Survival Trends in T-cell Lymphomas in the Era of Novel Therapies: A National Cancer Database (NCDB) Study

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BACKGROUND

- T-cell lymphomas (TCL) are heterogeneous with unsatisfactory overall survival outcomes.
- New drug approvals for TCL have been limited, including pralatrexate (in 2009), romidepsin (in 2011, withdrawn in 2022), and belinostat (in 2014) for peripheral TCL (PTCL), and brentuximab vedotin (in 2011) for anaplastic large cell lymphoma (ALCL) and CD30-positive PTCL (in 2018).
- The impact of these drugs on the survival outcomes of patients with TCL is unclear.
- We aimed to evaluate survival trends in patients with TCL before and after FDA approval of brentuximab vedotin utilizing the National Cancer Database (NCDB).

METHODS

- Patients diagnosed with PTCL (not otherwise specified), angioimmunoblastic T-cell lymphoma (AITL) or ALCL between 2004 and 2020 were identified in the NCDB.
- Two treatment eras were defined based on the timing of initial FDA approval of brentuximab vedotin: Era 1 (2004–2011) and Era 2 (2012–2020).
- Patient and disease characteristics were compared using Chi-square test.
- Survival analyses were conducted using the Kaplan-Meier method and Cox proportional hazards model.

RESULTS

Table 1. Baseline characteristics by era in patients with ALCL

	Era 1 (2004–2011) (n=3966)		Era 2 (2012–2020) (n=4030)		*P* value
	n	%	n	%	
Median age (range)	57 (18-90)		57 (18-90)		0.018
Age group					<0.001
<65	2483	62.6	2627	65.2	
≥65 and <79	1036	26.1	1057	26.2	
≥80	447	11.3	346	8.6	
Sex					0.485
Male	2351	59.3	2358	58.5	
Female	1615	40.7	1672	41.5	
Race					<0.001
White	3243	82.7	3143	78.9	
Black	566	14.4	617	15.5	
Others	111	2.8	225	5.6	
Ethnicity					0.718
Non-Hispanic	3369	91.8	3608	91.6	
Hispanic	299	8.2	330	8.4	
Charlson-Deyo score					0.765
0	3104	78.3	3131	77.7	
1	559	14.1	581	14.4	
2	160	4.0	179	4.4	
≥3	143	3.6	139	3.4	
Ann Arbor stage*					0.009
I-II	1767	48.0	799	44.3	
III-IV	1915	52.0	1006	55.7	
Insurance type					<0.001
Private	1780	46.1	1862	47.2	
Government	1831	47.4	1908	48.4	
None	248	6.4	173	4.4	
Treatment facility					<0.001
Academic	1046	26.4	1319	32.7	
Non-Academic	2920	73.6	2711	67.3	

* Ann Arbor stage data missing in 2016–2020.

Table 2. Baseline characteristics by era in patients with PTCL or AITL

	Era 1 (2004–2011) (n=8378)		Era 2 (2012–2020) (n=12701)		*P* value
	n	%	n	%	
Median age (range)	65 (18-90)		66 (18-90)		<0.001
Age group					<0.001
<65	4074	48.6	5656	44.5	
≥65 and <79	2909	34.7	5086	40.0	
≥80	1395	16.7	1959	15.4	
Sex					0.636
Male	4863	58.0	7414	58.4	
Female	3515	42.0	5287	41.6	
Race					<0.001
White	6717	81.2	9645	76.8	
Black	1176	14.2	2108	16.8	
Others	384	4.6	804	6.4	
Ethnicity					0.002
Non-Hispanic	7215	92.7	11382	91.5	
Hispanic	564	7.3	1056	8.5	
Charlson-Deyo score					<0.001
0	6391	76.3	9282	73.1	
1	1380	16.5	2110	16.6	
2	384	4.6	684	5.4	
≥3	223	2.7	625	4.9	
Ann Arbor stage*					0.005
I-II	2354	30.2	1437	27.9	
III-IV	5448	69.8	3722	72.1	
Insurance type					<0.001
Private	3138	38.6	4345	34.8	
Government	4607	56.7	7709	61.8	
None	376	4.6	414	3.3	
Treatment facility					<0.001
Academic	2947	35.2	5213	41.0	
Non-Academic	5431	64.8	7488	59.0	

* Ann Arbor stage data missing in 2016–2020.

Figure 1. Overall survival by era in patients with ALCL

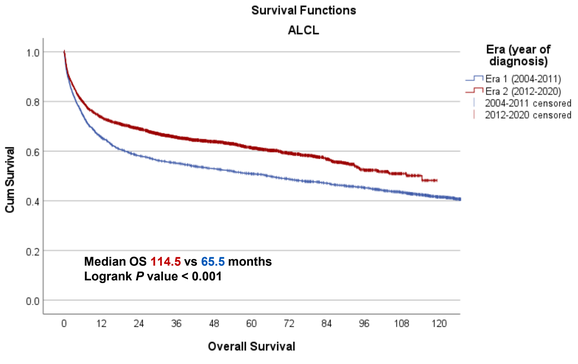


Figure 2. Overall survival by era in patients with PTCL or AITL

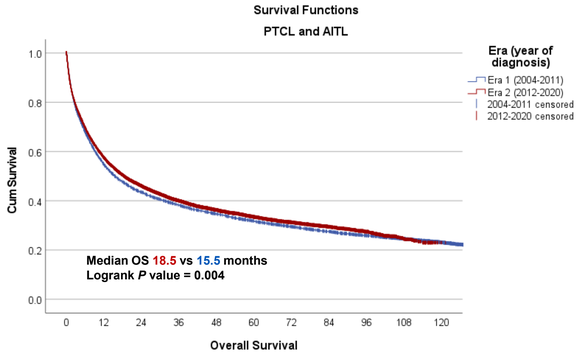


Table 3. Multivariable Cox regression analysis for overall survival in patients with ALCL

		Hazard ratio	95% confidence interval	*P* value
Era	Era 1 (2004–2011)	Reference		
	Era 2 (2012–2020)	0.730	0.680 – 0.784	<0.001
Age	<65	Reference		
	≥65 and <79	1.883	1.713 – 2.069	<0.001
	≥80	3.485	3.113 – 3.902	<0.001
Sex	Male	Reference		
	Female	0.792	0.738 – 0.849	<0.001
Race	White	Reference		
	Black	1.335	1.216 – 1.466	<0.001
	Others	0.981	0.809 – 1.191	0.847
Ethnicity	Non-Hispanic	Reference		
	Hispanic	0.997	0.871 – 1.142	0.971
Charlson-Deyo score	0	Reference		
	≥1	1.637	1.519 – 1.764	<0.001
Insurance type	Private	Reference		
	Government	1.502	1.368 – 1.651	<0.001
	None	1.411	1.192 – 1.669	<0.001
Treatment facility	Academic	Reference		
	Non-Academic	0.887	0.825 – 0.954	0.001

* Ann Arbor stage not included in the analysis due to missing data in 2016-2020.

Table 4. Multivariable Cox regression analysis for overall survival in patients with PTCL or AITL

		Hazard ratio	95% confidence interval	*P* value
Era	Era 1 (2004–2011)	Reference		
	Era 2 (2012–2020)	0.930	0.897 – 0.965	<0.001
Age	<65	Reference		
	≥65 and <79	1.421	1.353 – 1.493	<0.001
	≥80	2.328	2.196 – 2.468	<0.001
Sex	Male	Reference		
	Female	0.854	0.824 – 0.885	<0.001
Race	White	Reference		
	Black	1.300	1.237 – 1.366	<0.001
	Others	1.005	0.927 – 1.089	0.912
Ethnicity	Non-Hispanic	Reference		
	Hispanic	0.941	0.876 – 1.011	0.096
Charlson-Deyo score	0	Reference		
	≥1	1.403	1.349 – 1.459	<0.001
Insurance type	Private	Reference		
	Government	1.272	1.211 – 1.366	<0.001
	None	1.384	1.255 – 1.526	<0.001
Treatment facility	Academic	Reference		
	Non-Academic	1.087	1.048 – 1.127	<0.001

* Ann Arbor stage not included in the analysis due to missing data in 2016-2020.

CONCLUSIONS

- The overall survival has significantly improved for patients diagnosed with ALCL in Era 2 (2012–2020) compared to Era 1 (2004–2011), possibly associated with the FDA approval of brentuximab vedotin in 2011.
- However, survival improvement was very modest for patients diagnosed with PTCL or AITL in Era 2 (2012–2020) compared to Era 1 (2004–2011), highlighting unmet needs for novel effective therapies for these T-cell lymphoma subtypes.

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