TP53 Mutation and Its Association With Treatment Response in Patients Diagnosed With CLL in Azerbaijan: A Retrospective Study

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Objectives

TP53 mutation is recognized as a key biomarker influencing disease prognosis and is considered a negative prognostic factor, typically associated with poor response to immunochemotherapy in patients with Chronic Lymphocytic Leukemia (CLL).

This study aims to evaluate the frequency of TP53 mutations among CLL patients in Azerbaijan, their association with treatment choices, and their impact on disease course.

Although the prevalence and clinical significance of this mutation are well established globally, they remain insufficiently characterized in the Azerbaijani patient population.

Methods

This retrospective study analyzed data from 112 patients diagnosed with CLL between 2021 and 2024 th years across three hematology centers in Azerbaijan.

TP53 mutations were identified using Sanger sequencing, primarily affecting exons 5–8 of the DNA-binding domain. Clinical staging was based on Rai and Binet systems. Treatment responses were assessed according to 2018 International Workshop on CLL (iwCLL) criteria.

Progression-free survival (PFS) and overall survival (OS) were analyzed using Kaplan-Meier curves and Cox regression models.

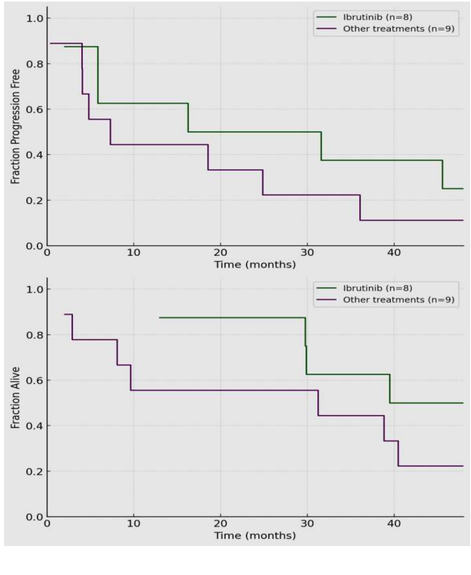


Figure 2. Treatment effects with Ibrutinib in subgroups of patients with chronic lymphocytic leukemia (CLL) defined by TP53 mutation status.
Among those with TP53 mutations, patients treated with ibrutinib (8/17) had better outcomes. Their response rate was 75% compared to 40% with other treatments (P=0.02). Median PFS was 24 months for ibrutinib vs 14 months for others (P=0.01), and 2-year OS was higher (80% vs 55%).

Results

Among the 112 patients, 65% (n=73) were male, with a median age of 67 years (range, 55–82). At diagnosis, 40% (n=45) were early-stage and 60% (n=67) were advanced stage. TP53 mutations were more frequent in advanced disease (82%; P=0.01) and found in 15% of patients (17/112). These patients had higher relapse/refractory rates (35% vs 15%; P=0.01), lower treatment response rates (58% vs 82%; P=0.003), and significantly shorter PFS (14 vs 36 months; P<0.001).

Median OS was lower in patients with TP53 mutations compared to those without (58% vs 82%; P=0.003), and their median PFS was significantly shorter (14 months vs 36 months; P<0.001).

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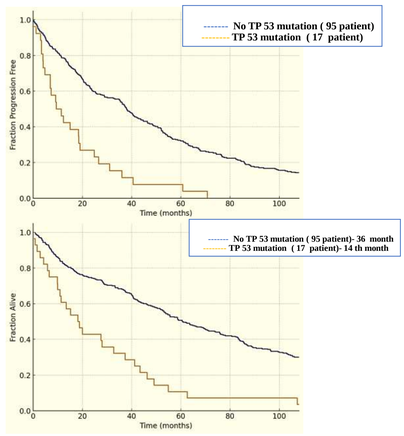


Fig 1. TP53 mutations are associated with poor outcome in chronic lymphocytic Leukemia (CLL). Median OS was lower in patients with TP53 mutations compared to those without (58% vs 82%; P=0.003), and their median PFS was significantly shorter (14 months vs 36 months; P<0.001).

Discussion

The frequency and prognostic impact of TP53 mutations in this Azerbaijani cohort are consistent with international data. CLL patients with TP53 mutations responded poorly to immunochemotherapy but benefited from targeted therapy with ibrutinib. These findings support incorporating TP53 testing into routine diagnostic workup and considering Bruton tyrosine kinase (BTK) inhibitors as first-line treatment for TP53-mutated CLL.

References

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