ASK A PATHOLOGIST - American Journal of Hospital Medicine

April 7, 2015

[1]Emily Coberly MD

[1]Department of Pathology and Anatomical Sciences, University of Missouri Health Care, Columbia, MO and
[1]Department of Pathology, Microbiology and Immunology, Vanderbilt University, Nashville, TN

Corresponding Author: Emily Coberly coberlyE@health.missouri.edu

Citation: E Coberly, Ask A Specialist: Ask A Pathologist. Journal of Academic Hospital Medicine 2015 Volume 7 Issue 2

QUESTION

My patient has thrombocytopenia, but after the last platelet transfusion his platelet count only increased from 21,000/μL to 26,000/μL. Does he need crossmatched platelets?

ANSWER

As a general rule of thumb, transfusion of one unit of apheresis platelets or a single pooled unit ("5 pack" or "6 pack") of whole blood derived platelets is expected to increase an adult's platelet count by about 30,000-50,000/μL. If two or more platelet transfusions result in a lower than expected increase in platelet count, platelet refractoriness should be considered.
If platelet refractoriness is suspected, pre- and post-transfusion platelet counts should be measured on at least two separate occasions. The post transfusion platelet count should be drawn 10 to 60 minutes after the platelet transfusion is completed. These values can then be used to calculate the corrected count increment (CCI):

$$CCI = \frac{(\text{Platelet count(post)} - \text{platelet count(pre)}) \times \text{body surface area (m2)}}{\text{Number of platelets transfused (x 1011)}}$$

A total CCI of less than 5000 indicates platelet refractoriness.

For the scenario in question, the change in platelet count of 5,000 multiplied by an average male body surface area of 1.9 (m2) divided by the minimum required number of platelets in an apheresis unit of 3.0 (x 1011) equals 3167, consistent with platelet refractoriness. Units are usually omitted when reporting the CCI result.

Platelet refractoriness may be caused by a variety of immune-mediated or nonimmune causes. Nonimmune mechanisms such as infection, fever, bleeding, DIC, splenomegaly and drugs account for the majority of cases of platelet refractoriness. In these cases, treatment should be aimed at the underlying cause whenever possible; crossmatched or HLA matched platelets are of no additional benefit over random platelets in non-immune cases.

If nonimmune causes have been excluded, the next step is to confirm that the patient received ABO identical or compatible platelet units. Although platelets do not require ABO matching, they do express a small number of ABO antigens which may contribute to a decreased count increment in some cases. If available, ABO compatible platelet units should be requested.

When platelet refractoriness is immune-mediated, it is most commonly caused by antibodies against HLA class I antigens or platelet specific antigens. In these cases, crossmatched platelets or HLA-matched platelets may be helpful. Crossmatched platelets can usually be obtained more quickly than HLA-matched platelets (1-2 days) and can detect HLA, ABO, and platelet specific antibodies. HLA-matched platelets generally take longer to obtain, but may be considered for patients who are highly alloimmunized when crossmatch compatible platelets cannot be found. If immune-mediated platelet refractoriness is suspected, consult your blood bank pathologist to determine if crossmatched or HLA matched platelets may be an option for your patient.

REFERENCES

Kopko PM, Warner P, Kresie L, Pancoska C. Methods for the selection of platelet products for alloimmune-refractory patients. Transfusion. 2015;55(2):235-244.
Nester T, Jain S, Poisson J. Hemotherapy decisions and their outcomes. In: Fung MK, Grossman BJ, Hillyer CD, Westhoff CM editors. AABB technical manual. 18th ed. Bethesda, Maryland: American Association of Blood Banks; 2014. 507-517.