

# THE IMPORTANCE OF COLD STORAGE FOR PLATELETS

## *What Physicians Need to Know*

Proper storage of platelet products used for blood transfusion is important to prevent bacterial contamination that can lead to patient illness or death. While common practice has been to store platelets at “room temperature” (20-24 degrees Celsius) to increase the lifespan in circulation after transfusion, recent regulatory changes as well as significant clinical research now support the shift to cold storage (1-6 C). The ideal storage of the platelet product to be transfused depends on the clinical scenario as well as the inventory of the facility.

Disadvantages of “room temperature” storage for platelets are:

- Increased risk of bacterial growth;
- Regulatory requirement for either bacterial testing or pathogen reduction of the platelet component;
- The need for agitation of the product during storage;
- A short component shelf life (five to seven days); and
- Delayed activation of platelet function after transfusion.

Advantages of cold-stored platelets (CSPs) are:

- Improved inventory flexibility: Supply can be transferred more easily between facilities. CSPs can help increase the availability of platelets in smaller or rural hospitals that typically do not maintain platelet inventory.
- Increased shelf life and reduced waste during times of scarcity, such as during the COVID-19 pandemic: CSPs have been shown to have improved hemostatic efficacy up to 21 days post-collection. FDA guidance allows storage of CSPs up to 14 days from the date of collection.
- Reduced bacterial contamination risk: CSPs do not require bacterial testing if placed in 1-6 C conditions within four hours of collection (or 24 hours if pathogen-reduced). The FDA recently issued a guidance stating, “Cold storage of platelets as described in this guidance is an adequate method to assure the risk of bacterial contamination is adequately controlled.”

- Improved platelet function: In vitro data show superior aggregation, viscoelastic properties, clot retraction, and occlusion time compared with room-temperature platelets. CSPs have also been shown to form stronger clots through fibrin cross-linking from cold-induced plasma factor XIII binding to platelet surfaces.

## **What TMA Members Can Do**

Although CSPs have greater hemostatic efficacy, they have shorter circulating lifespan once transfused into the patient. The following should be considered when deciding on the appropriate use of CSPs:

- For nonbleeding patients being transfused prophylactically, the TMA Subcommittee on Transfusion and Transplantation recommends continuing using room-temperature platelets, prioritizing longer circulating half-life in this scenario.
- In any clinical scenario involving significant hemorrhage (complex surgery, MTP, OB bleed), cold storage platelets may be preferable because of the increased hemostatic efficacy.
- By integrating CSP into blood bank inventories, hospitals can increase platelet inventory, allowing for more flexibility in times of critical platelet shortages.

## **REFERENCES:**

1. Becker GA, Tuccelli M, Kunicki T, Chalos MK, and Aster RH. Studies of platelet concentrates stored at 22 C and 4 C. *Transfusion*, 13(2):61-8, Mar 1973.
2. Getz TM, Montgomery RK, Bynum JA, Aden JK, Pidcoke HF, and Cap AP. Storage of platelets at 4o C in platelet additive solutions prevents aggregate formation and preserves platelet functional responses. *Transfusion*, 56(6):1320-28, 2016.
3. Mayo Clinic. [Innovations in blood and blood products for adult trauma patients](#). July 19, 2019.
4. Nair PM et al. Platelets stored at 4o C contribute to superior clot properties compared to current standard-of-care through fibrin-crosslinking. *Br J Haematol*, 178(1):119-129, 07 2017.
5. Nair PM, Pidcoke HF, Cap AP, Ramasubramanian AK. Effect of cold storage on shear-induced platelet aggregation and clot strength. *J Trauma Acute Care Surg*, 77: S88-93, 2014.
6. Pidcoke HF et al. Refrigerated platelets for the treatment of acute bleeding: a review of the literature and reexamination of current standards. *Shock*, 41 Suppl 1:51-53, May 2014.
7. Reddoch KM et al. Hemostatic function of apheresis platelets stored at 4o C and 22o C. *Shock*, 41 Suppl 1:54-61, May 2014.
8. Strandenes G et al. A pilot trial of platelets stored cold versus at room temperature for complex cardiothoracic surgery. *Anesthesiology*, 133:1173-1183, December 2020.
9. U.S. Food and Drug Administration Guidance for Industry: [Bacterial Risk Control Strategies for Blood Collection Establishments and Transfusion Services to Enhance the Safety and Availability of Platelets for Transfusion: Guidance for Industry](#). September 2019. Updated December 2020.
10. U.S Food and Drug Administration Guidance for Industry: [Alternative Procedures for the Manufacture of Cold-Stored Platelets Intended for the Treatment of Active Bleeding when Conventional Platelets Are Not Available or Their Use Is Not Practical](#). June 2023.



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