

Clinical pathology selected abstracts

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Evaluation of platelet bacterial contamination and septic transfusion reaction rates

August 2020—Bacterial contamination of platelets continues to be an important cause of transfusion-associated morbidity and mortality. From 2001 to 2016, there were 51 deaths reported to the FDA due to transfusion of apheresis products contaminated with bacteria, including 30 deaths since testing for bacterial contamination was mandated in 2004. This mandate was implemented through primary culture of single-donor apheresis platelets in 2004 and then prestorage pooled platelets (PSPPs) in 2007. The authors conducted a study to compare the platelet bacterial contamination and septic transfusion rates before and after introducing testing of pooled and apheresis platelets by primary culture over an extended time period. They cultured platelet aliquots at issue and evaluated transfusion reactions. Bacterial contamination and septic transfusion rates were evaluated before and after the mandated introduction of primary culture by blood centers that used a microbial detection system (BioMérieux BACT/Alert) or enhanced bacterial detection system (Haemonetics eBDS). A total of 28,447 platelets (44.7 percent apheresis platelets, 55.3 percent at-issue pooled platelets) were cultured during pre-primary culture periods and 97,595 during post-primary culture periods (79.3 percent apheresis platelets, 20.7 percent PSPPs). Seventy-seven contaminated units were identified, with 43 in the pre-primary culture and 34 in the post-primary culture period. Contamination rates for apheresis platelets did not decrease after introducing primary culture (393 versus 387 per million transfusions). In contrast, contamination rates of pooled platelets decreased significantly from 2,415 to 198 per million transfusions. The overall septic transfusion rates were also unchanged for apheresis platelets (79 versus 90 per million transfusions) but decreased significantly for pooled platelets (826 versus 50 per million transfusions). There were no differences in contamination or septic transfusion rates based on the primary culture testing method used. A decrease in contamination and septic transfusion rates occurred after 2012 and may be associated with a change in donor skin preparation. The authors concluded that primary culture significantly reduced the bacterial contamination and septic transfusion rates associated with pooled but not apheresis platelets. Yet there is a need to further reduce bacterial contamination rates by performing secondary testing via rapid tests at or near the time of issuance, performing secondary culture, or using pathogen-reduction technology.

Kundrapu S, Srivastava S, Good CE, et al. Bacterial contamination and septic transfusion reaction rates associated with platelet components before and after introduction of primary culture: experience at a US academic medical center 1991 through 2017. *Transfusion*. 2020;60:974–985.

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HLA-matched platelet support using an ethnically diverse donor population

Platelet refractoriness may increase the risk of bleeding, prolong hospital stays, and contribute to hospital costs. A percentage of patients who are platelet transfusion dependent for a prolonged period will develop refractoriness. Platelet refractoriness is defined as a one-hour corrected count increment (1hCCI) of 7.5 or less after two ABO-compatible platelet transfusions. In the majority of patients, low 1hCCIs are caused by nonimmunological factors. However, the causes are immunological and result in increased clearance of transfused platelets in 10 percent of patients. Alloantibodies against class 1A or class 1B human leukocyte antigens (HLA) represent the majority of the causes for refractoriness in these patients. The refractory patients are shown to benefit from completely HLA-matched and ABO-compatible donors. A genetically diverse HLA-typed donor population is mandatory to ensure sufficient support for all patients. In this study, conducted in the Netherlands, the investigators evaluated the HLA-matched donor program of the Dutch national blood supply foundation by estimating the proportion of the patient

population in the Netherlands that could be supported by the current HLA-typed donor population. The authors performed a cohort study among consecutive patients who received HLA-matched platelet concentrates in the Netherlands between 1994 and 2017. The number of available donors was then determined for each patient using computer software to construct haplotypes. Using these haplotypes, the HaploStats algorithm from the National Marrow Donor Program determined the likely ethnic background of patients for whom five or fewer and 30 or more donors were identified. The results showed that HLA typing was available for 19,478 donors and that 1,206 patients received 12,350 HLA-matched transfusions. A median of 83 donors were available for each patient. The 95 patients with five or fewer donors were more likely to have an African American background whereas patients with 30 or more donors were more likely to have a Caucasian background. The investigators assumed that distribution of the phenotypes of patients in the registry was representative of the patient population. Because donor ethnicity information is not collected in the Netherlands, the investigators estimated the most likely ethnicity based on the most likely estimated haplotype for patients and donors using HaploStats. In conclusion, the Netherlands has almost 20,000 donors, representing 6,717 unique HLA phenotypes, to donate HLA-matched platelets upon request. However, despite nationwide coverage, insufficient numbers of completely HLA-matched donors were available for 10.3 percent of refractory patients. In addition, nearly 10 percent of donors are no longer available to donate annually, resulting in a continuous need for new HLA-typed donors. The investigators are evaluating to what extent it is possible to register the ethnicity of blood donors in the Netherlands, which would make it easier to promote blood donation in selected groups and increase HLA typing of blood donors with more rare RBC phenotypes. This could be a useful strategy to increase the availability of matched donors for refractory patients in the Netherlands.

Kreuger AL, Haasnoot GW, Somers JAE, et al. Ensuring HLA-matched platelet support requires an ethnic diverse donor population. *Transfusion*. 2020;60:940-946.

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