

## LETTERS TO THE EDITOR

## Infection Prevention in Transfusion Practice

*To the Editor*—Contamination prevention of blood products is a challenge in transfusion practice. Contamination can occur at any point in the transfusion chain, including collection, processing, storage, issue, and administration. The objective of this communication is to describe strategies for preventing transfusion transmitted infections (TTIs) as practiced in a blood bank in a 167-bed oncology center in India.

The blood bags used for collection comply with ISO 3826 standards.<sup>1</sup> We use bags with an attached diversion pouch for collection of the initial 20–25 mL of blood. This reduces bacterial contamination during collection by preventing the skin core from entering into the collection bag. The packet and blood bag are inspected for any evidence of visible contamination.

Blood collection at our center is either for component preparation or as an apheresis (ie, single-donor platelets). The cleaning and disinfection methods before blood collection are followed as per World Health Organization guidelines.<sup>2</sup> This procedure consists of washing the donor's relevant arm with soapy water and disinfecting the antecubital fossa, initially with isopropyl alcohol for 30 seconds over a diameter of 8 cm in concentric manner, followed by application of 2.5% chlorhexidine with 70% isopropyl alcohol. Until screening tests are completed, whole blood is stored between 2 and 6°C, and after component preparation, which is done within 1–2 hours of blood collection, platelets are stored at 22°C. Packed red blood cells (RBCs) are stored between 2 to 6°C, and plasma is stored at –40°C. The shelf-lives of stored products are defined as follows: 5 days for platelets, 1 year for plasma, and 6 weeks for RBCs.

Blood components can potentially transmit several pathogens, and all donated units are screened for transfusion transmissible infections (TTIs). In India, mandatory testing for TTI is required for only 5 pathogens: human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), malaria, and syphilis. However, the list of potentially transmissible infections is large and includes other viruses: human T-lymphotropic virus (HTLV), cytomegalovirus (CMV); bacteria (eg, *Yersinia* and *Serratia*); parasites (eg, *Babesia*, *Trypanosoma*, and *Leishmania*); and prion agents (eg, Creutzfeldt-Jakob disease [CJD]).<sup>3,4</sup> In our center, the Vitros ECi system (Johnson & Johnson) is used to test for HBV surface antigen (HBsAg), anti-HCV antibodies, anti-HIV antibodies; immunochromatographic test (ie, a pan malaria card) is used to test for malaria (*Plasmodium vivax* and *P. falciparum*) antigen, and syphilis serology is performed using a card agglutination test (Rapid Plasma Reagin test). Blood units found to be serologically reactive for any of the markers (Table 1) are immediately identified, segregated, and discarded. All seroreactive donors are notified, as counseling is essential. Our data show that donor response for counseling after

notification is only ~9.5%. Regular, repeat, voluntary donors represent a safer source of blood because they have been repeatedly tested and have low seroprevalence. The cost of serological screening for TTI in our center is Indian rupees (Rs) 180 (~\$3) per component or Rs 540 (~\$9) per donation.

Quality control of blood products for content is undertaken, and 1% of all units are collected, or 4 units/month, whichever is greater. Data on sterility testing in our center show that 3.2% of RBCs, 5.2% of platelets, and 12% of fresh-frozen plasma samples were culture positive (Table 1). Most of these organisms were environmental contaminants and low-pathogenicity organisms. These findings correlate well clinically, as no septic transfusion reactions were recorded during this period (September 2013–August 2014). The relatively higher rate of microbiology culture positivity could be due to more sensitive methods of detection (eg, pediatric BacTALERT blood culture bottles were used), to period of incubation (5 days vs 2 days, as practiced in some centers), and to relative volume of inoculum used (0.5 mL of blood product in 30 mL of broth). The cost of sterility testing (bacteria and yeasts) is Rs 240 (~\$4) per sample.

Screened blood products can be infectious, which can be due to window-period positivity (ie, nucleic acid positive while serologically nonreactive), to mutant strains of virus, to immuned silent donors (ie, immunoglobulin-deficient status), to testing errors, to agents not tested, or to unknown agents. Nucleic acid amplification tests (NATs) have further reduced the chance of TTIs.<sup>5</sup> In centers where the NAT technique is used for screening donated units, the estimated residual risk is 1 in 360,000 for HBV, 1 in 4.3 million for HIV, and 1 in 10 million for HCV.<sup>3</sup> Pathogen inactivation procedures (eg, Mirasol) represent a new technology used to reduce TTIs.<sup>4</sup>

Today, bacterial infections remain the most common TTI, and the risk is greatest with platelet components. Incidence of transfusion-associated septic events is reported to be 1 in 250,000 for packed RBCs but 1 in 25,000 for platelets.<sup>5,6</sup> Bacterial contamination reactions are second only to ABO incompatibility as cause of death post transfusion.<sup>7</sup> Transfusion-associated septic reactions are often underrecognized unless they are dramatic, such as shaking chills with hypotension, disseminated intravascular coagulation, or shock. If any such event occurs, transfusion must be stopped immediately, the relevant unit must be sent for culture, and the satellite units must be cultured and quarantined. Sources of bacterial contamination include asymptomatic donor bacteremia, contamination during phlebotomy, and bag contamination during processing, storage, thawing, or administration. Fresh-frozen plasma bags stored at –40°C can harbor invisible fractures or micropunctures due to inappropriate handling.

Prevention of TTIs, including bacterial contamination, requires a comprehensive approach throughout the transfusion chain and the implementation of high-quality practices. Quality standards are necessary not only to fulfill legal requirements but also to ensure patient safety.

TABLE 1. Seroreactivity in Donors and Microbiological Culture Positivity Rate in Blood Products at Tata Medical Center, Kolkata, India

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|--|---|
| Seroreactivity in donors (September 2013–August 2014)                                | Anti-HIV: 13 of 6,900 (0.19%)<br>HBsAg: 47 of 6,900 (0.68%)<br>Anti-HCV: 55 of 6,900 (0.79%)<br>RPR test for syphilis: 12 of 6,900 (0.17%)<br>Malaria antigen test: 0 of 6,900 (0%)   |
| Microbiological culture positive rate in blood products (September 2013–August 2014) | Packed RBCs: 2 of 31 (6.45%); <i>Staphylococcus warneri</i> ,<br><i>Sphingomonas paucimobilis</i><br>Platelets: 1 of 46 (2.1%); <i>Micrococcus luteus</i><br>Fresh-frozen plasma: 2 of 15 (13.3%); <i>S. warnerii</i> , <i>S. epidermidis</i> |

NOTE. HIV, human immunodeficiency virus; HBsAg, hepatitis B surface antigen; HCV, hepatitis C virus; RPR, rapid plasma reagin; RBC, red blood cells.

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## Infectious Complications Following Transrectal Ultrasound-guided Prostate Biopsy: A Canadian Tertiary Cancer Center Experience

*To the Editor*—Transrectal ultrasound (TRUS)-guided prostate biopsy, used to diagnose prostate cancer, is associated with infectious complications ranging from simple cystitis to severe sepsis.<sup>1</sup> Antimicrobial prophylaxis prior to TRUS-guided prostate biopsy, most commonly using ciprofloxacin, has been shown to reduce infectious complications.<sup>2</sup> Recent reports, however, have documented increasing rates of infections complicating TRUS-guided prostate biopsy, including infections secondary to fluoroquinolone-resistant *Escherichia coli*.<sup>3</sup>

We reviewed the temporal trends of infectious complications following TRUS-guided prostate biopsy at Princess Margaret Cancer Center, a 130-bed Canadian tertiary-care cancer center in Toronto, Canada, where ciprofloxacin prophylaxis is routinely prescribed prior to these procedures. Passive surveillance for complications following TRUS-guided prostate biopsy has been conducted since 2003. Following biopsy, patients are provided with both written and verbal instructions to return to the emergency department if they develop complications including fever, dysuria, or hematuria within 1 week of biopsy and to contact their urologist. Additionally, at the bottom of each computer-generated procedure report sent to the referring physician, the following message appears: “Please let us know if the patient has any late complications.”