Vaccine Treatment for Glioblastoma Brain Tumor Shows Promise

The vaccine, based on an individual's own tumor cells, improved survival time and proved safe in an early-stage trial.

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A personally tailored vaccine was safe and improved both overall survival and progression-free survival among people with glioblastoma multiforme, the most insidious form of brain tumor.

People diagnosed with glioblastoma typically have a poor prognosis: 11 to 15 months if they receive the current standard treatment. Notably, Senator John McCain died of this type of brain cancer in 2018.

David Andrews, MD, of Thomas Jefferson University in Philadelphia, and Imvax, the company developing the vaccine, presented the study findings at the American Association for Cancer Research annual meeting last week in Atlanta.

The researchers enrolled 33 individuals into a Phase Ib clinical trial of an experimental vaccine, called IGV-001. Enrollment spanned September 2015 to March 2018. All participants had been recently diagnosed with glioblastoma and were scheduled to receive surgery.

Following surgery to remove the primary brain tumor, the researchers created the vaccine by taking each patient's own tumor cells and treating them in a laboratory with a drug known as an antisense oligodeoxynucleotide (AS-ODN). This treatment targets a receptor on cells called IGF-R1, which propels the growth of tumors as well as metastasis, or the spread of cancer from the original site to other parts of the body. The therapy ultimately makes tumor cells more susceptible to radiation therapy.

Next, the researchers put a certain amount of the treated tumor cells into dime-sized diffusion chambers along with additional AS-ODN and exposed these chambers to radiation. Then they implanted a variable number of these chambers over a variable period of time under the skin of the study participants' abdomens.

The vaccine works because the treated and implanted tumor cells in the chambers release antigens, which trigger an immune response. Combined with the AS-ODN treatment, these antigens spread through an individual's body and prime immune cells to better attack the tumor

cells still in the brain.

Initially, the participants were randomized into four groups, receiving one of two different doses of the implanted chambers over either 24 hours or 48 hours, starting the day after their brain surgery. But after the 23rd participant, the researchers canceled the randomization and instead assigned all subsequent participants to receive 20 chambers over a 48-hour period, considered the highest dose.

The participants were followed for a median of 13 months after their surgery and for a range of four to 39 months. After four to six weeks, they received the standard-of-care treatment for glioblastoma, consisting of radiotherapy and the chemotherapy drug temozolomide.

As of January 2019, the researchers had observed no adverse events related to the vaccine and about half of the participants were progression-free and a majority of those were “functioning well,” according to the study abstract.

The researchers compared outcomes among the study participants with another group of 35 people treated for glioblastoma with the standard of care at the same medical institution. For this analysis, the vaccine trial participants were categorized into two groups: the 17 people in the highest-dose group and the entire group of 33 participants.

The median overall survival duration was 21.9 months in the highest-dose vaccine group, compared with 14.6 months in the standard-of-care group, according to a university press release. The median progression-free survival, meaning patients were still alive without progression of the brain tumor, was 10.4 months, compared with 6.9 months and 5.4 months in two earlier standard-of-care studies.

The study authors concluded that the vaccine was well tolerated and prolonged progression-free survival and overall survival compared with the standard of care for glioblastoma. They are planning to move the vaccine into a Phase II trial later in 2019.

To read the study abstract, click here.

To read a press release about the study, click here.

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