

News in Review

COMMENTARY AND PERSPECTIVE

NEURO-OPHTHALMOLOGY

Immediate Rehab Can Save Vision After Stroke

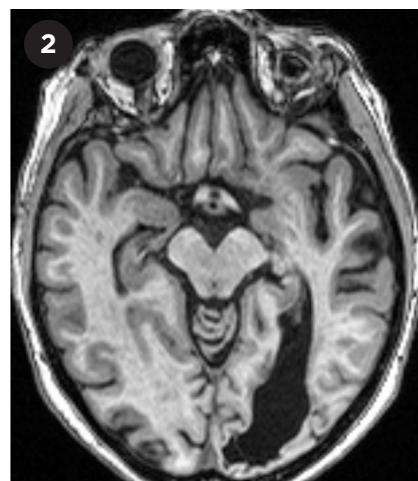
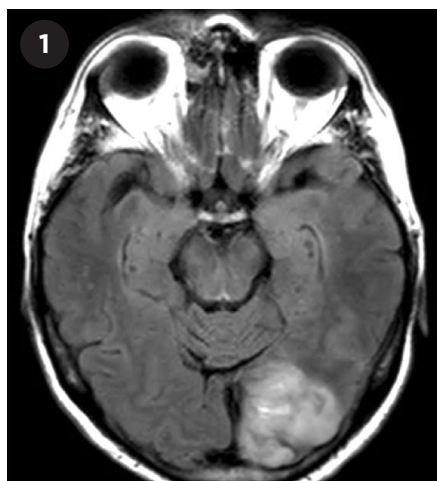
BECAUSE THERAPY FOR POSTSTROKE

motor deficits follows the axiom “time is brain,” rehabilitation usually begins within a few days after the stroke. But when a stroke in the visual cortex leaves a patient with hemianopia or quadrantanopia, visual rehab therapy generally begins only after the patient’s vision has stabilized, at around six months.

But as it turns out, “time is vision,” too, according to researchers at the University of Rochester, New York.¹

Surprise finding. Using a special assessment and training system, the scientists discovered for the first time that after an occipital stroke, the brain retains small, residual visual pathways able to process vision in the hemianopic field. Early rehabilitation can strengthen these pathways, the researchers found—but without early intervention, the pathways cease functioning by six months following the stroke, said senior author Krystel R. Huxlin, PhD, at the University of Rochester.

“To our surprise, we discovered that vision loss was not immediate or absolute right after the stroke,” Dr. Huxlin said. “Instead, many visual functions appeared preserved when measured in the subacute period, disappearing by the onset of the chronic period.” For example, a portion of the subacute patients had measurable contrast sensitivity functions in their blind



COMPARISON. Early visual training after an occipital stroke appears to halt further degradation of visual perception and may allow for greater recovery of vision than if given during the chronic phase. Brain imaging of visual stroke damage in (1) a subacute versus (2) a chronic patient.

field. “To our knowledge, good luminance contrast sensitivity in perimetrically-defined blind fields has never been described in the literature on this patient population,” the researchers wrote.¹

Study specifics. The researchers evaluated two groups of patients: those defined as subacute (evaluated less than three months after an occipital stroke; n = 18) and those defined as chronic (evaluated six months or more post-stroke; n = 14). Both groups were tested for their ability to detect and discriminate the direction of motion of random dot patterns and luminance contrast gratings in the hemianopic field.

After this initial evaluation, the patients were given testing software and a chin/forehead positioning device and instructed to do at-home practice of both tasks on a precise schedule. After about four months of home training, repeat testing in the lab (with controlled fixation) showed that both groups improved at discriminating motion direction, but the subacute patients improved much faster and over a larger

area of their blind field than did the chronic patients, Dr. Huxlin said.

Will the benefits persist? Further research must be done to determine whether the training improvements will persist and to assess possible clinical benefits, Dr. Huxlin said.

Anecdotally, after undergoing training, the subacute patients reported that the ability to distinguish the presence and the movement of faint objects in their hemianopic field improved their ability to function as they went about their everyday tasks, Dr. Huxlin said. “They’re more confident about navigating in new environments and at getting around independently. They can actually detect objects, and they can tell when something is coming at them, so they don’t trip over the cat or bump into a pole or traffic sign while walking on a footpath.”

—Linda Roach

¹ Saionz EL et al. *Brain*. 2020;143:1857-1872.

Relevant financial disclosures—Dr. Huxlin: Coinventor on U.S. Patent No. 7,549,743, which describes the visual retraining approach used in this research.

CATARACT

Support Grows for Minimizing OR Waste

IT HAS BEEN ESTIMATED THAT A single phacoemulsification procedure, with its plethora of disposable supplies and medications, generates as much greenhouse gas emissions as a 310-mile car trip.¹ Now, more than 1,200 cataract surgeons and an additional 300 OR nurses and administrators indicated that they would welcome the opportunity to shrink this carbon footprint by reusing many surgical instruments, supplies, and medications instead of discarding them after every surgery.²

The responses were elicited in an online survey developed by the Ophthalmic Instrument Cleaning and Sterilization (OICS) Task Force. Members of the task force represent the Academy, the American Society of Cataract and Refractive Surgery, the Outpatient Ophthalmic Surgery Society, and the Canadian Ophthalmological Society, said David F. Chang, MD, task force cochair. “There is strong consensus and support for tackling this problem of unnecessary surgical waste,” said Dr. Chang, who practices in Los Altos, California.

Time for action. “There were some significant surprises” in the survey results, Dr. Chang said. “I think many people in industry believe that physicians want more single-use, disposable



REUSE. Two-thirds of those surveyed said that more surgical instruments and supplies should be reused.

instruments. But our survey showed that 10 times as many surgeons would choose a reusable instrument over a disposable equivalent instrument, assuming they were of equal cost and functionality, thereby dispelling the notion that the market wants more single-use products.”

GLAUCOMA

Real-World Impact of IOP on RNFL Loss

IN A COHORT OF REAL-WORLD PATIENTS, THE RATE OF glaucoma progression, as reflected in loss of retinal nerve fiber layer (RNFL) thickness, was related to levels of intraocular pressure (IOP) during follow-up.¹ Fast glaucoma progression was uncommon in eyes that had very low IOPs (all measures below 15 mm Hg). However, a substantial number of eyes with fast progression had all visits with IOPs at levels that sometimes are assumed to be safe, such as 18 or 21 mm Hg.

“Certain levels of IOP over time were effective in preventing RNFL loss,” said Felipe A. Medeiros, MD, PhD, at Duke Eye Center in Durham, North Carolina. “Our data provide rates of change according to levels of IOP and disease severity, which can help guide clinicians’ decisions in setting target IOP.”

Largest longitudinal SD-OCT results to date. This retrospective cohort study included 14,790 eyes of 7,844 glaucoma patients and suspects listed in the Duke Glaucoma Registry. Those included in the study had at least six months of follow-up, two good quality spectral-domain optical coherence tomography (SD-OCT) scans with the Spectralis platform (Heidelberg), and two IOP measures with Goldmann applanation tonometry. All evaluations were conducted between January 2009 and September 2019.

Rates of RNFL change. Overall, each increase of 1 mm Hg in mean IOP was associated with approximately 0.051 $\mu\text{m}/\text{year}$ faster RNFL loss, even after adjusting for variables of age, sex, race, central corneal thickness,

baseline disease severity, and follow-up time. Researchers also assessed the relationship over time between three levels of IOP (21, 18, and 15 mm Hg) and slow, moderate, and fast progression as shown on SD-OCT. (Rates of progression were defined as follows: slow = slower than $-1.0 \mu\text{m}/\text{year}$; moderate = between -1.0 and $-2.0 \mu\text{m}/\text{year}$; and fast = faster than $-2.0 \mu\text{m}/\text{year}$.)

Eyes progressing at fast rates had relatively lower frequency of visits with “satisfactory” IOP measures. For example, 20% of fast-progression eyes had an IOP below 18 mm Hg in all visits, whereas 40% had an IOP above 18 mm Hg for more than half of visits. Only 9% of eyes with fast progression had stricter control—that is, IOP below 15 mm Hg at all visits.

Of note, a higher frequency of visits with an IOP below 18 mm Hg translated into slower RNFL change over time. However, this was not sufficient to prevent moderate or fast progression in all cases.

Other findings. Patients with primary open-angle glaucoma had faster rates of change than glaucoma suspects, but slower change than other glaucoma types. Older age and thicker baseline RNFL were also associated with faster rates of RNFL loss over time.

Clinical implications. “These findings indicate that certain levels of IOP may not be as safe as some clinicians think,” Dr. Medeiros said. “It is very important to adequately assess the rates of change over time and adjust the target pressure in order to effectively prevent deterioration.”

—Miriam Karmel

1 Jammal AA et al. *Ophthalmology*. Published online June 20, 2020.

Relevant financial disclosures—Dr. Medeiros: Carl Zeiss: C,S; Heidelberg: S.

The survey found that 93% of respondents believe that OR waste is excessive and should be reduced; 78% state that more supplies should be reused; 91% are concerned about global warming and climate change; and 87% want medical societies to advocate for reducing the surgical carbon footprint.

In other findings, 95% of those surveyed were willing to reduce waste by eliminating the full-body drape and by having the OR staff wear the same surgical mask all day; 91% were willing to reprocess and reuse single-use instruments; 93% were willing to send topical medications home with patients; and 97% were willing to save and donate unused surgical supplies.

Barriers to address. Key barriers to putting these strategies into action in the United States are manufacturers' concerns about liability and the instructions for use (IFUs) that surgeons must follow, Dr. Chang said. Per the IFUs, off-label reuse is not at the surgeon's discretion. "A strong majority of surgeons we surveyed feel that both profit incentive and liability reduction are behind that type of labeling and that it's not really for any proven safety benefit," Dr. Chang said. "There basically is no good evidence that reusing many single-use devices—such as metal blades, phaco tips, and tubing—is dangerous."

What prompted the survey? In the task force's original work—writing guidelines for the cleaning and sterilization of intraocular surgical instruments³—members cited evidence from India's Aravind Eye Care System indicating that careful reuse and re-sterilization strategies could minimize waste and save money⁴ while still keeping the endophthalmitis rate quite low,⁵ Dr. Chang noted. Thus, the group launched this survey to find out if cataract surgeons in North America would support the environmentally friendlier approach taken at Aravind, he said.

Moving forward. Dr. Chang said he hopes the survey's results will catalyze a movement toward a smaller carbon footprint for U.S. cataract surgery. "While a survey doesn't solve the prob-

lem, I think it illuminates it and lays out potential solutions that the majority of ophthalmologists agree should exist: first, greater discretion to reuse things, based on our best clinical judgment, and second, manufacturers being more conscious of wasteful packaging and providing us with more options for reusable instruments and multiuse pharmaceuticals." —Linda Roach

- 1 Morris DS et al. *Eye*. 2013;27(4):495-501.
 - 2 Chang DF, Thiel CL. *J Cataract Refract Surg*. 2020;46(7):933-940.
 - 3 Chang DF, Mamalis N. *J Cataract Refract Surg*. 2018;44(6):765-773.
 - 4 Thiel CL et al. *J Cataract Refract Surg*. 2017;43(11):1391-1398.
 - 5 HariPriya A et al. *J Cataract Refract Surg*. 2019;45(9):1226-1233.
- Relevant financial disclosures—Dr. Chang: Johnson & Johnson Vision: C.

RETINA

Shedding Light on DR After Cataract Surgery

SOME EVIDENCE SUGGESTS THAT patients with diabetes are at increased risk of developing diabetic retinopathy (DR) following cataract surgery. A recent report confirms this link in Asian patients.¹ Even after adjusting for variables, the relative risk of developing DR was higher in eyes that had undergone cataract surgery than in eyes that remained phakic. This finding was observed mainly in cases of mild or moderate DR.

Mining the data. For this population-based study, the researchers recruited 972 Malay and Indian participants (1,734 eyes) with type 2 diabetes from the Singapore Epidemiology of Eye Diseases Study. A total of 350 eyes had undergone cataract surgery, either before baseline or during six years of follow-up. Of those who had undergone cataract surgery, 22% developed DR, compared to 14.1% of eyes that remained phakic through follow-up.

Adjusted covariates significantly



PDR. Risk of DR development following cataract surgery was higher in patients with mild or moderate DR, in contrast to the proliferative DR shown here.

associated with increased risk of developing DR included being slightly younger (mean age, 59 vs. 57.7 years old), having a higher hemoglobin A1c level (8.7 vs. 7.4), and having a longer history of diabetes at baseline (6.6 vs. 5.2 years).

Need for additional study. No significant association emerged between cataract surgery and progression of DR, possibly due to the limited statistical power of the data. A meta-analysis or consortium collaboration might address this question, said coauthor Ching-Yu Cheng, MD, PhD, at the Singapore Eye Research Institute.

Dr. Cheng and his colleagues are conducting an additional analysis of the data with 12-year follow-up; this will include a Chinese cohort. They also plan to study the impact of other factors on DR development or progression.

Need to follow diabetic patients. It is too early to generalize the study's findings to other populations or to issue new clinical guidelines, said Dr. Cheng. In the meantime, he advised that clinicians inform patients with diabetes about the postsurgical risk of developing DR. He also suggested that clinicians should consider careful, and perhaps more frequent, monitoring of diabetic patients following cataract surgery. —Miriam Karmel

1 Tham YC et al. *JAMA Network Open*. 2020;3(6):e208035.

Relevant financial disclosures—Dr. Cheng: None.