FAB Classification of Acute Lymphoblastic Leukaemia (ALL) and its relevence to ALL in Karachi children

Pages with reference to book, From 233 To 236

Mirza Naqi Zafar (Zafar Research and Diagnostic Centre, 7/14 Rimpa Plaza, M.A. Jinnah Road. Karachi.)

Abstract

FAB classification on ALL describes three morphological variants Li, L2 and L3. Employing scoring criteria outlined by the French American and British co-workers on Romanosky stained bone marrow and peripheral blood films of eighty cases of ALL all aged below fifteen years, the following types were observed Ll 55%, L2 40% and L3 nil. A small minority of cases could not fit the criteria outlined by FAB. This comprised 5% of cases with a heterogenous population of blasts with a high nuclear cytoplasmic ratio and indistinct nucleoli. These cases are either a separate variant of ALL or are undifferentiated blast cell leukaemias. We report a high frequency of L2 in our population and since Li is associated with better explain the poor prognosis observed in our children prognosis within ALL, this high frequency of L2 may with ALL. (JPMA 35 : 233, 1985).

Introduction

The morphologic classication of the acute leukaemias essentially began with the description of the myeloblast by Naegeli[1]. For many years three distinct varieties of acute leukaemia were generally accepted: lymphoblastic, myeloblastic and monoblastic. However before effective chemotherapy of acute lymphoblastic leukaemia (ALL) was introduced by Farber[2], the classification had no prognostic implications but were merely exercises in toxonomy. Although the therapy of ALL has resulted in longer remissions and possible cures in many children, still a large number do not respond to therapy. Efforts have been made over the years to identify this group of ALL who respond poorly to usual chemotherapy regimes. A number of factors such as age, sex, initial leucocyte counts, visceral involvement and cell surface markers have been reported to be useful prognostic indicators[3,4,5,6] Morphological sub-classification of ALL has been proposed by a number of workers in an attempt to establish another prognostic indicator. Mathe[7] suggested a subdivision of ALL into four morphological sub-types which appeared to have a prognostic significan'e. However others were unable to confirm his classification and the survival in patients with ALL[8,9,10] Pantazopoulos and Sinks[11] devised a system of semi-quantitative estimates of cell size and nucleolar number and prominance and also found it to be reproducible and related with prognosis. Again others were unable to confirm their findings[12,13] In 1976 the French-American and British coworkers (FAB) proposed a classification of ALL[14] and described three variants of ALL: Ll, L2 and L3. Ll a homogenous population of blasts with indistinct or small nucleoli regular nuclear membrane outline and high nuclear cytoplasmic ratio. L2 a heterogenous population of blasts with prominant nucleoli , irregular nuclear membrane outline and low nuclear cytoplasmic ratio. L3 a homogenous population, with prominent nucleolf basophilic cytoplasm and cytoplasmic vacuolation. After 1976 several workers found prognostic value of this classification[15,16,17,18,19]. They reported a better prognosis of LI as compared to L2. In 1981[20] FAB group devised a scoring system for Li and L2 to get better concordance among workers while criteria for L3 were the same as 1976 due to high concordance among workers. In this study we have applied FAB criteria on eighty children with ALL all below fifteen years of age to determine the frequency distribution of Li, L2 and L3 in Karachi children.

Material and Methods

Pretreatment samples of peripheral blood and bone marrow slides were obtained from various hospitals in Karachi. Romanosky stained films were made and scoring criteria outlined by FAB were applied on each case. The following set of features were used for the classification of ALL sub-types (1) nuclear cytoplasmic ratio N/C ratio (2) nucleolii presence, prominance and frequency (3) nuclear membrane outline and (4) cell size. The scoring system utiised for N/C ratio and nucleoli, criteria for positive (+) and negative (-Ve) scores (Table I).

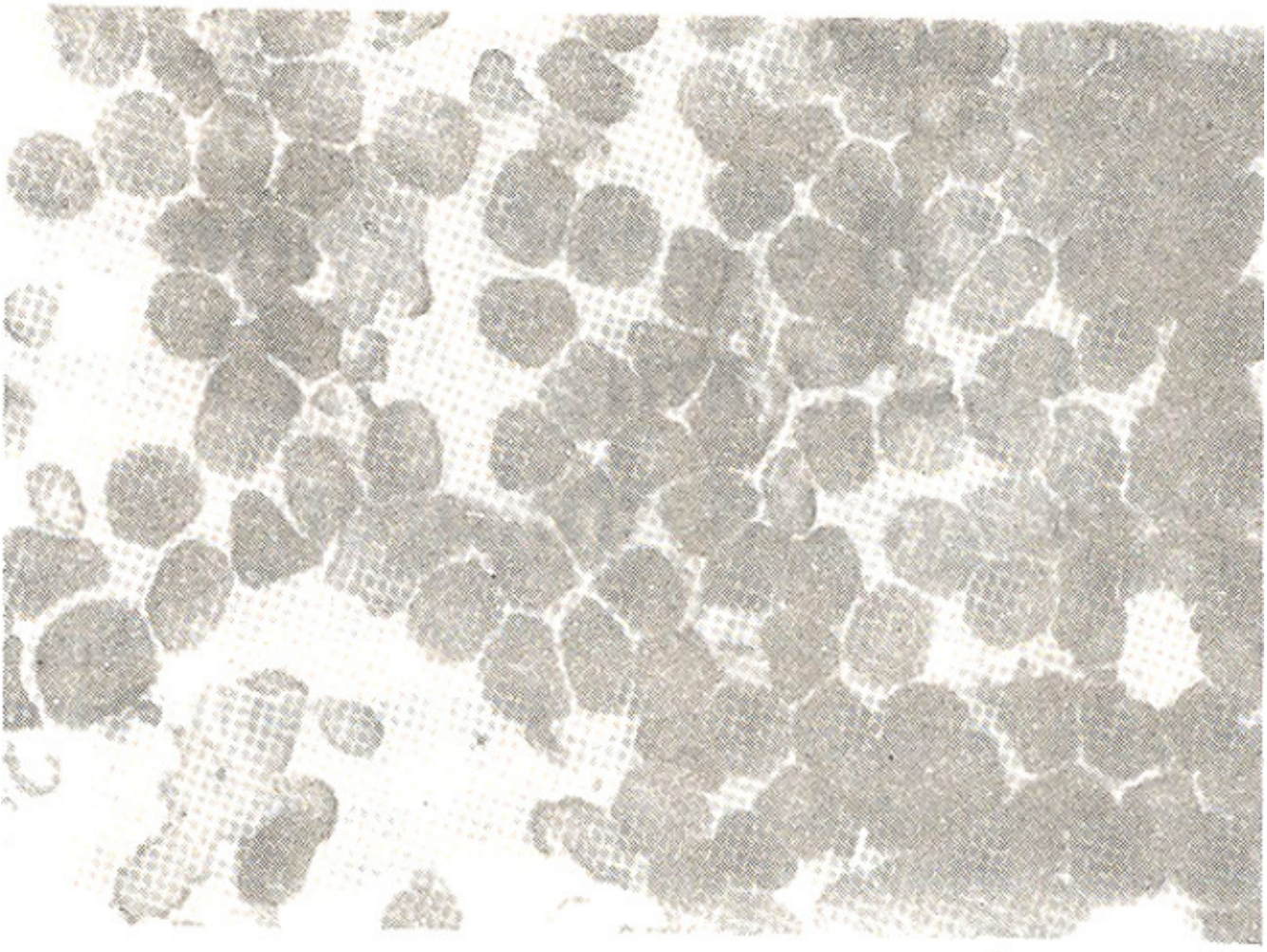
Table I
Scoring System For L1 and L2

Criteria	Score
High N/C Ratio $\geqslant$ 75% of cells	(+)
Low N/C Ratio $\geqslant$ 25% of cells	(–)
Nucleolii 0 to 1 (Small) $>$ 75% of cells	(+)
Nucleolii 1 or more (Prominant) $\geqslant$ 25% of cells	(–)
Irregular Nuclear Membrane $\geqslant$ 25% or cells	(–)
Large cells $\geqslant$ 50% of cells	(–)

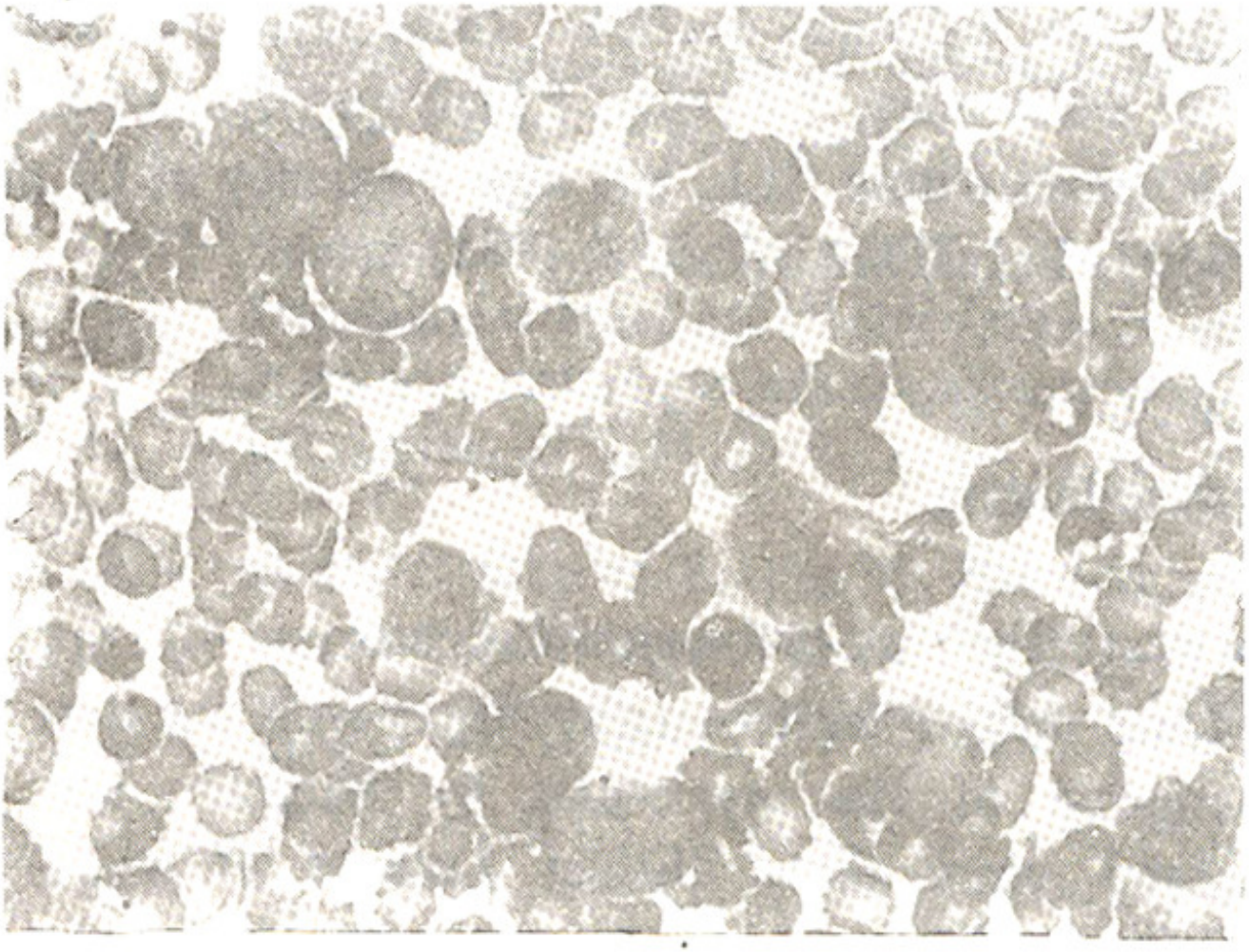
Intermediate and indeterminate criteria were not scored. The maximum positive score in any case is two (+2) and maximum negative score is four (-4). A total score of 0 to +2 establishes a diagnosis of Li whereas a total score of -ito -4 makes L2.

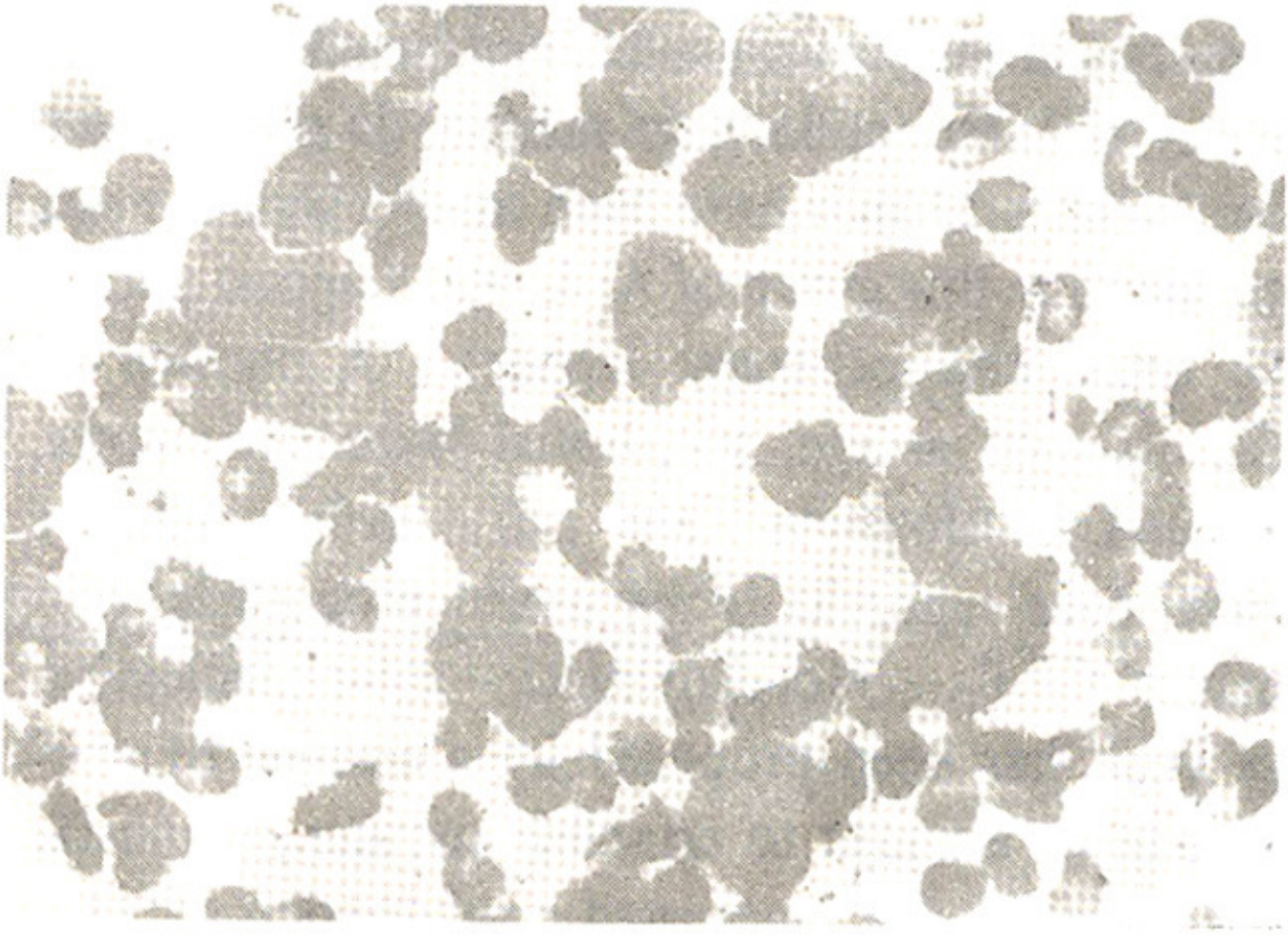
Results

The eighty cases studied were scored by the criteria outlined by FAB group. The frequency determined was Li 55% (figure 1),



L2 40% (figure 2 and 3)





and L3 nil. 5% of the cases could not fit the criteria, this comprised cases with high N/C ratio, heterogenous population and indistinct nucleolii (figure 4).

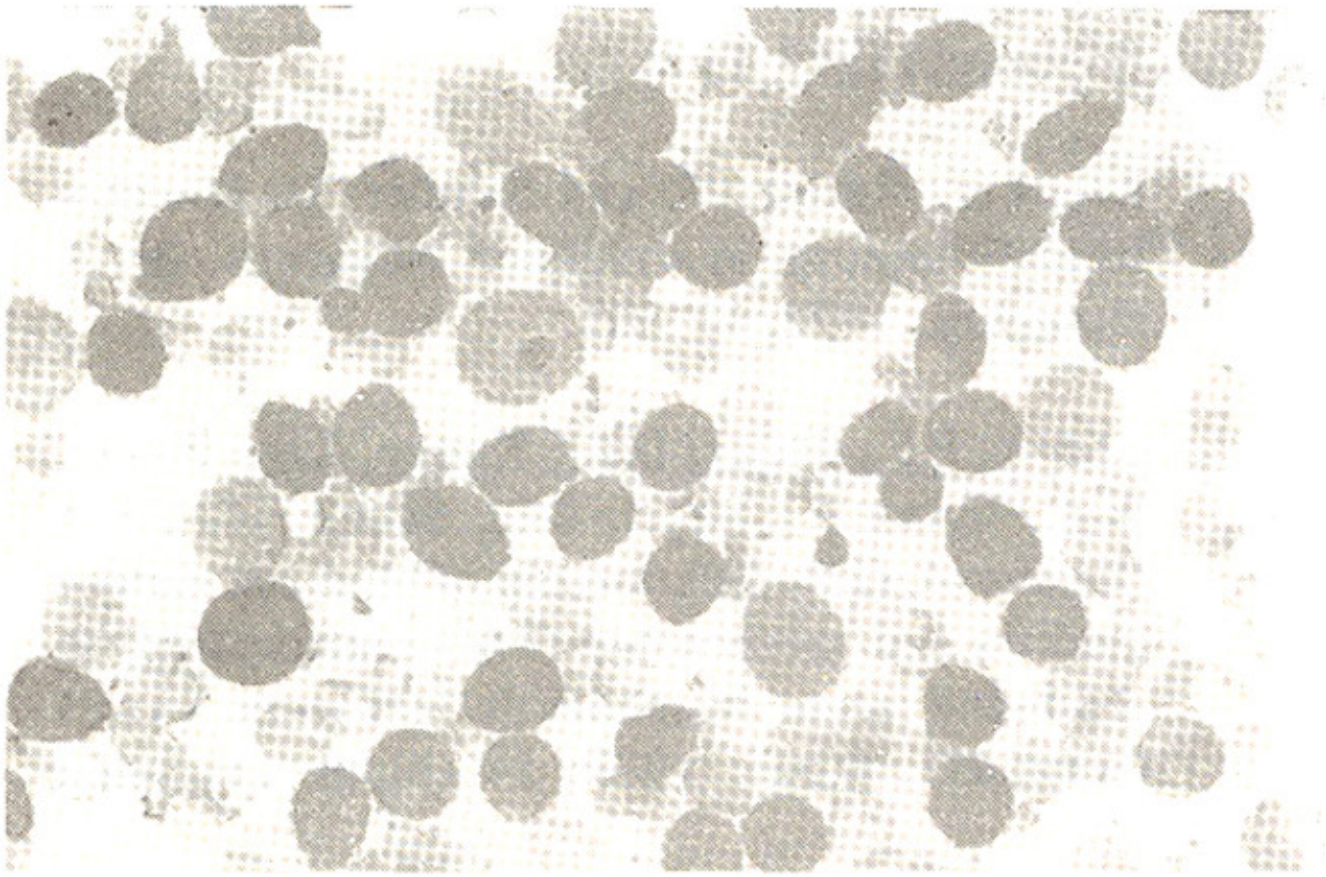


Table II
Frequency of the ALL Morphological Types in Various Childhood Series

Author	Year	No of Cases	L1%	L2%	L3%
Keleti et al	1978	229	63	36	1
Coccia et al	1979	324	78	22	nil
Han et al	1979	209	73	24	3
Viana et al	1980	223	71	25	4
Bennett et al	1981	61	80	17	2
This Report		80	55	40	nil

Table II gives a comparision of various childhood series in Europe and America with the present report.

Discussion

All studies in Table II have shown a significantly better prognosis for Li than L2. Keleti[16] showed a better survival for Li unrelated to other risk factors, WBC count, mediastinal mass or age. Coccia[17] and Viana[18] reported higher relapse rates in L2 indpendently of the WBC count and Han[15] described a significantly Longer duration of first remission in Li. We have observed a higher frequency of L2 in our population which may explain the poor response and remissions and high relapse rates observed in Karachi children treated with similar regimes. A small group of cases could not be classified, they perhaps are a separate variant of ALL or undifferentiated blast cell leukaemias. Furthermore there could be continental variations in morphological sub-types of ALL, since reduction of 75% limit set by FAB to 60% would classify these cases as Ll .A larger series of these cases and their follow up in the coming years is needed to evaluate further the morphological sub-types in our population.

Acknowledgements

This project was funded by the Pakistan Medical Research Council. I am grateful to Dr. Huma Qureshi, of PMRC Research Centre for doing bone marrows and to Dr. Ejaz Vohra, and Dr. Malik of Dr.

Ziauddin Hospital, Karachi, Professor Ghaffar Billo, and Dr. D.S. Akram, of Civil Hospital, Karachi, and Professor Mushtaq, and Dr. M.A. Arif, of National Institute of Child Health, Karachi for sending patients for making this study possible.

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