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POSTER ABSTRACTS

704.CELLULAR IMMUNOTHERAPIES: EARLY PHASE AND INVESTIGATIONAL THERAPIES

Long-Term Follow-up of Fully Human BCMA-Targeting CAR (CT103A) in Patients with Relapsed/Refractory Multiple Myeloma

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Background: CT103A is a fully human chimeric antigen receptor T cell product targeting B cell maturation antigen (BCMA). Our previous reports showed a remarkable efficacy and safety of CT103A in patients with relapsed/refractory multiple myeloma (RRMM) at a median follow-up of 394 days. Here, we report the updated safety and efficacy profile in the long-term follow-up.

Methods: This trial was a phase 1, single-arm, open-label study conducted in Tongji hospital in China. Eighteen consecutive patients with RRMM were enrolled, who received at least three lines of prior therapies that contain a proteasome inhibitor and an immunomodulatory agent. Lymphodepletion was performed using Fludarabine (30 mg/m ^{2}) and cyclophosphamide (500 mg/m ^{2}) for three consecutive days. CT103A was administered at 1, 3 and 6×10^6 CAR-positive T cells/kg in the dose-escalation phase, and 1×10^6 CAR-positive T cells/kg in the expansion cohort. From one-year post infusion, the response was evaluated every six months according to the IMWG 2016 consensus criteria. Minimal residual disease (MRD) was evaluated in the visits that bone marrow aspiration was performed. The minimum sensitivity of MRD was 10^{-5} nucleated cells by standardized flow cytometry. All the adverse events (AEs) during the long-term follow-up were recorded and graded by CTCAE v5.0.

Results: As of December 31, 2022, the median follow-up time after CAR T-cell infusion was 41.47 months (range, 0.63-51.33 months). Of the 18 patients assessable for efficacy, all patients (100%) achieved an overall response (partial remission or better) to CT103A. Among them, a total of 77.8% (14 of 18) of the patients finally achieved a CR or sCR, with enhanced responses over time. At the time of data-cutoff, nine patients (50%) were still alive, and seven patients (38.9%) remained sCR status with negative MRD. The median progression free survival (PFS) was 22.64 months and the median overall survival (OS) was 41.97 months. The rate of PFS and OS at 2 year was 50.0% and 72.2%, respectively. The patients with EMM had shorter survival than those without EMM. The median PFS was 12.02 months and the median OS was 28.52 months in patients with EMM, whereas the median PFS was 27.92 months and the median OS was 41.97 months in patients without EMM. During the long-term follow-up, the occurrence of AEs gradually reduced over time. The most common late adverse events occurring 8 weeks after CAR T-cell infusion were hematologic toxicities. Leukopenia and neutropenia could be observed in 11 patients (61.1%). After 8 weeks, the adverse events were mainly infections. 26 infectious events were recorded in 11 patients (61.1%) beyond 8 weeks, including nine events judged as severe AE (sAE) in 6 patients (33.3%). Five infectious events in five patients (27.8%) occurred after one year. Severe infections led to the death of 4 patients. The recovery of B cells and globulin were observed in 5 and 15 patients, respectively. But for the seven alive patients with sCR, only two of them had B cell recovered. The median CAR transgene persistence was 419 days. To the cutoff date, CAR transgenes were detectable in seven (38.9%) patients, six of these patients were in sCR state.

Conclusion: The updated data from the long-term follow-up of CT103A demonstrated a durable clinical benefit for RRMM patients, based on the sustained existence of fully human CAR-T cells. In addition, the favorable safety profile strengthens the prospect of clinical application of CT103A.

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