



Association of Absolute Lymphocyte Count (ALC) with Event Free Survival (EFS) and Overall Survival (OS) in Pediatric B-Cell Acute Lymphoblastic Leukemia(B-ALL)

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Background

Absolute lymphocyte count has been evaluated as a prognostic factor in pediatric B-ALL. However, few prospective studies are available with BFM-90 protocols in a uniform group of patients, and there is a lack of consensus regarding the optimum cutoff for ALC as a prognostic factor.

Objective

This study was done to evaluate the association of ALC with EFS and OS in pediatric B-ALL. Association of ALC at baseline, day 8, day 15, and the end of induction with EFS and OS was evaluated in pediatric B- ALL.

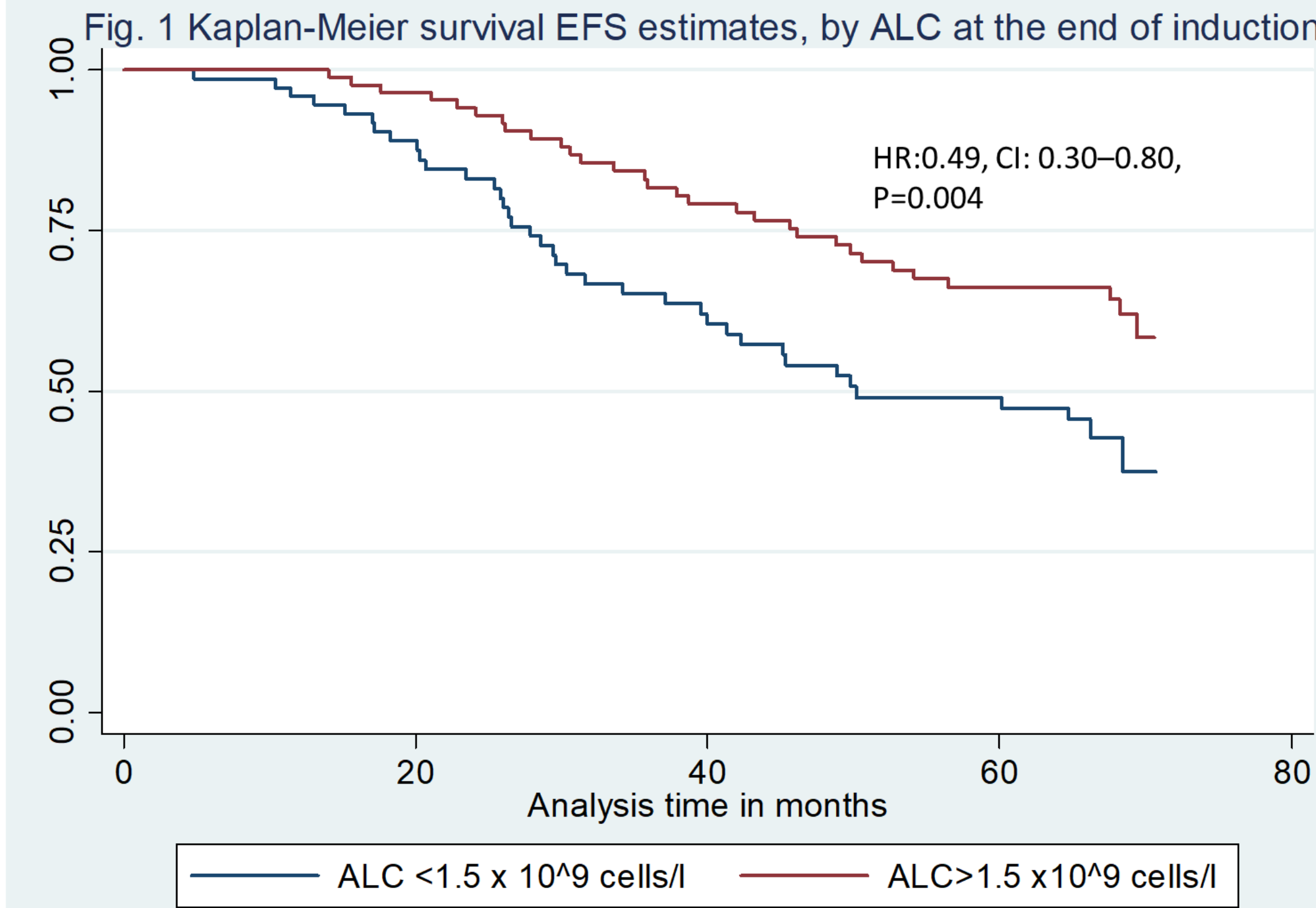
Materials & Methods

It was a prospective study conducted from July 2015–June 2017.The study was done in a tertiary cancer institute in India. *De novo* B-ALL patients between age 1 and 18 years were included. 20th May 2021 was the cutoff date for EFS and OS data analysis. Total leukocyte count was done on MS95s (MeletSchloesing Laboratories, Osny, France) at baseline, day 8, day 15, and the end of induction. Simultaneously, a peripheral smear was made, and a manual differential count was done to determine the percentage of lymphocytes. ALC was calculated as a percentage of lymphocytes multiplied by total leukocyte count. ALC was categorized into two categories taking cutoffs at 0.5×10^9 cells/l, 0.75×10^9 cells/l, 1×10^9 cells/l, and 1.5×10^9 cells/l. EFS and OS for these categories were evaluated by Kaplan–Meier method.

Results

Table 1: Baseline patient characteristics and response to induction (N=183)(The tables contains missing data #)

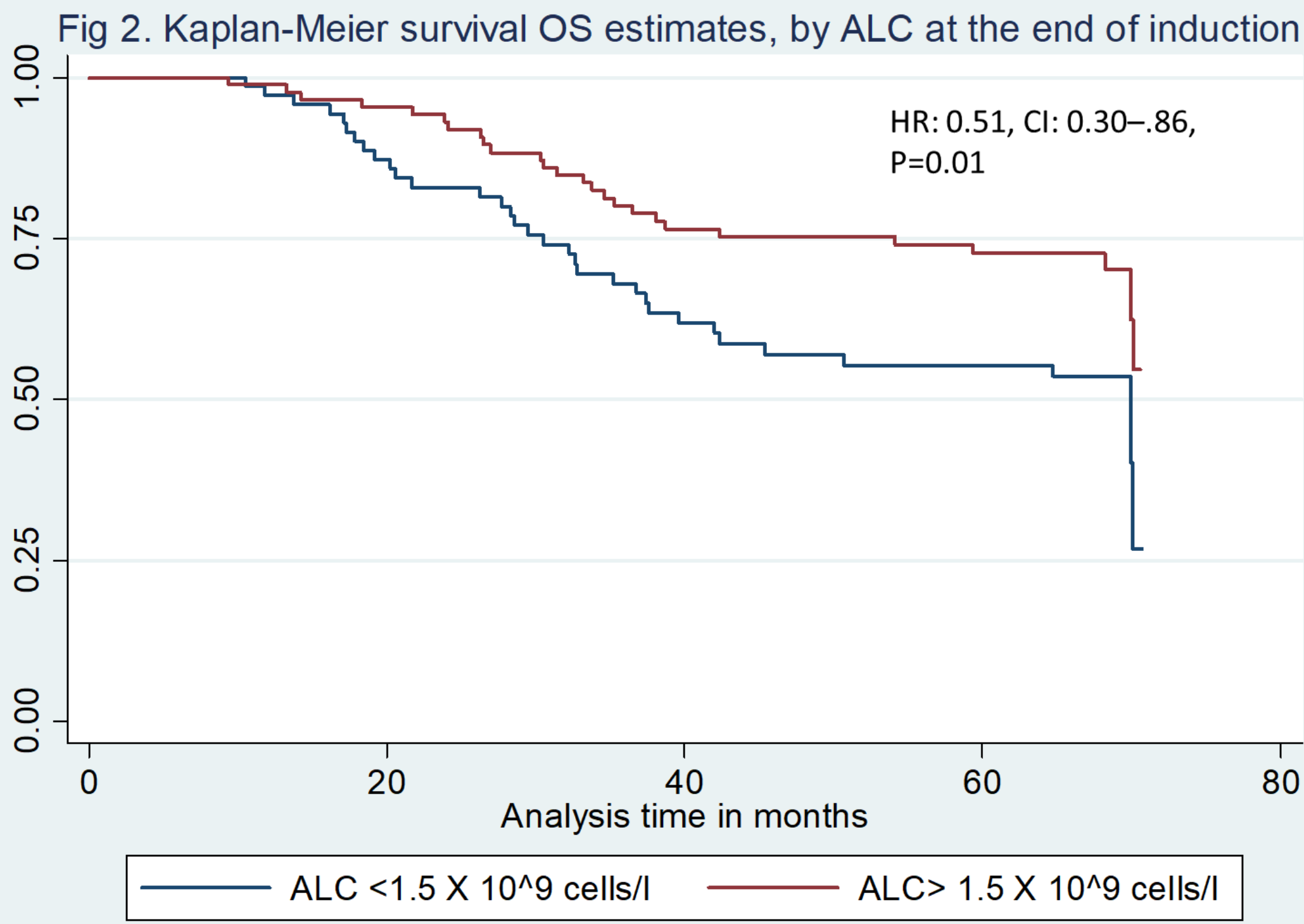
Number of patients		183(100%)
Age (years), median (range)		5(1-18)
Sex	Male	124(67.76)
	Female	59(32.24)
WBC ($\times 10^9$ cells /l), median(range)		13.2(0.3-477.3)
Hemoglobin (g/l), median (range)		69(22-130)
Platelet ($\times 10^9$ cells /l), median (range)		38(2-500)
ALC-day 0 ($\times 10^9$ cells/l), median (range) (N=177)#		2.58(0-100.5)
ALC- day 8 ($\times 10^9$ cells /l), median (range) (N=179)#		1.16(0-14.1)
ALC- day 15 ($\times 10^9$ cells/l), median (range) (N=146)#		0.7515(0.035-16.64)
ALC- day 35 ($\times 10^9$ cells /l), median (range)(N=161)#		1.632(0.006-18.131)
Day 8 steroid response N=180(100%)#	Blast less than 1×10^9 cells /l	139(77.22)
	Blast more than 1×10^9 cells /l	41(22.78)
CR(Yes/No) N=183(100%)#	Yes	175((95.63)
	No	8(4.37)



For the two-year duration, 197 B-ALL patients were recruited, of which 183 were analyzed. We found that day 8 ALC $>1.5 \times 10^9$ cells/l was associated with poor OS (HR: 2, CI: 1.24–3.24, P=0.004), whereas ALC $>1.5 \times 10^9$ cells/l at the end of induction was associated with significantly better OS (HR: 0.51, CI: 0.30–.86, P=0.01) and better EFS (HR:0.49, CI: 0.30–0.80, P=0.004). ALC cutoffs at baseline and day 15 were not associated with EFS and OS.

Discussion

Our study was a prospective study conducted in pediatric B-ALL patients treated with uniform protocol. The results were consistent with Rabin et al.¹ where in a retrospective study ALC $>1.5 \times 10^9$ cells/l was predictor of significantly better relapse free survival and OS.



Conclusion

In our prospective study, we found that ALC $>1.5 \times 10^9$ cells/l predicted better EFS and OS in pediatric B-ALL. A larger sample size is needed to establish ALC as a predictor of EFS and OS.

References

1. Rabin KR, Gramatges MM, Borowitz MJ, Palla SL, Shi X, Margolin JF, et al. Absolute lymphocyte counts refine minimal residual disease-based risk stratification in childhood acute lymphoblastic leukemia. *Pediatr Blood Cancer*. 2012 Sep;59(3):468–74.