

BACKGROUND & METHODS

Background:

Acute myeloid leukemia (AML) is the most common form of leukemia among US adults, and it has a fairly low survival rate: approximately 15% of diagnosed adults survive for 5 or more years after AML onset.^{1,2,3} The outcome in older patients with AML is usually much worse than outcomes for similarly treated younger patients.^{4,5,6} Lang and colleagues recently reported that only 7% of older patients survived for 2 or more years after AML diagnosis.⁷ Reasons for poorer survival in older patients include higher incidences of unfavorable cytogenetics, CD34-positive phenotypes, raised serum lactate dehydrogenase levels, and multidrug resistance protein expression.⁸ Because of the toxicity and higher treatment-related mortality associated with chemotherapy treatment in this population, and the presence of complex cytogenetics, many elderly patients remain untreated or undertreated compared to younger patients with AML.⁹

Objective:

To estimate survival rates among AML patients ≥65 years in the linked Surveillance, Epidemiology, and End Results (SEER)-Medicare database according to inpatient chemotherapy treatment, comorbidities, and other predictive factors.

Methods:

Data Source

- SEER-Medicare database (data from 1991-2003)
- SEER files include demographic data, cancer diagnostic data, and dates of death for deceased patients
- Medicare claims files include enrollment data, details on inpatient and outpatient utilization, dates and type of service, ICD-9-CM (diagnostic and procedure) codes, diagnosis-related group codes, HCPCS (procedure) codes, and Medicare payment amounts

Patient Selection and Matching

- Inclusion criteria:
 - Aged 65 or older with a new diagnosis of AML reported to a SEER registry between 1999 and 2002
 - Eligible for fee-for-service Medicare coverage for at least 1 year prior to AML diagnosis as well as the month of the initial AML diagnosis
- Each chemotherapy-treated patient was matched to a non-chemotherapy-treated patient by:
 - Age
 - Sex
 - Geographic region
 - Hospital type (teaching or non-teaching)
 - Charlson comorbidity score (determined based on certain ICD-9-CM diagnoses in the prior 12 months)
 - Myelodysplastic syndrome (MDS) diagnosis in the 12 months prior to AML diagnosis
- Patients were randomly matched if more than one potential match existed

Study Measures

- Survival at 3-month intervals
- Median survival time

Data Analyses

- Survival at 3-month intervals was estimated with the Kaplan-Meier technique for up to 2 years after patients' initial AML diagnosis
- Median survival was estimated, and significance levels for differences were determined via Wilcoxon homogeneity test across cohorts

SUMMARY & CONCLUSIONS

- This large retrospective cohort study of older patients (65+ years) with AML illustrates that chemotherapy treatment is associated with significantly improved survival.
- In this study, the survival gain for chemotherapy treatment is slightly less than that observed in a previous population-based AML study that did not match on prognostic factors.⁷
- Close to 65% of Medicare patients with AML over 65 years of age were not treated with chemotherapy.
- The untreated patient group was older and had higher prevalence of comorbidities than the treated group.

RESULTS

Table 1: Characteristics of pts with newly diagnosed AML

Characteristic	Unmatched			Matched		
	Treated	Untreated	Overall	Treated	Untreated	Overall
Number of patients	1193	2124	3317	888	888	1776
Mean age ± SD (years)	74.0 ± 5.9	78.3 ± 7.2	76.5 ± 7.1	74.8 ± 6.1	75.0 ± 6.1	75.0 ± 6.2
Male (%)	58	52.1	54.2	59.5	59.4	59.4
Geographic Region						
- Northeast (%)	22.6	18.5	20.0	19.4	19.4	19.4
- Midwest (%)	18.3	20.4	19.6	17.1	17.1	17.1
- South (%)	15.3	15.0	15.1	13.3	13.3	13.3
- West (%)	43.8	46.1	45.3	50.2	50.2	50.2
Treated at teaching hospital (%)	58.2	44.2	48.5	52.5	52.5	52.5
Treated at non-teaching hospital (%)	43.8	55.8	51.5	47.5	47.5	47.5
Clinical Characteristics						
- Myelodysplastic syndrome* (%)	26.5	28.0	27.5	23.8	23.8	23.8
- Charlson comorbidity score ^b (mean ± SD)	1.2 ± 1.4	1.7 ± 1.7	1.5 ± 1.6	1.3 ± 1.4	1.3 ± 1.4	1.3 ± 1.4

* Diagnosed in the 12 months prior to AML diagnosis. ^b Determined based on certain ICD-9-CM diagnoses in the prior 12 months

Table 2: Prevalence of Comorbidities

Comorbidity ^a (%)	Unmatched			Matched		
	Treated	Untreated	Overall	Treated	Untreated	Overall
Chronic obstructive pulmonary disease	25.4	32.0	29.6	25.5	28.4	26.9
Congestive heart failure	21.5	30.7	27.4	22.4	25.0	23.7
Diabetes without chronic complications	23.2	24.8	24.2	24.9	22.4	23.7
Cerebrovascular disease	13.9	21.1	18.5	14.6	14.9	14.8
Any malignancy	9.0	8.7	8.8	9.2	11.5	10.4
Peripheral vascular disease	7.4	8.9	8.3	7.2	6.9	7.0
Myocardial infarction	5.5	8.7	7.5	5.5	5.7	5.6
Renal disease	4.7	8.5	7.1	5.2	5.4	5.3
Rheumatologic disease	6.0	6.7	6.5	6.5	4.8	5.7
Peptic ulcer disease	3.5	5.4	4.7	4.2	4.8	4.5
Dementia	0.7	4.5	3.1	0.9	2.5	1.7
Metastatic solid tumor	3.1	2.8	2.9	3.2	2.9	3.0
Diabetes with chronic complications	2.4	2.4	2.4	2.8	1.6	2.2
Mild liver disease	0.6	1.4	1.1	0.6	0.9	0.7
Hemiplegia or paraplegia	0.3	0.6	0.5	0.1	0.5	0.3
Moderate or severe liver disease	0.4	0.5	0.5	0.5	0.0	0.2
AIDS	0.1	0.1	0.1	0.1	0.0	0.1

^a Determined based on ICD-9-CM codes. Patients were matched on overall Charlson comorbidity score (Table 1), but not on individual comorbidities.

Table 3: Median months of survival (matched)

Characteristic	Treated	Untreated	Difference	P Value	Interquartile Range
Overall	6.1	1.7	4.4	<0.001	1.6-9.7
History of cancer	6.1	1.7	4.4	<0.001	1.6-6.0
No history of cancer	6.2	1.7	4.5	<0.001	1.6-10.3

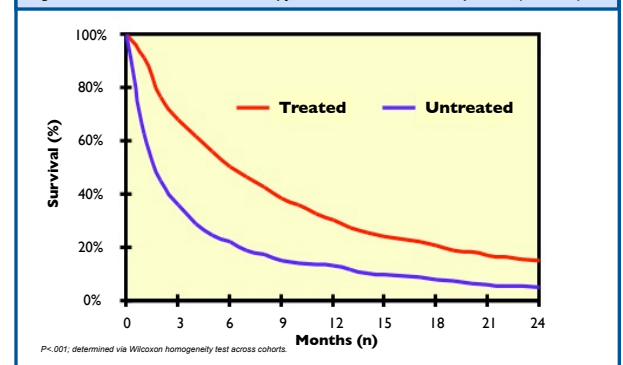
Unmatched Cohorts:

- N=3317 patients with AML aged ≥65 were identified
- N=1193 (36%) received chemotherapy
- N=2124 (64%) did not receive chemotherapy
- Patients who were treated with chemotherapy were younger and had lower Charlson Comorbidity Scores compared to untreated patients
- The most prevalent comorbidities were chronic obstructive pulmonary disease, congestive heart failure, diabetes, and cerebrovascular disease (Table 2)
- Cardiac comorbidities (CHF, myocardial infarction), cerebrovascular disease, and COPD were more common in the untreated group

Matched Cohorts:

- N=888 patients in each cohort (mean age 75; 59.4% male)
- 52.5% of patients received care at teaching hospitals
- The mean comorbidity score was 1.3
- 23.8% of patients had been diagnosed with MDS within the prior 12 months

Figure 1: Survival rates for chemotherapy-treated vs. untreated AML patients (matched)



- For the matched cohorts, median survival was 4.4 months longer for the chemotherapy-treated cohort than for the untreated cohort (6.1 versus 1.7 months; $P < .001$). Prior cancer history did not influence this survival benefit.
- As shown in Figure 1, at 12 months more than twice as many chemotherapy-treated patients had survived compared to untreated patients (30.3% versus 13.1%, respectively). At 24 months, three times as many treated patients had survived, compared to untreated patients (15.2% versus 5.3%, respectively).

LIMITATIONS

- SEER contained no data on cytogenetics or response rates
- Claims data had limited data on type of chemotherapy administered, and no information was available on treatment with outpatient oral chemotherapy drugs
- Data were lacking on severity of comorbidities that constitute the Charlson Comorbidity Index

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