The Pattern of Bone Marrow Involvement among Chronic Lymphocytic Leukemia Patients and Its Impact on the Disease Outcome in Kurdistan Region of Iraq

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Background

There are a variable degree of BM infiltration patterns: - interstitial (good prognosis) 30%, mixed (nodular + interstitial) 25%, nodular 10%, and diffuse 25% (poor prognosis). The nodular and interstitial patterns are predominating in the early clinical stage, while the diffuse pattern predominates in the advanced stage.

Generally, the BM examination is not vital in CLL diagnosis but it's recommended before starting therapy and in complex cases to give us valuable information about the causes of cytopenias.

Objective

The aim of this study to assess the effects of BM infiltration patterns on the disease outcome among CLL patients in Kurdistan Region of Iraq.

Patient and Methods

This is a cross-sectional descriptive retrospective study to show the relation of BM involvement with the OS , PFS and mortality rate of 106 CLL patients. The data collected in the Kurdistan region of Iraq including (Erbil, Sulaymaniyah, and Duhok) Cancer centers. Through the period from 1/1/ 2010 to 31/12/ 2019.The Inclusion criteria are all age group CLL Patients who were diagnosed at or referred to Regional Haematology - Oncology Centers in Kurdistan regions. While the patients without initial BM biopsy are excluded from this study.A sample of 250 CLL patients was chosen after qualifying the inclusion and exclusion criteria Just 106 patients included.

Results

- [Table 1] shows the comparison of BM involvement patterns in terms of age, gender, Rai stage, Binet stage, and mortality rate. A significant correlation found that the patients with diffuse BM pattern had advanced age (p = 0.01), higher mortality rate (66.2%) (p < 0.001), and also had advance Rai and Binet staging (p < 0.001).
- No significant association were observed between the BM patterns and patient gender (P-value <0.7)

Table 1: The comparative characteristics with BM patterns (N=106)

		Interstitial, n(%)	*Nodular,n(%)*	*Mixed,n(%)*	*Diffuse,n(%)*	*Total*	*P-value*
Age (Years)							
	<65	35 (59.3)	12(20.3)	4(6.8)	8(13.6)	59(100.0)	0.01* (S)
	≥65	18 (38.3)	5(10.6)	10(21.3)	14(29.8)	47(100.0)	
Gender							
	Male	37 (53.6)	11(15.9)	8(11.6)	13(18.8)	69 (100.0)	0.7 * (NS)
	Female	16(43.2)	6(16.2)	6(16.2)	9(24.3)	37(100.0)	
Rai staging							
	0	27(73.0)	4(10.8)	4(10.8)	2(5.4)	37(100.0)	<0.001** (S)
	I-II	23(53.5)	12(27.9)	5(11.6)	3(7.0)	43(100.0)	
	III-IV	3(11.5)	1(3.8)	5(19.2)	17(65.4)	26(100.0)	
Binet staging							
	A	34(70.8)	8(16.7)	4(8.3)	2(4.2)	48(100.0)	<0.001** (S)
	B	16(51.6)	7(22.6)	5(16.1)	3(9.7)	31(100.0)	
	C	3(11.1)	2(7.4)	5(18.5)	17(63.0)	27(100.0)	
Mortality rate							
	Dead	5(21.7)	1(4.3)	2(8.7)	15(65.2)	23(100.0)	<.001** (S)
	Alive	48(57.8)	16(19.3)	12(14.5)	7(8.4)	83(100.0)	
Total		53(50.0)	17(16.0)	14(13.2)	22(20.8)	106(100.0)	

S = significant; NS = non significant.
**Chi-square test; **Fishers exact test.*

A significant correlation was found between BM patterns with OS and PFS by using the chi-square test. The results showed that patients with interstitial, nodular, and mixed BM patterns had a superior OS and PFS survival rate than diffuse BM pattern.
For interstitial BM pattern the survival rate of <3 years was 39.0%, and for those ≥ 3 years was 62.0% (P-value <0.04). Moreover, the diffuse pattern had an inferior survival rate with <3 years was 30.4% , and ≥ 3 years survival probability of 10.0%respectively (P-value <0.04).
The PFS <3 years was 40.6% and PFS ≥ 3 years was 64.3% among interstitial BM patterns (P <0.017), while the PFS <3 years was 29.7% and PFS ≥ 3 years was 7.1% among the diffuse BM pattern (P <0.017).

Table 2: The BM patterns in relation to overall survival and progression-free survival (N= 106).

	OS			PFS			
BM pattern	<3 years n(%)	≥3years n (%)	P-value	<3years n (%)	≥3years n (%)	P-value	Total n (%)
Interstitial	22(39.0)	31(62.0)	0.04 (S)*	26(40.6)	27(64.3)	0.017(S)*	53 (50.0)
Nodular	9 (16.1)	8 (16.0)		9 (14.1)	8 (19.0)		17 (16.0)
Mixed	8 (14.3)	6 (12.0)		10(15.6)	4 (9.5)		14 (13.2)
Diffuse	17 (30.4)	5 (10.0)		19(29.7)	3 (7.1)		22(20.8)
							106(100)

OS = Overall survival; PFS = Progression-free survival; S = significant.
**Chi-square test.*

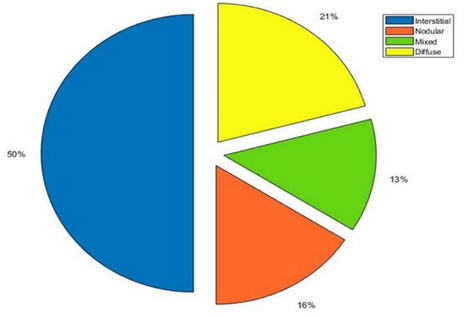


Figure 1: four bone marrow infiltration patterns in CLL patients in the kurdistan region of Iraq(N = 106).

Summary

In conclusion, we demonstrate that the BM involvement patterns have a prognostic value in our CLL patients and provide more reliable information regarding the clinical outcome and survival probability.

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