



FOCUSING ON TUMORS

*Oligodendroglioma
and
Oligoastrocytoma*



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 to meet the needs of brain tumor patients and their families.

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Introduction

Oligodendroglioma and oligoastrocytoma belong to a group of brain tumors called “gliomas.”

Gliomas are tumors that arise from the glial, or supportive, cells of the brain. There are several different types of gliomas. This publication addresses two of the gliomas: oligodendroglioma (pronounce everything you see -- oligo den dro glioma) and oligoastrocytoma (oligo astrocytoma). If you are interested in a different type of brain tumor, please call us for a copy of our book, *A Primer of Brain Tumors*.

- Oligodendrogliomas arise from oligodendrocytes -- fried egg-shaped cells within the brain. The role of normal oligodendrocytes is to form a covering layer for the nerve fibers in the brain.

OLIGODENDROCYTE



ASTROCYTE



- *Astrocytomas* are gliomas that arise from astrocytes -- star-shaped cells within the brain. The normal role of astrocytes is to store information and nutrients for the nerve cells in the brain.
- *Oligoastrocytomas* are “mixed glioma” tumors, containing both abnormal oligodendroglioma and astrocytoma cells.

Oligodendrogliomas are soft, greyish-pink tumors. They often contain solid mineral deposits – which are mostly calcium - called calcifications. Oligodendrogliomas may also contain small pockets of blood and/or cysts.

Incidence

Primary brain tumors are tumors that arise in the brain and tend to stay in the brain. About 40% of primary brain tumors are gliomas. About 10% of those gliomas are oligodendrogliomas. However, oligodendrogliomas may be more common than older statistics indicate. Biologic markers now help pathologists separate oligodendrogliomas from other types of gliomas.

Oligodendrogliomas are most common in adults, and have a peak incidence in people ages 35-44. Anaplastic oligodendrogliomas tend to occur in slightly older adults, ages 45 - 74. Although these tumors are found in both men and women, they tend to occur more often in men. Relatively few children are diagnosed with this tumor; only 3 % of the primary brain tumors found in children ages 0-14, and about 5 % in older children ages 15-19 are found to be oligodendrogliomas.

Cause

The exact cause of these tumors, as well as other types of brain tumors, is unknown. We do know that tumors develop when a normal cell, for some unknown reason, becomes abnormal. That abnormal cell may produce the wrong number of proteins or enzymes, or it may be missing genetic material containing the cell's basic instructions. When that abnormal cell reproduces itself, it creates two abnormal cells. Those two cells reproduce to create four cells, four cells create eight, and so on. This reproduction continues, resulting in a "lump" of abnormal cells. That lump is called a tumor.

Scientists now know that the cells of some oligodendrogliomas contain abnormal genetic material. Deletions or absence of chromosomes 1p and 19q are frequently seen in oligodendroglioma and oligoastrocytoma tumors. In addition, anaplastic (malignant) tumors appear to have abnormalities on chromosomes 9 or 10, along with unusual amounts of growth factors and gene proteins.

Those substances are thought to regulate the growth of blood vessels around a tumor. The greater the blood supply, the more nutrients brought to the tumor.

Researchers also believe both oligodendrogliomas and astrocytomas originate from one mother cell whose “offspring” may follow two slightly different developmental pathways. This research helps explain the biologic relationship between these two types of gliomas. However, the initial steps that change these cells from normal brain cells to abnormal tumor cells are still uncertain. Tracing these pathways is of interest to many researchers as our understanding of the biology of brain tumors continues to advance.

If your doctor initially calls your tumor a glioma, and later tells you it is an oligodendroglioma or an oligoastrocytoma, the diagnosis did not “change.” These are both very specific types of glioma.

Symptoms

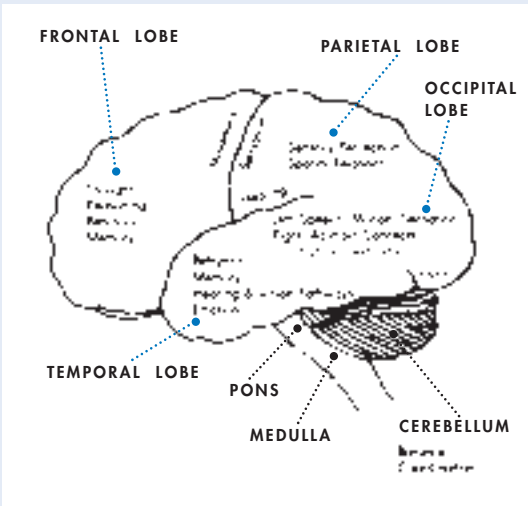
Some oligodendrogliomas grow slowly and may be present for years before diagnosis. When the tumor makes its presence known, the most common symptoms are seizures, headaches, and personality changes. Other symptoms vary by location and size of the tumor, and can include weakness, numbness, or visual symptoms.

The frontal and temporal lobes are the most common locations for these tumors, although they can be found anywhere within the cerebral hemispheres of the brain. The frontal lobe controls the movement of your arms and legs, houses personality and behavior characteristics, controls language, and maintains your ability to reason. Tumors of the frontal lobe may cause weakness on one side of the body, difficulty walking, or seizures. Difficulty remembering very recent occurrences, comments that do not match the conversation, or sudden changes in a person’s usual behavior may be some of the symptoms of a tumor in the frontal lobe.

The temporal lobe of the brain generally controls memory, understanding language, comprehending what your eyes see and understanding the significance of what is seen, some emotions and interpreting sensations. Temporal lobe tumors generally cause few “visible” symptoms other than partial seizures and subtle language problems. Sometimes the seizures will start with unusual smells or tastes.

If you are interested in learning more about the parts of the brain and their functions, or about the symptoms of brain tumors, please call us at 800-886-2282 or visit our web site at www.abta.org. If you have symptoms that are concerning you, we encourage you to speak with your doctor. Some of these symptoms can have other causes; your doctor can best determine the next diagnostic step for you

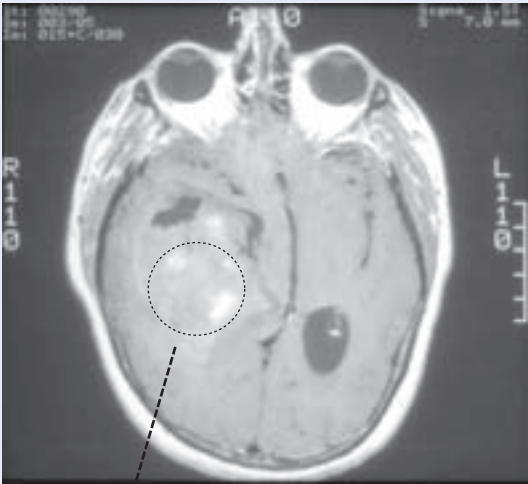
FUNCTIONS OF THE LOBES OF THE BRAIN



Diagnosis

After a neurological examination, done in the office by your doctor, MRI and/or CT scans may be suggested. The calcifications sometimes present in an oligodendroglioma may be seen on a scan, and suggest the diagnosis of oligodendroglioma. Sometimes both an MRI and a CT scan will be ordered; MRI visualizes the softer tissues and blood vessels, while CT can better see structures such as the skull, calcifications within the tumor, and blood.

MRI OF AN OLIGODENROGLIOMA



TUMOR AREA

MRI Courtesy of Dr. Paleologos

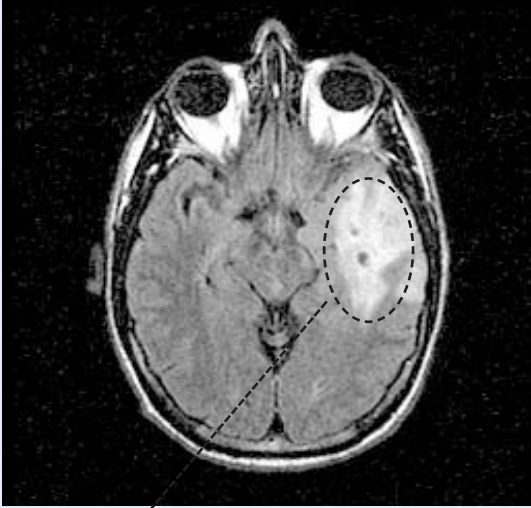
Although scans may give your doctors an educated idea of the tumor type, only examination of a sample of tumor tissue by a pathologist confirms the exact diagnosis and leads to appropriate treatment.

This is why surgery or, minimally, a biopsy will be done to obtain tumor tissue.

Following the surgery, a pathologist will microscopically examine the removed tumor tissue. A report, called a pathology report, will be sent back to your neurosurgeon. If the pathologist is

part of the hospital system, the report will take about 3-5 days. If tissue was also sent out of the hospital to another institution, that report may take a few weeks. The pathology report states the type of tumor and the “grade” of the tumor.

LOW GRADE OLIGODENDROGLIOMA



TUMOR AREA

MRI Courtesy of Dr. Paleologos

Grading tells you how close to normal, or how abnormal, the tumor cells looked when viewed under a microscope. The higher the grade number, the more abnormal the cells, and the more aggressive the tumor. Using the World Health Organization grading system of I through IV, “almost normal” appearing cells are assigned a grade I. The cells of a grade II tumor appear slightly abnormal; grade III tumor cells are definitely abnormal in appearance; and the cells of a grade IV tumor are very abnormal.

In this system, oligodendrogliomas and oligoastrocytomas are usually grade II or grade III tumors. Grade II tumors are considered low grade tumors, which generally grow at a slower rate than grade III tumors. Grade III tumors are anaplastic. Grade II tumors may evolve over time into grade III tumors. “Anaplastic” tumors are malignant tumors. Sometimes anaplastic

oligoastrocytomas contain glioblastoma cells, which are grade IV astrocytoma cells. Those are fast growing, aggressive tumor cells. If your tumor is an oligodendroglioma or anaplastic oligodendroglioma, additional testing may be done to determine if your tumor shows a “loss of chromosomes 1p and 19q.” This laboratory test looks for the presence – or absence – of bits of genetic material called chromosomes. Recent research found that oligodendrogliomas can be further subdivided based on the status of these two chromosomes. If this test is ordered for your tumor, it will take about 2-3 weeks for the results to be returned to your neurosurgeon.

As you learn more about brain tumors, you will often see the word “genetic.” Genetic means “pertaining to the genes” – the tiny parcels that carry cell instructions. *Genetic is not the same as hereditary (the ability to pass disease from one generation to another).* Less than 5% of brain tumors are thought to be hereditary tumors. Those tend to be part of hereditary syndromes, such as neurofibromatosis or Li Fraumeni syndrome, which cause tumors in other parts of the body as well as the brain.

Treatment

SURGERY

Surgery remains the first step in treatment for most brain tumors located in an accessible area of the brain. An “accessible” tumor is one that can be removed without causing severe neurological damage. Numerous tools are available to assist the neurosurgeon in tumor removal. Computer-guided stereotactic navigational systems, along with sophisticated imaging equipment, can help define the exact tumor location. A special functional MRI may help to identify whether or not vital areas of function are mixed in with the tumor or not. Using that information, brain mapping techniques may help outline vital parts of the brain to be avoided during surgery. Lasers and tiny microscopic instruments may be used to further remove tumor tissue. MRI scanners in or

near the operating room can provide up-to-the-moment images of the tumor site.

Even with the use of all of these tools, however, some tumors can be only partially removed because of their location. If the tumor is considered “inoperable,” the neurosurgeon may be able to perform a biopsy to obtain a tissue sample and confirm the exact diagnosis. To learn more about surgery for brain tumors, including pictures from an actual craniotomy, please call us at 800-886-2282 for a free copy of our publication, *Surgery*.

CHEMOTHERAPY

If your tumor is an anaplastic tumor, or a mixed tumor such as an oligoastrocytoma, or if the tissue shows a loss (also called a “deletion”) of chromosomes 1p or 19q, your doctor may talk with you about chemotherapy as part of your treatment plan. Temozolomide (Temodar) is an oral chemotherapy drug that may be suggested. “PCV” is an acronym for the combination of the drugs procarbazine, lomustine (CCNU) and vincristine. Gliadel wafers contain carmustine (BCNU) - they may be placed during surgery in the space created by the removal of the tumor. Drugs given in high doses followed by a stem cell or bone marrow transplant may be considered. There are also several new drugs being tested for oligodendroglioma and oligoastrocytoma - to find those treatment studies, please call the National Cancer Institute’s Cancer Information Service at 800-422-6237.

Chemotherapy may also be used in infants and very young children to delay radiation therapy until the child is older. Clinical trials are underway to evaluate the most effective ways of treating these tumors in infants and children.

There are a few other drugs that may be suggested for someone with a brain tumor. It is not unusual for a tumor to cause swelling, or edema, around the tumor; steroids are drugs used to decrease that edema. Antiepileptic drugs, also called “AEDs” or anticonvulsant drugs, are

used to control seizures. Antiemetic drugs prevent vomiting and help control nausea. Please call our office at 800-886-2282 for additional information on any of these topics.

RADIATION

Radiation therapy may be suggested as an additional treatment for oligoastrocytoma, or for a tumor that does not show a loss of chromosomes 1p or 19q. If the tumor is a low-grade oligodendroglioma, your doctor will determine if radiation therapy is recommended at this time. If your tumor is a high grade tumor, radiation may be given at the time of diagnosis or deferred depending on other factors.

There are different types of radiation, using various doses and schedules. Most forms of radiation, however, are aimed at the tumor and a small area around the tumor. Conventional external beam radiation is "standard" radiation given 5 days a week for 5 or 6 weeks. A form of "local radiation" may be used to boost the conventional radiation. Stereotactic radiosurgery aims converged beams of radiation at the tumor. Intensity-modulated radiation therapy (IMRT) shapes radiation beams to the shape of the tumor. Interstitial radiation, also called brachytherapy, may be implanted into the tumor during surgery. Monoclonal antibodies may be capable of carrying radiation or drugs to the tumor site. Several of these radiation techniques are investigational and are offered in organized studies called "clinical trials." Your doctor can tell you if the radiation technique you are considering is a standard treatment or an investigational treatment.

Just as in treating any disease, treatment for a brain tumor may have side effects. Ask your doctor to talk with you and your family about these potential effects. He or she can also help you balance the risks of treatment against the potential benefits.

Recurrence

Tumors recur or progress when all the tumor cells cannot be removed by surgery or killed by other treatments. Over time, those cells multiply and result in tumor regrowth. A tumor may recur as a higher grade tumor. It may contain a greater percentage of anaplastic cells, more astrocytoma cells, or the tumor may spread into the spinal canal. However, because many oligodendrogliomas are generally slow growing tumors, it may be years before regrowth occurs.

Treatment for a recurrent tumor may be additional surgery, radiation therapy if the tumor was not previously radiated, or a form of local radiation if the tumor was previously radiated. There are also many clinical trials open to those with a recurrent tumor. Researchers are exploring the role of new drugs and new drug combinations. Biodegradable wafers soaked with chemotherapy drugs may be placed at the time of re-operation. Anti-angiogenesis drugs, thought to interfere with the growth of new blood vessels which feed a tumor, are being evaluated and developed. Monoclonal antibodies are being studied for their potential in seeking out tumor cells and killing them, for their ability to carry tumor-killing substances to the tumor, or they may also have anti-angiogenesis properties.

Finding Clinical Trials

To find out more about these new treatments in development, contact the National Cancer Institute's Cancer Information Service at 800-422-6237. They can provide you with a list of clinical trials for your tumor type, and send you information about the way in which these new therapies are studied.

We maintain a resource listing of physicians participating in clinical trials for brain tumors, including oligodendrogliomas and oligoastrocytomas. Call us at 800-886-2282 for a copy. At the same time, ask for a copy of our booklet about clinical trials, or access it online at our web site: www.abta.org.

Prognosis

“Prognosis” is the medical term for a prediction of life expectancy. Keep in mind that these predictions are estimates. When your doctor talks with you about prognosis, s/he will take into account your age, the location of the tumor, grade of the tumor cells, whether your tumor has deletions of 1p and 19q, and the amount of tumor removed during surgery. Low-grade oligodendrogliomas tend to be slow growing tumors. Anaplastic oligodendrogliomas are more aggressive tumors which grow more quickly. Oligoastrocytoma growth generally depends on the percent of astrocytoma in the tumor, as astrocytomas tend to grow more rapidly than oligodendrogliomas. Scientists continue to study the impact of natural biologic differences amongst all of these tumors and the role of various treatment plans.

If you would like detailed information about prognosis, we encourage you to feel comfortable asking your doctor about your expected outcome. Make your question direct, and to the point. Your physician can provide you with prognosis information specific to your tumor and the biology of your tumor. When considering a therapy, ask your doctor how the recommended treatment will affect your prognosis. What are the expected benefits of this treatment? What are the risks? What quality of life can you expect during and after the treatment? If this is an investigational treatment, how many patients with your tumor type have received this treatment, and what were their results?

Resources

Support groups, pen-pal programs, online list serves and chat forums allow you to share experiences with others in the same situation. Social workers can help you find these support networks, as well as sources of financial assistance, transportation help, and/or rehabilitation programs. Ask if your hospital offers a social worker; if not, please feel free to call the ABTA

social work office at 800-886-2282. Your nurses can provide you with information about how to care for yourself, or your loved one. Dietitians can design a healthy eating plan to ensure your body receives the healthy nutrients you'll need during and after treatment. Rehabilitative medicine programs can provide assistance with memory skills, balance challenges, employment skills or other techniques that can help you return to the daily activities important to you.

A Next Step

We offer several ways to keep yourself updated with brain tumor treatment news and support resources. Our free newsmagazine, *MessageLine*, is mailed three times a year. It offers treatment, research, support, and social/fundraising event updates. Call us at 800-886-2282 to receive this mailing. We also offer two free monthly e-mail services: the ABTA Brain Tumor News and/or Tips for Living and Coping. Sign up for these at our web site: www.abta.org. While you are there, our web site offers extensive brain tumor information, treatment explanations, research news, many support suggestions, wellness resources, and patient/family stories.

In addition, ABTA holds regional meetings across the country which bring patients, and their families, in touch with leaders in the brain tumor field.

These meetings offer information about the latest in treatment advances in your community, as well as the opportunity to meet others living with the diagnosis of a brain tumor. An Events & Meetings calendar is posted at our web site (www.abta.org), announced in the *MessageLine* newsmagazine, and shared in the ABTA E-news e-mail messages.

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 helps you communicate better with the people who are caring for you. Our purpose is not to provide answers; rather, we encourage you to ask questions.

Publications & Services

BUILDING KNOWLEDGE

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 (DVD)
Education Packet (Parent or Teacher)
When Your Child Returns to School

SHARING 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
Neuropsychology Resources
Scholarship & Educational Financial Aid Resources
Social Security Disability Resources
Spanish-Language Resources
Transportation Assistance Resources
Wig and Head Covering Resources
Wish Fulfillment Resources

NEWSLETTER

MessageLine Newsletter
Sharing Knowledge, Sharing Hope E-News

FOCUSING ON SUPPORT GROUPS

Listing of Brain Tumor Support Groups
Listing of Bereavement (Grief) Support Groups
Organizing and Facilitating Support Groups
Pen Pal Programs
 Connections (program for patients and family members)
 Bridges (program for those who have lost someone to a brain tumor)
Resources for Online Support
TLC (Tips for Living and Coping) e-bulletin

Single copies of our publications are available free of charge.



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