SOHO ANNUAL MEETING 2024

AN APPROACH TO IDENTIFY A BIOMARKER FOR SECONDARY PLASMA CELL LEUKEMIA DEVELOPMENT

Harshita Dubey, Amar ranjan, Pranay Tanwar

Laboratory Oncology, Dr.B.R.A.IRCH, AIIMS, New Delhi, India

INTRODUCTION

Plasma cell leukemia definition:

- **Presence of**
  - >2 ×109/L plasma cells (PC) in peripheral blood or
  - >20% PC in differential leukocytes count (1)
- **Secondary PCL (sPCL) develops in 2%-4% of multiple myeloma (MM) (2)**
- **In comparison to Primary PCL (pPCL), sPCL shows:**
  - Higher incidence of lytic lesions and renal failure
  - Lesser incidence of extramedullary involvement (3)

AIM

To predict the development of PCL in cases of MM

METHODS

- **Institute Ethical Clearance was taken**
- **Among 160-180 new cases of plasma cell dyscrasia per year at our center, all the cases of PCL were retrieved**
- **We found 17 cases (pPCL: sPCL:: 9: 8) of PCL in between 2016-2021**
- **Statistical analysis was done to establish a correlation between pPCL & sPCL in using the following variables**
  - Age, sex, Hemoglobin, TLC, Platelet count
  - Plasma cell % in PS & in BM ,B2M,
  - Positive M- band in serum & urine, positive M- band in urine only
  - Immunofixation to identify Immunoglobulin types along with Light chain variants
  - Presence or absence of renal disease (evaluated by the higher value of urea &/ or creatinine),
  - Overall survival (months), Values of M-band, Serum levels of kappa(K), lambda (L), K/L ratio, IgG, IgM, IgA & LDH.

RESULTS

Table 1: Shows results of clinicopathological parameters of all cases

Characteristics	Measurable parameter	Results
Sex	Male to Female ratio	10:7
Age	Range Mean	39-71 years 55.2 years
Hematological Parameters Range	Hb TLC Platelet count	3.5 – 13.1 gm% 2600- 34500/ cumm 15000-230000/cumm
Plasma Cell count	PBS BMA	5%*-90% 40-90%
B2 microglobulin	Range	1.1 to 12.6 mg/L

Age ≤50 years was 4/17 (23.5%) cases (aged 39, 39, 45, 50)

*** Presence of ≥5% circulating plasma cells in patients with MM had a similar adverse prognostic impact as the previously defined PC**

- **In statistical analysis, we couldn't find any significant correlation between pPCL & sPCL in above-mentioned variables, except LDH**
- **LDH showed a differential trend between the two**
- **LDH was higher in sPCL in comparison to pPCL(normal range: 120-260U/L)**
  - Mean value in
    - ❖ pPCL 213 ± 44.9
    - ❖ sPCL 516 ± 290.
    - ❖ p-value <0.08;Wilcoxon rank-sum (Mann-Whitney)

Fig: Diagrammatic representation of LDH trend in pPCL and sPCL

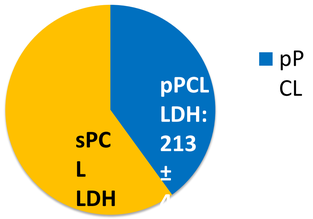


Figure 1: Diagramatic representation of LDH level in the two types of PCL

Statistical analysis for age (years)

PCL|	N	mean	SD	p50	min	max
1 |	9	56.77778	10.0222	54	39	71
2 |	8	53.5	8.585702	53.5	39	67
Total |	17	55.23529	9.236676	54	39	71

Statistical analysis for Hemoglobin level

PCL|	N	mean	SD	p50	min	max
1 |	9	8.011111	2.444097	7.8	3.5	11.5
2 |	8	8.05	3.51202	6.85	4.8	13.8
Total |	17	8.029412	2.89542	7.7	3.5	13.8

Statistical analysis for B2M

PCL |	N	mean	SD	p50	min	max
1 |	7	33.29429	63.94887	12.4	1.16	178
2 |	5	10.3	3.898718	12.6	3.6	12.6
Total |	12	23.71333	48.74768	12.5	1.16	178

Statistical analysis for LDH

PCL |	N	mean	SD	p50	min	max
1 |	4	213	44.93699	223.5	155	250
2 |	6	516	290.069	425	137	933
Total |	10	394.8	268.1417	322	137	933

DISCUSSION

- No study is available on prediction of development of PCL in cases of MM is available
- Only few case reports are available
- Teke HÜ et al 2014 have shown increasing level of LDH is associated with disease progression in cases of MM (1)
- Proposed markers for survival in MM
  - Serum beta2-microglobulin, serum albumin, platelet count, serum creatinine and age (2).
- Serum level of B2M Correlates positively with serum LDH level (3)
  - In our study LDH showed p-value 0.06, whereas B2M hasp-value 0.8
  - So we couldn't establish any correlation
- Elevated LDH levels are observed rarely at the onset of MM
- LDH levels increases with disease progression (4)
- The median overall survival of the patients with higher LDH levels is shorter than the patients with normal LDH level (5)
- Higher sLDH level indicates larger tumor mass (6)
- Increasing LDH level during the course of the disease may refer to
  - Increasing tumor mass
  - Relapse or
  - Existence of extramedullary plasmacytomas (6)
- Studies show that the development of sPCL is unpredictable in MM
- The high-risk criteria group includes failure to respond to the higher serum levels of LDH, low albumin, B2M, calcium, advanced age, and increase plasma cells at the time of diagnosis of MM (4)
  - LDH level may outstand among these markers

CONCLUSION

- In this project, the p-value of LDH for the two types of PCLs is not significant,
  - but it shows a significant trend of differentiation (p-value <0.06)
- Smaller sample size may be a confounding factor
- In this pilot study, we can affirm that LDH may play a role in the prediction of sPCL in cases of MM

REFERENCES

1. Teke HÜ, Başak M, Teke D, Kanbay M. Serum level of lactate dehydrogenase is a useful clinical marker to monitor progressive multiple myeloma diseases: a case report. Turkish Journal of Hematology. 2014 Mar;31(1):84.
2. Greipp PR, San Miguel J, Durie BG, Crowley JJ, Barlogie B, Bladé J, Boccadoro M, Child JA, Avet-Loiseau H, Kyle RA, Lahuerta JJ, Ludwig H, Morgan G, Powles R, Shimizu K, Shustik C, Sonneveld P, Tosi P, Turesson I, Westin J. International staging system for multiple myeloma. J Clin Oncol. 2005;23:6281–6281.
3. Simonsson B, Brenning G, Kallander C, Ahre A. Prognostic value of serum lactic dehydrogenase (S-LDH) in multiple myeloma. Eur J Clin Invest. 1987;17:336–339.
4. Dimopoulus MA, Barlogie B, Smith TL, Alexanian R. High serum lactate dehydrogenase level as a marker for drug resistance and short survival in multiple myeloma. Ann Intern Med. 1991;115:931–935
5. Gkotzamandou M, Kastritis E, Gavriatopoulou MR, Nikitas N, Gika D, Mparmparousi D, Matsouka C, Terpos E, Dimopoulos MA. Increased serum lactate dehydrogenase should be included among the variables that define very-high-risk multiple myeloma. Clin Lymphoma Myeloma Leuk. 2011;11:409–412.
6. Sanal SM, Yaylacı M, Mangold KA, Pantazis CG. Extensive extramedullary disease in myeloma. An uncommon variant with features of poor prognosis and dedifferentiation. Cancer. 1996;77:1298–1302.