

FEVER AFTER DIRECTED DONOR RBCS
Case Study by Jim Perkins, (©2009)
ANSWERS

1. What is the differential diagnosis of this patient's fever? Which of those possibilities do you think is responsible for this patient's fever?

Fever is the most common symptom of a hemolytic transfusion reaction, but this is ruled out by the negative DAT and the absence of hemoglobinemia, as well as by the other tests for incompatibility. Bacterial contamination of the unit may cause high fever, often with hypotension, but this is ruled out by the negative culture. The most common causes of fever in association with transfusion are a febrile, non-hemolytic transfusion reaction (FNHTR) and the patient's underlying disease.

2. What is the mechanism of this type of reaction? Is the fact that this was a directed donation relevant in any way?

Classically, FNHTRs are due to recipient antibody directed against donor WBC antigens, particularly HLA antigens. In fact anti-HLA leuco-agglutinins were first described by Dauset in a population of thalassemia patients who frequently developed fever when they were transfused with blood. Febrile reactions may also be due to soluble substances, pro-inflammatory cytokines, released into the plasma and anticoagulant solution of units of RBCs and platelets during storage. The latter reactions and fever due to the patient's underlying medical problems form a continuum, as patients who are already primed by systemic inflammation are more likely to react with the many substances, including cytokines and other pyrogens, in a unit of blood. Thus many patients with low grade fevers before transfusion experience an increase in temperature when they are transfused.

Antibodies directed against fetal/paternal HLA antigens are frequently found in pregnant women (~20%), and sensitization in the form of memory lymphocytes presumably persists for life. Thus women would often be expected to have antibodies directed against HLAs of their children or spouse, and febrile reactions might be more common after transfusion of leukocyte-containing components from these individuals.

3. What might be done to prevent such reactions in this patient in the future?

If FNHTRs are due to recipient antibody directed against donor leukocyte antigen, they may be prevented by leukocyte reduction of WBC-containing blood components (RBCs and platelets), and this is well documented. Leukocyte reduction filters will not remove soluble cytokines produced during storage of the unit, but the latter might be reduced by pre-storage filtration. In fact, the incidence of febrile reactions is lower with units filtered before storage and those filtered at the bedside.