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Cytogenetic alterations detected by interphase-Fish, help in risk stratification and predicting therapy response in newly diagnosed multiple myeloma patients: A study of 342 cases

Hemani Jain, Dhanlaxmi Shetty, Yogita Deshpande, Manju Sengar, Navin Khattry, Hasmukh Jain, Bhausaheb Bagal, and **PG Subramanian**
Tata Memorial Centre, India

Introduction: Multiple myeloma (MM) is a cytogenetically heterogeneous plasma cell malignancy. The detection and interpretation of cytogenetic abnormalities in MM is of critical importance for prognosis and risk stratification.

Objectives: To determine the role of cytogenetic aberrations in classification, risk stratification and predicting therapy response.

Material and Methods: Retrospective analysis was carried out in 342 de novo multiple myeloma patients referred to Cancer Cytogenetic department, ACTREC, Tata Memorial Centre, Navi Mumbai, India from August 2016 to November 2017. Fluorescence in situ hybridization (FISH) was performed using commercially available DNA probes on purified CD138 positive plasma cells.

Results: Cytogenetic abnormalities by FISH were detected in 65% (221/342) patients. Monosomy 13/del(13q) was observed in 35% patients followed by hyperdiploidy in 33%, IgH translocations in 30%, gain(1q21) in 21% and monosomy 17/TP53 deletion in 7% patients. Patients' median age was 55.5 years (range, 27 to 84 years) with male preponderance. IgH translocation group (P<0.042) and TP53 deletion (P<0.052) were identified as a high-risk group due to correlation with advanced disease, ISS stage III, whereas chromosome 13 aberrations were associated with high plasma cells (P<0.043). Lower response rates were observed in patients with high-risk cytogenetic abnormalities: t(4;14) (P<0.008), t(14;20) (P<0.032) and gain(1q) (P < 0.003).

Conclusions: Our patients presented lower median age which is a decade younger than those from other countries. Low prevalence of chromosome 13 aberrations and IgH translocations was observed, as compared to Western population probably due to geographic heterogeneity. Deletion(17p13), t(4;14), t(14;20) and gain(1q21) were independent high-risk prognostic factors, can predict lower response rates to therapy, are more likely to relapse early, thus need more intensive treatments. Interphase-FISH can efficiently detect poor prognostic markers thus helping in risk stratification aiding in treatment decisions and better patient management.

hemanijain7@gmail.com

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