How do I allocate blood products at the end of life? An ethical analysis with suggested guidelines

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Blood products are scarce resources requiring prudent and reasoned allocation. The utilization of red blood cells and platelets in terminally ill patients can be complicated and requires guidelines tempered by individualized considerations. Representative cases are discussed in which blood products are requested or utilized by patients at the end of life. Relevant literature is reviewed and ethical issues pertaining to each case are discussed. A practical approach to blood product utilization at the end of life is suggested.

A large number of resources are used to treat patients at the end of life in our health care system. Health care reform has focused attention on this critical issue. Transfusion medicine is one area in which costly and scarce resources are utilized routinely in patients who are either at the end of life or who have little hope for recovery. Few studies have addressed blood products specifically as an area amenable to rationing.

Ethical principles can help guide decision-making in allocating blood products for patients who are terminally ill. In certain situations, ethical considerations may conflict. Beauchamp and Childress[1] created the principlist paradigm often used in medical ethics. The principle of autonomy refers to the idea that the patient must consent to or refuse medical treatment. Beneficence means that the physician should act in the patient's best interest. Nonmaleficence is defined as not doing anything that is likely to be harmful. Finally, justice is the idea that medical care should be allocated fairly. The principles of beneficence and autonomy are used to justify pursuing a course of treatment that is best for the individual patient; however, this can conflict with the principle of social justice which promotes the idea that resources should be fairly distributed.

Hurst and Danis[2] attempt to provide a framework for understanding and implementing bedside rationing. They argue that clinical rationing does occur in certain situations. This type of rationing can occur in acute shortages, when using limited but not "immediately strained" resources, or when considering the benefit of adding interventions in any given patient. They offer six requirements for fair bedside rationing. They argue that it should be a closed system, meaning that everyone is subject to the same constraints and limitations. They believe that physicians should consider justice when formulating policies. In addition, the application of rationing should be consistent but also allow some amount of flexibility for individual exceptions. Finally, it should be transparent and iterative, meaning that the policies are available to everyone and reviewed and/or revised as needed.

Cases highlighting different types of blood bank resource utilization issues at the end of life will be presented with a discussion of the ethical issues involved. The first three cases are based on actual cases encountered in our blood bank practice. The final case is hypothetical. The cases have been modified to remove any identifying patient information.

CASE 1

Sally is a 10-year-old girl with acute myeloid leukemia. She underwent bone marrow transplantation but now her leukemia has recurred. She has required crossmatched platelets (PLTs) for the past two hospitalizations. Three days ago her family made the difficult decision to treat Sally with comfort measures only. Earlier today, she developed epistaxis and the pathology resident is now contacted by the pediatric team to approve a cross-matched PLT transfusion. The pathology resident questions why the patient should receive crossmatched PLTs at this stage in her illness. The pediatric resident is incredulous and asks the pathology resident how she can deprive a terminally ill child of PLTs at this difficult and emotional time.

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Discussion of Case 1

More than 2 million apheresis-equivalent units of PLTs are collected in the United States every year.[3] As the process is reasonably laborious, even a standard dose of PLTs is a scarce resource. Cross-matched and HLA-matched PLTs are exceedingly precious because of the difficulty involved in their acquisition and the need to ensure an adequate supply for patients who need them. Prevention of improper PLT utilization requires careful oversight. Inappropriate transfusion is also an issue because blood products are not harmless and can cause sequelae including infection, transfusion reactions, transfusion-related acute lung injury, and the development of alloantibodies.

In evaluating this case, it is helpful to examine the literature on the withdrawal of life support to better understand current practice patterns. Studies have shown that up to 10% of advanced cancer patients will suffer some type of hemorrhage.[4] In France, a study showed that cancer patients receive 76% of the PLT transfusions.[5] Asch and colleagues[6] studied the manner in which care is withdrawn from patients at the end of life. Of the types of life support studied, blood products were the first intervention to be withdrawn. In an earlier study, the same authors showed that physicians decide on withdrawal of life-sustaining treatment based on concerns over scarcity, cost, and invasiveness, although individual preferences do exist.[7] Based on these studies, the withdrawal of blood products is a common practice near the end of life.

Using a social justice argument, it can be asserted that cross-matched PLTs are not appropriate in a patient whose status is palliative care only. Another patient should not be deprived of cross-matched PLTs to provide them to this terminally ill patient. In addition, the plateletpheresis donor incurs health-related risk in providing PLTs. While most adverse events are minor, some more serious risks include thrombophlebitis, infection, and neurologic injury.[8] Severe reactions occur in approximately 3.22 in 10,000 donors per year.[9] While a small percentage of donors have a severe reaction, the number is high enough to place limits on blood products to reduce these risks. Furthermore, the financial cost of providing cross-matched or HLA-matched PLTs is high. If health care reform is going to be successful in controlling costs, expensive interventions at the end of life will have to be carefully examined and justified.

In this case, attempts could be made to control the bleeding with packing and local hemostatic measures. If the bleeding is prolonged and causes distress, PLTs (a standard pooled dose) may be indicated.[4] While cross-matched PLTs are more likely to remain in circulation longer and result in a prolonged increase in PLTs, a standard dose could help alleviate acute bleeding. The case presented is a situation in which a trainee may not have considered the scarcity of the resource in question and the interventions that should reasonably be performed in a patient who has been designated as comfort or palliative care only. Alternatively, it could be argued by some who oppose rationing in any form, that it would be unfair to place limits on this resource or any other at the end of life. However, if these specialized interventions are limited in a clear policy, we believe that this would be justified. If such a policy is adopted, educational programs designed for trainees and clinicians could help in avoiding confusion in this type of situation. In this case, the cross-matched PLTs were not provided. It is unknown how long the patient survived after this request.

CASE 2

Ms. S is a 42-year-old woman with metastatic ovarian carcinoma. She has undergone extensive radiation and chemotherapy over the past 3 years. She is hospitalized with new-onset gastrointestinal bleeding as the tumor has eroded through the wall of the colon. The patient has been evaluated and the bleeding is not amenable to embolization or radiation. The only treatment that will sustain life is blood transfusion. Current estimates indicate that the patient will require 5 to 6 units of red blood cells (RBCs) daily. The patient is hopeful that future treatment will be curative and wants to have daily transfusions with the goal that the bleeding will stop and additional treatment will be possible. The physicians caring for the patient believe that she is at the end of her life and the transfusions will only serve to postpone the moment of death.

Discussion of Case 2

Approximately 17.3 million units of RBCs are collected each year.[3] While more abundant than PLTs, RBCs are nonetheless a limited resource. Shortages are frequent and blood drives are often required to maintain a continuous supply, particularly for less common blood types. Maintaining a continuous supply of 5 to 6 units per day is likely to be a significant burden on the blood bank, especially if the patient has an unusual blood type and the course of disease is prolonged. Interestingly, nature may provide its own "rationing" in the case of blood transfusions, in that patients who have been repeatedly transfused with blood may develop alloantibodies that can make obtaining compatible blood more difficult. Eventually, one could argue, the number of antigen-negative (or compatible) units required may be impossible to obtain if alloantibodies did develop.

Ethically, this is a difficult case as the patient has not elected to discontinue aggressive care. The principle of autonomy dictates care in many situations. Patients are allowed to elect or decline medical care based on personal preferences. Rationing has negative connotations and is not generally condoned in our current health care system.

However, limits can be placed, especially when a treatment may have questionable medical benefit. In this case, the physicians can argue that the transfusions are medically futile. Futility is variably defined but includes end-of-life situations in which the treatment is very unlikely to achieve the desired effect or lead to medical improvement.[10] Futility is a difficult ethical concept to invoke as it is somewhat dependent on the goals of care. The patient could argue that even one extra day of time with her family is a reasonable goal. Balancing the patient's preferences against the needs of society is challenging in these situations.

In resolving this case, a consultation from the hospital's ethics committee was requested. Different options were discussed by the committee. One idea was to suggest that the patient's family donate blood to the community blood supply to offset her use; however, in this case the sheer number of units required made this an untenable option. It may also have been possible for the family to organize a blood drive for the patient. Ultimately, the decision was made to discuss the scarcity of blood products and limit the transfusions to a certain number per week (one to two in this case). The patient and family agreed to this plan. The patient was discharged to hospice care and, interestingly, was alive on follow-up a couple of weeks later, suggesting that the bleeding had subsided on its own.

CASE 3

Ms. H is a 28-year-old woman who was in a motor vehicle accident. She was transferred to a tertiary care center from a community hospital with massive bleeding. The patient used 100 units of RBCs and during this time it was necessary to switch from D– to D+ blood. Due to dwindling group O inventories, the intensive care unit was contacted to alert the clinical team that the patient would need to be transitioned to group A blood products. The team acknowledged that the patient was not going to survive but wished to keep the patient alive until the family members could arrive to say goodbye.

Discussion of Case 3

This case illustrates the difficulties that can arise in massive transfusion. In general, a first-come, first-served approach is typically used if the transfusion is clinically indicated. One issue involves the protection of scarce O– units to accommodate other potential trauma patients. In terms of transitioning to D+ blood, alloimmunization is estimated to occur in approximately 20% to 25% of D– patients who receive D+ RBCs.[11-13] Many blood banks have policies on switching patients to D+ blood in these types of situations. This can be a difficult decision in a woman of child-bearing age if she is expected to survive, although that is not the case here.

The larger problem here is the depletion of the group O inventory. The mortality rate of an acute hemolytic transfusion reaction due to ABO incompatibility is approximately 10%. In a massive transfusion situation where isoagglutinins have been effectively washed out by transfusion of out-of-group plasma, the risk of a fatal reaction is probably much lower, although there are no clear data. Depletion of the group O inventory is likely to cause delay in transfusion of other patients, which could be especially dangerous if there is another severe trauma case. This particular situation is problematic because the team is requesting massive blood product utilization after they have determined that the patient will die. In this case, the care is futile and the patient is using resources that could be saved for another patient. Interestingly, at this time, another trauma patient was also using large numbers of group O units and additional RBCs had to be acquired from a local community hospital.

In this case, it must be determined whether such a request should be honored to attain this specific goal of care. Accommodations are often made to allow family to arrive, as in the case of terminally ill patients in the intensive care unit. This situation is also expensive and could potentially deprive another patient of a needed bed. This case is somewhat similar in that a scarce resource is being used solely to delay the moment of death with the possibility that another patient will not receive a life-saving treatment. The principle of social justice can be used to justify a different course of action in this case, although it is difficult to know where to draw the line. The transfusions were not successful in keeping the patient alive long enough for the family to arrive, in spite of the clinical team's best efforts.

CASE 4

Ms. R is a 35-year-old woman with metastatic breast cancer who has elected to forego additional chemotherapy, recently entering hospice care. As she has metastatic masses in her liver, her life expectancy is estimated to be several months. On a routine visit with her oncologist, she complains of severe fatigue. Her hemoglobin level is 7 g/dL. The oncologist feels that a RBC transfusion would substantially improve the quality of the patient's remaining life. She discusses this with the patient who agrees to have a transfusion.

Discussion of Case 4

In this case, a transfusion is very likely to significantly improve the patient's quality of life by improving her fatigue. For this reason, it is ethically justified to provide the blood. At the end of life, patients and families are often concerned that if they elect hospice or comfort care they will be abandoned by their physicians and their needs will

be ignored.[14] This concern is often centered on pain management, but can also include other physical and emotional support. A blood transfusion in these circumstances will help in meeting the goals of care at this point in the course of illness.

SUGGESTED GUIDELINES

Transfusion at the end of life can be useful in certain situations, but may be justifiably limited in others. A parallel can be drawn to the guidelines that have been suggested for utilization of scarce resources during a pandemic. Some argue that the most aggressive interventions should be reserved for those patients who are more likely to leave the hospital,[15-17] while others believe that using this criterion alone is problematic.[18] Similarly, limiting the scarce resources utilized for patients who are designated "comfort/palliative care only" can be justified, in part, as they will not recover. As suggested by Hurst and Danis, it is important to have consistent guidelines that place limits on product use, but can be modified to fit unusual individual circumstances.[2] The following are possible examples based on the cases presented:

1. Exceedingly scarce resources such as crossmatched and HLA-matched PLTs, granulocytes, and rare units of blood should not be used in patients who have transitioned to palliative or comfort care. Routine blood products should be used sparingly and requests should be approved by the transfusion medicine service.
2. Transfusions in medically futile situations should be avoided, if possible, and limited to the minimum number of RBC transfusions necessary to ameliorate symptoms of anemia. PLTs should also be limited to the minimum necessary to control bleeding (if it is causing significant patient distress, such as upper airway bleeding). In the event that the frequency of transfusions impacts resources available for other patients (i.e., more than twice a week), the request should be reviewed by the transfusion medicine service. In determining whether care is futile at the University of Michigan, a policy is in place that requires the agreement of two independent physicians. The hospital ethics committee is often consulted in difficult cases.
3. If shortages of blood products arise, attempts should be made to defer transfusion in patients at the end of life to preserve the products for other patients. In cases of shortages of D– blood, terminally ill patients can be transiently transitioned to D+ blood if the transfusion is necessary at all. Unusual requests such as massive transfusion in a futile situation should not be allowed. If agreement cannot be reached on this, an ethics consult should be urgently requested.
4. Transfusion in stable, terminally ill patients requires a careful analysis of the goals of care. Transfusions should not be discouraged in patients for whom an occasional transfusion is likely to alleviate primary symptoms such as extreme fatigue. Large numbers of transfusions, however, should be reviewed by the transfusion medicine service.

Physicians working in transfusion medicine may find it helpful to have institutional guidelines, such as these, in place to ensure fair and proper utilization of blood products at the end of life. With a standard policy in place, these decisions are less likely to seem arbitrary to the treatment teams and patients. Educational sessions could be employed to disseminate the guidelines and answer questions in anticipation of the difficult situations that may arise. These sessions could include discussions with intensive care unit teams in the form of "ethics rounds" or could be presented in didactic form at an established ethics grand rounds presentation. Of course, no policy can address all possible contingencies. Some issues will need to be addressed on a case-by-case basis, particularly when a shortage exists. In contentious or ambiguous cases, consultation with a hospital ethics committee can be extremely helpful. Empirical research is needed to fully understand the attitudes of blood bank directors, physicians, patients, and the general public regarding rationing blood products.

In conclusion, utilization of blood products at the end of life is a controversial issue. Careful analysis of salient medical and ethical issues fosters the responsible use of these resources. Formulating guidelines and promoting communication between transfusion medicine physicians and treatment teams ensures the optimal care of each patient. With reasoned consideration of these issues and their solutions, the ethical principles of beneficence and social justice need not conflict.

CONFLICT OF INTEREST

The author has no relevant disclosures.

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