Platelet refractoriness is defined as the failure of platelets to show adequate increment after platelet transfusion. Platelets are important to the normal clotting and hemostasis process in the prevention of bleeding. Platelet refractoriness is a significant clinical concern because of resulting hemorrhagic emergencies, increased length of hospital stays, higher inpatient costs, and decreased survival. As part of the healthcare team, oncology nurses play a crucial role in early detection and using evidence-based management strategies for platelet refractoriness to limit the potential for associated morbidity and mortality.

AT A GLANCE

- Platelet refractoriness is a significant clinical concern related to the onset of hemorrhagic emergencies.
- Corrected count increment calculation after transfusion is recommended to help monitor and manage patients with platelet refractoriness.
- Early detection of immune-mediated causes enables appropriate platelet transfusions to achieve a good increment in the recipient's platelet count.

KEYWORDS
platelet refractoriness; corrected count increment; bleeding complications

DIGITAL OBJECT IDENTIFIER
10.1188/21.CJON.89-92

Platelet Refractoriness

Examining associated morbidity and mortality

Sijimol Mathew, MSN, APRN, ACNP-BC

Platelet transfusion is necessary to maintain homeostasis in patients with low platelet counts. However, a patient who does not show any improvement in platelet counts, even after multiple transfusions, has a life-threatening condition known as platelet refractoriness (Börger et al., 2016). Between 30% and 70% of patients with hematologic malignancy may develop refractoriness to platelet transfusion because of bone marrow failure and/or after a hematopoietic stem cell transplantation (Wang et al., 2017). The normal number of platelets circulating in a healthy individual ranges from 150,000 to 400,000 platelets per microliter of blood (Forest & Hod, 2016). Platelet refractoriness remains a significant clinical problem for patients with cancer because of the risk for hemorrhagic emergencies, increased length of hospital stays, higher inpatient costs, and decreased survival (Stanworth et al., 2015). Bleeding complications associated with platelet refractoriness include spontaneous bleeding in the absence of overt trauma, such as petechiae, epistaxis, and gum bleeding. In the worst scenarios, intracranial hemorrhage, pulmonary hemorrhage, gastrointestinal bleed, and frank hematuria occur (VanDruff, 2019).

Significance

Platelets can be obtained only from a healthy donor. Platelets are prepared for transfusion from the platelet fractions of separate donors (pooled platelets) or collected by apheresis from a single donor. Normal platelets survive for as many as 10 days, whereas the lifespan of transfused platelets is approximately four to five days (Cushing & DeSimmone, 2019), further shortened by immune- and nonimmune-mediated causes. Platelet transfusions are given to prevent bleeding or as prophylaxis. The American Association of Blood Bank guidelines recommend prophylactic platelet transfusion at a threshold of 10,000 per mcl to reduce the risk for spontaneous bleeding (Kaufman et al., 2015). The threshold is increased based on the patient's indication for the procedure and/or location of bleeding (Cowan, 2017). The adult dose of the whole blood–derived platelet is a pool of four to six units, which will allow transfusion of $3–4 \times 10^{11}$ platelets per transfusion (Strauss, 2019; Yuan & Goldfinger, 2020). Appropriate use of evidence-based transfusion guidelines is crucial to minimize the risks associated with platelet transfusion and to maintain an adequate supply of platelets. Repeated transfusions in patients with platelet refractoriness are also associated with safety concerns such as infection, transfusion reaction, and increased costs (Newland et al., 2019). The possible adverse events associated with platelet transfusion are febrile nonhemolytic transfusion reactions, allergic reactions, transfusion-related acute lung injury, transfusion-related circulatory overload, bacterial sepsis, and hemolytic reactions (Newland et al., 2019).

Platelets are stored at 20°C–24°C, with continuous gentle agitation for as many as five days. Platelet transfusion is