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NurOwn, phase 2, randomized, clinical trial in patients with ALS

Safety, clinical, and biomarker results

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Study objective and summary result

This study investigated the safety of neurotrophic factor–secreting mesenchymal stem cells (MSC-NTF cells; proprietary name, NurOwn) administered via combined intrathecal and intramuscular injections in patients with amyotrophic lateral sclerosis (ALS), and it found that MSC-NTF cell transplantation is safe for patients with ALS.

Classification of evidence

Class I.

What is known and what this paper adds

Open-label trials have provided preliminary evidence for the safety, tolerability, and efficacy of MSC-NTF cells for patients with ALS. This trial provides further evidence of safety.

Participants and setting

The investigators recruited 48 adults with possible, probable, laboratory-supported, probable, or definite ALS at three clinical sites. These patients had ALSFRS-R ≥30, vital capacity (VC) ≥65% of the predicted normal value for height, age and gender, and symptom duration of between one and two years. This trial was conducted between May 2014 and July 2016.

Design, size, and duration

In this phase 2 double-blind trial, participants were randomized, after a 3-month run-in period, to MSC-NTF cells (n = 36) or placebo treatment (n = 12). Bone marrow was aspirated from all participants after randomization and MSCs were isolated from the bone marrow, expanded and differentiated to secrete NTFs using a culture-based approach. Patients received one dose of combined intrathecal and intramuscular MSC-NTF cells or placebo. They were monitored for adverse events for six months.

Primary outcome measure

The primary outcomes were AEs over the 6-month post-treatment period.

Main results and the role of chance

During the 6-month post-treatment period, there were no deaths, no treatment-related serious AEs, and no AEs that prompted withdrawal from the trial. The rate of disease progression (ALSFRS-R slope change) in the overall study population was similar in treated and placebo participants.

Table Selected AE outcomes in the intervention and placebo groups

Outcome	No. (%) affected in the intervention group	No. (%) affected in the placebo group
Treatment-emergent AEs	36 (100)	12 (100)
Treatment-related treatment-emergent AEs	35 (97.2)	9 (75)
Serious AEs	9 (25)	2 (16.6)
Treatment-emergent serious AEs	8 (22.2)	1 (8.3)

Bias, confounding, and other reasons for caution

This trial had a small sample size, and the participants only received a single dose of MSC-NTF cells or placebo treatment.

Generalizability to other populations

The recruitment of participants through 3 referral centers in the US may limit the generalizability of the results.

Study funding/potential competing interests

This study was funded by Brainstorm Cell Therapeutics. Some authors report being employees of Brainstorm Cell Therapeutics; receiving committee appointments and consulting fees from healthcare companies, including Brainstorm Cell Therapeutics; serving as investigators on studies sponsored by healthcare companies and foundations; receiving funding from the NIH and foundations; consulting for the US Federal Trade Commission; founding Apic-Bio; and holding equity in healthcare companies. Go to Neurology.org/N for full disclosures.

Trial registration number

NCT02017912 on ClinicalTrials.gov.

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The corresponding author(s) of the full-length article and the journal editors edited and approved the final version.

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