

FOCUSING

Metastatic Brain Tumors



American Brain Tumor Association

A Word About ABTA

Founded in 1973, the not-for-profit American Brain Tumor Association has a proud history of funding research, providing patient services, and educating people about brain tumors. Our mission is to eliminate brain tumors through research and meet the needs of brain tumor patients and their families.

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Introduction

The terms metastatic brain tumor, metastasis to the brain, or secondary brain tumor are different names for the same type of brain tumor. A metastatic brain tumor begins as a cancer elsewhere in the body and spreads to the brain. Metastatic brain tumors are treatable. Often, the symptoms caused by these tumors can be reversed, allowing the person with cancer to live a quality life.

METASTASIS means one tumor.

METASTASES is plural — it means two or more tumors.

METASTASIZE is the process of cells traveling through the body to reach another part of the body.

PRIMARY SITE refers to the location of the original

Cancer cells usually metastasize to the brain via the blood stream. They may give rise to a single tumor or multiple tumors. The number, and location, of those tumors is important when considering treatment options.

Lung, breast, melanoma (skin cancer), colon and kidney cancers commonly spread to the brain. Breast cancer and kidney cancer usually cause single tumors in the brain. Lung, melanoma, and colon cancers tend to cause multiple tumors. Sometimes the body's immune system is able to destroy the primary cancer, but not the metastasized cells which traveled to the brain. This is called an "unknown" primary site, which may never be found. Or, the primary site may have been too tiny to be seen or cause symptoms. In this situation, the metastatic brain tumor is found first, then the primary site is discovered.

The metastatic brain tumor usually contains the same type of cancer cells found at the primary

site. For example, small-cell lung cancer which metastasizes to the brain forms small-cell cancer in the brain. Squamous-cell breast cancer forms squamous-cell cancer in the brain.

Incidence

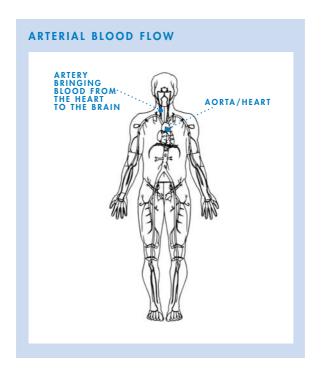
The risk of developing cancer increases with age. As more effective treatments are found for primary cancers and as larger numbers of people live longer, the number of metastatic brain tumors appears to be rising. About 150,000 people in the US each year are diagnosed with a metastatic brain tumor. The incidence begins to increase in those ages 45-64, but is highest in people over 65. Slightly more men than women develop these tumors. Researchers have also found that women with breast cancer appear to be at higher risk of developing a meningioma — a benign type of primary brain tumor — than those who have not had breast cancer. Please call us if you would like information about meningiomas.

Cause

Metastatic brain tumors are caused by cancer elsewhere in the body. Tiny cancer cells, too small to be seen under a microscope, may move away from the primary tumor. Scientists believe those cells enter the blood or lymph system, make a stop in the lungs, then move on to other sites. The immune system attempts to destroy these moving cancer cells. However, if the number of cancer cells becomes very high the immune system may become overwhelmed, or tolerant, of these cells.

Because blood from the lungs flows directly to the brain, lung cancer is capable of quickly spreading to the brain. Sometimes, this happens so quickly the brain metastasis is found before

the primary lung cancer is found. Metastatic brain tumors can also appear many years *after* the diagnosis of a primary cancer. In that situation, the cancer cells may have been dormant for the years in-between. It is unknown what reactivates those stray cells.



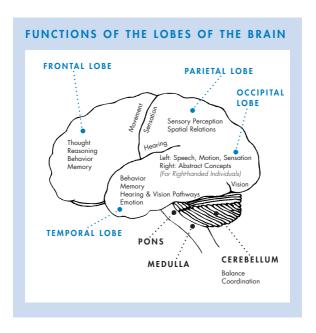
Scientists do know that primary cancers tend to move, or metastasize, to certain organs. For example, colon cancer tends to metastasize to the liver and the lung. Breast cancer tends to metastasize to the bone, the lung and the brain. Some scientists believe these preferences may be caused by hormones or proteins which attract tumor cells to that site. Other scientists believe cancer cells may be able to adhere, or stick, only to select organs. Some cancer cells find hiding places in 'protected' parts of the body such as the brain. The blood vessels of the brain contain a shield called the blood brain barrier. That barrier allows microscopic cancer cells to enter the brain, but may block the

entrance of larger-sized particles such as chemotherapy drugs. "Safe" from the effects of cancer-killing drugs, these cells may sit in the brain quietly until they begin to grow. Those growing cells may eventually form a metastatic tumor.

Symptoms

The symptoms of a brain tumor are related to the location of the tumor within the brain. Each part of the brain controls specific body functions; symptoms appear when the brain can no longer do its work properly.

Headaches, weakness on one side of the body, an unbalanced walk, and/or seizures are some of the most common symptoms. Behavior, memory, and personality changes may also signal a tumor. When these symptoms begin gradually, they are usually due to increased pressure within the brain caused by the growing tumor. Swelling around the tumor may occur, or the blood vessels around the tumor may



bleed and cause the sudden onset of symptoms. Metastatic tumors in the spine may cause back pain, weakness or changes in sensation in an arm or leg, or loss of bladder/bowel control. For additional information about the symptoms of a brain or spinal cord tumor, please see A Primer of Brain Tumors.

Diagnosis

Metastatic tumors are diagnosed using a combination of neurological examination and contrast-enhanced MRI or CT scan. Your physician will determine if an MRI or CT scan is the preferred test. The contrast dye makes the tumor(s) easier to see on the scan.

An MRI scan of the brain may be part of the initial screening process when the primary cancer is diagnosed, or a scan may be ordered if a person living with cancer begins to have symptoms of a brain or spinal cord tumor. The scan helps the doctor determine the size, location, number and probable type of brain or spinal cord tumor(s). However, only examination of a sample of tumor tissue under a microscope confirms the exact pathologic diagnosis. The tissue sample may be obtained during surgery to remove the tumor, or during a biopsy. A biopsy is a surgical procedure to remove a small amount of tumor for diagnosis. The sample is then examined under a microscope by a pathologist.

If a metastatic tumor is diagnosed before the primary site is found, tests to locate the primary cancer will be done. The pathology report can also help the doctor determine possible sites of the primary cancer if testing fails to do so. If you already have a history of cancer, you may not require a biopsy or surgery. Your doctor will determine if this is necessary.

Specific Types of Metastases

LUNG METASTASES

- The most common type of brain metastases
- About 35% of lung cancers metastasize to the brain
- The brain tumor may be found before, or at the same time, as the primary lung tumor
- Multiple brain metastases are common

BREAST METASTASES

- Second most common type of brain metastases
- About 10-30% of breast cancers metastasize to the brain
- Metastases tend to occur a few years after the breast cancer is found
- Are generally found in younger and pre-menopausal women
- A single metastatic tumor is just as common as multiple tumors

MELANOMA METASTASES

- Third most common type of brain metastases
- About 30-40% of melanomas metastasize to the brain or the meninges (the covering of the brain and spinal cord)
- Metastases tend to occur several years after the primary melanoma
- Multiple brain metastases are common
- The metastatic tumors are rich with blood vessels which have a high tendency to bleed

KIDNEY METASTASES

- Fourth most common type of brain metastases
- About 5-10% of kidney tumors metastasize to the brain
- Metastases tend to occur within a few years after the primary tumor
- Single tumors are common
- The metastatic tumor often contains blood vessels

COLON METASTASES

- Fifth most common type of brain metastases
- About 5% of colon cancers metastasize to the brain
- Metastases tend to occur a few years after the primary tumor is found
- A single metastatic tumor is common

Treatment

When planning your treatment, your doctor will take several factors into consideration:

- The type of primary cancer
- Your overall health
- The number of metastatic tumors
- The location of the metastatic tumor(s) within the brain or spine
- Your body's response to the treatment of the primary cancer

The first steps in treating metastatic brain tumors are controlling pressure in the brain and controlling seizures. Steroids are drugs used to reduce the swelling that can occur around a brain tumor. Reducing the swelling in the brain can remarkably reduce the pressure, and thus, the symptoms of a metastatic brain tumor. Antiepileptic drugs are used to control seizures.

SINGLE OR LIMITED BRAIN METASTASES

If you have a limited number of metastatic brain tumors (generally 1 or 2 tumors, or a small number of tumors that are close to each other) and if your primary cancer is treatable and under control, surgery may be the next step in treatment. The surgeon will determine if your tumors can be surgically removed. He or she will also consider the type of primary cancer and the number of tumors that particular cancer tends to form in the brain. If surgery is not possible or the primary cancer has not been identified, a biopsy may be done to confirm the tumor type. A form of radiation therapy may follow the surgery; your doctor will make this determination.

Your tumors may also be treated with radiation

and chemotherapy rather than surgery if you have a known history of cancer and that type of cancer is known to be sensitive to radiation therapy, such as small-cell lung cancer or lymphoma.

MRI OF A SINGLE BRAIN METASTASIS The picture on the left is taken after the injection of the contrast dye. The picture on the right is called the "T₂" image and shows the edema (brain swelling) around the tumor. MRI courtesy of Dr. Sawaya

MULTIPLE BRAIN METASTASES

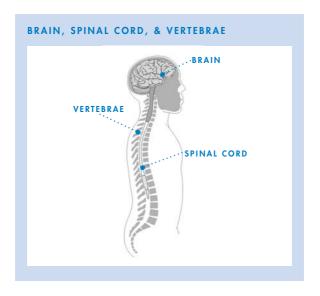
Your treatment plan will take into consideration the numbers of tumors, their location, and the status of your primary cancer. Generally, the primary treatment for multiple metastatic brain tumors (usually 3 or more tumors, or multiple tumors that are not close to each other) is whole-brain radiation. The goal of this therapy is to treat not only the tumors seen on scan, but those that may be too small to be seen. Thus, whole brain radiation may be preventive as well as therapeutic.

Surgery may be used for symptom relief if your tumors are close to each other and can be removed. Or, a biopsy may be done to confirm the tumor type if your primary cancer site has not been identified.

SPINAL METASTASES

Spinal metastases are most often caused by breast, lung or prostate cancers. These tumors generally involve the bones of the vertebrae or the surface of the spinal cord. Radiation therapy alone, or surgery plus radiation, may be used to treat metastatic tumors to the spine.

Spread of cancer cells to the meninges or to the spinal fluid is called leptomeningeal cancer. This type of metastases occurs most commonly with melanoma, breast or lung cancers, and may be treated with a regional form of chemotherapy. "Intrathecal" chemotherapy is delivered between the layers of the meninges using a pump or implanted chemotherapy device. An "Ommaya reservoir" is a small container, surgically placed under the scalp, with a tube that leads into a ventricle of the brain. The purpose of these devices is to place chemotherapy drug into the spinal fluid, allowing it to "bathe" the cancer cells. The treatments may be given with or without radiation therapy. Your doctor will decide which treatment plan is best for you based on the type of primary cancer and the amount of cancer cells present in the spinal fluid.



RADIATION

Radiation therapy can be used to treat single or multiple metastases. It may be used therapeutically (to treat a brain tumor), it may be used prophylactically (to help prevent brain metastases in people newly diagnosed with small-cell lung cancer or acute lymphoblastic leukemia), or it may be used as palliative treatment (to help relieve symptoms caused by the brain tumor).

There are several different types of radiation used for metastatic brain tumors. Whole-brain radiation is radiation therapy delivered in 10 or more reduced doses called "fractions." By dividing the doses in smaller amounts, the normal brain is somewhat protected from the toxic effect of radiation. This is a common form of radiation for metastatic brain tumors, especially when multiple tumors are present. Focused radiation (such as stereotactic radiosurgery or conformal radiation) delivers shaped beams of radiation to a specified area in an attempt to avoid normal brain tissue. Focused radiation is most commonly used for small tumors which are limited in number. It may be used for recurrences if whole brain radiation was previously given, or it may be used as a local "boost" following whole brain radiation. Interstitial radiation, or brachytherapy, is the use of radioactive materials surgically implanted into the tumor to provide local radiation. Radioenhancers, which make the tumor more sensitive to the effects of radiation, are under investigation.

CHEMOTHERAPY

Chemotherapy is not widely used to treat metastatic brain tumors, however, recent studies show that some tumors may be sensitive to drug therapy. Small-cell lung cancer, breast cancer, germ cell tumors, and lymphoma are among these tumors. Intrathecal chemotherapy

(drugs placed within the lining of the spinal cord) may be used for leptomeningeal metastases — cancer cells which metastasize to the covering layers of the brain and spinal cord.

In choosing to use chemotherapy, your doctor will take into account the size and number of tumors, the type of tumors, the status of the primary cancer site, the drugs available and your previous history of chemotherapy treatment, if any. Some tumors which are sensitive to chemotherapy in other parts of the body may become resistant to the chemotherapy once in the brain. Why this happens is unknown. A different drug may be considered if you received chemotherapy for your primary cancer, or a different type of therapy may be considered.

As in any disease, there are possible side effects from brain tumor treatment. Ask your doctor to explain these effects. He or she can also help you and your family balance the risks against the benefits of treatment.

Recurrence

After your brain tumor treatment is completed, MRI or CT scans of the brain are usually done every three months for a year. Your doctor will determine the frequency thereafter. The scans are used to monitor for possible tumor recurrence. Metastatic brain tumors, just like tumors elsewhere in the body, may recur.

Treatment for a recurrent metastatic brain tumor begins with evaluating the original cancer site. If the primary cancer appears to be under control, treatment for the metastatic brain tumor may include additional surgery, radiosurgery, conformal radiation, or in

some situations, whole brain re-irradiation. Chemotherapy or immunotherapy may also be an option.

Finding Clinical Trials

New, investigative treatments called "clinical trials" are available for those with metastatic cancer. We maintain a resource listing of physicians participating in clinical trials for brain tumors, including metastatic tumors. Our office can be reached at 800-886-2282.

For additional information about both standard and research treatments (clinical trials) for metastatic brain tumors, call the National Cancer Institute's Cancer Information Service at 800-422-6237. They can provide information specific to the primary site of the cancer, such as lung cancer or breast cancer.

We also offer our Focusing on Treatments series of booklets which address Surgery, Steroids, Conventional Radiation Therapy, Stereotactic Radiosurgery, and Chemotherapy. If that information is of interest to you, please call us at 800-886-2282.

Resources

Many families living with metastatic brain tumors find assistance through cancer support resources. Support groups and pen-pal programs allow you to share experiences with others in the same situation. Social workers can help you find these networks as well as sources of financial assistance, transportation help, home-care needs or hospice programs. Nurses can provide you with information about how to care for yourself or your loved one. Reach out to neighbors, family, and friends for help with daily chores. You are not alone there are extensive resources available to you. If you would like help finding them, please call our social work office at 800-886-2282.

A Next Step

"Becoming Well Again" is an ABTA Quality of Life series exploring fatigue management, caregiver stress, rehabilitative medicine, financial aid, and care options. Call us, or send an e-mail to info@abta.org and request a copy of the series. Our web site — www.abta.org — offers extensive brain tumor information, treatment and research updates, and patient/family stories. The thread that runs through each of our services and programs is hope. Become involved - join us in some way, to make sure there is a cure, and ultimately, a way to prevent brain tumors.

We hope that the information in this pamphlet will help you communicate better with your healthcare team. Our purpose is not to provide answers, rather, we encourage you to ask questions.

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Questions I Want to Ask

Publications & Services

BUILDING KNOWLEDGE

A Brain Tumor – Sharing Hope Tumor del Cerebro – Compartiendo la Esperanza Dictionary for Brain Tumor Patients Living with a Brain Tumor A Primer of Brain Tumors

FOCUSING ON TUMORS

Ependymoma Glioblastoma Multiforme and Anaplastic Astrocytoma Medulloblastoma Meningioma Metastatic Brain Tumors Oligodendroglioma and Oligoastrocytoma Pituitary Tumors

FOCUSING ON TREATMENT

Chemotherapy
Conventional Radiation Therapy
Stereotactic Radiosurgery
Steroids
Surgery

Physician Resource List: Physicians Offering Clinical Trials for Brain Tumors

FOR & ABOUT CHILDREN

Alex's Journey: The Story of a Child with a Brain Tumor (Video or Booklet) Education Packet (Parent or Teacher) When Your Child Returns to School

SUPPORT RESOURCES

Bibliography
Care Options
Emergency Alert Wallet Cards
Employment Information
End-of-Life Care
Financial Aid Resources
Health Insurance Resources
Housing During Treatment Resources
Net-Working Links
Scholarship & Educational Financial Aid Resources
Social Security Disability Resources
Spanish-Language Resources
Transportation Assistance Resources
Wig and Head Covering Resources
Wish Fulfillment Resources

NEWSLETTER

Message*line* Newsletter Sharing Knowledge, Sharing Hope e-News

FOCUSING ON SUPPORT

Connections – A Pen Pal Program Listing of Brain Tumor Support Groups Listing of Bereavement (Grief) Support Groups Organizing and Facilitating Support Groups Resources for Online Support TLC (Tips for Living and Coping)

Single copies of these publications are available free of charge.





Sharing knowledge. Sharing hope.



American Brain Tumor Association