

## Brain Metastases

**Metastasis** refers to when a tumor spreads to other parts of the body away from its original site. Cancers frequently metastasize (spread) to brain, occurring in about 10 to 30% of patients. Tumors in the brain can cause a variety of neurological symptoms such as seizures, arm or leg weakness or numbness, difficulty speaking, dizziness or balance problems that result in difficulty walking, changes in vision, or headaches. Tumors can be seen on CT scan or MRI. Usually multiple tumors are present in the brain, although occasionally just one tumor is present. In addition to visible tumors, seeds (small deposits of cancer) that cannot be detected on CT or MRI are present that can give rise to tumors in the future.

### Treatment of Brain Metastases:

Many factors influence how brain metastases are managed. Once brain metastases are detected, the patient is evaluated by a group of physicians to decide how best to manage the individual. The team consists of a group of specialists all dedicated to brain tumor treatment. The resulting plan is individualized to the patient.

#### There are several tools available:

- **Dexamethasone (Decadron):** Decadron is a corticosteroid used to reduce the swelling associated with the tumor. Unlike tumors in other parts of the body, tumors in the brain can swell putting pressure on and affecting the normal brain around it. Decadron reduces the swelling often improving symptoms patients are experiencing. Decadron is often started at a higher dose and gradually reduced over several days or weeks.
- **Surgery:** Removal of a tumor requires the involvement of a neurosurgeon. For a variety of reasons, not all patients can have surgery. Several factors are considered by multiple members of a patient's treatment team. Removal of a tumor requires a surgery that has risks associated with it and also requires a period of time for recovery and healing before other treatments can be administered, such as chemotherapy or radiation.
- **Radiation Therapy:** Radiation is not a medicine but rather energy beams aimed at a target. There are several forms of radiation that are used to treat brain metastasis.
  - Focal radiation is when the beams are aimed at individual tumors.
  - Whole brain radiation targets the entire brain.
- **Whole Brain Radiation:** Whole brain radiation is often considered the standard therapy for the management of brain metastases. In addition to treating the visible tumors, whole brain radiation has the benefit of treating the seeds not seen on CT or MRI of the brain. This reduces the risk of developing new tumors in the future. However, there are more side effects associated with whole brain radiation. Although there are exceptions, whole brain radiation is generally administered only once to a patient. Whole brain radiation is administered as a small daily dose repeated several times. Typically, ten to fifteen treatments are given over two to three weeks.

- **Radiosurgery:** Radiosurgery is a form of focal radiation in which individual tumors are treated with a single dose of radiation. It is considered in patients with a smaller number of tumors (usually less than four or five). In addition, only smaller tumors can be treated. Under certain circumstances, radiosurgery can be repeated. In addition, whole brain radiation can be used if necessary. Furthermore, it reduces exposure of normal brain tissue to radiation thereby reducing complications. However, when only treated with radiosurgery there is a higher risk of developing new tumors (presumably as a consequence of untreated seeds). Consequently, patients are monitored with frequent MRIs (about every 3 months).
- **Fractionated Stereotactic Radiotherapy (FSRT):** FSRT is another form of focal radiation in which individual tumors are treated rather than the whole brain. However, instead of a single dose of radiation, treatment is administered as a series of repeated doses the number of which is dependent on the individual circumstance. It has the same advantages and disadvantages as radiosurgery but can be used to treat larger lesions or those located in areas of the brain that may be at higher risk of injury from radiosurgery.
- **Chemotherapy:** Chemotherapy is medicine administered either orally or intravenously (through a vein) for the purpose of killing tumor cells. Historically, chemotherapy has not been used to treat brain metastases because of the blood brain barrier, a protective membrane that limits the penetration of medicines from the blood stream into the brain. However, it is now recognized that many medicines do in fact reach the brain tumors and chemotherapy is increasingly being used to treat brain metastases. Currently, chemotherapy is not a primary treatment for brain metastases but is often reserved for patients who cannot receive more radiation therapy.

Brain metastases are part of a patient's primary cancer. In addition to treatment directed at the brain tumors, patients often require treatments for tumors within their body. These treatments are administered by a medical oncologist, a specialist in the management of cancer. Follow-up with a medical oncologist is necessary.

Brain metastases are high-risk and despite treatment, can come back either as new tumors or as re-growth of previously treated tumors. As such, patients are closely monitored with MRI, about every three months initially. Should new tumors develop, the case is again evaluated by the team and a new treatment plan established. During this time, patients should be attentive to new symptoms and any new problems should be brought to the physician's attention.