Allogeneic stem cell transplantation in T-cell prolymphocytic leukemia: final disappointment or a chance for cure?

Evgenii Shumilov and Norbert Schmitz

Department of Medicine A, Hematology and Oncology, University Hospital of Muenster, Muenster, Germany

Correspondence: N. Schmitz
norbert.schmitz@ukmuenster.de

Received: May 13, 2026.
Accepted: May 15, 2026.
Early view: May 28, 2026.

https://doi.org/10.3324/haematol.2026.301173

©2026 Ferrata Storti Foundation
Published under a CC BY-NC license

In this issue of *Haematologica*, Drozd-Sokołowska and colleagues report on allogeneic hematopoietic cell transplantation (allo-SCT) for T-cell prolymphocytic leukemia (T-PLL).[1] The major aim of this study updating data registered with the European Society for Blood and Marrow Transplantation (EBMT) and reported previously was to assess long-term results of allo-SCT performed between 1995 and 2012. With a median follow-up of 12.5 years, 59 (76.6%) patients have succumbed after allo-SCT, about half of them dying from relapsed/refractory disease and the remaining predominantly dying from infections and/or graft-*versus*-host disease (GvHD). Ten-year overall survival rates of 21% (95% confidence interval: 11-31%) and progression-free survival rates of 9% (95% confidence interval: 1-17) are certainly disappointing. Notably, complete response at the time of allo-SCT, older age, and use of total body irradiation ≥6 Gy were associated with improved survival. The authors concluded that the treatment of T-PLL by allo-SCT requires better bridging to transplantation, as well as better conditioning and infectious-risk management to improve the results of allo-SCT.

Table 1 summarizes other studies reporting results of allo-SCT in T-PLL. Although some studies show somewhat better results, progression-free and overall survival rates generally vary between 20% and 30%, with high relapse rates (30-50%) and non-relapse mortality (30-40%) representing the causes of death in most cases. Unfortunately, no study reports distinctly on the outcomes of patients undergoing

Table 1. Allogeneic stem cell transplantation in patients with T-cell prolymphocytic leukemia.*

Analysis	N of patients	CR rate at allo-SCT, %	RI and NRM after allo-SCT, %	PFS and OS after allo-SCT
Murthy *et al.*, 2022	266	56	4-yr 32.4/41.9	4-yr NA/30%
Braunstein *et al.*, 2025	169	80	1-yr 17/20	Median PFS 20.8 mo/ Median OS 32.6 mo
Braunstein *et al.*, 2024	99	100 CR/PR	NA	NA/3-yr 50%
Wiktor-Jedrzejcak *et al.*, 2011	41	27	3-yr 41/41	3-yr 19%/21%
Wiktor-Jedrzejcak *et al.*, 2019	37	62	4-yr 38/32	4-yr 30%/42%
Merril *et al.*, 2026	33	70	5-yr 53/18	5-yr 29%/41%
Guillaume *et al.*, 2014	27	52	3-yr 47/31	3-yr 26%/36%
Kalaycio *et al.*, 2010	21	NA	1-yr 39/28	1-yr 33%/48%
Yamasaki *et al.*, 2019	20	30	3-yr 69.6/1-yr 20.9	3-yr 33.5%/39.8%

*Only studies with at least 20 patients undergoing allografting are considered. Allo-SCT: allogeneic hematopoietic cell transplantation; ASH: annual meeting of American Society of Hematology; CR: complete response; mo: months; NA: not available; NRM: non-relapse mortality; OS: overall survival; PFS: progression-free survival; PR: partial response; RI: relapse incidence; T-PLL: T-cell prolymphocytic leukemia; yr.: year.

allo-SCT in first complete response. Only Braunstein *et al*. reported a 3-year overall survival rate of 50% among 99 patients allografted in first complete response/partial response[2] and an encouraging median progression-free survival and overall survival of 32.5 and 48.6 months, respectively, for 50 patients allografted in minimal residual disease (MRD)-negative remission.[3]

With regard to conventional treatment of T-PLL before allo-SCT, Drozd-Sokołowska *et al*. raise valid concerns about the use of alemtuzumab due to the increased risk of infections before and after transplantation, the impairment of T-cell engraftment, and the increase in non-relapse mortality as a consequence of both. Indeed, in a large cohort of patients reported by Center for International Blood and Marrow Transplant Research (CIBMTR) (N=266), the avoidance of *in vivo* T-cell depletion (with antithymocyte globulin or alemtuzumab) correlated with significantly lower non-relapse mortality.[4] However, also in 2026, alemtuzumab seems irreplaceable in the treatment of T-PLL achieving unsurpassed complete response rates of 60-80%.[5,6] Unfortunately, about half of the patients relapse after allo-SCT regardless of whether they receive alemtuzumab for remission induction or not. It is, therefore, not yet clear whether the increase in complete response rates induced by alemtuzumab prior to allo-SCT is counterbalanced and outweighed by causing higher relapse rates after allo-SCT as a consequence of the long-standing depletion of normal recipient T cells and donor T cells transferred by the graft. This problem certainly cannot be solved by the long wash-out periods recommended prior to allo-SCT because patients with highest risk will relapse early while waiting for transplantation. Excluding these patients may seemingly improve survival after allo-SCT although, in reality, only at the cost of excluding those patients from allo-SCT who most need the procedure. Other explanations for the poor outcomes of transplantation reported in this paper might be that only two-thirds of patients underwent allo-SCT early after one line of therapy and only half of them were in complete response. Based on current guidelines,[7] at least 20% of the patients actually would not be considered candidates for allo-SCT. Finally, one may ask whether results obtained with allo-SCT performed between 1995 and 2012 reflect the current standard of care. Better infection prophylaxis and supportive care may reduce non-relapse mortality substantially.

Due to the high median age of patients diagnosed with T-PLL and the frequent and severe infections observed after alemtuzumab, reduced-intensity conditioning is considered the preferred preparatory regimen before allo-SCT. Taking into account the high relapse rates reported in all studies of allo-SCT, and the finding that radiation doses ≥6 Gy improve outcomes in T-PLL, one may re-consider whether reduced-intensity conditioning is actually the best conditioning, especially in patients who need to be transplanted while not in complete response. Similarly to Drozd-Sokołowska *et al*., previous studies also showed high incidences of grade 2-4 acute GvHD and severe chronic GvHD. Recent advancements in the prophylaxis and treatment of GvHD with agents such as post-transplant cyclophosphamide, ruxolitinib, ibrutinib, and belumosudil should help to decrease treatment-related mortality in the future. Sellner *et al*. evaluated longitudinal quantitative

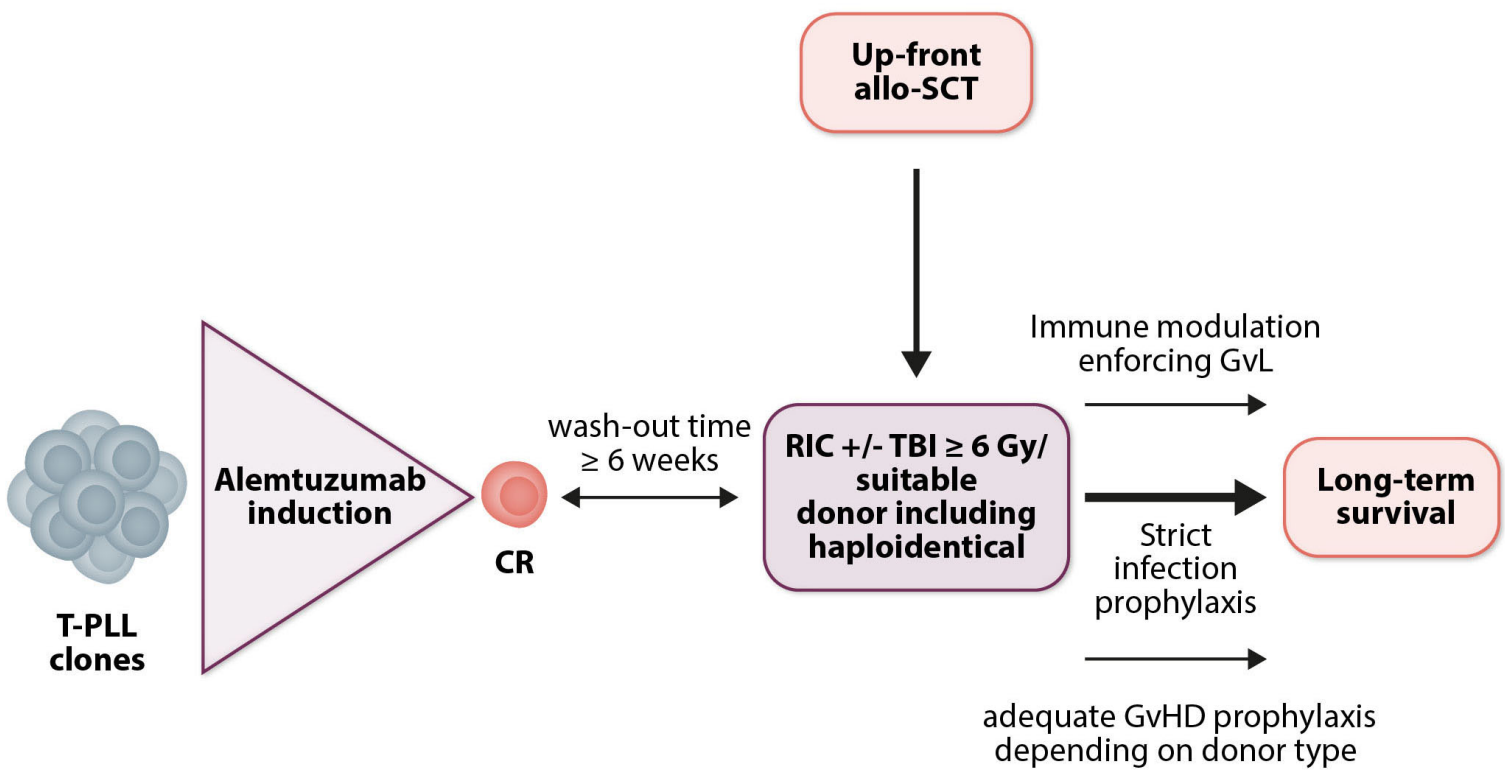

Figure 1. Treatment approach for patients with T-cell prolymphocytic leukemia who are eligible for allogeneic hematopoietic stem cell transplantation. allo-SCT: allogeneic hematopoietic stem cell transplantation; CR: complete remission; Gy: Gray; GvHD: graft-*versus*-host disease; GvL: graft-*versus*-leukemia effect; RIC: reduced-intensity conditioning; TBI: total body irradiation; T-PLL: T-cell prolymphocytic leukemia.

MRD using clone-specific T-cell receptor-based real-time quantitative polymerase chain reaction and found that MRD responses after allo-SCT were associated with a shift from a clonal, T-PLL-driven profile to a polyclonal signature, thus validating the graft-*versus*-leukemia effect in T-PLL.[8] As relapses continue to occur over expanded periods of time,[1,9,10] close monitoring of individual patients, including repeated measurements of MRD, should be considered to detect imminent relapses early. Pre-emptive therapy (e.g., early donor lymphocyte infusions) could possibly prevent overt relapse in such patients.

A surprising finding was that older patients survived better than younger ones. While convincing reasons for this unexpected finding remain obscure, one important consequence could be that older patients should not be excluded from allo-SCT if their performance status is acceptable. Notably, different donor types seem not to influence the outcomes of allo-SCT in T-PLL[4] although numbers of patients are small and the experience with new approaches to GvHD prophylaxis, e.g., post-transplant cyclophosphamide, is limited

Although the long-term outcomes of allo-SCT in T-PLL reported here seem disappointing, allo-SCT remains the most effective treatment approach to achieve long-term survival and potentially cure. Transplanting more patients early in first complete response or very good partial response should make a significant difference. Further improvements should result from optimizing donor selection, conditioning (including myeloablative conditioning in suitable cases), GvHD prophylaxis, supportive care putting emphasis on intensified infection prophylaxis, and post-transplant MRD monitoring followed by immunological or other interventions (Figure 1). With valid alternatives remaining unknown, each transplant-eligible patient should be considered a transplant candidate as soon as possible.

Disclosures

No conflicts of interest to disclose.

Contributions

ES and NS jointly wrote the manuscript and both approved the final version.

References

1. Drozd-Sokolowska J, Gras L, Baaij LGA, et al. Long-term outcome of allogeneic hematopoietic cell transplantation for T-cell prolymphocytic leukemia - a study on behalf of the Chronic Malignancies Working Party of the EBMT. Haematologica. 2026;111(12):4149-4154.
2. Braunstein Z, McLaughlin E, Lingamaneni P, et al. Survival and therapeutic outcomes in T-cell prolymphocytic leukemia (T-PLL): a collaborative multi-center study cohort. Blood. 2024;144(Supplement 1):982.
3. Braunstein Z, McLaughlin E, Lingamaneni P, et al. Allogeneic stem cell transplant results in T-cell prolymphocytic leukemia (T-PLL): a collaborative multi-center study cohort. Blood. 2025;146(Supplement 1):1054.
4. Murthy HS, Ahn KW, Estrada-Merly N, et al. Outcomes of allogeneic hematopoietic cell transplantation in T cell prolymphocytic leukemia: a contemporary analysis from the Center For International Blood And Marrow Transplant Research. Transplant Cell Ther. 2022;28(4):187.e1-e10.
5. Dearden CE, Khot A, Else M, et al. Alemtuzumab therapy in T-cell prolymphocytic leukemia: comparing efficacy in a series treated intravenously and a study piloting the subcutaneous route. Blood. 2011;118(22):5799-5802.
6. Dearden CE, Matutes E, Cazin B, et al. High remission rate in T-cell prolymphocytic leukemia with CAMPATH-1H. Blood. 2001;98(6):1721-1726.
7. NCCN Guidelines. T-Cell Lymphomas. Version 02.2026. https://wwwnccnorg/professionals/physician_gls/pdf/t-cell.pdf Accessed Feb 13, 2026.
8. Sellner L, Brüggemann M, Schlitt M, et al. GvL effects in T-prolymphocytic leukemia: evidence from MRD kinetics and TCR repertoire analyses. Bone Marrow Transplant. 2017;52(4):544-551.
9. Shumilov E, Hasenkamp J, Szuszies CJ, Koch R, Wulf GG. Patterns of late relapse after allogeneic hematopoietic stem cell transplantation in patients with T-cell prolymphocytic leukemia. Acta Haematol. 2021;144(1):105-110.
10. Guillaume T, Beguin Y, Tabrizi R, et al. Allogeneic hematopoietic stem cell transplantation for T-prolymphocytic leukemia: a report from the French Society For Stem Cell Transplantation (SFGM-TC). Eur J Haematol. 2015;94(3):265-269.