

Innovative approaches to improve vision in children with tumors

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Robert Avery, DO, MSCE, of Children's National Health System and colleagues are establishing innovative approaches with technology and medication to improve the vision of young children who have visual pathway glioma, a type of brain tumor.

Most optic pathway gliomas cause vision loss in children between one and eight years of age. As many as 20 percent of children with neurofibromatosis type 1—a genetic disorder that occurs in 1 in every 4,000 births – may develop these tumors. It is estimated that nearly half of those children may experience vision problems from their tumors.

Optic pathway gliomas can also occur sporadically, and not be related to neurofibromatosis type 1. Vision loss from these tumors can range from mild to complete blindness, and may be permanent if not properly treated. Unfortunately, standard treatment with front line chemotherapy typically results in modest improvements or stabilization of their vision.

Using Medications

In their study published in *JAMA Ophthalmology*, Avery and his colleagues report on four children with optic pathway gliomas that demonstrated marked recovery of vision when treated with the medication Bevacizumab. Other Children's National researchers included Roger J. Packer, MD, Senior VP of the Center for Neurosciences and Behavioral Medicine, and Eugene I. Hwang, MD, a

neuro-oncologist.

Bevacizumab is an angiogenesis inhibitor, a drug that slows the growth of new blood vessels, to treat various cancers.

Bevacizumab provides a fast, robust response in these children," Avery told Reuters Health. "Although it's not first-line treatment, Bevacizumab is a good alternative or adjunct treatment."

Dr. Avery and colleagues identified children who had recovery of [visual acuity](#) or visual field in treatment with Bevacizumab.

A nine-year-old girl's visual acuity improved from 20/400 to 20/100 within six weeks of Bevacizumab treatment and remained stable for nine months after the treatment was discontinued, Avery wrote. Her visual field improved after two months of Bevacizumab monotherapy and her visual acuity returned to normal after four months of therapy. It remained stable at 12 months.

The standard front line treatment using cardioplatin-based chemotherapy typically produces only a modest benefit in visual acuity, Avery says.

"Given that most patients with OPG-related visual impairment will show modest or no visual improvement with standard treatment, the incorporation of Bevacizumab in these cases may greatly improve visual outcomes and should be considered in appropriate clinical situations," Avery says.

Handheld Technology

In another study in *JAMA Ophthalmology* Avery and other researchers found that using innovative technology, such as handheld optical coherence tomography (OCT), may help physicians improve their ability

to evaluate children with optic pathway gliomas by capturing three-dimensional ultrahigh resolution (e.g., 3 microns....one-half the width of a red-blood cell) images of their retinal axons. Avery's study was also reported in Reuters Health.

In that study, the other Children's National researchers included Packer, Hwang, Maria T. Acosta, MD, in neurology, Domiciano Jerry Santos, MD, in anesthesiology, sedation, and perioperative medicine, Dina J. Zand, MD, PhD, in the genetics program, Lindsay B. Kilburn, MD, in neuro-oncology, Kenneth N. Rosenbaum, MD, in genetics and metabolism, and Brian R. Rood, MD, clinical director of the neuro-oncology program.

In very [young children](#) with these tumors, it may be difficult to measure visual acuity especially if they have cognitive or behavioral difficulties. "The handheld OCT provides a safe, non-contact and objective measure of visual pathway integrity that does not rely on a child's cooperation," Avery says.

"We hope that our handheld OCT measures will someday improve our ability to detect and monitor tumor progression that cannot be discovered during a routine eye exam or MRI scan," Avery adds.

Provided by Children's National Medical Center

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