4. SPECIAL CONDITIONS

THE PROGNOSTIC IMPACT OF BONE MARROW PLASMA CELL INFILTRATION AT DIAGNOSIS IN AL AMYLOIDOSIS

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Background. Systemic light-chain (AL) amyloidosis is a rare plasma cell dyscrasia characterized by tissue deposition of misfolded immunoglobulin light chains, leading to progressive organ dysfunction. Prognosis is primarily determined by cardiac involvement and hematologic tumor burden. While bone marrow plasma cell (BMPC) infiltration reflects clonal disease extent, its independent prognostic value in AL amyloidosis remains controversial.

Aims. We aimed to evaluate the impact of BMPC infiltration rate at diagnosis on clinical characteristics, treatment response, early mortality, and survival outcomes in patients with AL amyloidosis, and to determine its independent prognostic significance.

Methods. We retrospectively analyzed 116 patients diagnosed with AL amyloidosis at Ankara University Faculty of Medicine between January 2010 and December 2024. Patients were divided into two groups according to the median BMPC infiltration rate at diagnosis: BMPC ≤10% (n=58) and BMPC >10% (n=58). Clinical features, organ involvement, difference between involved and uninvolved free light chain levels (dFLC), Revised Mayo 2012 stage, treatment modalities, and hematologic and organ responses were evaluated. Overall survival (OS) and progression-free survival (PFS) were analyzed using the Kaplan–Meier method. Independent prognostic factors were assessed by multivariate Cox regression and logistic regression analyses.

Results. The median age at diagnosis was 59.5 years, and 55.2% of patients were male. Patients with BMPC >10% had significantly higher dFLC levels (p=0.0004) and were more frequently classified as Revised Mayo 2012 stage II-I/IV (p=0.039). Notably, 82.8% of patients with stage IV disease belonged to the high BMPC group (p=0.0004). BMPC infiltration >10% was associated with inferior hematologic response and a higher rate of early mortality. When analyzed as a continuous variable, BMPC percentage was significantly associated with early death (p=0.013). In multivariate logistic regression, BMPC >10% remained an independent predictor of early mortality (p=0.031). Median OS was 56 months in the BMPC ≤10% group versus 16 months in the BMPC >10% group. In multivariate Cox regression analysis, BMPC >10% was independently associated with worse OS (p=0.03) and PFS (p=0.013), after adjustment for age, Mayo 2004 cardiac stage, and number of involved organs.

Conclusions. Bone marrow plasma cell infiltration greater than 10% at diagnosis identifies a subgroup of AL amyloidosis patients with higher tumor burden, aggressive disease biology, poorer treatment response, and significantly inferior survival. BMPC infiltration represents a strong and independent prognostic marker and should be considered in risk stratification and therapeutic decision-making in AL amyloidosis.