



Reducing Transfusion - Associated Sepsis



By Patricia Kopko, MD

BloodSource is switching to a better method of detecting bacterial contamination in plateletpheresis units.

ALTHOUGH TRANSFUSION-ASSOCIATED sepsis is rare, it can be a serious, life-threatening transfusion reaction. Historically, it is the second leading cause of fatal transfusion reaction reported in the US (hemolytic ABO reactions are first), with 10-15 fatalities reported each year.

All blood products can potentially become contaminated with bacteria. However, platelets have the highest risk because they are stored at a warmer temperature (20-24°C) than other blood products, and in gas-permeable bags. The permeability is good for platelet viability, but has the unintended consequence of being conducive to bacterial growth.

Because of the known risk of bacterial sepsis associated with platelet transfusion, the American Association of Blood Banks (AABB) and the College of American Pathologists (CAP), the two main laboratory accreditation bodies for blood centers and transfusion services in the US, recently added a requirement for laboratories to have methods to "limit and detect bacterial contamination in all platelet components." California has adopted AABB Standards as law, so use of a bacterial detection system for platelet products is mandatory in this state.

BloodSource has been using the Chemstrip 10 UA Dipstick method for bacterial detection of platelet products since March 1, 2004. In this test system, plateletpheresis units are tested no earlier than 12 hours after collection. A positive result is defined as a pH of <7.0 and glucose <250 mg/dL. Positive units are quarantined and discarded. Negative units are released to hospitals for transfusion.

The BloodSource medical staff recently decided to change the method of bacterial detection for plateletpheresis. (BloodSource no longer manufactures platelet concentrates from whole blood, because a single plateletpheresis has fewer exposures and an improved safety profile.) The new method is culture based and provides increased sensitivity and specificity for bacterial detection. Culture based methods are now used by the majority of blood collection agencies in the US for the following reasons.

Increased Sensitivity. Dipstick methods detect 106-107 bacteria/mL, while culture based methods detect 102-103 bacteria/mL.

Breakthrough Infections. Serious septic transfusion reactions have been reported by centers using Dipstick Methods

Ongoing Detection. BloodSource will continue to culture a sample of the plateletpheresis until the product expires, allowing for retrieval of contaminated products.

The target date for implementing this new bacterial detection method is July 5, 2005. In this new test system, all plateletpheresis will be held at BloodSource for a minimum of 24 hours after collection. Culture bottles will be inoculated after the 24-hour hold.

Plateletpheresis will be made available for distribution if the initial reading of the culture is negative. The culture bottles will be maintained in the "incubator" for the entire shelf life of the plateletpheresis. The culture equipment will test possible bacterial contamination every 10 minutes during this time.

It is anticipated that only 1 in 2,000 plateletpheresis units will be contaminated with bacteria. Other blood centers have found that the majority of contaminated units are detected in the first 24 hours after the initial inoculation.

Our primary goal is to prevent transfusion of massively contaminated plateletpheresis units. The Dipstick Method tests the product at a single point in time, so does not prevent release of a plateletpheresis with a few bacteria that can subsequently multiply exponentially, in an incubator at a hospital, while awaiting transfusion. The Culture Based Method will allow BloodSource to retrieve such products as soon as the culture becomes positive.

If a sample becomes positive in the initial bacterial culture at BloodSource, all products associated with that donation will be retrieved. If a product is at a hospital, the hospital will be notified to quarantine the product immediately.

Rarely, physicians will be notified, by their transfusion service, that their patient has received a plateletpheresis that subsequently tested positive for bacteria. Because the plateletpheresis will contain fewer than 100-1,000 bacteria per ml, the risk of sepsis from these units will be small. Most patients will not have an adverse reaction associated with the infusion of this amount of bacteria. Patients who are immunocompromised or have implanted devices, such as heart valves, may be at increased risk from this level of bacteremia. Thus, the patient's clinical condition should help guide the clinician in deciding whether to initiate antibiotic therapy.

If a patient has been transfused with a plateletpheresis that subsequently tests positive in the bacterial culture method, BloodSource will have a stat Gram stain performed on the culture bottle. The results will be reported to the transfusion service. Additionally, a culture and sensitivity will be performed on a product from the donation, if available. These results will be conveyed to the hospital transfusion service.

The usual communication will occur from BloodSource to the transfusion service and from the transfusion service to the transfusing physician. However, a BloodSource physician is always available for consultation regarding this or any aspect of transfusion medicine. We look forward to working with you as we implement this new test. Together, we will continue to make the blood supply as safe as possible for your patients.

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