



# TRANSFUSION MEDICINE UPDATE

Institute for Transfusion Medicine

Issue #2 2005

## Common Adverse Reactions to Transfusion

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### **INTRODUCTION**

The signs and symptoms of transfusion reactions run the gamut from hives to chills to dyspnea. All transfusion reactions are diagnosed by exclusion. This Transfusion Medicine Update will review some of the more common transfusion reactions and provide a synopsis of the clinical and laboratory events that occur when a reaction is identified.

### **MANAGEMENT: INITIAL STEPS**

When a transfusion reaction is first suspected the most important first step is to stop the transfusion. Next is the clerical check: bedside re-verification that the information on the tag attached to the blood bag matches that on the patient's armband to assure that the unit being transfused is the one intended for the recipient. A transfusion reaction form should then be filled out in its entirety and sent to the blood bank, along with the unit(s) involved and a post-transfusion sample of the patient's blood (lavender top tube). Blood bank staff and physicians rely on the information on the form when evaluating the reaction, thus complete and accurate clinical information including the pre- and post-transfusion vital signs is important. If an especially severe reaction has occurred, a phone call to the on call blood bank physician can expedite the process, might assist in obtaining other important clinical or laboratory tests, and can assist the clinical team in managing the patient. Once the specimens arrive at the blood bank, a laboratory clerical check is performed to ensure the correct blood was issued for the intended recipient and a Direct Antiglobulin Test (DAT) is performed on the recipient's red blood cells (RBCs) to evaluate the possibility of immune hemolysis contributing to the observed reaction. An inspection of the recipient's plasma is also performed which would reveal even minute

quantities of free hemoglobin, indicative of hemolysis. The blood bank will telephone the results of these tests and checks back to the ward that initiated the reaction investigation. Note that a negative investigation for hemolysis does not mean that a transfusion reaction has not occurred. It simply indicates that hemolysis was not detected in the sample.

### **ALLERGIC REACTIONS**

A common transfusion reaction occurring in about 1% of recipients is a simple allergic reaction. The etiology is most often recipient antibodies to donor plasma proteins and commonly manifests with urticaria (hives), pruritis (itching) and possibly flushing of the skin. More severe but less common manifestations of an allergic reaction would include: hypotension, airway narrowing with wheezing or stridor, nausea/vomiting and, rarely, diarrhea. Frank anaphylaxis is uncommon.

When an allergic reaction is suspected, the infusion should first be stopped and the patient evaluated. If the reaction is mild (no airway or blood pressure instability), the symptoms resolve with antihistamines, and the blood bank investigation for hemolysis is negative, the unit can be slowly restarted with close observation for recurrence of symptoms. If symptoms recur or the initial reaction is severe, a new unit can be obtained from the blood bank after returning the partially infused one, accompanying post-transfusion blood sample and paperwork, and receiving clearance from the blood bank physician on call. In all cases, even if the transfusion is restarted, a transfusion reaction form should be filled out.

If patients suffer repeated allergic reactions, pre-medication with corticosteroids and

antihistamines 30-60 minutes before subsequent transfusions should be considered. If a patient suffers a severe allergic reaction, consult with the blood bank physician before administering additional blood products.

### **FEBRILE, NON-HEMOLYTIC REACTIONS**

Non-hemolytic “fever/chill” reactions (febrile reactions) are also common. By definition, a febrile reaction includes a  $\geq 1$  C rise in temperature vs. the pre-transfusion reading in a non-premedicated patient. The fever may be accompanied by chills/rigors, diaphoresis, hypertension, tachycardia, and a subjective feeling of being “cold”. While antipyretic pre-medication can abate a fever, the accompanying chills/rigors remain unaffected. Thus, a patient may suffer a “febrile reaction” even in the absence of a fever! Febrile reactions to platelets are caused by cytokines that accumulate in the plasma during their 5-day storage. Thus, older platelets are more likely to cause these events. The exact etiology of febrile reactions to RBCs has not been elucidated, but probably relates more to recipient antibodies to donor WBCs than to cytokine accumulation. Febrile reactions to plasma products are uncommon.

The diagnosis of a febrile reaction rests on excluding all other causes of fever in the recipient. Other considerably less common transfusion reactions that can present with fever include: acute and delayed hemolytic reactions, Transfusion-Related Acute Lung Injury (TRALI) and bacterial sepsis. Hemolytic reactions are identified by the DAT and plasma inspection, TRALI presents with respiratory complaints, and bacterial sepsis can manifest with very high fever, evidence of disseminated intravascular coagulation and shock. Fortunately, the rates of blood product contamination are exceptionally low in Pittsburgh due to the rigorous use of aseptic technique in product preparation and careful donor screening. Ordering cultures of the blood bag from a patient with a fever during or after transfusion should be performed in consultation with the blood bank physician and is typically reserved for those patients in whom bacterial contamination is highly suspected.

Prevention of febrile reactions is two-fold: using leukoreduced blood products removes most of the white blood cells which produce cytokines and are an antigenic target for recipient

antibodies, while antipyretic premedication can often abate the fever. Antipyretics are unlikely to mask the fever associated with bacterial sepsis.

### **VOLUME OVERLOAD**

Finally, the effects of Transfusion-Associated Circulatory Overload (TACO) are beginning to be better appreciated. In many cases this is due to rapid administration of the blood product or failing to optimize the recipient’s volume status prior to transfusion. Signs and symptoms include: headache, hypertension, dyspnea and those associated with exacerbations of chronic heart failure and pulmonary edema. Patients at risk of TACO include those with heart and renal failure, as well as those with expanded intravascular volume, such as those with chronic anemia. To avoid TACO, the recipient should be as euvolemic as possible prior to transfusion and the transfusion itself should proceed slowly over a period not exceeding 4 hours. If the recipient cannot tolerate the transfusion over 4 hours, the blood bank can prepare aliquots of the unit in a sterile fashion such that it can be administered in divided doses, each over a 4 hour period. Please consult with the on call blood bank physician in such cases. Note that even though TACO is not caused by the blood product per se, it should still be reported to the blood bank in the same manner as any other transfusion reaction.

There are numerous other transfusion reactions, all of which are much less common than the 3 discussed above. Reporting all transfusion reactions should follow the same basic steps. If in doubt, stop the transfusion, and consult the on call blood bank physician for guidance.

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