

Primary Brain Tumors

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Brain tumors are comprised of neoplasm arising from brain tissue itself



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(primary brain tumors), from tissues surrounding (the meninges), from certain structures arising from the brain (the cranial nerves), or from distant sites (metastases).

Although primary brain tumors are not as common as metastatic tumors to the brain, statistics from the National Cancer Institute suggest that more than 17,000 cases of primary brain tumors were diagnosed in the United States last year.

Incidence and Risk Factors

Children are affected commonly by primary brain tumors, as these tumors are the second most common cancer (following blood-related cancers) of pediatric age groups. Young adults are relatively spared, as a second group of patients at risk for primary cancer of the brain occurs between 40 to 70 years of age. The majority of primary brain tumors are discovered in outpatients.

Certainly, risk factors of metastatic brain tumors parallel the incidence of tumor at the site at which the cancer originally developed. For example, lung cancer is more common in smokers, as is metastatic pulmonary cancer to the brain. These associations with regard to primary

brain cancer are, however, more subtle. Whether these lesions develop *de novo* or are influenced by environmental or congenital factors remains the subject of speculation. Epidemiological investigations have implied, but not convincingly proven, the relationship of primary brain tumors with a family history of this particular neoplasm, and with direct contact to pesticides and toxins, as well as exposure to oil and chemical by-products, power lines, and microwaves.

Treatment Strategies

Various treatment strategies based upon both established and some more experimental protocols are available to all our patients. In critically assessing these options, tissue diagnosis is paramount in not only confirming the diagnosis, but also in evaluating the underlying grade, or aggressive behavior, of these tumors. Most patients opt for palliation, and some with very advanced lesions—both in size and biologic activity—choose nothing further be done.

Optimism for the Future—Beyond Primary Brain Cancer

Despite remarkable advances in neurosurgery over the last few decades, most people remain convinced that the majority of brain tumors are inaccessible, inoperable, and incurable. The prognosis of many such lesions varies, depending not only on tissue type, but also on tumor location, size at the time of diagnosis, and whether there is involvement of adjacent structures

Visit Our Website

Western Regional Center for Brain & Spine Surgery is pleased to announce our latest addition—our website located at www.BrainAndSpineOnline.com.

On our website, you will find information regarding our practice including office hours and locations, information on how to schedule an appointment, new patient paperwork that can be downloaded on to your computer and sent to our office, contact and insurance information, office policies, and much more.

In addition, learn more about our physicians and medical staff, about neurosurgery and spine surgery, as well as many of the more common symptoms and conditions that our physicians treat. ♦

within the nervous system. As a result, we hope to embark upon a new era, directed to the treatment of all types of intracranial tumor lesions.

To begin this journey, we must expand upon what we have previously thought of as “brain tumors.” In the past, these lesions were thought of mostly as the cancer of children, adolescents, and adults, arising or recurring from the nerves of the brain itself. We must now recognize that in affecting our patient’s lifestyle or life span, these tumors need not destroy or replace normal tissue of the brain. “Benign” brain tumors are, if properly situated, equally as devastat-

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ing as their malignant cousins.

We must also recognize the diversity of brain tumors encountered in individuals of all ages. Factors such as immune competency, functional status, and the effects of palliation, need all be carefully considered with regard to prognosis and treatment. Paramount, however, after all informed discussions have taken place, is the patient and their family's ultimate wishes.

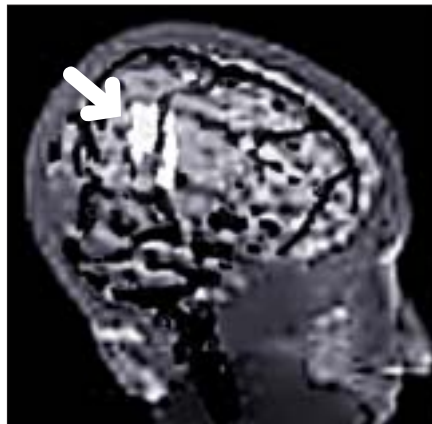
Research and Imaging Advances

As with all forms of cancer, time is of the essence. Research into tumor markers and genetics now play an ever-increasing role in identifying individuals at risk. Advances in imaging have revolutionized the early detection and localization of discrete brain masses or suspected microscopic intracranial disease. Still other imaging techniques assist in the determination of viable tumor within an array of already treated brain tissue.

Many of these same imaging techniques have been merged with other surgically based technologies. This has resulted in intraoperative navigation systems, which allow for real-time localization of not only lesions in question, but also the plotting of pathways through the brain that allow safe passage. Routinely, we can now access areas of the brain previously considered unreachable. With advanced imaging techniques, not only can the tumor be resected, but chemotherapy wafers can also be delivered to the site of tumor recurrences, adding to the effectiveness of tumor removal.

In addition, neurosurgeons have partnered with other specialists, providing the most comprehensive care for all brain tumors, regardless of malignant behavior. Interventional neuro-radiologists, for example, can embolize the vascular supply of many such lesions, minimizing operative bleeding as well as surgical

risks. Micro-catheters can be placed into the blood vessels supplying the tumor. This allows chemotherapy to be selectively delivered to the cancer, relatively sparing the remainder of the brain.



The arrow in this MRI points to a white mass which is the tumor. Blood vessels are indicated by the sinuous, dark areas.

Gamma Knife: Precision Radiation

The latest addition to our armamentarium in the fight against brain tumors actually does not involve an incision. As one of just more than 50 centers in the U.S., the Sunrise Gamma Knife utilizes 201 radioactive cobalt sources focused in such an array that the maximum radiation dose can be centered on a specific point within the brain. The physics of this type of radiation is such that the radiation dose delivered at this particular spot falls off sharply within short distances surrounding it. Thus, high doses of tumor-lethal radiation can be directed against the lesion sparing the adjacent normal brain tissue. By overlapping these radiation "shots" and shaping them with the aid of computer software, lesions up to three centimeters can be treated effectively with the accuracy of a single millimeter utilizing the Gamma Knife.

A Gamma Knife treatment lasts only a few hours. Many patients require an overnight hospital stay, while some may be able to return home on the completion of the "surgery." Other than some mild discomfort with the application of a skull frame, which is needed to identify where the tumor is, the procedure is relatively

painless. Unlike conventional brain radiation treatment, minimal hair loss and no cognitive problems occur. Compared to other treatments of brain tumors, Gamma Knife is also much less expensive.

Currently metastatic disease (the spread of tumors outside of the nervous system to the brain) is the most common indication for Gamma Knife radiosurgery. In addition, the Gamma Knife can be used as an adjunct in treating tissue-diagnosed primary brain neoplasm. While not only effective in the treatment of these cancers, the Gamma Knife is also used in the management of benign intracranial lesions (as well as the treatment of some blood vessel malformations, pain-related conditions, and other selected diseases of the brain).

Not everyone is a candidate for Gamma Knife radiosurgery. As in all treatment of brain tumors, decisions for conventional surgery or radiation treatments, Gamma Knife, or chemotherapy will be made with the input of the neurosurgeon as well as other involved specialists.

Conclusion

As we extend the envelope in the treatment of brain neoplasm, our perception of "brain tumors" must equally be expanded. No longer can we consider these diseases to represent just malignancy of the brain tissue itself. Our goal is to have available in southern Nevada the most modern and effective options for the treatment of any and all brain tumors. By incorporating new technologies, teams of committed specialists, and the support and confidence of our patients, this dream is now a reality.

The Western Regional Center for Brain and Spine Surgery is committed to the comprehensive neurosurgical care of the residents in Nevada and the surround-

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Questions & Answers

In this edition of *Western Neurosurgery Review*, we would like to introduce a Question and Answer section. These questions were gathered from referring physicians, their office staffs, and our patients.

1. Do you accept pediatric patients as part of your practice?

Yes. In fact our practice performs the majority of pediatric neurosurgery in southern Nevada and surrounding communities.

2. Do you perform spine surgery as well as intracranial procedures?

Yes, we have one of the busiest and diverse spine practices in southern Nevada. Our physicians not only evaluate acute and degenerative spine conditions, but also perform complex spinal reconstructive procedures in both adults and pediatric patients. ♦ Our practice directs the neuro/spine injury program at the only Level 1 Trauma Center in southern Nevada. We also routinely treat tumor and vascular disease within the spinal cord itself.

3. At which of the Las Vegas hospitals are your physicians on staff?

All of our physicians have privileges at Sunrise, UMC, Desert Springs, Valley, Mountain View, Summerlin, St. Rose DeLima, and Sienna Hospitals.

4. At which hospitals will your physicians perform surgery?

Our physicians perform surgery at Sunrise, UMC, Desert Springs, Valley, Mountain View, and St. Rose DeLima Hospitals.

5. Which physicians have regular clinics outside of your main Las Vegas office?

Dr. Venger holds regular clinic in the Laughlin, NV, Bullhead City and Kingman, AZ, and St. George, UT offices. ♦ Dr.

Anson sees patients in the Lake Havasu City, AZ office. ♦ Dr. Duke holds clinics in our Henderson, NV office. ♦ All physicians have regular office hours in our main office located at 3006 S. Maryland Parkway, Suite 265 in Las Vegas, NV.

6. Are any of the physicians on hospital medical staffs outside of Las Vegas?

We are also part of the medical staff of Western Arizona Regional Medical Center (Bullhead City, AZ), Kingman Regional Medical Center (Kingman, AZ), Havasu Regional Medical Center (Lake Havasu, AZ), and Dixie Regional Medical Center (St. George, UT). ♦ Dr. Venger has privileges at Western Arizona Regional Medical Center, Kingman Regional Medical Center, Havasu Regional Medical Center, and Dixie Regional Medical Center.

♦ Dr. Anson has privileges at Havasu Regional Medical Center in Lake Havasu City, AZ.

7. Prior to scheduling an appointment, does one of the doctors need to review any records or radiology reports?

The more information our physicians have to review prior to evaluating a patient, the more efficiently we can determine what is necessary to arrive at a correct diagnosis. Generally, we ask that records be sent, if possible, to help facilitate this.

8. Do patients need to bring their actual films with them to their scheduled appointment?

Yes. Before reaching a decision to recommend surgery, we need to personally review all pertinent radiology studies. For this reason, if patients arrive without their actual films, their appointments may need to be rescheduled.

9. Do you accept worker's compensation?

Yes. We accept many out-of-state plans including those in Arizona, Utah, and California.

10. Do you accept attorney liens?

Usually not, unless by prior arrangement with your attorney.

11. Do you have a website?

Yes. Please visit us at www.BrainAndSpineOnline.com. ■

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ing communities of Arizona, Utah, and California. To find out more information regarding brain tumors, their treatment, or any other questions about brain or spine-related diseases, please contact us at (702) 737-1948 or (800) 334-0878. Also, please visit our website at www.BrainAndSpineOnline.com.

Brain Tumor Questions

What is a Brain Tumor?

A brain tumor is a space occupying mass or volume that arises within the brain. The American Cancer Society estimates that 17,200 malignant brain tumors or spinal cord tumors (9,800 in men and 7,400 in women) will be diagnosed during 2001 in the United States. Approximately 13,100 people (7,200 men and 5,900 women) will

die from these malignant brain tumors or spinal cord tumors. Brain tumors and spinal cord tumors account for approximately 1.4% of all cancers and 2.4% of all cancer-related deaths. Both adults and children are included in these statistics.

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Utah	
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What is a Benign vs. Malignant Brain Tumor?

Benign: slowly growing and usually “pushing” on the surrounding normal brain.

The benign tumors are usually slow growing, have a fibrous covering (encapsulation), do not usually invade the brain, and can often be totally removed by surgery. The benign brain tumors include the meningiomas, acoustic neuromas, pituitary gland tumors, cranio-pharyngiomas, germinomas, pinealomas, hemangioblastomas, and other benign brain tumors. Because of the location, however, a benign brain tumor may or may not be able to have complete surgical removal. This means that even a benign brain tumor can be a serious problem if it is in a location that prevents treatment. The location of the brain tumor often

determines if surgery can safely remove the entire brain tumor. If a brain tumor is deep in the brain, surgery may not be able to safely remove the tumor in all cases.

Malignant: rapidly growing and usually invading normal brain tissue.

The malignant brain tumors are more rapidly growing, usually lack a covering, usually invade the brain, and often cannot be entirely removed surgically. The malig-

Various treatment strategies based upon both established and some more experimental protocols are available to all our patients.

nant brain tumors include the glioblastomas, anaplastic astrocytomas, gliosarcomas, malignant meningiomas, chordomas, pineoblastomas, medulloblastomas, primary CNS lymphomas, brain metastases,

and other malignant brain tumors.

What causes a Brain Tumor?

Source

Brain tumors can arise from the uncontrolled division of cells that normally occupy the brain or they can arise from growth of cells that arise elsewhere in the body but travel to the brain.

Family History

Rare brain tumors can run in families. Neurofibromatosis type 2 is an inherited condition associated with schwannomas of both acoustic (hearing) nerves and in some patients, multiple meningiomas, or spinal cord ependymomas. Patients with tuberous sclerosis may have noninfiltrating subependymal giant cell astrocytomas in addition to benign tumors of the skin, heart, or kidneys. □