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

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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 the patients dying from relapsed/refractory (r/r) disease and the remaining patients predominantly dying from infections and/or graft-versus-host disease (GvHD). Ten-year overall survival (OS) rates of 21% (CI 95: 11-31) and progression-free survival (PFS) rates of 9% (CI 95: 1-17) are certainly disappointing. Notably, complete response (CR) at the time of allo-SCT, older age, and use of total body irradiation (TBI) ≥ 6 Gy were associated with improved survival. The authors conclude that 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, PFS- and OS-rates generally vary between 20% and 30%, with high relapse rates (30-50%) and non-relapse mortality (NRM) (30-40%) representing the cause of death in most cases. Unfortunately, no study reports distinctly on the outcomes of patients undergoing allo-SCT in first CR. Solely Braunstein et al. reported a 3-year OS-rate of 50% among 99 patients allografted in first CR/partial response (PR) (2) and an encouraging median PFS and OS of 32.5 and 48.6 months 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 and 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 NRM being a consequence of both. Indeed, in the large cohort of patients reported by CIBMTR (n=266), the avoidance of *in vivo* T-cell depletion (ATG or alemtuzumab) correlated with significantly lower NRM (4). However, also in 2026, alemtuzumab seems irreplaceable to treat T-PLL achieving unsurpassed CR rates of 60-80% (5, 6). Unfortunately, about half of the patients relapse after allo-SCT regardless if they received alemtuzumab for remission induction or not. It therefore remains an unanswered question if the increase in CR rates induced by alemtuzumab prior to allo-SCT is counterbalanced and outweighed by causing higher relapse rates after allo-SCT being 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; in reality, however, only at the cost

of excluding those patients from allo-SCT who mostly need it. 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 CR. Based on current guidelines (7), at least 20% of the patients actually would not be considered candidates for allo-SCT. Finally, one may ask the question if results of allo-SCT obtained between 1995 and 2012 reflect the current standard of care. Better infection prophylaxis and supportive care may reduce NRM 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 (RIC) 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, however, re-consider if RIC is the best conditioning especially in patients who need to be transplanted while not in CR. Similarly to Drozd-Sokołowska et al., previous studies also report high incidences of grade 2–4 acute GVHD and severe chronic GVHD. Recent advancements in the prophylaxis and treatment of GVHD with agents like post-transplant cyclophosphamide (PTCy), ruxolitinib, ibrutinib, and belumosudil should help to decrease treatment-related mortality in the future. Sellner et al. evaluated longitudinal quantitative MRD using clone-specific T cell receptor-based real-time quantitative PCR and found that MRD responses post-allo-SCT were associated with a shift from a clonal, T-PLL-driven profile to a polyclonal signature, thus validating the GVL 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 DLI) 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 patient numbers are small and the experience with new approaches to GvHD prophylaxis, e.g. PTCy, is limited

Although the long-term outcomes of allo-SCT in T-PLL reported here seem disappointing, allo-SCT remains to represent the most effective treatment approach to achieve long-term survival and potentially cure. Transplanting more patients early in first CR or very good PR should make a significant difference. Further improvements should result from optimising donor selection, conditioning (including MAC in suitable cases), GvHD prophylaxis, supportive care putting emphasis on intensified infection prophylaxis, and post-transplant MRD monitoring followed by immunologic or other interventions (**Figure 1**). With valid

alternatives remaining unknown, each transplant-eligible patient should be considered a transplant candidate as soon as possible.

Literature

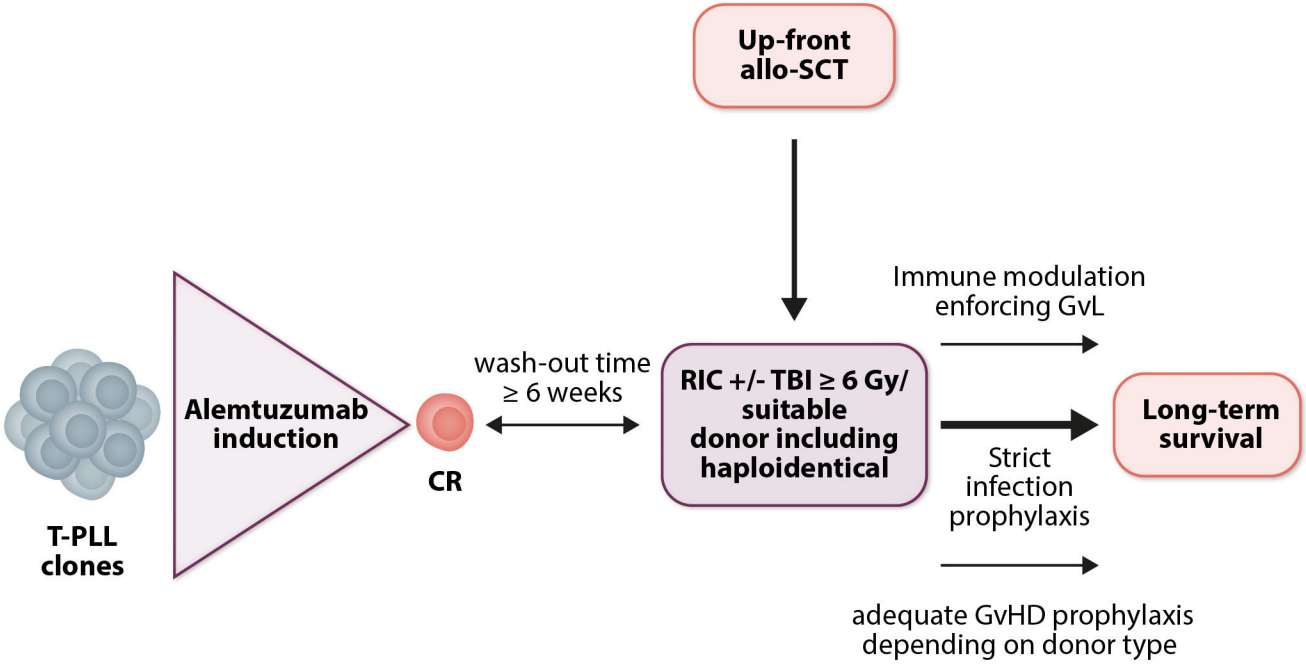
1. Drozd-Sokolowska J, Gras L, Baaij LGA, et al. Long-term outcome of allogeneic hematopoietic cell transplantation for T-cell prolymphocytic leukemia - a study on behalf of the Chronic Malignancies Working Party of the EBMT. Haematologica. xxx
2. Braunstein Z, McLaughlin E, Lingamaneni P, et al. Survival 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-cellpdf. February 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.

Table 1. Allo-SCT in patients with T-PLL. Only studies with at least 20 allografting patients are considered.

Analysis	Patient number	CR rate at allo-SCT, %	RI and NRM post-allo-SCT	PFS and OS post-allo-SCT
Murthy et al., 2022	266	56	4-yr 32.4/41.9%	4-yr n.a./30%
Braunstein et al, 2025, ASH	169	80	1-yr 17/20%	mPFS 20.8 mo/ mOS 32.6 mo
Braunstein et al, 2024, ASH	99	100 CR/PR	n.a.	n.a./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	n.a.	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%

Allo-SCT, allogeneic hematopoietic cell transplantation; T-PLL, T-cell prolymphocytic leukemia; CR, complete response; PR, partial response; RI, relapse incidence; NRM, non-relapse mortality; PFS, progression-free survival; OS, overall survival; n.a., not available; m, median; mo, months; yr., year(s).

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


Up-front allo-SCT
Immune modulation enforcing GvL
wash-out time ≥ 6 weeks
Alemtuzumab induction
CR
RIC +/- TBI ≥ 6 Gy/ suitable donor including haploidentical
Long-term survival
Strict infection prophylaxis
T-PLL clones
adequate GvHD prophylaxis depending on donor type