

Next step in blood use program: end-of-life transfusion

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October 2015—To improve blood usage in 2011, Advocate Health Care in Illinois launched a systemwide blood management program, “7 is the new 10.” Within two years of its implementation, there was a notable decrease in annual red cell usage from 64,178 to 41,000 red cell units, with overall savings of \$10 million.



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As a result of this overall drop in red cell use, hospital areas in which the number of red cell transfusions continued to increase became apparent. One such area was the adult medical intensive care unit. In 2013, 15 percent of adult patients who died within 14 days of admission were transfused a total of 2,318 units of red cells. Review of patient data showed that 29 percent had MICU listed as their hospital service code. Interestingly, 68 percent of these patients had limited emergency treatment orders, accounting for 1,246 red cell transfusions. Approximately 104 red cells per month were transfused to patients who had such orders and died within 14 days of admission.

A 2009 Department of Health and Human Services report showed that large amounts of resources are used to treat patients at end of life, increasing the overall cost of health care. This increased cost has not led to improved outcomes. In 2013, the American Hospital Association developed a “top-five list” of hospital-based procedures or interventions that should be reviewed and discussed between physicians and patients. At the top of the list is appropriate blood management in inpatient services.

To better understand our physicians’ approach to transfusions at the end of life, an online physician survey was conducted in spring of 2014. This survey consisted of 24 questions, four of which related to age, gender, years of practice, and specialty. Twenty questions related directly to transfusion practice.

One hundred fifteen physicians completed the survey and another 65 partially completed the survey, for a total of 180 respondents (out of 328 physicians who were targeted). The respondents identified themselves as belonging to primary medical specialties (palliative care, internal medicine, critical care, emergency medicine, hospitalist, family medicine, and OB/GYN). Sixty-four percent of the respondents were 51-60 years of age, with a 64 percent male preponderance. Here is a summary of the responses.

- One half of respondents have given an RBC transfusion to a patient in a medically futile situation.
- Expectations of patients and patients’ families have a sizable impact on how medicine is practiced. Of the respondents who said they would attempt every reasonable medical intervention on a patient, 45

percent responded that this expectation comes primarily from their patients and their families. Seventeen percent said it comes from fear of litigation.

- Thirty-two percent of the survey respondents reported that patients in medically futile situations or their family members request transfusion for comfort care most or some of the time.
- Nineteen percent of respondents agreed or strongly agreed that the standard transfusion criteria did not apply to patients in medically futile situations.
- Fifteen percent of respondents transfuse patients for fatigue/weakness, 14 percent for pain relief, and 31 percent for other causes, which included comfort and dyspnea even in imminently dying patients to alleviate symptoms.
- Forty-two percent of respondents agreed or strongly agreed that RBC transfusion provides comfort care by increasing the patient's energy/vitality level. Thirty-six percent of respondents agreed or strongly agreed that an RBC transfusion provides comfort care to the patient by increasing a patient's functional ability.
- Nine percent of physicians strongly agreed that transfusions at end of life provide comfort care in situations even when the patient's hemoglobin is greater than 7 g/dL.
- When a patient in a medically futile situation or a family member of a patient in a medically futile situation requested transfusion for comfort care, 79 percent of respondents said they talk with the family or patient about the risks and benefits of blood transfusion. Thirty-seven percent engage the assistance of staff or other clinicians who have had an experience with medically futile patients at end of life.
- Seventy-five percent of respondents agreed or strongly agreed that transfusion guidelines for patients in medically futile situations would be helpful to them in their practice.
- Forty-five percent of the physicians had been practicing for more than 25 years, and only six percent had practiced for five or fewer years. Fifty-five percent of these physicians said they had treated patients at end of life at

least one time per month, with 14 percent of these physicians saying they treat such patients 10 times per month.

Although blood and blood products are safer than they have ever been, even with universal leuko-depletion patients continue to be at risk for transfusion-related circulatory overload (TACO), transfusion-related acute lung injury (TRALI), and transfusion-related immunomodulation (TRIM). These reactions may not always be recognizable in a patient at end of life with multiorgan failure and altered immune response. Allogeneic blood transfusions have considerable impact on the recipient's immune system; this so-called TRIM effect is presumed to result from allogeneic leukocytes and foreign proteins/cell-derived microparticles in stored blood.¹ Immunosuppressive effects of blood transfusions were recognized as early as the 1970s when patients undergoing kidney allograft received several units of pretransplant blood with improved graft outcomes. It is the authors' opinion that end-of-life transfusions are less an ethical dilemma than they are a lack of understanding of the role of blood products in the care of patients.

To protect the public health, the federal government regulates the manufacture of blood products and defines blood as a "biological drug" that is to be prescribed by a licensed physician. Specific indications for red cells include treatment of symptomatic anemia and to improve oxygen delivery to tissues. The requirement for hemoglobins greater than 10 g/dL for general anesthesia is no longer valid, nor is the assumption that anemia slows healing. Oxygen partial pressure (pO₂) is well recognized as a more important determinant than hemoglobin. The most appropriate hemoglobin is understood to be a patient-specific and even situation-specific parameter. Transfusion is much less commonly indicated when anemia has persisted for weeks or months because compensatory mechanisms have had time to work. These anemias are usually best treated by addressing their etiologies.² If blood products were treated as a biological drug and transfused for definitive indications just as one would prescribe medication to treat cardiac disease, inflammation, and malignancies, the dilemma for physicians would be less than it is now.

Advocate Health Care recommendations

The following recommendations are intended to provide assistance to physicians in managing blood transfusions for patients who have a poor prognosis for recovery or have chosen to seek limited care. Additional assistance regarding individual patient scenarios should be reviewed with Advocate Health Care's ethics committee.

1. Blood product transfusions should be limited to red blood cells and platelets in order to ameliorate a patient's symptoms. Limited transfusions for comfort purposes can be made available, in addition to other palliative symptom management.
2. RBC units should be transfused as single units and limited to no more than twice a week.
3. Platelet units can be transfused up to two units per week.
4. Rare blood transfusions should be avoided (granulocytes, rare blood types, and HLA matched platelets).
5. Standing orders should not apply during a blood shortage.
6. Rh-negative blood should be transitioned to Rh-positive blood.

7. Transfusions for eligible organ donors will be managed per the organ procurement coordinator.

The results of the physician survey pointed to a need to advance the discussion within Advocate about patients with poor prognoses for recovery and ethical issues related to the transfusion of blood. Our approach is multi-pronged; it includes clear institutional guidelines, physician education, and additional resources related to questions of ethics and palliative and spiritual care for those physicians who treat patients in medically futile situations. One of the authors (SK) wrote a set of recommendations and presented them to the Advocate Health Care transfusion safety steering committee. With full support from our leadership, we developed seven transfusion recommendations for patients at end of life (see box). The Advocate ethics committee approved them in fall 2014, and a pilot project is being designed under the supervision of Advocate Palliative Care physicians. The aim of the pilot is to educate intensivists, primary care physicians, and nurses about the role of blood transfusions at end of life and assist them as needed.

Physicians' primary ethical obligation is to promote the well-being of individual patients. Physicians also have a long recognized obligation to patients in general to promote public health and access to care. This obligation requires physicians to be prudent stewards of the shared societal resources with which they are entrusted. It is our hope that in the near future blood will not be considered an elixir that heals all maladies.

1. Kriebardis A, Antonelou M, Stamoulis K, Papassideri I. Cell-derived microparticles in stored blood products: innocent-bystanders or effective mediators of post-transfusion reactions? *Blood Transfus.* 2012;10(suppl 2):S25–38.
2. Nester T, AuBuchon JP. Hemotherapy decisions and their outcomes. In: Roback JD, et al., eds. *AABB: Technical Manual*. 17th ed. Bethesda, Md.: American Association of Blood Banks; 2011:573–574.

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