

# Eye Signs Flag Stroke in Vestibular Syndrome

BY JEFF EVANS

BALTIMORE — A test battery of three oculomotor signs for patients with acute vestibular syndrome can detect stroke with greater sensitivity than does MRI with diffusion-weighted imaging in the first 24-48 hours after symptom onset, according to a prospective, cross-sectional study.

If the results are confirmed in a larger, multicenter study, they will help determine which patients with acute vestibular syndrome (AVS) should undergo MRI scanning, Dr. David E. Newman-Toker said at the annual meeting of the American Neurological Association.

MRI scanning of all patients with AVS is “probably an unrealistic strategy” for diagnosis, said Dr. Newman-Toker of the departments of neurology and ophthalmology at Johns Hopkins University, Baltimore.

Of 2.6 million visits to the emergency department for dizziness each year, about 5% (or 100,000-150,000 people) have a cerebrovascular event, mostly in the lateral brainstem or the inferior cerebellum (Mayo Clin. Proc. 2008;83:765-75). Of that 5%, evidence suggests that approximately 35% may be misdiagnosed, which is a much higher rate than with other types of stroke (Stroke

2006;37:2484-7). Another study reported that around 40% of these misdiagnoses culminate in death or disability.

Strokes in the lateral brainstem or the inferior cerebellum frequently mimic benign vestibular disorders, such as vestibular neuritis or labyrinthitis, which are collectively known as acute peripheral vestibulopathies.

To determine if a battery of bedside oculomotor signs could detect patients with stroke with greater accuracy than did early MRI with diffusion-weighted imaging (DWI), the investigators prospectively enrolled 101 patients during 1999-2008 who presented with AVS to an urban academic acute stroke referral center. AVS is a rapid onset of a new persistent dizziness or vertigo that is sustained for 12-24 hours with some degree of gait unsteadiness, in association with head-motion intolerance and nystagmus, nausea, and vomiting.

The patients were admitted either through the academic medical center’s emergency department or by transfer from other hospitals. They only included patients who had at least one risk factor for stroke.

Each patient underwent MRI scanning with DWI, which was repeated if the initial MRI was negative but oculomotor and other neurologic signs indicated

stroke. “This distinguishes this study from every other study to date on this subject, where it was assumed that the initial MRI scan in those studies was accurate, which was not necessarily a safe assumption,” Dr. Newman-Toker said.

One investigator performed the test battery for oculomotor signs of stroke—given the mnemonic HINTS: head impulse test, nystagmus, and test of skew.

These are assessed by performing a horizontal head impulse test (a test of vestibulo-ocular reflex function), a test for direction-changing nystagmus, and an alternating cover test to test for skew deviation. The results of each test have been individually associated with stroke in AVS (Stroke 2009;40:3504-10).

Men accounted for 65% of the enrolled patients, who had a mean age of 62 years. Most patients (70%) had two or more stroke risk factors, “so this was a very high risk for stroke population,” he noted.

Three-fourths of the patients were examined within 24 hours of symptom onset and about 70% underwent an MRI scan within 6 hours of their bedside exam. A single examiner, who was blinded only to the MRI findings, performed all of the neurologic exams.

Based on the reference standard of MRI with DWI for diagnosis, 25 patients had peripheral vestibulopathy (vestibular

neuritis or labyrinthitis) and 76 had central brain pathology (69 ischemic strokes, 4 hemorrhages, 2 demyelinating diseases, and 1 acute intoxication with an anti-convulsant).

Testing for HINTS to INFACT (Impulse Normal, Fast-Phase Alternating, or Refixation on Cover Test) detected stroke with 100% sensitivity and 96% specificity. In contrast, an initial MRI with DWI detected stroke with 88% sensitivity and 100% specificity. The use of any obvious neurologic signs for detecting stroke (such as limb ataxia, severe truncal ataxia, hemiparesis, or gaze palsy) provided a sensitivity of 64% with 100% specificity. General neurologic signs had only 19% sensitivity and 100% specificity. A normal horizontal head impulse test was the best single predictor of stroke with 90% sensitivity and 100% specificity, although it misses lateral pontine strokes because the reflex pathway tracks from the inner ear straight to the pons.

Peripheral vestibulopathies occurred in patients with an abnormal head impulse test, direction-fixed nystagmus, and no skew deviation.

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## Electric Stimulation Improves Swallow Function After Stroke

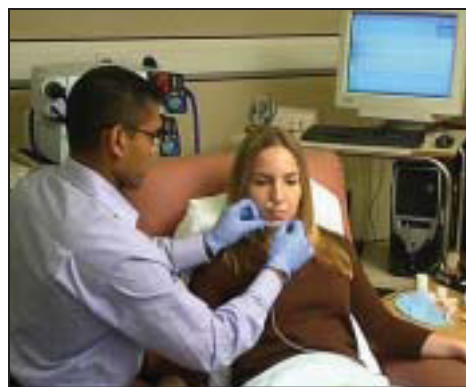
BY PATRICE WENDLING

CHICAGO — Electrically stimulating the swallowing apparatus at the back of the throat improves swallow function and speeds the recovery of normal feeding in patients with dysphagia following stroke, according to a small, randomized trial.

Dysphagia is common after stroke and is a risk factor for disruption of normal eating patterns, need for artificial feeding, and aspiration pneumonia. Patients with dysphagia can require frequent hospitalizations for pneumonia, prolonged hospital stays, and increased need for institutionalized care.

The management of dysphagia has thus far failed to provide reliable, effective rehabilitation for these patients, according to Dr. Vanoo Jayasekeran, a clinical research fellow and GI specialist at the School of Translational Medicine, University of Manchester, United Kingdom. However, pharyngeal electrical stimulation (PES) has been shown in stroke patients to enhance cortical excitability of swallowing pathways (Gastroenterology 1998;115:1104-12) and to induce changes in the motor cortex that mimic natural recovery of dysphagia (Neuron 2002;34:831-40).

Dr. Jayasekeran and his colleagues randomly allocated 26 dysphagic stroke patients, mean age 75 years, to PES delivered via a custom-made intraluminal indwelling pharyngeal catheter or sham stimulation via an in situ catheter with no current. The PES group received the treatment for 10 minutes



Electrical stimulation is provided with an indwelling pharyngeal catheter.

at 5 Hz for 3 consecutive days. At baseline, patients had a mean score on the National Institutes of Health Stroke Survey of 10 and a Penetration-Aspiration Scale (PA) score of 3 or more on an 8-point scale.

PES was associated with a significant reduction in mean cumulative PA scores 2 weeks post-treatment, with a 16% improvement in cumulative PA scores from baseline in the PES group and an 11% deterioration in the sham group, the authors reported in a poster at a meeting on neurogastroenterology and motility.

The PES group also had a significant reduction of abnormal swallows, as indicated by fewer PA scores greater than 3. The University of Manchester provided support for the current study. The investigators reported no conflicts of interest. ■

## Low Postsurgery Hemoglobin Level Raises Risk for Stroke

BY JEFF EVANS

BALTIMORE — A low hemoglobin level following cardiac surgery is associated with significantly increased odds of experiencing a stroke after cardiopulmonary bypass, results of a case-control study suggest.

Although previous studies have associated anemia with adverse cerebrovascular outcomes, including stroke, it is unclear whether low hemoglobin levels contribute to postoperative surgical complications, Dr. Rebecca F. Gottesman and her colleagues at Johns Hopkins University, Baltimore, said in a poster presented at the annual meeting of the American Neurological Association.

The researchers identified the postoperative outcomes of 357 patients who underwent various cardiac surgery procedures with cardiopulmonary bypass at Johns Hopkins Hospital and compared them with the outcomes of 714 control patients matched by age range, gender, and type and year of surgery.

The patients had a mean age of 65 years, and 59% in each group were male. Compared with controls, stroke patients were significantly more likely to have hypertension (77% vs. 68%) and peripheral vascular disease (20% vs. 10%). The

stroke and control groups had similar rates of diabetes mellitus (30% vs. 25%, respectively), history of myocardial infarction (37% vs. 32%), and high cholesterol (51% vs. 45%).

In a conditional logistic regression analysis, the investigators found that, for each 1 g/dL decline in hemoglobin, the odds of having a stroke significantly increased by 37%. Patients with a postoperative hemoglobin level below the group median of 8.8 g/dL had a 78% greater chance of having a stroke than did those above the median. (Normal hemoglobin levels are greater than 13 g/dL in men and greater than 12 g/dL in women.)

Postoperative hemoglobin levels were below the median in significantly more patients who had a new stroke (57%) than in those who did not have a stroke (41%).

“The association between stroke and post-cardiopulmonary bypass hemoglobin could be the result of hemodilution or cerebral hypoperfusion,” Dr. Gottesman and her associates suggested. Studies are needed to determine whether having normal hemoglobin levels would decrease the risk of stroke.

The study was supported by grants from the National Institutes of Health and the Dana Foundation. ■