

New treatment designed to save more eyes from cancer (w/ Video)

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Doctors at Cincinnati Children's Hospital Medical Center have developed a new technique for treating the eye cancer retinoblastoma to improve the odds for preventing eye loss, blindness or death in children with advanced forms of the disease.

Treatments for retinoblastoma have progressed dramatically in recent years, one being a procedure called ophthalmic artery infusion chemotherapy. A tiny catheter is inserted into an artery that provides <u>blood flow</u> (and chemotherapy) directly to the eye and tumor. Originally introduced in the late 1980s, direct ophthalmic artery infusion significantly increases treatment effectiveness while reducing side effects.

Unfortunately, many children with retinoblastoma are not good candidates for conventional ophthalmic artery infusion – in particular younger, smaller patients with advanced disease, according to Todd Abruzzo, MD, director of Interventional Neuroradiology at Cincinnati Children's.

"The catheters are so large compared to the smaller arteries of the child that they restrict blood flow to the eye, causing back pressure that pushes blood flow and chemotherapy away from the eye and tumor," Abruzzo said. "Unfortunately, for too many of these children there is no option other than enucleation, or loss of the eye. You can imagine what that means for a child."



Four-year-old Khloe Cline is one of these children. Her case was especially challenging because she had advanced cancer in both eyes (bilateral retinoblastoma). When she developed retinoblastoma at 18 months old, doctors in her hometown of Indianapolis identified 11 tumors in both eyes.

After an unsuccessful attempt with conventional chemotherapy therapy, Khloe's physicians referred her to Cincinnati Children's, where researchers have been testing an innovation to ophthalmic artery infusion chemotherapy.

Working with physicians in the Cancer and Blood Diseases Institute (CBDI) at Cincinnati Children's, Abruzzo developed a double-catheter infusion technique that involves inflating a tiny balloon in the external carotid artery to prevent backpressure and ensure blood and chemotherapy flow to the eye and tumor. He further improved the technique by administering verapamil, a drug that increases the flow of chemotherapy to the tumor and helps block the tumor's ability to pump chemotherapy away before it does its job.

The result is a safe, effective and reproducible method for delivering chemotherapy treatment to the eye, especially in patients with advanced retinoblastoma who are not candidates for conventional infusion therapy, according to a recent study Abruzzo and colleagues published in the *Journal of Neurointerventional Surgery*. Of 19 eyes (17 patients) treated in the study, 11 eyes were saved.

After undergoing a series of treatments at Cincinnati Children's with the new procedure, Khloe's mother, Alicia Gray, credits the physicians with saving her daughter's eyes and allowing her to retain functional eyesight. And while Khloe's eyes have been scarred and her vision is not perfect, she carries on like any normal energetic four-year-old, with a penchant for learning and a strong desire to be a doctor when she grows up.



"Just to look at her, you would never know (about her eye cancer). That's why I have to tell people, like her teachers, 'you might notice this child falls a lot or runs into things if she's running. She probably shouldn't be running too much,' " explains Ms. Gray. "But Khloe tells me all the time she wants to be a doctor. She loves coming to the hospital. The doctors here brought us all the way and they did it for her."

Although additional research into the new double-catheter technique continues and its overall benefit still must be verified in larger clinical studies, its development is part of a larger overall effort at Cincinnati Children's to broaden the range of enhanced treatment options for children with retinoblastoma, according to James Geller, MD, Khloe's oncologist and a physician in the CBDI.

This comprehensive approach to retinoblastoma includes investigating different delivery techniques for cancer-fighting drugs and testing the dosage levels and safety of different chemotherapies. It also includes helping patients and their families successfully manage the treatment process and life after the cancer is gone.

In Khloe's particular case, where the cancer was in both eyes and other effective treatment options were very limited, the new double-catheter procedure helped saved her vision, Geller said.

"In the field of pediatric oncology we have had a lot of success in past years, but in reality we don't have an every-year situation where we can bring a new technology to the forefront and actually see a difference in a case-by-case basis," Geller said. "With the advent of selective ophthalmic arterial infusion, and being able to build the retinoblastoma team we have, and then to see kids like Khloe come here who were perceived to have no options and suddenly save two eyes - it's wonderful for her more than anyone else, but it's wonderful for all of us who are involved in treating retinoblastoma and other families facing it."



Provided by Cincinnati Children's Hospital Medical Center

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