Case Study: Allogenic stem cell transplant

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On behalf of the **International Collaboration for Transfusion Medicine Guidelines (ICTMG),** in partnership with Canadian Blood Services, to support the "Platelet Transfusion: 2025 AABB and ICTMG International Clinical Practice Guidelines".

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Case study suggested citation: Patidar, G. (2026). Allogenic stem cell transplant. [Case study]. International Collaboration for Transfusion Medicine Guidelines (ICTMG). https://www.ictmg.org/platelets-2025

Disclaimer: This case study is intended for educational purposes only. The scenario presented in this case study is entirely fictional and does not describe a real patient or actual clinical event.

Guideline reference: Metcalf RA, Nahirniak S, Guyatt G, et al. Platelet Transfusion: 2025 AABB and ICTMG International Clinical Practice Guidelines. JAMA. 2025;334(7):606–617. doi:10.1001/jama.2025.7529.

Background

Patients undergoing allogeneic hematopoietic stem cell transplantation (allo-HSCT) commonly develop prolonged thrombocytopenia due to conditioning chemotherapy/radiotherapy, marrow aplasia, delayed engraftment, infection, medications, graft-versus-host disease (GVHD), or transplant-associated microangiopathy. Platelet transfusion is frequently used to prevent or treat bleeding.

However, platelet transfusions also carry risks such as adverse transfusion reactions, multiple donor exposure, infections, platelet refractoriness. Multiple studies, including the TOPPS, PLADO, and GIMEMA trials, support the use of a restrictive platelet transfusion threshold of 10,000/μL for patients with hematologic malignancies. This threshold is safe, reduces platelet consumption, and does not increase the risk of bleeding or mortality. Therefore, the AABB-ICTMG 2025 guideline supports a restrictive, evidence-based prophylactic strategy, reserving transfusions for counts <10,000/μL or for specific clinical indications rather than transfusing solely because the count is “low.”

Population	Recommendation & guidance	Certainty of the evidence*	Summary justification
Nonbleeding patients with hypoproliferative thrombocytopenia actively receiving chemotherapy or undergoing allogenic stem cell transplant (SCT)	Platelet transfusion should be administered when the platelet count is $<10 \times 10^3$/μL	Moderate	The data support no benefit with liberal strategies and a platelet count threshold $<10 \times 10^3$/μL is practical for implementation

*The certainty of evidence was determined using GRADE methodology and synthesizing effect estimates across multiple studies, when applicable. GRADE considers imprecision, inconsistency, indirectness, and risk of bias. Imprecision depended on predefined minimal important differences (MIDs). The MIDs chosen by the panel were 2% for mortality, 5%for grade 3-4 bleeding or equivalent, and 20%for grade 2-4 bleeding or equivalent.

Adapted from Table 3. Recommendations for Platelet Transfusion (*Metcalf RA, Nahirniak S, Guyatt G, et al. Platelet Transfusion: 2025 AABB and ICTMG International Clinical Practice Guidelines. JAMA. 2025;334(7):606–617. doi:10.1001/jama.2025.7529*).

Special considerations

Transfusion may still be reasonable if the patient has special clinical conditions such as active mucosal or gastrointestinal bleeding, rapidly falling platelet count, severe grade 3–4 mucositis with oozing, concurrent anticoagulation, or suspected platelet dysfunction.

In allo-HSCT patients, repeated transfusions increase risk of HLA alloimmunization and platelet refractoriness. Avoiding unnecessary transfusions preserves efficacy for when they are truly needed.

Alternatives

While donor-derived platelet transfusions remain the standard for acute, life-threatening hemorrhage, several alternatives now offer the potential to reduce "transfusion burden" and minimize donor-related risks like alloimmunization and febrile reactions.

For subacute/long-term needs, thrombopoietin receptor agonists (TPO-RAs), such as Eltrombopag and Romiplostim, represent the most robust pharmacological alternative. For acute procedural needs, newer agents like Avatrombopag act as effective "bridges," raising counts to safe levels without biological units.

Complementary to production-focused strategies are antifibrinolytics (e.g., Tranexamic Acid), which preserve clot integrity by inhibiting fibrinolysis.

Scenario

A 42-year-old acute myeloid leukemia patient underwent a matched sibling allogeneic stem cell transplant 12 days ago. The patient is currently pan-cytopenic awaiting engraftment. Today's labs show Hb: 8.6 g/dL, WBC: 0.3 ×10⁹/L, and a platelet count of 25,000/µL. The patient is currently afebrile, hemodynamically stable, has no petechiae, no mucosal bleeding, and no melena. There are no planned procedures today and the patient is receiving antiviral, antifungal, and antibacterial prophylaxis.

The transplant team asks whether platelets should be transfused now.

A. Do NOT transfuse platelets now and continue clinical monitoring and repeat CBS in 24 hours.
B. Transfuse one adult therapeutic dose of irradiated apheresis platelets prophylactically now because the count appears "low."

If you select "A" as the best course of action, go to page 3 to see how the scenario progresses with this strategy.

If you select "B" as the best course of action, go to page 6 to see how the scenario progresses with this strategy.

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For the first decision, you selected “A. Do NOT transfuse platelets now and continue clinical monitoring and repeat CBS in 24 hours”.

The patient remains stable. No bleeding develops over the next 24 hours. Platelet count next morning is 18,000/μL.

What do you do next?

A. Continue observation without transfusion unless bleeding occurs or count falls to <10,000/μL.
B. Transfuse platelets now because the count dropped from 25,000 to 18,000/μL.

If you select “A” as the best course of action, go to page 4 to see how the scenario resolves with this strategy.

If you select “B” as the best course of action, go to page 5 to see how the scenario resolves with this strategy.

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For the second decision, you selected “A. Continue observation without transfusion unless bleeding occurs or count falls to <10,000/μL”.

Final result of this management strategy:
The patient remains clinically well. Two days later the platelet count reaches 11,000/μL, then drops to 9,000/μL before engraftment. At that time, prophylactic platelets are transfused appropriately.

Applying the recommendations helps reduce donor exposures, thereby reducing alloimmunization and infection risks, while also conserving resources to prevent platelet shortages.

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For the second decision, you selected “B. Transfuse platelets now because the count dropped from 25,000 to 18,000/μL”.

Final result of this management strategy:
Platelets are transfused at 18,000/μL despite no bleeding. Post-transfusion increment is temporary and count falls again the next day.

Platelet transfusion above the recommended threshold lead to unnecessary transfusion exposure without proven benefits.

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For the first decision, you selected “B. Transfuse one adult therapeutic dose of irradiated apheresis platelets prophylactically now because the count appears “low.””.

The patient receives prophylactic platelets at 25,000/μL. Immediate post-count rises to 42,000/μL, but no clinical issue was present beforehand.

What do you do next?

A. Continue transfusing whenever platelets fall below 25,000/μL.
B. Reassess practice and revert to guideline-based threshold of <10,000/μL unless bleeding occurs.

If you select “A” as the best course of action, go to page 7 to see how the scenario resolves with this strategy.

If you select “B” as the best course of action, go to page 8 to see how the scenario resolves with this strategy.

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For the second decision, you selected “A. Continue transfusing whenever platelets fall below 25,000/μL”.

Final result of this management strategy:
Patient received multiple transfusions over the treatment period. The patient later showed poor corrected count increments, raising concern for immune refractoriness. More transfusions lead to multiple donor exposures which increases the risk of alloimmunizations and/or infections. Furthermore, higher utilization of the platelets leads to increased transfusion laboratory workload and decreased platelet supply for the health system.

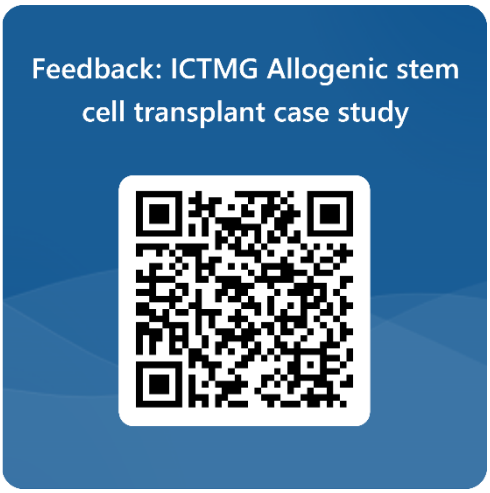
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For the second decision, you selected “B. Reassess practice and revert to guideline-based threshold of <10,000/μL unless bleeding occurs”.

Final result of this management strategy:
The team adopts restrictive practice. Subsequent transfusions are only given when clinically indicated.

By applying the recommendations, patients avoid unnecessary exposure to risks such as platelet refractoriness and adverse transfusion events, while maintaining the blood supply.

If you have feedback on this case study, please let us know by completing this short survey: Feedback: ICTMG Allogenic stem cell transplant case study – Fill out form



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