Retrospective Review of Outcomes in Newly Diagnosed Leukemia Patients Aged 65 and Older When Admitted to the Hospital

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Introduction

Patients admitted to the hospital with acute leukemia have a diminished survival inversely proportional to their age at presentation. In Acute Myeloid Leukemia patients, reported 5 year overall survival of nearly 50% if age < 50 years old. The survival decreases to <25% in patients aged 60-65 years old and <10% if ≥ age 70. Many factors contribute to this observation including poor performance status, decreased complete remission rates with induction therapy, increased treatment related mortality, increased unfavorable cytogenetics, and increased secondary leukemia. Recognizing these expectations of outcome in elderly leukemia patients may help to assist in treatment decisions. Primary objective of this analysis was to learn the observed baseline characteristics and early observed outcomes of our elderly leukemia patients admitted to the hospital for initial treatment.

Methods

A retrospective chart review of all patients age > 65 who were admitted to the University of Kentucky inpatient leukemia service with a diagnosis of acute leukemia from July 1, 2015 through June 30, 2021. Demographic information including age and gender as well as clinical information such as leukemia sub-classification, duration of hospital stay, number of blood products administered, type of treatment, and outcome data such as disposition at time of discharge, response to therapy, 3 month and 6 month remission and survival data was collected.

Figure 1 - Acute Leukemia Composition

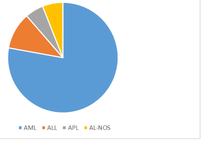
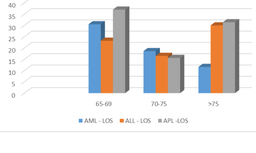


Figure 2 - Length of Stay (Days)



Patients

Patients were identified by utilizing ICD-10 codes and inpatient billing for acute leukemia hospitalizations and cross-referenced with age > 65. 167 total patients were identified and included in the analysis. Acute Leukemia included Acute Myeloid Leukemia (AML) [n=130], Acute Lymphoblastic Leukemia (ALL) [n=18], Acute Promyelogenous Leukemia (APL) [n=9], and Acute Leukemia not otherwise specified (AML-NOS) [n=10].

Patients were separated into three groups: those < 70 [n=55], those 70 to 74 [n=52], and those > 75 years old [n=60].

Figure 3 AML - Treatment

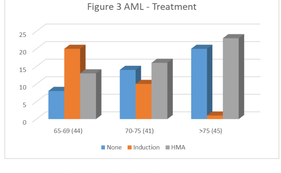


Table 1. Transfusions (Total blood products)

Age range:	65-69	70-75	>75
AML	14.5	9.9	4.1
ALL	8.7	7.3	17
APL	4	6	6.6

Age range (number of patients);
HMA = hypomethylating Agent (mono or Combination)

Interventions

113 patients went on to receive treatment for their leukemia depending upon their leukemia subtype and performance status. Treatments included for AML: Induction therapy (Cytarabine and Daunarubicin); Hypomethylating Agent (Azacitidine or Decitabine) with or without Venetoclax; or combination daunorubicin and cytarabine liposome. For ALL patients: Hyper-CVAD (cyclophosphamide, Vincristine, Doxorubicin, Dexamethasone) mini or full dose with or without Tyrosine Kinase Inhibitor; or Vincristine and Dexamethasone with or without Tyrosine Kinase Inhibitor. APL patients received all-trans retinoic acid (ATRA) with or without Arsenic trioxide. AML-NOS generally did not receive treatment with just one patient receiving a Hypomethylating Agent.

Results

Patients who did not receive any therapy increased as age increased amongst the three cohorts (21.8%, 32.7%, and 41,7%). Length of hospital stay was reflective of type of treatment and was longer in the younger population (28 days, 17.6 days, and 15.3 days). Survival at 6 months for the three cohorts demonstrated 51%, 42.3%, and 23.4%. Mortality rate during hospital stay including transitioning to hospice care for each cohort increased with age (29%, 34% and 50%).

In the AML population, 31 of the 130 patients received induction chemotherapy. 20 patients were < 70 while 11 were > 70 years old. Utilizing the TRM calculator developed at Fred Hutchinson Cancer Center, the cohort <70 had an expected TRM of 10.68% (1 – 41%) while the elder group averaged 10.1% (1-20%). The observed TRM was 10.5% in the younger cohort but was 50% in the older cohort. For both groups the TRM was 20%. Previously reported TRM for this age population has been as high as 31% with induction chemotherapy. Most of the AML patients > 70 received a hypomethylating mono- or combination therapy. The 6 month survival was 50% for the younger cohort, 26.8% for the middle cohort and just 13.3% for the eldest cohort.

In the ALL population, only 6 patients were included in each of the 3 age groups. Survival at 6 months included 4 patients in the younger group, 5 patients in the 70-74 age group, and just 1 in the > 75 age group. 2 patients (33%) in the younger cohort and 1 (17%) in the middle cohort died during hospitalization, likely related to more intense induction treatment. Utilization of blood products was increased in the elder patient cohort.

A total of 9 APL patients were identified with 5 being in the eldest cohort. Despite reported good outcomes in elderly patients with APL (>75% Overall Survival), at 6 months, only 3 of the original 9 were alive (33.3%). Out of the 10 patients with AML-NOS none were alive at 6 months.

Discussion

Acute Leukemia in the elderly population remains a challenge therapeutically with poor outcomes despite tailored treatments based on patient's age and performance status. Realistic expectations of therapy should be discussed with patients before deciding on treatment.

Table 2. Remission at 3 months

Age range:	65-69	70-75	>75
AML (130)	9.1% (4)	4.8% (2)	4.4% (2)
ALL (18)	16.7% (1)	16.7% (1)	33.3% (2)
APL (9)	0%	0%	20% (1)

Table 3. Survive to Home Discharge

Age range:	65-69	70-75	>75
AML (130)	61.3% (27)	65.8% (27)	46.7% (21)
ALL (18)	66.7% (4)	83.3% (5)	66.7% (4)
APL (9)	0%	33.3% (1)	40% (2)

Table 4. Overal Survival - 6 months

Age range:	65-69	70-75	>75
AML (130)	50% (22)	26.8% (11)	13.3% (6)
ALL (18)	66.7% (4)	83.3% (5)	16.7% (1)
APL (9)	100% (1)	33.3% (1)	20% (1)
AL-NOS (10)	0%	0%	0%

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