Hematopoietic Stem Cell Transplantation From HLA-Matched Sibling Donors in Children with Acute Lymphoblastic Leukemia: A Report From the Children's Cancer Hospital in Egypt

Mahmoud Hammad,[1] Hanafy Hafez,[1] Iman Sidhom,[1] Dina Yassin,[2] Sherine Salem,[2] Khaled Alsheshtawi,[3] Nayera Hamdy,[2] Nahla Elsharkawy,[2] Alaa Elhaddad [1]

1) Pediatric Oncology NCI; Cairo University & CCHE-57357. 2) Clinical Pathology NCI; Cairo University & CCHE-57357. 3) Clinical Research CCHE-57357.

Presenter: Mahmoud Hammad

Background

Allogeneic hematopoietic stem cell transplantation (HSCT) is widely used for high-risk acute lymphoblastic leukemia (ALL) patients in their first complete remission (CR1), and for relapsed patients in second complete remission (CR2). We aimed to describe the outcomes (overall survival [OS], event-free survival [EFS], and non-relapse mortality [NRM]) and relapse probabilities in a group of pediatric ALL patients who had undergone HSCT in CR1 or CR2 from matched sibling donors using myeloablative conditioning (MAC) regimens. We further aimed to determine outcome differences in relation to indications for HSCT in patients transplanted in CR1.

Materials & Methods

We retrospectively analyzed data for 67 children with ALL, from a cancer center in a low/middle income country, who had undergone HSCT, between 2007 and 2020, describing the survival outcome and relapse probability after achieving CR1 and CR2 and determining outcome differences in relation to indications for HSCT in patients transplanted in CR1. All patients had achieved a negative minimal residual disease prior to transplant (<0.01%).

Results

Forty-six patients (68.7%) were in CR1. The 5-year OS, EFS and cumulative incidence of relapse (CIR) for the whole cohort were 56.1% (95% CI, 42.8%-69.4%), 49% (95% CI, 35.7%-62.3%) and 33.5% (95% CI, 21.7%-45.8%), respectively with better EFS and CIR for CR1 transplants compared to CR2 transplants (P=0.02 and P=0.03, respectively). Patients with Ph-positive ALL had better 5-year OS, EFS and NRM compared with other CR1 transplants (P=0.015, P=0.009 and P=0.028, respectively).

Figure 1: Survival rates

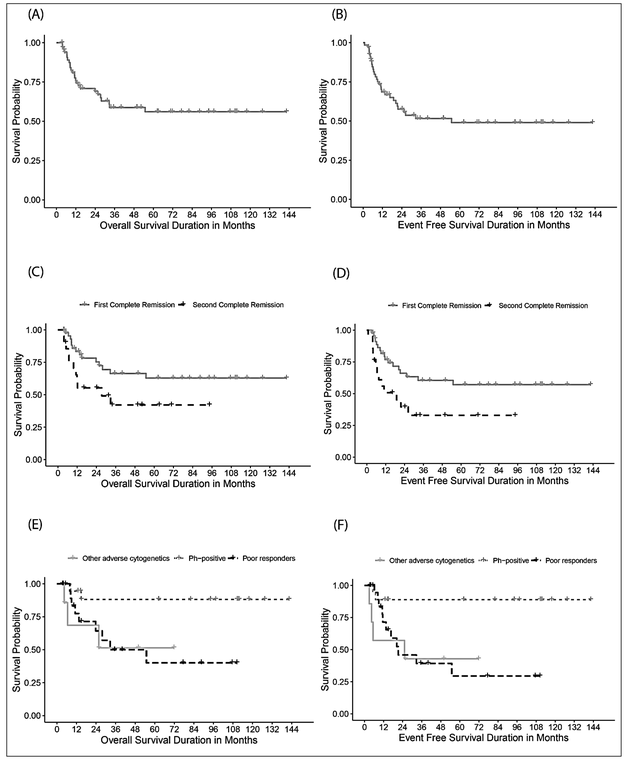


Figure 2: Cumulative incidence of relapse (CIR) and non-relapse mortality (CI-NRM)

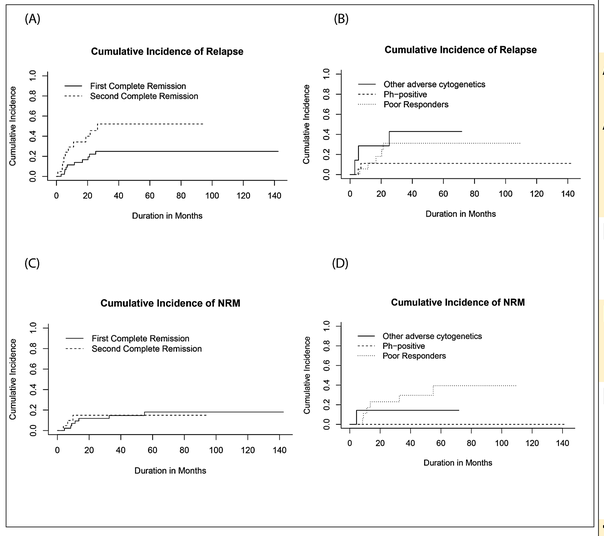


TABLE 1: : Clinical and biological characteristics of the 67 ALL patients

Characteristics	n (%)
All patients	67 (100)
Gender	
Male	46 (68.7)
Female	21 (31.3)
Age at Diagnosis, Median (range)	8 years (0.35-17.7)
Age at Diagnosis	
≤ 1 year	3 (4.5)
> 1- ≤10 years	39 (58.2)
> 10 years	25 (37.3)
Immunophenotype	
T-cell	18 (26.9)
B-cell	49 (73.1)
Disease Status at transplant	
CR1	46 (68.7)
CR2	21 (31.3)
Indications for HSCT in CR1	
Ph-positive ALL; t(9;22)	18 (39.1)
Hypodiploidy (<44 chromosome)	6 (13.0)
t(4;11)	1 (2.2)
Poor induction response	21 (45.7)
Time to first pre-HSCT relapse (for CR2)	
≤18 months	5 (23.8)
>18-≤36 months	11(52.4)
>36 months	5 (23.8)
Site of pre-HSCT relapse (for CR2)	
Bone Marrow	10 (47.6)
Isolated CNS	7 (33.3)
Combined	4 (19)

Conclusion

Hematopoietic stem cell transplantation from MSD for ALL in CR1 group had superior outcomes compared to CR2 group and was apparently a curable option for Ph-positive ALL without an increased risk of non-relapse mortality. Poorer survival rates and higher relapse probabilities were associated with HSCT conducted to patients who had a poor response to induction therapy or suffered a relapse.

References

1. Merli P, et al. Curr Hematol Malig Rep (2019)
2. Locatelli F, et al. Blood (2012)
3. Iacobucci I, et al. J Clin Oncol (2017)
4. Schrappe M, et al. N Engl J Med (2012)

Contact person: Mahmoud Hammad: Mahmoud.hammad@nci.cu.edu.eg