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INSIDE PEDIATRICS

Oncolytic virotherapy offers novel approach in treating brain tumors

For Jennifer Amsley and daughter Xia Martinez of Maryland, an oncolytic virotherapy study at Children's of Alabama has strengthened their resolve to fight and their desire for a sense of normalcy.

Xia, 14, has an aggressive glioma brain tumor and a MRI showed new growth. That's when doctors in Maryland informed Xia and her family of a clinical trial conducted by Gregory Friedman, M.D., associate professor of pediatrics at the University of Alabama at Birmingham (UAB) and Children's, and scientist at the UAB Comprehensive Cancer Center. Friedman's goal is improving outcomes for children with malignant brain tumors using herpes simplex virus, which typically causes cold sores but has been genetically altered, to target gliomas and other types of aggressive brain tumors by killing cancer cells while leaving normal cells intact.

"In addition to infecting and killing cancer cells, the virus stimulates the patient's immune system to attack the tumor. The virus is killing the cancer cells, the immune system can recognize newly exposed proteins on the cancer cells that have been killed, and that allows the immune system to fight other tumor cells not killed by the virus," Friedman said. "So you get a one-two punch of the virus killing the cancer cells, and the patient's immune system fighting the tumor, too."

Xia is one of three patients who has taken part thus far in the Phase I clinical trial funded by the National Institutes of Health and the U.S. Food and Drug Administration to test the safety and tolerability of the virotherapy. "Phase I patients for this trial are between 3 to 18 years old with recurrent or progressive malignant tumors and typically have an average life expectancy of three to six months," Friedman said. For Xia and her mother, the question of whether to pursue the clinical trial garnered a simple answer.

"I told Xia let's go big or go home," Amsley said.

Friedman said based on the size and location of the tumor, one to four catheters are inserted into enhancing areas of the tumor, which are areas thought to be most active or malignant as evidenced by the MRI. Once the catheters are inserted, the patient recovers in the intensive care unit overnight and Johnston and his team check the catheters again the following morning to ensure they are in the precise location.

"When [the catheters] are in the right place, the virus is infused through the catheters into the tumor over a six-hour period," Friedman said. "After the infusion, the catheters are removed at bedside and the patient is observed for three days in the hospital."

Upon discharge, the patient returns to Children's for follow-up appointments one week after the virus infusion and again the following week. Xia will return home to Maryland and resume normal activities between subsequent appointments every other month.

Friedman said it's too early to talk results as the clinical trial is ongoing, but so far, it's been safe and tolerable with some evidence suggesting response. Meanwhile, the study fields inquiries from prospective candidates stateside and internationally, and Friedman has secured additional funding from the Cannonball Kids' cancer Foundation in Orlando to work on expanding the study to include patients with medulloblastoma, the most common malignant brain tumor in childhood. Currently, the area of the brain where medulloblastoma often recurs – the cerebellum – is excluded from testing in the trial. One long-term goal, Friedman said, is adding virotherapy to upfront therapies for patients such as those receiving radiation to the brain and spine. This may enable the dose of radiation to be decreased, which could reduce harmful side effects and improve outcomes.

More information on the study is available at www.childrensal.org/cancer-clinical-trials.