

CASE AND COMMENTARY

How Should Decision Science Inform Scarce Blood Product Allocation?

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Abstract

Blood products are a scarce resource in our health care system. This article discusses a pediatric case involving large quantities of blood products transfused at the end of life. It argues that decision aids could help clinicians determine when to request ethics consultation or re-evaluation of blood product usage in a specific patient care situation and considers questions about scarce resource allocation, futility, and parental involvement in decision making.

Case

Sam is a 10-year-old boy with influenza who was admitted for respiratory failure. His clinical condition rapidly deteriorated, and he was placed on extracorporeal membrane oxygenation (ECMO). Sam developed sepsis, which led to multisystem organ failure, and now he requires continuous transfusions of packed red blood cells, platelets, and fibrinogen. To date, hundreds of blood products have been administered to Sam without any improvement in hemostasis. After suffering cardiac arrest and cardiopulmonary resuscitation after an ECMO line was lost, Sam is also now suspected to have neurological damage. Sam's chance of recovery at this time is extremely low. The team has discussed Sam's prognosis with his parents, who insist on continuing aggressive care.

Commentary

Pediatric critical care entails unique stressors due to the integral roles parents play in decision making for their minor children. When children become critically ill, parents and families are faced with unexpected choices and demands. Although ethics consultation is available, most children's hospitals receive 10 or fewer requests for ethics consultations annually.¹ And when pediatric ethics consultations are requested, deliberation is commonly about withdrawing or withholding treatment,² as demonstrated in this case. Questions about [scarce resource utilization](#), futility, and navigating conflict between parental preferences and a child's best interest are also common. Here we consider how decision aids can be used in ethics consultation to help facilitate decision making and resolution in these types of cases.

Blood Product Allocation

Blood products are scarce resources that require donation, and shortages occur.³ Often used to treat critically ill patients and those nearing the [end of life](#), blood products can be difficult to ration because they are used frequently and can be vital to survival. In the United States, the moral acceptability of [bedside rationing](#) is debated,⁴ with justice and beneficence being two of the prominent ethical principles in conflict.

Blood product shortages can be compared to drug shortages. For example, hospitals have attempted to make policies guiding fair allocation of chemotherapeutic agents during shortages.⁵ In one hospital, policy stipulates that the allocation committee (which includes ethics representatives) meet if a shortage is projected and that a drug have probable benefit for the patient; the policy was communicated to staff and to patients whose care could be affected by a shortage.⁵ Policies such as this one could be translated into decision aids that would allow clinicians to follow the guidelines more uniformly.

The second author (L.B.S.) and colleagues have similarly proposed guidelines for allocating blood products when supply is low and demand is high.⁶ More specifically, it was proposed that scarce resources be limited for use in palliative care patients, although short-term use for symptomatic relief is acceptable. It was also proposed that transfusions be avoided in cases in which they do not meet goals of care for a patient, particularly in times of shortage. Ideally, decision aids could be created based on these guidelines that would facilitate just blood product allocation in most cases, with unique, unusual, or ethically complex cases being referred for ethics consultation.

In this case, Sam receives large numbers of blood products as part of ECMO, which might be seen by some as overuse or excessive depletion of a hospital's blood product supply. His treatment team has been using maximum interventions, with no improvement in his overall prognosis. Blood transfusions are not clinically appropriate and would not improve his chance of survival; massive transfusion poses risks of coagulopathy, transfusion-related acute lung injury, and systemic inflammatory response syndrome.⁷ These particulars of Sam's case suggest that continued blood product use could be unjust, since it offers no benefit, prolongs his imminent death, and could deprive others of lifesaving interventions. Based on the guideline that transfusions should meet goals of care, one could argue for the ethical permissibility of discontinuing Sam's transfusions.

Yet without a process for reliably distinguishing futile from beneficial transfusion, discontinuing transfusion might seem arbitrary. Sam's case illuminates both our discomfort with rationing and our acceptance of the view that limits are warranted in some cases. This tension is one reason to consider translating guidelines into decision aids for assessing blood product utilization, particularly in pediatric intensive care settings.

Policy-Based Decision Aids

In pediatric cases, parents are typically the decision makers, as children cannot consent unless they reside in a state that recognizes “mature” or “emancipated” minor status.⁸ Parents usually have a child’s best interest in mind. However, as Santoro and Bennett note:

This protective parental role, while critically important and valid, must be balanced and possibly tempered with sound medical practice that weighs quality of life and realistic expectations of outcomes.... It is important to involve parents regarding discussing and educating them on the child’s development and condition.⁹

Honoring parents’ authority to make decisions is particularly challenging when their decisions conflict with a care team’s clinical recommendations. Clinicians also have a child’s best interest in mind, and they have the expertise and knowledge to assess what is medically possible. Pediatric intensive care can place significant psychological stress on parents,¹⁰ and it is one factor among many that can influence parental decision making.^{9,11} An example of a parental decision that would not be honored is one in which the parents refuse recommended lifesaving treatment, such as Jehovah’s Witness parents refusing recommended blood products to save a child suffering massive hemorrhage.¹²

Decision aids could be designed based on organizations’ policy guidelines to facilitate parents’ contributions to treatment planning. For example, decision support systems, which can be thought of as computerized decision aids tailored to individual patients, have been used to improve blood product usage,¹³ overall and in pediatrics.¹⁴ Such support systems could trigger ethics consultations in patient care situations in which standard blood product usage has been exceeded in order to avoid long delays in addressing whether and when a particular case constitutes futility or overutilization.

Futility

Medical futility has no universally accepted definition,¹⁵ but words such as *excessive*, *inappropriate*, *nonbeneficial*, *ineffective*, or *useless* are sometimes used when talking about it, as are concepts such as benefits and burdens, probability of success, resources utilization and cost, personal values, and professional duties.¹⁶ Physician trainees who participate in care they perceive as futile can experience moral distress along with emotional detachment from their patients.¹⁷ Institutional [policies regarding futility](#) can help ease these burdens by clarifying the nature and scope of physicians’ responsibilities in withholding and withdrawing treatments. The University of Michigan Health System, for example, has adopted the following policy:

When a medical intervention is futile, the attending physician is under no obligation to initiate, or to continue such treatment, even though it may have been requested by the patient, or the patient’s family or

representative(s). For the purpose of this section, an intervention is considered futile when it cannot accomplish the intended physiologic goal.... Treatments that the health care team believes have no reasonable medical chance of achieving the outcome sought beyond minor physiologic changes are outweighed by the danger to the patient, and/or would not achieve a medically appropriate goal are considered to be nonbeneficial treatments...

When the attending physician has documented these determinations in the patient's medical record, and another physician with appropriate expertise who has no prior or present relationship with the patient has examined the patient and reached the same medical conclusions and similarly has documented this ... the patient's attending physician is under no obligation to initiate or to continue any interventions deemed inappropriate.¹⁸

Policies like this one can also be helpful for parents like Sam's because they counteract the perception that decisions to withhold or withdraw treatment are arbitrary or nonstandard. In Sam's case, continuing transfusion would meet the University of Michigan Health System's definition of nonbeneficial care as being unable to "accomplish the intended physiologic goal."¹⁸ Since patients and families are the stakeholders most affected by other stakeholder's views of futility, it is important to explore their opinions and have open conversations early.¹⁶

Decision Aid Partnering

For cases involving ECMO or massive transfusions, development of decision aids for intensive care units or early involvement of hospital ethics committees should be considered. Our institution has developed a program of *preventive ethics* wherein an ethics consultant rounds regularly in intensive care settings and attempts to identify ECMO or transfusion cases that might progress to deliberations about futility or resource overutilization. Determining ethically appropriate end-of-life care is a common reason why pediatricians request ethics consultations, and most report that these consultations were helpful in decision making.¹⁹ For patients receiving blood products, clinicians should draw upon available guidelines and decision aids, particularly when using extremely scarce resources such as crossmatched and HLA-matched platelets or in situations in which there is need to reserve blood products for other patients.⁶ If blood products are initiated and warranted, their continued usage must be regularly re-evaluated to ensure that it is consistent with goals of care. Decision aids can assist clinicians in determining when blood product usage should be re-evaluated, perhaps based on the number of units used or the product's scarcity. Decision aids that provide appropriate parameters for transfusion, especially when developed in conjunction with an organization's transfusion medicine service, can promote appropriate utilization.

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Editor's Note

The case to which this commentary is a response was developed by the editorial staff.

Citation

AMA J Ethics. 2019;21(10):E852-857.

DOI

10.1001/amajethics.2019.852.

Conflict of Interest Disclosure

The author(s) had no conflicts of interest to disclose.

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ISSN 2376-6980**