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Battling a Deadly Foe

Researchers at Cedars-Sinai are racing to develop experimental treatments, and even vaccines, for fast-growing malignant brain tumors like the one Sen. Edward Kennedy has been diagnosed with.

By Tina Peng

Sen. Edward Kennedy of Massachusetts, 76, has been diagnosed with a malignant glioma, a type of brain tumor that's rare and aggressive and has frighteningly low survival rates: fewer than 10 percent of people with this kind of cancer survive two years after their diagnosis. These tumors are extremely resistant to standard cancer treatments like radiation and chemotherapy, but researchers are developing a number of experimental therapies that are now in clinical trials. Dr. Keith Black, chairman of the department of neurosurgery at Cedars-Sinai Medical Center in Los Angeles, is one of leaders in the field. Black's team has come up with a type of vaccine that can help the body's immune system fight the cancer and prolong the patient's survival. Black is also looking at other alternative therapies, such as using a synthetic version of the venom of the giant yellow Israeli scorpion as a "Trojan horse" to deliver drugs to kill the tumor cells. Black spoke to NEWSWEEK's Tina Peng about Kennedy's diagnosis, his prognosis, and the latest treatment research. Excerpts:

NEWSWEEK: How common are gliomas?

Dr. Keith Black: A glioma is a tumor that originates directly in the brain itself. It arises not from the nerve cells but the cells that support the nerve cells, called the glia, which is Latin for glue. There are about 30,000 cases of primary brain tumors a year, of which about 15,000 are benign and 15,000 are gliomas, for which surgery is beneficial but not necessarily a cure. The most aggressive [glioma] is the glioblastoma multiforme, and they make up about 9,000 of those

15,000 glial primary tumors. [It's unclear which type of glioma Kennedy has.]

How are gliomas usually treated, and what is the survival rate?

Radiation therapy, which is done over seven weeks, and chemotherapy, which is actually given orally as a pill called Temodar. The median survival with standard therapy is 15 months. [The tumors] tend to grow very fast. Half the patients will survive for less than 15 months, and half will survive for more. Only about 10 percent of patients will be alive at two years. The five-year survival rate is very low; it's certainly less than 5 percent. One of the strongest predictors of survival is age, and in fact age can be a stronger predictor of survival than the grade of the tumor. The fact that the senator is 76 means that he'll have a worse prognosis than someone who is 26. If the surgeons cannot surgically remove the tumor, then that's also a negative.

You and your colleagues at Cedars-Sinai's Maxine Dunitz Neurosurgical Institute have been developing a vaccine against malignant brain tumors. Can you explain how it works and whether the clinical trials have been successful?

In order for a brain cancer cell to survive in the brain, it has to first make itself invisible to the immune system. The patient's immune system has to recognize the tumor to really mount any response against it. We take the tumor out at the time of surgery and take the special markers, which are little proteins, off the cancer cells, and we put those cancers on a special immune cell. We then inject [those cells] back under

the skin, which basically becomes the vaccine. Those immune cells will allow the immune system to become activated against the cancers and allow the immune system to mount an attack against the brain cancer.

Sixty percent of patients [in the clinical trials so far] have an immune response against the tumor, and their survival is much longer than patients that don't. If we are able to activate the tumor, then we are definitely able to improve survival and quality of life for those patients.

What other promising therapies are you exploring?

In treating any brain tumor with chemotherapy, you always have the problem of the blood-brain barrier, in that chemotherapy doesn't get into brain tumors very well. Some of our research has been working on drugs that can improve the delivery of chemotherapy across the blood-brain barrier to make chemotherapy more effective. That's currently in clinical trials. And so we've been using chemotherapy in combination with other drugs that can selectively open the blood-brain barrier right within the tumor to get more drug in and try to help kill the tumor.

Doctors said the glioma was found in Kennedy's left parietal lobe. What cognitive abilities would a tumor in this area affect?

The left parietal area controls functions such as language, the ability to comprehend language, as well as spatial orientation. It can also control sensory functions as well, but the main area that we're most concerned about is language. It can get very close to language areas.