Brain Metastases

Introduction
Brain tumors can be separated into two general categories depending on the tumors’ origin. Primary brain tumors are tumors that arise from cells in the brain or from the covering of the brain. Secondary, or metastatic, brain tumors are made up of cancer cells that originate in another part of the body and spread, or metastasize, usually through the blood stream, to the brain.

Once cancer cells metastasize to the brain, the majority of brain metastases will produce symptoms at some time during the life of the patient. Symptoms, such as headaches, nausea, vomiting, confusion and lethargy, are caused by increased intracranial pressure from a large tumor, brain swelling (edema), or by blockage of the cerebral spinal fluid pathway (hydrocephalus). Brain metastases can also cause focal brain irritation or a disruption of brain function, which can lead to seizures or convulsions, weakness, numbness, language deficits, visual problems and gait disturbances.

Incidence
Brain metastases are a common complication of cancer, occurring in 20-40% of cancer patients. Since over a million new cancers are diagnosed each year, this translates to 200 to 400 thousand new cases of brain metastases each year. This number is more than 10 times the number of new cases of primary brain tumors diagnosed each year in the United States. Lung, breast, colon, melanoma, and kidney cancer pose the greatest risk for brain metastases. Of these cancers, melanoma has the highest propensity to metastasize to the brain.

In some cases of metastatic brain tumors, the original cancer site is unknown. With time, most of these cancers will show up with further testing. Metastatic brain tumors can appear years after a primary cancer has been diagnosed and treated. Therefore, it is important that all cancer patients are carefully followed and diagnostic testing be done if patients develop new neurological symptoms.

Diagnosis
Since contrast-enhanced brain magnetic resonance imaging (MRI) can detect small metastatic tumors, it is currently the best study for evaluating patients for brain metastases. Contrast-enhanced computerized tomography (CT) scans are also useful in patients who cannot get an MRI.

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If brain metastasis is discovered in a patient without a prior history of cancer, CT scans of the body will in many cases show the origin of the metastasis. This can establish the extent of the cancer outside the brain. In women, mammography should be done to determine if breast cancer is the source of their brain metastases.

Treatment
The risk of developing cancer increases with age, and with improvements in treatments for cancers and other illnesses, people are living longer. Paradoxically, because cancer patients are living longer, there is an increase in metastatic brain tumors. The highest incidence of metastatic brain tumors is in people over the age of 65.

The treatment of metastatic brain tumors depends on many factors, including the type of cancer, the number of metastatic brain tumors, the size of the tumor, location within the brain, and their response to the treatment of the original cancer. Treatment plans are tailored to each patient depending on these factors.

The use of steroids often relieves neurological symptoms rapidly by reducing the swelling, or edema, caused by the tumor. Surgery is generally limited to tumors that are causing symptoms, or to patients with single metastasis who have limited or controlled primary cancer. Whole brain radiation is useful in improving neurological symptoms and lengthening survival. This treatment is usually recommended for patients with multiple brain metastases. More recently, the use of focused radiation or stereotactic radiosurgery has been used to treat small metastases, less than 3 cm in diameter, that are located in sensitive regions of the brain where surgical removal would carry risks of neurological damage. In addition to surgery and radiation, new chemotherapies are being developed and used to treat brain metastases.

With earlier detection and improved treatments, complications from metastatic brain tumors are reduced. However, because of the large number of patients with cancer, brain metastases remains a major problem for cancer patients and requires more intensive research for more effective and durable therapies.

About the Brain Tumor Society
Resources and supportive services are always available at the Brain Tumor Society. We offer a wealth of information for brain tumor patients, long-term survivors and families coping with a brain tumor diagnosis.