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Original Research Article

Aberrant markers expression in leukemia patients: a report from Western Iran

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Abstract: Leukemias comprise approximately 8% of the entire human cancers, and around 50% of these cases are classified as acute leukemia. The aim of this study was to evaluate the aberrant markers in Leukemias in the West of Iran. In an analytical-descriptive study, we analyzed the report of flowcytometry of peripheral blood samples from leukemia patients in Dr. Mohammad Kermanshahi Hospital, Kermanshah city, Iran. Age and sex were identified for every patient. Aberrant Markers of flow cytometry were checked for a number of patients. Positive staining of the markers was shown based on three cuts-off that >15%, >20% or >30%. Out of 132 leukemia samples, 67 cases (50.8%) had CLL (all B-CLL), 38 cases (28.8%) had ALL (11 T-ALL and 27 B-ALL) and 27 cases (20.4%) had AML-non M3. The mean age at diagnosis for CLL patients was 65.3 years, AML 39.2 years and ALL 13.6 years. CD2, CD3 and CD7 were checked in some of B-CLL and AML-non M3 patients and CD3 in B-ALL patients as aberrant markers and showed positivity, however, further studies are needed for evaluation of prognosis, therapy, response and survival in patients with these aberrant markers.
Keywords: Leukemias, aberrant markers, Cut-off

INTRODUCTION

Leukemias comprise approximately 8% of the entire human cancers, and around half of these cases are classified as acute leukemia [1]. Acute leukemia involves both children (ALL, Acute lymphoblastic leukemia) and adults (AML, Acute myelogenous leukemia) with a prevalence rate of approximately 4 million people per year in the developed countries [1]. AML increase the proliferation in megakaryocytic, monocytic, granulocytic, and erythrocytic lineages [1]. AML is generally regarded as a stem cell disease [2]. ALL is a disseminated malignancy of B- or T-lymphoblasts which imposes a rapid and accurate diagnostic process to support an optimal risk-oriented therapy and thus increase the curability rate [3]. B-cell chronic lymphocytic leukemia (B-CLL) is phenotypically characterized by cell surface co-expression of CD19, CD20, CD5, and CD23 [4]. Immunophenotypic analysis plays a critical role in the diagnosis and classification of acute leukemia [5] and it as well as a variety of clinical and biological parameters examined for potential importance in predicting treatment response and patient's survival [6]. The aim of this study was to evaluate the aberrant markers in Leukemias in the West of Iran.

MATERIALS AND METHODS

In an analytical-descriptive study, we analyzed the report of flowcytometry of peripheral blood samples from leukemia patients in Dr. Mohammad Kermanshahi Hospital, Kermanshah city, Iran. The study was approved by the ethical committee of Kermanshah University of Medical Sciences. The diagnosis was based on flowcytometry results, cell morphology, cell blood count and clinical data. In some cases, bone morrow aspiration samples were also submitted. Flowcytometry analysis was done by Partec CyFlow® Space flow cytometer (Partec, Germany) using standard procedure. Age and sex were identified for every patient. Aberrant Markers of flow cytometry were checked for a number of patients. Positive staining of the markers was shown based on three cuts-off that >15%, >20% or >30%. Aberrant markers were CD2 (clone MT910), CD3 (clone UCHT1) and CD7 (clone CBC.37) that were made by DAKO Corp, Denmark.

RESULTS

Out of 132 leukemia samples, 67 cases (50.8%) had CLL (all B-CLL), 38 cases (28.8%) had ALL (11 T-ALL and 27 B-ALL) and 27 cases (20.4%) had AML-non M3. The mean age at diagnosis for CLL patients was 65.3 years, AML 39.2 years and ALL 13.6 years (Table 1). We divided the patients into 4 age groups. More CLL patients (55.3%) had age≥65 years, but more AML (37%) and ALL patients (89.4%) had age<25 years. Out of 67 CLL patients, 27 AML and 38 ALL, 42 patients (62.7%), 15 (55.6%) and 20 (52.6%) were males, respectively. Fig 1: shows the expression of the main markers in CLL, ALL and AML patients.

Expression of CD5, CD19, CD20, HLA-DR and CD45 is observed in B-CLL patients. Expression of CD10, CD19, HLA-DR and CD45 in B-ALL patients and CD13, CD33, HLA-DR and CD45 in AML-non M3 patients.

Table 1: The baseline characteristics in all patients

Variables	**CLL** N=67	**AML** N=27	**ALL** N=38
Age, years			
Mean	65.3	39.2	13.6
Range	29-86	1-77	1-59
Age group, years			
<25	0	10(37%)	34(89.4%)
25-44	6(8.9%)	5(18.6%)	2(5.3%)
45-64	24(35.8%)	6(22.2%)	2(5.3%)
≥65	37(55.3%)	6(22.2%)	0
Sex			
Male	42(62.7%)	15(55.6%)	20(52.6%)
Female	25(37.3%)	12(44.4%)	18(47.4%)

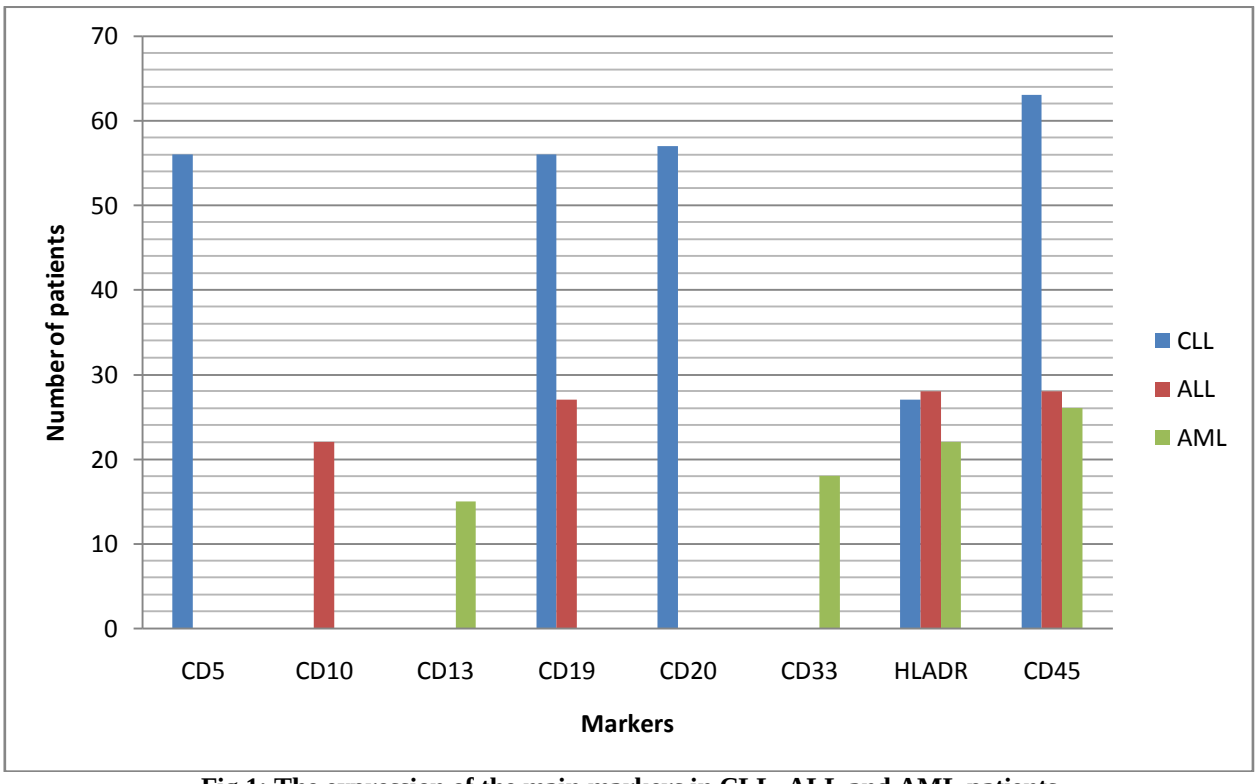

Fig 1: The expression of the main markers in CLL, ALL and AML patients

We checked the types of aberrant markers in a number of patients for three groups (**Table 2**). CD2, CD3 and CD7 were checked in some of B-CLL and AML-non M3 patients and CD3 in B-ALL patients.

Table 2: Positive staining for the aberrant markers in B-CLL, B-ALL and AML-non M3

Aberrant marker	Cut-off:>15%	Cut-off:>20%	Cut-off:>30%
B-CLL			
CD2, n=16	8(50%)	2(12.5%)	2(12.5%)
CD3, n=16	8(50%)	7(43.7%)	2(12.5%)
CD7, n=16	3(19%)	1(6.2%)	0
B-ALL			
CD3, n=27	5(18.5%)	4(14.8%)	0
AML- non M3			
CD2, n=12	4(33.3%)	3(25%)	2(16.7%)
CD3, n=13	3(23.1%)	3(23.1%)	0
CD7, n=14	5(35.7%)	5(35.7%)	4(28.6%)

DISCUSSION

The B-CLL has the immonophenotype of CD19+, CD20+, CD79a+, CD5+ and CD23+ [7]. Some studies have examined the expression of aberrant markers such as CD2, CD4, CD7, CD10, CD13, CD33, and CD34 on B cells in CLL [8]. In addition, the expression of CD8 on B-CLL is rare and its significance, if any, remains unknown [9], but another study has considered it as a good prognostic factor [4]. Detection of CD2 or CD13 expression in CLL has been shown familial CLL and checking of family history for additional affected members is warranted [10]. Kampalath *et al.;* [8] reported 117 cases of B-cell CLL/SLL and found 40 (34.2%) aberrant expression for one or more markers. CD2, CD3 and CD7 were aberrant markers in 16 B-CLL patients in our study that expression of CD2 and CD3 in B-CLL in Cut-off of >30% was 12.5% and 12.5%, respectively.

Al Gwaiz *et al.;* [11] reported that CD3 was positive in 70% of T-ALL cases and negative in other ALL subtypes. In this study, CD3 was observed in B-ALL as aberrant marker. One study [5], described the unique pattern of expression of CD19, a B-cell associated cell surface antigen, in cases of AML.

In one study, aberrant expression of CD7 was at 33% of AML cases [12]. Another study [13] showed that CD7 and CD2 was the most common aberrant marker in Iranian patients with AML. Our study confirmed these results and showed that CD3 is another aberrant marker in AML.

CONCLUSION

Further studies are needed for evaluation of prognosis, therapy, response and survival in patients with these aberrant markers.

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