ASK A SPECIALIST

Ask a Pathologist

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Question:
Our hospital blood bank has started using platelet additive solution (PAS) platelets and psoralen treated platelets. What are the advantages and disadvantages of these different types of platelets?

Answer:
Platelet additive solution (PAS) platelets have had the majority (60-70%) of the plasma removed and replaced with a crystalloid solution. Since antigens in the plasma are responsible for allergic transfusion reactions, PAS platelets have a significantly reduced incidence of this type of reaction and are a good choice for patients who experience recurrent or severe allergic reactions to platelet transfusions. The corrected count increment (CCI), a measurement of patient response to platelet transfusion, is slightly lower with PAS platelets than standard apheresis platelets at one hour post transfusion, however there is no significant difference in CCI at 24 hours. The cost of PAS platelets is similar to standard apheresis platelet units.

Psoralen treated platelet and plasma products have been in use in Europe for over a decade, and one such treatment (brand name Intercept) was approved by the Food and Drug Administration (FDA) for use in the United States in 2014. Psoralen treated platelets start with a standard apheresis platelet collection, which is then treated with a psoralen drug (amotosalen) followed by UV light. During this process, the psoralen intercalates into nucleic acids and becomes fixed, preventing DNA or RNA replication. Platelets remain unaffected, but viruses, bacteria, and donor white blood cells present in the bag are inactivated. The majority of the psoralen is then removed from the bag, and the platelet unit may then be transfused to a patient.

Potential advantages of psoralen treated platelets include a reduced risk of transfusion transmitted infections, including bacterial contamination of the unit. Psoralen treated platelets do not require an initial culture to screen for bacterial contamination before they are released from the donor center, which may effectively increase the shelf life of the unit and reduce wastage due to expiration. Since the drug prevents replication of donor white blood cells in the unit, there is no need for irradiation of psoralen treated platelets for prevention of transfusion associated graft versus host disease. Psoralen treated platelets will also meet a new FDA requirement, expected to be finalized later this year, requiring blood banks to take additional steps to prevent transfusion of platelets contaminated with bacteria.

Psoralen treated platelets cost about $100 more per unit than standard apheresis platelet units, but this increased cost should be weighed against the cost savings from eliminating extra charges for Cytomegalovirus (CMV) negative and/or irradiated platelets, not having to perform daily bacterial testing of platelet units to meet the new FDA requirement, and the potential for decreased platelet expiration rates due to an increased effective shelf life.

Patients with allergies to psoralens should not receive psoralen treated platelets. An early US study of psoralen treated platelets found a small increased risk of acute respiratory distress syndrome (ARDS) compared to standard platelets, however an independent blinded repeat analysis using standard diagnostic criteria for both groups found no significant difference in ARDS between the two types of platelets; the initial difference was attributed to inconsistent reporting between study sites. A larger study to evaluate this potential adverse reaction is currently in progress.

Notes

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Suggested references:

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