Beyond the Stage: The Evolving Landscape of Cytogenetic Risk in African Americans with CLL and Its Impact on Clinical Strategies

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Introduction

- Chronic Lymphocytic Leukemia (CLL) is the most common form of adult B-cell leukemia. It is characterized by a wide range of clinical outcomes that are often unpredictable.
- The variability in disease progression and response to therapy suggests the influence of underlying factors—beyond traditional clinical staging—that independently affect prognosis.

Aim

- To enhance understanding of CLL in the African American population by examining clinical staging and cytogenetic features, in order to identify prognostic markers that more accurately predict treatment course leading to better survival outcomes.

Objectives

- To assess the prevalence of clinical stage (Rai/Binet) of CLL at time of diagnosis in African American patients.
- To assess the distribution of clinical stages of CLL with respect to cytogenetics risk stratification in African American patients.

Methods

- **Design:** Retrospective cross-sectional study
- **Setting:** Brooklyn Cancer Center
- **Participants:** 26 African American patients diagnosed with CLL/SLL (2013–2024)
- **Inclusion Criteria:** Patients with complete clinical and laboratory data at presentation, including flow cytometry, FISH reports, and post-diagnosis imaging (CT or PET-CT). Staging was performed using Rai and Binet systems; cytogenetic risk was stratified based on FISH findings.
- **Outcomes:** Demographics of CLL/SLL patients, prevalence of clinical stages at presentation, and their distribution across cytogenetic risk groups.

Results

- A total of 48 patient records were reviewed, with 26 meeting the inclusion criteria.
- The mean age was 69.9 years (range: 61–78.8), with 16 males (61.5%) and 10 females (38.5%). Among these, 23 patients (88.6%) were diagnosed with CLL, 1 (3.8%) with SLL, and 2 (7.6%) with both CLL and SLL. B symptoms were present in only 15.4% of patients.
- Mean laboratory values: WBC 41.7x 10^9/L, ALC 33.3 x 10^9/L, Hb 11.8 g/dL, Hct 36.6 %, and platelet count 171.2 x 10^9/µL

- For risk stratification and understanding the distribution, the following were used
  - **Clinical Staging (Rai and Binet systems)**
  - **Cytogenetics risk stratification**

Fig 1: Distribution of patients based on Rai Staging

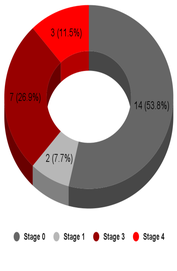


Fig 2 : Distribution of patients based on Binet Staging

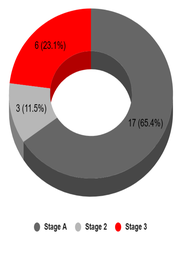
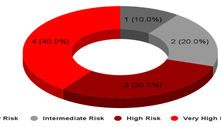


Fig 3 : Distribution of patients based on Cytogenetics risk stratification



Rai Staging	Cytogenetic Risk				
	LR	IR	HR	VHR	Total
0	6 (42.9)	5(35.7)	2(14.2)	1(7.1)	14
1	2 (100.0)	0	0	0	2
2	0	0	0	0	0
3	3(42.9)	3	0	1(14.3)	7
4	0	3(100.0)	0	0	3
Total	11	11	2	2	26

Table 1*#. Distribution of the study population according to Rai staging with respect to cytogenetic risk stratification.

Binet Staging	Cytogenetic Risk				
	LR	IR	HR	VHR	Total
A	7(41.2)	7(41.2)	2 (11.8)	1(5.9)	17
B	3(100.0)	0	0	0	3
C	1(16.7)	4(66.7)	0	1(16.7)	6
Total	11	11	2	2	26

Table 2*#. Distribution of the study population according to Rai staging with respect to cytogenetic risk stratification.

***LR: Low risk ; IR: Intermediate risk ; HR: High risk ; VHR :Very High Risk**
 # Number(%)

Summary

- Del(17p) and TP53 mutations were found in both early and advanced CLL stages, indicating that clinical staging alone is insufficient.
- Integrating cytogenetics with Rai and Binet systems may improve risk stratification and guide treatment.

Discussion

- AA patients have lower CLL incidence but worse outcomes than White patients, suggesting ethnic differences in disease biology.
- Traditional Rai and Binet staging, based on clinical signs, does not capture molecular complexity.
- High-risk cytogenetic changes (e.g., del(17p), del(11q)) can appear even in early stages and predict poor outcomes.
- Combining cytogenetics with clinical staging may improve risk stratification and guide personalized care, especially in underserved AA populations.

References

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