New Transfusion Audit Criteria  
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The Transfusion Committee is establishing new transfusion audit criteria which will be more restrictive. Transfusions that can be life saving can also have serious side effects. Some transfusion reactions are well known, such as hives and fever. Other reactions, such as transfusion associated circulatory overload (TACO) and transfusion related acute lung injury (TRALI) are well established but less well known. Finally, data is accumulating that transfusions are associated with systemic inflammatory response syndrome (SIRS) and induce immunomodulation leading to increased infection susceptibility. Since patients who receive transfusions generally have complex problems, these more global transfusion complications are less easily identified as “transfusion related”. Consider transfusion as a transplant which exposes the patient to foreign antigens, RBC and HLA antigens plus others, and cytokines with the ensuing complications. New findings guiding the decisions of the Transfusion Committee are as follows:

First, it is important to understand what “audit criteria” are and what they are not. They are not considered Clinical Practice Guidelines. For instance, meeting a particular audit criteria, i.e. H/H < 8/24, does not mean the patient needs a transfusion. That can only be determined by the clinical condition of the patient. Additionally, audit criteria are not triggers or indications for a transfusion. Transfusions should not be based on numbers but, in the case of RBC, on the need for increased oxygen carrying capacity. Audit criteria are a set of numbers and/or clinical conditions the Transfusion Committee has deemed sufficient evidence for the appropriateness of a transfusion. Each transfusion is screened for review. For those which do not meet the audit criteria and the transfusions marked with “Other” are further reviewed. In many reviews, the patient met the audit criteria but the clinician ordering the blood did not use the most appropriate criteria. A frequent example is to have the criteria “Other” used and in the comments have Hemoglobin 6.5! This is frustrating to those who do the review. It is essential to use the most appropriate criteria.

*Hint* – if you expand the window with the criteria so that you can see all of your choices it will make it easier to select the most appropriate criteria.

The criteria for RBC transfusion will become more restrictive and introduce clinical criteria independent of the H/H. A recent paper (NEJM 2007; 356:1609-1619) found that in stable, yet critically ill children, a restrictive hemoglobin threshold of 7 g per deciliter for red-cell transfusion can decrease the transfusion requirement without increasing adverse out-comes compared to using a liberal threshold of 9.5. Only 46% of patients in the restrictive group received one or more transfusions while 98% of the patients in the liberal group were transfused. Indeed an earlier article in adults (NEJM 1999; 340:409-17) suggested a restrictive transfusion strategy may be superior to a liberal strategy.
Likewise, the transfusion audit criteria for FFP will become more restrictive. The current national standard for FFP audit criteria is 1.5 times the “normal” PT or PTT value. What is not clear is what normal value – the mean, the upper limit or even the lower limit.

Our current PT audit criteria is 18 which corresponds to an INR of only 1.4. Clearly, this is too low. There is a national trend to use only PT and not PTT as a guideline for FFP transfusion. There are two contributing factors to this trend. First, the PT can be “standardized” by actually using the INR and not the PT. This is controversial as the INR has only been validated for monitoring warfarin therapy and not for otherwise assessing the coagulation system. In addition, calculation of the INR requires very good mean normal values, something not available in our youngest patients. Second, those coagulation factors which correlate with bleeding and which, when not in adequate concentration, lead to an elevation of the PTT alone and not also the PT, are best corrected with administration of specific factors and not FFP.

The PTT alone, and not the PT, is elevated when there is a deficiency of Factors 12, 11, 9 and 8. A deficiency for Factor 12 is NOT associated with in vivo bleeding. Factor 11 deficiency has a complex picture. The frequency of the homozygous deficiency state is 0.2% in those patients of Ashkenazi origin but otherwise is rare. Bleeding does not correlate well with the level of Factor 11 activity. The bleeding tendency of an individual patient is more closely related to the bleeding tendency of the patient’s relatives. Deficiencies of Factors 8 or 9 are best addressed with the use of specific factors, not FFP. Vitamin K deficiency, DIC and liver disease are all associated more frequently and to a greater extent with an elevation of the PT than the PTT.

The use of PTT as part of the audit criteria at Children’s Mercy Hospital is complicated by the fact that many specimens for coagulation testing are collected through lines which are contaminated with heparin. When the Laboratory is aware of this and the PTT is elevated, the Laboratory reports the PTT and also treats the specimen in a manner neutralizing the heparin, followed by reporting the “HPTT” if it is lower. Unfortunately, many times FFP is ordered based on the first result and not the heparin neutralized results. The Laboratory is considering eliminating reporting the PTT before the neutralization of heparin.

There will be relatively few changes in the audit criteria for platelets and cryoprecipitate.

The Transfusion Committee is planning a very extensive education campaign and indeed this Newsletter is the first step in that program.