MedicalXpress

Weight loss after gastric bypass surgery reduces expression of Alzheimer's genes

June 6 2011

Obesity is a risk factor for Alzheimer's disease, but weight loss due to bariatric surgery may reduce the risk of this common dementia, a new study suggests. The results will be presented Sunday at The Endocrine Society's 93rd Annual Meeting in Boston.

"Our study shows for the first time that weight loss resulting from bariatric surgery leads to a reduction in the expression of genes related to Alzheimer's disease," said the study's main author, Paresh Dandona, MD, PhD, professor at State University of New York (SUNY) at Buffalo.

Past research has shown that obesity and Type 2 diabetes increase the chance of getting Alzheimer's disease. In this study, 15 morbidly obese patients with Type 2 diabetes had Roux-en-Y gastric bypass surgery and lost nearly 86 pounds, on average, over six months. The patients gave blood samples before surgery and six months later.

Dandona and co-workers recently found that white blood cells in the circulating blood, called peripheral blood mononuclear cells, express amyloid precursor protein. This APP is the precursor of beta-amyloid, protein pieces that form plaques in the brain, one of the key brain abnormalities in Alzheimer's disease.

In this study, the researchers measured the expression of APP, and it fell by 22 percent after weight loss. Expression of the messenger RNA that carries genetic information for APP decreased by an average of 31

percent, the data showed.

After weight loss there also was reduced expression in other genes related to risk of Alzheimer's disease, according to the authors. They included the presenilin-2 gene, which mediates the conversion of APP into beta-amyloid. Also reduced in expression was the gene for an enzyme known as glycogen synthase kinase-3-beta (GSK-3-beta), which phosphorylates, or abnormally modifies, tau protein to form the neurofibrillary tangles in the brains of people with Alzheimer's disease. Tangles are a main suspect in the death of nerve cells in this disease.

Dandona said that their clinical study cannot prove that these effects are also occurring in the brain. If it is true, he said, "this may have implications for the treatment of Alzheimer's disease."

"It is relevant that cognitive function has previously been shown to improve with weight loss following bariatric surgery," Dandona said.

Also, inflammation is another brain abnormality seen in Alzheimer's disease, and in this study, the gene expression changes paralleled the reductions in the blood of mediators of inflammation, he said.

Provided by The Endocrine Society