CD19-targeted chimeric antigen receptor-modified T cells induce remission in patients with relapsed acute B lymphoblastic leukemia after umbilical cord blood transplantation

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Abstract

Background Few therapies are available for treating patients with B acute lymphoblastic leukemia (B-ALL) who relapse after umbilical cord blood transplant (UCBT). Chimeric antigen receptor (CAR)-modified T cell therapy targeting CD19 is novel and effective for treating refractory/relapsed (R/R) hematological malignancies. Method We report the response rate, toxicity, and survival of CD19-targeted CAR modified T cells administered to 10 patients with B-ALL who relapsed after UCBT from April 2018 to September 2019. Patients [?]14 years of age were subsequently recruited in the clinical trial (NCT02851589) conducted at the First Affiliated Hospital of USTC, Hefei, China. Results Patients (n = 11) were infused with peripheral blood T cells transduced with CD19-directed CAR lentiviral vectors (0.42 × 106 –3.91 × 106 cells/kg body weight). Among 10 patients who were successfully infused, 9 achieved minimal residual disease-negative complete remission (MRD-neg CR). As of July 30, 2020, 6 of 10 patients experienced a relapse (median follow-up for CR was 13.2 months, range 5.8–31.7 months). The 6-month rates of progression-free survival (PFS) and overall survival (OS) were 44.4% and 77.8%, respectively. Toxicities were reversible, including severe cytokine release syndrome (CRS) ([?] grade 3) and neurotoxicity in 10% (1/10) and 10% (1/10) of patients, respectively, and no patient experienced graft-versus-host disease (GVHD). Conclusion CD19-targeted CAR-modified T cell therapy may therefore serve as a safe and effective approach for treating patients with relapsed B-ALL after UCBT. A multicenter clinical trial including more subjects is required to confirm safety and efficacy.

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