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Real-Life Analysis of Heavy-Light Chain Assay in Multiple Myeloma Patients Undergoing Transplantation

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INTRODUCTION

Background, Multiple myeloma (MM) is a hematologic cancer marked by proliferation of clonal plasma cells, leading to monoclonal immunoglobulin secretion. Heavy-Light Chain (HLC) assay (Hevylite®) measures both monoclonal (iHLC) and polyclonal (uHLC) immunoglobulin components. Recent studies suggest that HLC improve monoclonal protein assessment in MM and has prognostic value for disease monitoring.

Purpose. To evaluate the clinical utility of the Hevylite® assay in newly diagnosed MM (NDMM) patients eligible for autologous stem cell transplantation (ASCT).

Methods. We retrospectively analyzed 28 NDMM patients undergoing ASCT, assessing Hevylite® at induction, post-ASCT, and post-consolidation.

Response was evaluated using two HLC-based methods: HLC ratio (rHLC) and HLC differential (dHLC).

Results were compared with serum protein electrophoresis (SPEP) to assess concordance in disease response monitoring.

RESULTS

We included 220 samples from 28 NDMM patients (2017–2022) with a median age was 60 years. Patient characteristics and induction treatment received was in Table 1.

Age, median (ys)	60 (43-69)
Gender (M/F)	20 / 8
Monoclonal component, n (%)	
IgG kappa	16 (57%)
IgG lambda	5 (18%)
IgA kappa	6 (21%)
IgA lambda	1 (4%)
ISS	
I	7 (25%)
II	16 (57%)
III	5 (18%)
Induction treatment	
VTD	21 (75%)
VRD	5 (18%)
KRD	1 (3,5%)
VCD	1 (3,5%)

Table 1. Characteristics of patients at diagnose and induction treatment

We analyze Passing-Bablok linear regression between SPEP and HLC for IgG and IgA concentrations across all samples. We showed strong correlation in all samples (r=0.98), with a better correlation for IgA samples (IgG r=0,96 and IgA r =0,98). (Figure 1)

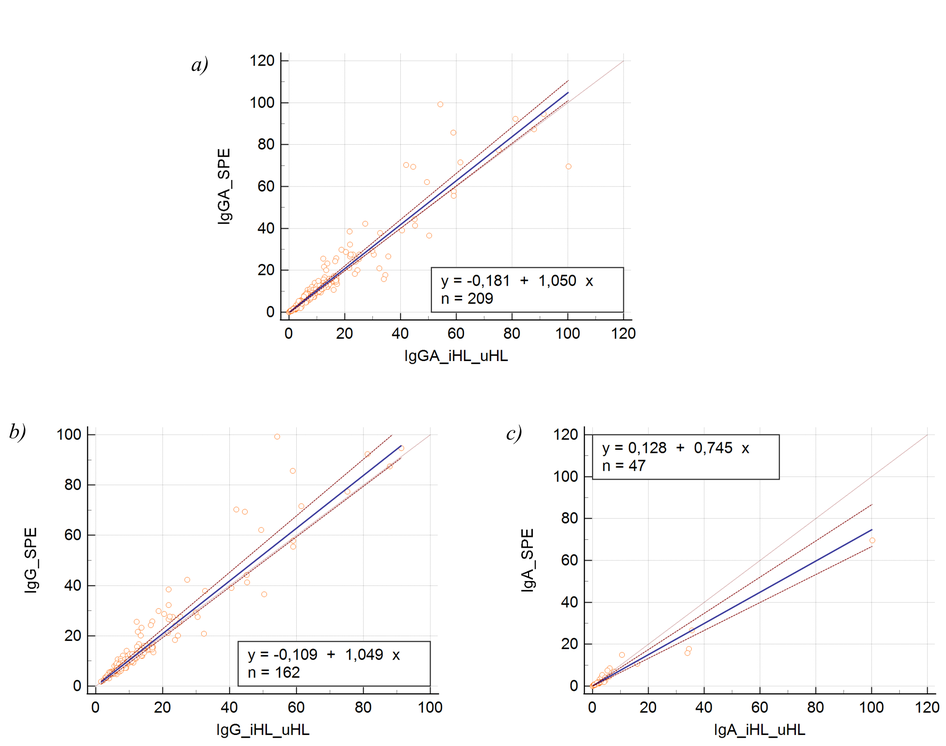

Figure 1. Passing Bablok linear regression between SPEP and HLC: a) all samples b) IgG samples c) IgA samples.

Monoclonal protein was quantified by SPE and iHLC, obtaining a r^2 of 0.89; interestingly, the correlation was better for IgA patients (r^2=0.92) than for IgG patients (r^2=0.87). (Figure 2)

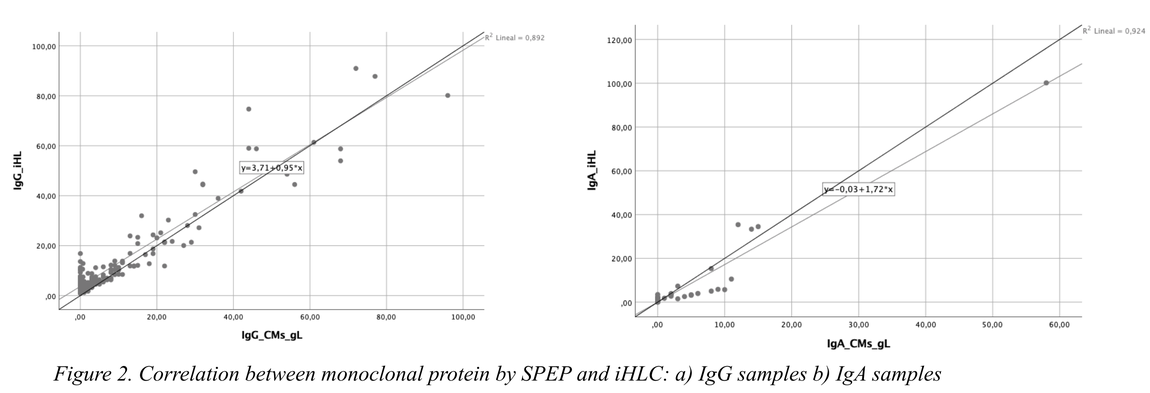

Figure 2. Correlation between monoclonal protein by SPEP and iHLC: a) IgG samples b) IgA samples

We analyze median iHLC and uHLC (g/L) levels at diagnosis, post-ASCT, and post-consolidation. Longitudinal analysis demonstrated that iHLC levels decreased with treatment, while uHLC values normalized, indicating immune recovery. (Table 2)

		Diagnosis	Post-ASCT	Post-consolidation
IgG	iHLC (g/l)	44,4	6,2	3,6
	uHCL (g/l)	0,5	3,1	3,1
IgA	iHLC (g/l)	33,3	0,3	0,3
	uHCL (g/l)	0,2	0,3	0,4

Table 2. Levels of iHLC/uHLC at different phases of treatment.

Response classification comparison between HLC-based methods (dHLC/rHLC) and standard IMWG criteria showed moderate agreement, though VGPR category agreement was low. (Tables 3 & 4)

Notably, dHLC-based response classification showed better agreement with IMWG criteria than rHLC (dHLC: κ=0.80, 95% CI: 0.72–0.87; rHLC: κ=0.65, 95% CI: 0.56–0.75).

		SPEP				
		RC	**VGPR**	**RP**	**SD**	**PD**
dHLC	**RC**	28 (93%)	20 (67%)	5 (9%)	0	0
	VGPR	1 (3%)	7 (23%)	5 (9%)	0	0
	RP	1 (3%)	3 (10%)	40 (75%)	2 (15%)	0
	SD	0	0	3 (6%)	11 (85%)	0
	PD	0	0	0	0	1 (100%)

Table 3. Concordance of response rates for SPE and dHLC

		SPEP				
		RC	**VGPR**	**RP**	**SD**	**PD**
rHLC	**RC**	21 (70%)	23 (77%)	7 (13%)	0	0
	VGPR	5 (17%)	4 (13%)	16 (30%)	0	0
	RP	4 (13%)	3 (10%)	22 (41%)	2 (15%)	0
	SD	0	0	7 (13%)	9 (69%)	0
	PD	0	0	1 (2%)	2 (15%)	1 (100%)

Table 4. Concordance of response rates for SPE and rHLC

CONCLUSION

Heavy-Light Chain (HLC) assay (Hevylite®) provides valuable insights for monitoring patients with multiple myeloma. This study analyzes the utility of the Hevylite® assay in real-life multiple myeloma patients who are candidates for autologous stem cell transplantation. HLC-based response assessment shows strong correlation with the IMWG criteria. In our study, we observed a better agreement with dHLC compared to rHLC.

CONTACT INFORMATION

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