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Impact of Blinatumomab on Survival Outcomes in Adolescents and Young Adults with Philadelphia Chromosome-Negative B-cell ALL Following the Initial Phase of Pediatric-Inspired Chemotherapy: A Comparative Study

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INTRODUCTION

- Pediatric-inspired chemotherapy protocols have markedly improved outcomes in adolescents and young adults (AYAs) with Philadelphia chromosome-negative acute lymphoblastic leukemia (ALL) compared to adult-based chemotherapy protocol with an improvement in 5-year overall survival from 40% to 75%.
- However, minimal residual disease (MRD) positivity post-consolidation remains a significant challenge, often leading to a poor prognosis.
- Blinatumomab, a bispecific T-cell engager, has emerged as a potential treatment for ALL patients with persistent minimal residual disease (MRD).

AIM

This study evaluates the efficacy of Blinatumomab incorporation into a pediatric-inspired treatment regimen for AYAs with post-consolidation MRD-positive Philadelphia chromosome-negative B-ALL or those unable to tolerate intensive chemotherapy on survival outcomes.

METHOD

- We retrospectively analyzed **92** AYAs patients with Philadelphia chromosome-negative ALL, divided into those who received a pediatric-inspired chemotherapy regimen without Blinatumomab (n=**71**) and those treated with Blinatumomab for MRD positivity post-consolidation or due to intolerance to intensive chemotherapy phases (n=**21)**.
- Outcomes measured included MRD status post-consolidation, allogeneic stem cell transplantation (SCT) rates, relapse, survival, and other clinical parameters.

RESULTS

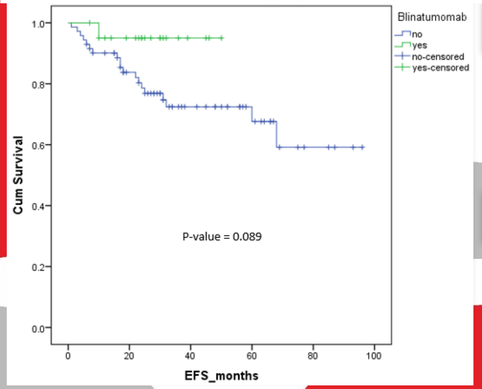
- Baseline characteristics were comparable between groups.
- The addition of **Blinatumomab** significantly **improved post-consolidation MRD** positivity (from 57% to only 5% after Blinatumomab usage). Around 47.6% of the Blinatumomab group underwent allogeneic SCT, indicative of its role in enabling more patients to reach a transplant in MRD negative state (which allows better outcomes).
- While not statistically significant, a trend towards **improved 4-year EFS was noted** in the Blinatumomab group (95% vs. 73%, p = 0.089), indicating a potential benefit in delaying relapse or disease progression, with comparable 4-year OS between the two cohorts (95% vs. 82%, p = 0.311),

		Without blinatumomab 71patients		with blinatumomab 21 patients		
		Frequency	Percent	Frequency	Percent	P-value
sex	Male	42	59.2%	12	57.1%	1
	female	29	40.8%	9	42.9%	
Diagnosis risk	high risk	58	81.7%	15	71.4%	0.3603
	very high-risk	13	18.3%	6	28.6%	
CD20	negative	33	47.8%	10	47.6%	1
	positive	36	52.2%	11	52.4%	
Karyotype_ risk	standard risk	56	0.9	18.0	0.9	
	high risk	6	0.1	3.0	0.1	0.68
FISH	standard risk	63	88.7%	18	85.7%	.709
	high risk	8	11.3%	3	14.3%	
CNS	negative	66	93.0%	20	95.2%	1
	positive	5	7.0%	1	4.8%	
day14 bone marrow	negative	60	92.3%	16	84.2%	0.3725
	positive	5	7.7%	3	15.8%	
D28 bone marrow	negative	67	94.4%	19	90.5%	.617
	positive	4	5.6%	2	9.5%	
PET/CT	negative	7	41.2%	1	50.0%	1
	positive	10	58.8%	1	50.0%	
day28 MRD	negative	52	76.5%	17	81.0%	.772
	positive	16	23.5%	4	19.0%	
post-consolidation MRD	negative	63	94.0%	9	42.9%	.000
	positive	4	6.0%	12	57.1%	
allogeneic SCT	no	63	88.7%	11	52.4%	.001
	yes	8	11.3%	10	47.6%	
Relapse	no	56	78.9%	20	95.2%	.107
	yes	15	21.1%	1	4.8%	
Death	no	60	84.5%	20	95.2%	.284
	yes	11	15.5%	1	4.8%	
LDH	normal	8	11.3%	3	15.0%	.701
	high	63	88.7%	17	85.0%	
WBCs	normal	51	71.8%	14	66.7%	.786
	high	20	28.2%	7	33.3%	
Age median (range)		17 (14-51)		20.5(16-53)		
median Followup (months)		34		24		

CONCLUSIONS

- However, Blinatumomab administration post-consolidation phase in MRD-positive B-ALL or those intolerant to intensive chemotherapy did not significantly extend overall survival, there is an indication of enhanced event-free survival.
- So **Blinatumomab can not only overcome the poor prognosis of post-consolidation MRD-positivity but also have a trend towards better EFS**.
- We recommend larger, prospective trials with longer follow-up periods to validate these findings and determine the full clinical benefit of Blinatumomab in the management of B-ALL.

Event-free survival of the Blinatumomab group versus non Blinatumomab



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