

Cognitive Vitality and Brain Health: Dementia

Detecting dementia progression

To date, there is no definitive way for health care professionals to forecast the onset of dementia in a patient. But two physicians at St. Joseph's Health Care London are committed to cutting-edge research that will predict this irreversible, progressive disease of the brain.

"Finding early dementia detection methods is vital," says Dr. Borrie. "In the future, it is conceivable we will be able to make the diagnosis of Alzheimer's disease and other dementias before people even have significant memory loss. Our hope is to combine these methods with promising new medications to slow or halt the progression of MCI to dementia."

Dr. Manuel Montero-Odasso, a geriatrician at St. Joseph's Parkwood Institute and a researcher at Lawson Health Research Institute, is looking at walking speed and variability as a predictor for dementia's progression and whether it is associated with physical changes in the brain. While walking has long been considered an automatic motor task, new evidence suggests cognitive function also plays a key role.

In the study, Dr. Montero-Odasso's team asks people with mild cognitive impairment (MCI) to walk on a specially-designed mat linked to a computer. The computer records the individual's normal walking gait variability and speed.

This information is then compared to their walking gait while simultaneously performing a cognitive task, such as counting backwards. If the research confirms walking gait is an effective predictor, a simple walking study done in a physician's office may eventually help diagnose dementia earlier.

Neuroimaging study

In a ground-breaking effort to curb dementia, Dr. Michael Borrie and his colleagues at Parkwood are participating in the largest international neuroimaging study ever conducted. Their research uses cognitive testing and precise neuroimaging methods, such as Magnetic Resonance Imaging (MRI) and Positron emission tomography (PET), to measure the shrinkage in the brain and the enlargement in the ventricular system. This detects progressive changes in the brain before a person has MCI or dementia symptoms and may predict who will progress to dementia and who will remain stable.

Dementia with Lewy Bodies

While not nearly as well known, the second most prevalent dementia after Alzheimer's Disease is Dementia with Lewy Bodies, or DLB (Mayo Clinic). DLB is a neurodegenerative condition of the brain. In 2008 it was estimated that about 110,000 Canadians were suffering from DLB with an annual cost of \$3.3 billion (Alzheimer Society of Canada).

The history obtained from the patient or family member is important to make the DLB diagnosis and help differentiate DLB from Parkinson's Disease. Progressive decline in cognitive abilities to the point of interfering with normal social and occupational activities is the central feature in diagnosing DLB. Specialists also look for fluctuations in attention and alertness, new changes in sleep behavior, physical features that resemble Parkinson's, and determine if the person is experiencing visual hallucinations during the daytime. Brain scans may also help confirm DLB.

There are medications that help with hallucinations and enhance cognition; however more understanding of the use of medications in the most effective ways to treat DLB is needed.

Cognitive Vitality and Brain Health is already hosting a new clinical research project to better understand how to diagnose and treat DLB with three cognitive enhancing medications - rivastigmine, donepezil and galantamine (also known as Exelon, Aricept and Reminyl).

The *Lewy Body Project* is in collaboration with neuroimaging scientists from the Robarts Research Institute at Western University and St. Joseph's. It is anticipated collaboration will provide earlier and more accurate diagnosis and ensure that those affected by DLB and their families receive the care they need.

Frontotemporal Dementia

Researchers estimate that approximately two to five per cent of all dementia cases are frontotemporal dementia. (Alzheimer Society of Canada)

Frontotemporal Dementia (FTD), which most often occurs as people reach their 50s and 60s, progressively ravages the frontal and temporal lobes of the brain. This neurodegenerative disorder can initially go undiagnosed because of the subtle changes it brings to personality, decision making and judgement.

Currently there are no treatments to slow or cure FTD or to treat its symptoms. But research by Dr. Elizabeth Finger, a neurologist at St. Joseph's Parkwood Institute and a researcher with Lawson Health Research Institute, is exploring how a hormone called oxytocin can help with FTD symptoms.

Oxytocin is holding new promise for increasing positive social behaviour and, most importantly for patients with FTD, in restoring empathy. "The lack of empathy for others is the FTD symptom that is most devastating to caregivers," says Dr. Finger. "Patients with FTD become cold, indifferent and lose all empathy toward the people they most love and cherish, while at the same time becoming entirely dependent on these same people for care."

Results in Dr. Finger's first study of oxytocin in FTD, sponsored by the Alzheimer Society of London and Middlesex, revealed improvements in some patients' behaviours.

When Mary Wolff's husband, Chris, was diagnosed with FTD they immediately got involved in Dr. Finger's research. For some patients, like Chris, pain may be associated with FTD and he started resisting physical contact.

"This made caring for Chris challenging because it was difficult not to touch him when doing personal care," Mary says. After taking oxytocin, she saw a definite improvement. "He was calmer."

While Chris received only a small dose of oxytocin, Dr. Finger believes a larger dose has the potential to do greater good. She is currently evaluating the safety of varying doses of oxytocin in a study sponsored by the Canadian Consortium for Clinical Cognitive Research. If successful, it will be followed by an international multi-centred study of oxytocin for the symptoms of FTD.

"We are hopeful our work with oxytocin will identify potential new treatments to at least temporarily reawaken some emotions in our FTD patients," Dr. Finger says. Building further on this work, she and Dr. Derek Mitchell from Western University received a grant from Canadian Institute of Health Research to study the brain's response to oxytocin and other interventions that may augment empathy in FTD sufferers

For families like the Wolffs, research is critical. "I figured if we participated in the study," says Mary, "maybe it would help our kids, grandkids or somebody in the future."