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Haploidentical IL-15/41BBL activated and expanded natural killer cell infusion therapy after salvage chemotherapy in children with relapsed and refractory leukemia

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ABSTRACT

Primary refractory or relapsed pediatric leukemia yield significant morbidity and mortality, with long-term survival rates < 40%. Here we present a post-hoc analysis assessing safety and efficacy of infusing activated and expanded Natural Killer cells (NKAE) from haploidentical donors in patients from 2 clinical trials. In total, 18 children, adolescents and young adults with relapse or refractory acute leukemia were treated with two cycles of rescue chemotherapy followed by fresh NKAE cells infusions and low doses of IL-2. The overall response rate, complete remission achievement at the end of the study, was 72% (13 of 18). We infused 52 NKAE cell products containing a median of $6.76x10^6$ NK cells/kg (0.7-34.16) and $0.49x10^6$ T cells/kg (0-11). All infusions were well tolerated with no graft versus host disease nor other serious adverse events. Among the 14 patients who completed treatment, 4 of them are alive and leukemia-free more than 750 days post-transplant. We conclude that infusion of fresh NKAE cell therapy is feasible and safe in heavily pretreated pediatric population, and should be further investigated in advanced-phase clinical trials as well as a consolidation therapy to decrease relapse in patients with high-risk leukemia.

Running title: Activated NK cell therapy in pediatric refractory leukemia

Key words: Natural killer cells, Hematopoietic stem cell transplantation, Immunotherapy, Acute myeloid leukemia, Lymphoblastic leukemia, Myeloblastic leukemia

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