

New surgical approach may improve cognitive function in patients with brain cancer

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A new approach to treating cancer that has spread to the brain is able to preserve and, in some cases, improve cognitive function in patients, while achieving local control of tumor progression. A study led by researchers with the Perelman School of Medicine at the University of Pennsylvania found that 98 percent of patients who deferred whole brain radiation therapy and had chemotherapeutic wafers placed around the areas where metastatic tumors in the brain had been surgically removed showed preserved cognitive function in one or more of three domains; 65 percent showed preservation in all areas tested: memory, executive function, and fine motor skills. The study, published [online in *Cancer*](#), demonstrated improvements in cognitive function, particularly in executive function and memory, which were observed in more than 40 percent of patients. In the fine motor movement category, 50 percent of patients showed improvements.

Brain metastases affect between 25 and 45 percent of all cancer patients. Whole [brain radiation](#) therapy is often used to control recurrence and spreading of metastases in the brain, but it causes [cognitive decline](#) in more than a third of patients and fails to improve independent function or prolong overall survival. Newer treatments, such as stereotactic radiation (e.g. Cyberknife or Gamma knife) and chemotherapeutic wafers (Gliadel wafers) aim to treat metastases or recurrences locally while preserving cognitive function. These new approaches preserve white matter integrity; [previous studies](#) have looked at current [surgical](#)

[approaches](#) using advanced neuroimaging, such as [diffusion tensor imaging](#) (DTI or diffusion tractography), that enable surgeons to remove the tumor while sparing the fiber tracts that mediate language, motor skills, and other key functions.

"While not denying the value of whole brain [radiation therapy](#) for select patients, the current study supports the growing trend for some patients to have surgery and local therapy to the tumor bed, via stereotactic radiosurgery or chemowafers," said lead author Steven Brem, MD, professor of Neurosurgery at the Perelman School of Medicine. "We know that about half of patients with metastatic brain cancer go on to develop a new, separate brain metastasis, which can be detected by using surveillance MRI every 2 to 3 months. Some patients can go for years with normal brain function without risking the toxicity of whole brain radiation."

The study – by a team of researchers from Perelman School of Medicine at the University of Pennsylvania, the University of North Carolina, MD Anderson Cancer Center, and Moffitt Cancer Center – followed 59 patients with up to three [metastatic tumors](#) who had received surgery and chemowafers wafers lining the tumor cavity. Of the 54 patients who followed the post-surgical protocol, 63 percent of patients had preserved fine motor coordination (34 of 54 patients), 72 percent had preserved executive function (39 of 54), and 69 percent had preserved memory (37 of 54), including 48 percent that saw an improvement in memory function (26 of 54). Only one patient (2 percent) had a decrease in all three cognition domains. Local tumor recurrences occurred in 28 percent of patients evaluated at the end of the one-year study. Distant recurrences were found in 48 percent of patients, with more than half of recurrences happening within four months of the treatment.

"We will continue to try to find interventions that preserve function while preserving or increasing the quality life for patients with cancer

that spreads to their brain," said Dr. Brem, noting that further studies comparing treatment options are needed to determine the optimal treatment strategy.

The toxicity profile was that expected for a patient population with advanced cancer metastatic to the brain. Serious adverse events were reported in 40 of 59 patients; complications related to the chemowafers were resolved with medical or surgical intervention. Nine patients died during the study, one from a neurologic cause and eight as a result of their primary cancers.

Provided by University of Pennsylvania School of Medicine

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