

COMPARISON OF BONE MARROW ASPIRATE SMEAR MORPHOLOGY AND MULTIPARAMETER FLOW CYTOMETRY PLASMA CELL PERCENTAGE IN PATIENTS WITH MULTIPLE MYELOMA

Seodisa KK¹, Dlova AN^{1,2}

¹ Department of Haematological Pathology, Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa. ² Dr George Mukhari Academic Laboratory, National Health Laboratory Service, Ga-Rankuwa, South Africa.

BACKGROUND AND OBJECTIVES: Multiple myeloma (MM) is a malignant plasma cell disorder characterized by the clonal proliferation of plasma cells within the bone marrow. Accurate quantification of plasma cell percentage is crucial for diagnosis, disease staging, and monitoring. Traditionally, bone marrow aspirate (BMA) morphology has been used for this purpose; however, multiparameter flow cytometry (MFC) has emerged as a complementary tool offering immunophenotypic precision. This study aimed to compare plasma cell percentages obtained from BMA morphology and MFC in MM patients and to assess the concordance between the two techniques.

METHODS: This was a cross-sectional descriptive study which retrospectively analysed historical data from the TrakCare® laboratory information system (LIS) of the National Health Laboratory Service (NHLS) over a two-year period ranging from 1st January 2023 to 31st December 2024. Stata Version 16.1 software package was used to analyse the data

RESULTS: A total of 36 participants were included, with a mean age of 56.5 years. Plasma cell percentages determined by BMA morphology were consistently higher than those obtained by MFC across all demographic groups. Despite this difference, a positive correlation existed between the two methods, with stronger concordance observed in younger patients and females. The Bland–Altman analysis demonstrated a systematic bias, confirming that MFC tends to underestimate plasma cell percentages compared to BMA morphology.

CONCLUSION: The findings indicate that while BMA morphology and MFC correlate significantly, they are not interchangeable. Instead, their combined use provides a more

comprehensive and reliable evaluation of plasma cell burden in multiple myeloma. The study recommends standardization of MFC procedures and continued integration of both techniques in routine diagnostic and monitoring protocols.