Patient Characteristics and Treatment Patterns in Elderly Patients Newly Diagnosed with ALL Using 100% Medicare ALL Data

Shuling Li, PhD,[1] Julia T. Molony, MS,[1] Victoria M. Chia, PhD, MPH,[2] Aaron J. Katz, PharmD, PhD[2]

[1]Chronic Disease Research Group, Minneapolis Medical Research Foundation, Minneapolis, MN, USA; [2]Center for Observational Research, Amgen Inc., Thousand Oaks, CA, USA

Introduction

- Acute lymphoblastic leukemia (ALL) is a rare disease. The age-adjusted incidence rate in the US is 1.7 per 100,000 individuals per year with a slightly lower incidence in elderly adults (>65 years); 6590 new cases of ALL, representing approximately 0.4% of all new cancer cases, are estimated for the US in 2016.
- Older adults with ALL have a markedly poor prognosis and higher mortality that may be attributable in part to greater comorbidity and lower use of intensive therapeutic options.
- In this study, we described treatment patterns in a population-based cohort of elderly (≥66 years) adults with ALL.

Methods

- Data source: 100% Medicare ALL data (2007-2012).
- We included patients who were diagnosed with ALL at age ≥66 years in 2008-2011, were continuously enrolled in Medicare Parts A and B for 12 months before diagnosis (baseline period), and had Part D coverage for ≥30 days after diagnosis.
- We excluded patients who were enrolled in an HMO, had another malignancy, or received chemotherapy and/or radiotherapy during the baseline period, or who underwent stem cell transplant at ALL diagnosis.

- Follow-up began on the ALL diagnosis date and ended at the earliest of death, disenrollment from any Part A/B/D coverage, or December 31, 2012.

Incident ALL identification:
- ALL diagnosis: ≥1 Part A inpatient (IP)/skilled nursing facility (SNF)/home health agency (HHA)/hospice (HS) or ≥2 Part A outpatient (OP)/Part B (PB) claims on different dates in any 2-month interval carrying an ICD-9 code of ALL (204.0X).
- Date of ALL diagnosis: earlier date of the 1st IP/SNF/HHA/HS claim or the 2nd of 2 OP/PB claims carrying an ALL code.

Treatment identification:
- Chemotherapy: Part A IP/OP claims and Part B claims using HCPCS/CPT/ICD-9/DRG/revenue codes for chemotherapy agent or administration.
- Tyrosine kinase inhibitor (TKI): Part D prescription drug event claims using NDC codes.
- Stem cell transplants: Part A IP/OP claims and Part B claims using ICD-9/CPT codes.

Statistical Analysis:
- Patient characteristics and treatment patterns were described using descriptive statistics.
- Differences in patient characteristics between chemotherapy treated and untreated groups were assessed using the Fisher's exact test among TKI users and Chi-square test among TKI non-users.
- Median overall survival from treatment initiation was estimated using the Kaplan-Meier method.

Results

Table 1. Baseline characteristics, overall and by type of treatment initiated within 90 days of ALL diagnosis[a]

Characteristics	Total(%) (n=727)	Any TKI(%) (n=68)	Any Chemo(%) (n=286)	TKI and Chemo(%) (n=51)	TKI only(%) (n=17)	Chemo only(%) (n=235)	No TKI and No Chemo(%) (n=424)
%Total	100.0	9.4	39.3	7.0	2.3	32.3	58.3
Age at diagnosis							
Mean(SD), years	78.0(7.4)	75.8(6.2)	75.2(6.0)	74.2(5.7)	80.8(4.8)	75.4(6.0)	79.9(7.8)
66-69	16.1	19.1	20.3	25.5	*	19.2	13.9
70-74	21.9	32.4	33.6	39.2	*	32.3	14.4
75-79	21.5	^	21.7	*	*	23.4	21.0
80-84	19.4	23.5	16.1	*	*	15.3	21.0
≥85	21.2	*	8.4	*	*	9.8	29.7
Sex							
Male	40.7	42.7	42.3	41.2	*	42.6	39.4
Female	59.3	57.4	57.7	58.8	*	57.5	60.6
Race							
White	84.7	79.4	85.3	76.5	^	87.2	84.2
Non-white	15.3	20.6	14.7	23.5	*	12.8	15.8
Charlson Comorbidity Index[b]							
Mean(SD)	1.2(1.6)	0.9(1.3)	0.6(1.1)	0.6(1.0)	1.5(1.7)	0.6(1.0)	1.6(1.8)
0 (low)	49.5	60.3	65.4	64.7	*	65.5	38.9
1-2 (medium)	30.8	^	27.6	^	*	27.7	33.3
≥3 (high)	19.7	*	7.0	*	*	6.8	27.8

Chemo, chemotherapy; SD, standard deviation; TKI, tyrosine kinase inhibitors.
*Values for cells with ten or fewer patients are suppressed.
^Values are suppressed to avoid deriving cells with ten or fewer patients.
*Significantly different between chemotherapy treated and untreated patients using the 0.05 level: P<0.001 for age group among TKI users; P<0.0001 for age group and comorbidity level among TKI non-users.
[b]Defined in the one year before ALL diagnosis.

Table 2. Time to treatment initiation by type of treatment within 90 days of ALL diagnosis.

		Time to treatment initiation, days	
	N (%)	Mean(SD)	Median(range)
Among patients treated with chemotherapy within 90 days of ALL diagnosis			
Chemotherapy	286(100.0)	9.4(15.5)	3(0-11)
TKIs[a]	57(19.9)	43.5(72.2)	27(14-48)
SCT[a]	17(5.9)	447.4(455.0)	214(113-736)
Among patients with TKI prescription filled within 90 days of ALL diagnosis			
TKIs	68(100.0)	25.1(18.0)	20(12-34)
Chemotherapy[a]	53(77.9)	32.7(144.2)	2(0-11)
SCT[a]	*	379.4(470.8)	102(63-580)

*Values for cells with ten or fewer patients are suppressed.
[a]Treatment can start beyond the first 90 days of ALL diagnosis.
SCT: Stem cell transplant.

Table 3. Chemotherapy treatment patterns among patients with chemotherapy initiated within 90 days of ALL diagnosis

	N(%)	Mean(SD)	Median(range)
Total patients	286(100.0)		
No. of courses per patient		1.6(1.0)	1(1-2)
1	177(61.9)		
2	74(25.9)		
3+	35(12.2)		
Total courses and course duration (days)	450	101.9(132.1)	53.5(22-137)
First course duration (days)		109.9(127.8)	65(28-148)
Setting of chemotherapy initiation			
Inpatient[a]	209(73.1)		
Length of stay, days		22.9(13.9)	23(10-31)
Outpatient	77(26.9)		

[a] Of these patients, 90(43%) received chemotherapy only in an inpatient setting during the first chemotherapy course.

Table 4. Treatment patterns of TKIs among patients with TKI prescription filled within 90 days of ALL diagnosis

	N(%)	Mean(SD)	Median(range)
Total patients	68(100.0)		
No. of courses per patient		2.4(2.3)	1(1-3)
1	35(51.5)		
2	11(16.2)		
3+	22(32.3)		
Total courses and course duration (days)	162	114.8(203.9)	40(31-114)
First course duration (days)		121.4(180.2)	32(31-127.5)
Type of first TKI agent			
Imatinib	55(80.9)		
Dasatinib	13(19.1)		
Switch of TKI agent	20(29.4)		
imatinib->dasatinib	16(80.0)		
imatinib->nilotinib	*		
dasatinib->imitinib	*		

*Values for cells with ten or fewer patients are suppressed.

Table 5. Median overall survival(OS) after treatment initiation within 90 days of ALL diagnosis

	At risk, n	Death, n(%)	Median OS (95% CI), months
TKI and chemotherapy	51	31(60.8)	18.1(11.3-31.2)
TKI only	17	16(94.1)	5.8(1.2-13.7)
Chemotherapy only	235	169(71.9)	10.2 (8.3-12.7)

Summary

- Among elderly Medicare patients diagnosed with ALL in 2008-2011, 58% of patients did not receive chemotherapy or TKI within 90 days of ALL diagnosis, 32% received treatment with chemotherapy only, 7% with chemotherapy and TKI, and 2% with TKI only.
- Patients of advanced age and with higher comorbidity level were less likely to receive chemotherapy.
- The median time from ALL diagnosis to treatment initiation was 3 days for chemotherapy and 20 days for TKI.
- Most patients (73%) initiated chemotherapy in an inpatient setting with an average of 23 days in hospital.
- About 3% of patients received stem cell transplantation after ALL diagnosis.
- Median overall survival among treated patients: 10 months, patients treated with chemotherapy only; 18 months, chemotherapy and TKI; 6 months, TKI only.

Conclusion

- More than half of elderly patients diagnosed with ALL were not treated with chemotherapy or TKI within 90 days of diagnosis.
- Patients who were treated within 90 days of diagnosis had a dismal survival outcome.
- These findings regarding real-world management of ALL in elderly patients show an unmet need for safe and effective treatments for this patient population.