

August 22, 2007

FOR IMMEDIATE RELEASE

CONTACT: Tom Rosenberger, APR  
Communications Department  
(513) 569-5260

CONTACT: Cindy Starr  
Communications Department  
(513) 569-5321

## ***ALZHEIMER'S AND PARKINSON'S LOOK-ALIKE CAN BE CURED***

CINCINNATI—It has been misdiagnosed as Alzheimer's disease, Parkinson's disease and vascular dementia. But unlike these progressive neurological conditions, which have no known cure, normal pressure hydrocephalus, or NPH, can be effectively reversed.

NPH, despite its name, indicates an abnormal condition. It occurs when the normal flow of cerebrospinal fluid, which travels from the brain back into the blood for distribution to the rest of the body—at the rate of about one ounce per hour—is blocked or interrupted, causing the fluid-containing cavities (ventricles) in the brain to swell. The pressure of cerebrospinal fluid, which can be measured by a spinal tap, remains normal, but as the ventricles absorb the excess fluid they can damage surrounding brain tissue.

“The condition is defined by three classical symptoms: dementia, difficulty walking and urinary incontinence,” said Raj Narayan, MD, chair of neurosurgery at the University of Cincinnati (UC) and a neurosurgeon with the Mayfield Clinic.

“The typical patient who may have NPH, and therefore is most likely to be helped with surgery, has experienced symptoms for a relatively short time and has a more significant problem with walking than dementia,” Narayan said. “Someone who has been in a nursing home for several years with severe dementia but is able to walk reasonably well probably does not have NPH.”

An accurate diagnosis is important, Narayan said, because patients with NPH who go untreated are likely to suffer unnecessary loss of independence and reduced quality of life.

NPH can be difficult to differentiate from other, more common causes of dementia. It also can co-exist with other causes.

NPH is believed to account for 5 percent of all cases of dementia, and an estimated 375,000 Americans suffer from it.

“The condition is seen typically in older people, and as the population is living longer, the incidence of NPH is also increasing,” Narayan said.

NPH can develop independently of any apparent incident, or it may occur as a result of a closed head injury, brain surgery, meningitis or a ruptured aneurysm.

Several tests are used to diagnose NPH. They include MRI or CT scans, which reveal enlarged ventricles, neuropsychological testing and formal gait analysis. “Objective testing by a team,”

Narayan said, “limits the bias that can creep in when both the patient and the doctor want the procedure to work.”

Patients most likely to be diagnosed with NPH are those in whom the gait disturbance predominates, Narayan said. Patients with NPH tend to have a spastic gait, whereas people with Parkinson’s disease tend to have a rigid, stiff gait. In some cases, the gait of NPH and Parkinson’s disease may not be distinguishable with the naked eye, making more sophisticated measurements necessary.

Alberto Espay, MD, assistant professor of neurology and a specialist in movement disorders, collaborates with Narayan in the diagnosis of NPH at the Neuroscience Institute at UC and University Hospital. During the last year Espay has assessed patients’ gait with a \$22,000 computerized gait analysis system (GaitRITE), a 14-foot-long mat that records the timing and regularity of an individual’s gait using such parameters as stride, step length and cadence.

Espay’s gait analyses are crucial in helping Narayan objectively determine how likely a patient is to benefit from the surgical implantation of a ventriculo-peritoneal shunt, a tube-like device that drains excess cerebrospinal fluid from the brain to the stomach, where it is safely absorbed.

After the gait and neuropsychological tests have been completed, Narayan inserts a temporary lumbar drain into the patient’s spine. For three days the drain continuously drains off excess cerebrospinal fluid. Then the patient undergoes a second round of gait and neuropsychological testing.

“If patients do show an improvement in these functions after three days of drainage, then this usually will clinch the diagnosis of NPH, and the likelihood that they will benefit from a shunt is very high—about 90 percent,” Narayan said. “On the other hand, if they don’t show any improvement, the likelihood of their being helped with a shunt is less than 20 percent.”

If the team concludes that the patient has shown improvement, Narayan’s next step is to surgically implant a permanent shunt. Newer shunts can be adjusted without additional surgery. Doctors can now adjust drainage levels with magnets outside the body.

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