Personalized vaccine for most lethal type of brain tumor shows promise

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Patients with recurrent glioblastoma multiforme (GBM) treated with an experimental vaccine made from the patient's own resected tumor tissue showed an improved survival compared with historical patients who received the standard of care alone, according to an analysis of a phase 2 trial of this vaccine that was recently published in the journal *Neuro-Oncology* and accompanied by an editorial highlighting the importance of the trial.

A GBM took the life of former Senator Edward Kennedy in 2009. The most aggressive form of primary brain tumor, GBM tumors are often resistant to standard therapies and median survival is approximately three to nine months for a recurrent tumor.

"We are talking about fast-growing tumors that invade normal brain tissue and are very difficult to treat," said Orin Bloch, MD, a neurosurgeon at Northwestern Memorial Hospital and lead author of the study. "These tumors occur in up to 23,000 Americans annually, and are typically treated with surgical resection of the tumor followed by chemotherapy and radiation treatment."

This phase 2 trial enrolled 41 adult patients with recurrent tumors between 2007 and 2011. Each patient received an average of six doses of the HSPPC-96 vaccine. Following treatment, 90 percent of patients were alive at six months and 30 percent were alive after one year. Further study will be needed to see if this vaccine could potentially be approved to treat recurrent brain tumors. Currently there are only a few approved

therapeutic cancer vaccines, none of which are approved for the treatment of GBM.

While new findings continue to extend the lives of patients with glioblastoma, for the moment, it remains one of the most dreaded diagnoses because despite treatment, GBMs almost always come back, said Bloch.

"The grim prognosis is exactly why new research is important," said Bloch, who is an assistant professor of neurological surgery at the Northwestern Feinberg School of Medicine. "GBMs have been around for a long time, and still outcomes are poor. With studies such as this one, I believe we can change that."

The vaccine, HSPPC-96, is produced individually for each patient using that patient's own resected tumor tissue. Following the patient's surgery, the tumor is sent to the vaccine production facility at Agenus Inc., where the HSPPC-96 vaccine is created. The vaccine is unique to the individual participant and is engineered to trigger an immune system response to kill tumor cells that may remain following surgery.

Northwestern Medicine researchers are currently conducting the next phase of this research, a randomized phase II trial which will investigate if the HSPPC-96 vaccine is safe and more effective when given with Avastin (bevacizumab). Avastin is a drug that is known to shrink brain tumors and is a standard therapy for recurrent GBM.

"When it comes to brain tumor research, I picture our Northwestern Medicine team climbing a mountain and with every new discovery that shows the potential to prolong survival, we are establishing a new base camp," said Andrew Parsa, MD, PhD, corresponding author of the study and chair of neurological surgery at Northwestern Memorial and the Michael J. Marchese Professor and chair of the department of

neurological surgery at the Feinberg School. "Someday, thanks to studies like this one, we'll get to the top of the mountain and convert this particular cancer into a chronic disease – something that patients can live with, controlled by medication."

Provided by Northwestern Memorial Hospital