AAO: Camera Chip Provides Sight in Retinitis Pigmentosa

By John Gever, Senior Editor, MedPage Today
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MedPage Today Action Points

- Note that this study was published as an abstract and presented at a conference. These data and conclusions should be considered to be preliminary until published in a peer-reviewed journal.

- Explain to interested patients that preliminary data from a recent study indicates that a small chip (consisting of light-sensing diodes) surgically implanted into the retinas of several patients with retinitis pigmentosa restored a measure of sight for these patients.

Review

CHICAGO -- A tiny array of light-sensing diodes restored a measure of sight to a small number of patients with retinitis pigmentosa, a researcher said here.

Eleven patients with the condition, who had been blind for 13 to more than 40 years, had the chip implanted in their retinas with no major ill effects, said Walter G. Wrobel, PhD, CEO of Retinal Implant AG of Tübingen, Germany, manufacturer of the device.

In a late-breaking oral presentation at the American Academy of Ophthalmology's annual meeting here, Wrobel also showed videos portraying a participant in the pilot study who was able to recognize letters and words and identify fruits by their shapes.

Other participants had similar results, Wrobel said.

Retinitis pigmentosa is a condition in which photoreceptors progressively die off, starting at the retinal periphery, and eventually wipe out the ability to see at all. There is currently no effective treatment to halt the process, although various therapies can help patients make the most of their remaining sight.

The Retinal Implant chip comprises 1,500 light-sensing diodes, each 50 microns across, capable of generating seven images per second that flash for approximately 2 microseconds. It is surgically inserted just behind the retina -- normally just under the fovea, Wrobel said -- delivering electrical pulses to the retinal cells that otherwise are unable to respond to light.

Wrobel said the chips used in the trial required connection to an external power supply, with a wire passing through the skull and out behind the patient's left ear. But the company has now developed a wireless power supply, he said.

He described five sets of tests of visual ability in the study. Patients were asked to describe what they could make of so-called Landolt rings -- shapes like a thick letter C, projected in various orientations on a screen -- and of fruits laid on a table in front of them.

They were also shown block letters two to three inches high, white on a black background at waist height.

A fourth tested involved a set of squares shaded in different levels of gray.

Finally, patients were placed in a room with people in it and were encouraged to approach and touch them.

The videos showed one participant in the study successfully completing all five tests. Wrobel noted that the addition of regular eyeglasses appeared to improve the visual acuity in many patients, including the one in the video.

One video depicted the patient recognizing a banana and an apple from their crescent and spherical shapes, respectively. It also showed him reaching out to touch the banana, which Wrobel said was a demonstration that the system allowed for a degree of hand-eye coordination.

The patient was also able to recognize the letters of his name -- including the fact that the researchers had misspelled it -- and could distinguish among the different shades of gray.

He also successfully recognized that two people were in the test space and was able to touch one gently, again successfully mastering the required hand-eye coordination, Wrobel pointed out.

Twelve patients were initially recruited into the study, but one patient died just before the chip was to be implanted, he said.

Among the 11 patients receiving the device, none suffered retinal detachment, major hemorrhages, inflammation or vitreoretinal tractions -- the major safety concerns for such a procedure.

Session organizer Daniel F. Martin, MD, of the Cleveland Clinic, commented afterward that the device was a promising development, calling it "terrific work."

"The patient was able to read his name. That's truly a remarkable thing to do," he said, even if the resulting acuity still falls short of normal.

"All surgery is going to have some risk, obviously, but given the fact that [patients] are destined to complete blindness for the rest of their life without it, it's one that probably most patients will take," Martin added.

The study was funded by Retinal Implant AG.

Wrobel is an employee of Retinal Implant. Martin declared he had no relevant financial interests.

Primary source: American Academy of Ophthalmology
Source reference:
Zrenner E, et al "Subretinal implants for retinitis pigmentosa: 'seeing' with multilocal electrical stimulation" *AAO* 2010; Late Developments II.