficult and emotional process of providing end-of-life care after stopping ECMO life-support technology. CCN

Financial Disclosures
None reported.

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To learn more about extracorporeal membrane oxygenation, read “Discharge Outcome in Adults Treated With Extracorporeal Membrane Oxygenation” by Gottendorf et al in the American Journal of Critical Care, September 2014;23:305-377. Available at www.ajcconline.org.

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