P008 FACTORS ASSOCIATED WITH THE CLINICAL PROGNOSTIC PERFORMANCE OF MINIMAL RESIDUAL DISEASE ASSESSMENT BY NEXT GENERATION FLOW CYTOMETRY IN MULTIPLE MYELOMA

Topic: 14. Myeloma and other monoclonal gammopathies - Clinical

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Background: Minimal Residual Disease (MRD) negativity (-) using next generation flow (NGF) cytometry with a minimum sensitivity of 10^-5 is strongly associated with improved progression-free survival (PFS) and overall survival (OS). However, clinicopathologic factors affecting the prognostic performance of this assay are not clear at this time, and despite the achievement of MRD (-) status, disease progression is still readily observed in multiple myeloma (MM).

Aims: We investigated quantitative non-clonal plasma cell factors measurable in the bone marrow sample that could predict disease progression in MRD (-) MM patients.

Methods: We retrospectively reviewed all patients with MM who underwent a bone marrow biopsy at the Mayo Clinic, Rochester, USA from July 2017 to December 2020. MRD testing was done on bone marrow using the established Euroflow protocol with analytic sensitivity between 10^-5 and 2x10^-6. In addition to quantitative measurements of the number of clonal plasma cells, the number of hematogones, polyclonal plasma cells and mast cells were collected.

The time to next therapy (TTNT) was defined as the time from the date of MRD testing to the date of starting a new treatment regimen due to disease progression. Patients who did not require change in treatment for MM were censored at the last known follow-up. Kaplan-Meier curves and log-rank method were used to compare TTNT.

Results: A total of 1,142 NGF assessments, obtained in 783 different patients with MM, were found to have an MRD (-) result. The median age of patients at the time of collection was 63 years. The median absolute number of non-aggregate events captured was 8,586,360 (range: 840,904 - 9,975,075). For the entire sample cohort, the median number of polyclonal plasma cells were 1,874 (range: 0 - 121,221), the median number of hematogones were 70,307 (range: 0 - 6,486,739) and the median number of mast cells were 734 (range: 0 - 116,834).

Of the 1,142 NGF assessments, follow-up data was available on 675 samples, of which 204 (30%) were associated with disease progression requiring a change in therapy.

Number of polyclonal plasma cells and mast cells greater than their respective medians were considered elevated and were associated with disease progression ($X^2 p < 0.001$ for polyclonal plasma cells and $X^2 p = 0.046$ for mast cells).

Patients with higher polyclonal plasma cell events were found to have significantly higher TTNT compared to those with lower plasma cell events (median NA vs. 31 months, $p < 0.001$). The median TTNT for patients with higher mast cell events was also significantly higher compared to those with lower mast cell events (median NA vs. 36 months, $p = 0.002$).

Summary/Conclusion: The number of polyclonal plasma cells and mast cells in the bone marrow sample could be useful in predicting myeloma progression in patients with a MRD (-) bone marrow assessment by NGF. This observation may be related to the quality of the specimen (hemodilution), true biologic activity of polytypic plasma cells and mast cells, or both.

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