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REVIEW ON BRAIN TUMOR

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ABSTRACT

Brain tumor typing is a major task in the daily practice of clinical neuropathologists. For more than 100 years, brain tumors have been classified on the basis of a histogenetic concept, with the definition of more than 120 brain tumor entities over time. In the past decades, biomedical research on brain tumors has led to the identification of clinically meaningful diagnostic, prognostic, and predictive molecular markers. Taking this progress into account, the 2016 update of the World Health Organization classification of tumors of the central nervous system has incorporated for the first time molecular markers for definition of brain tumor entities. This development has resulted in integrated diagnostics on the basis of histologic and molecular characteristics. This chapter summarizes essential features of brain tumors in the light of integrated diagnostics. To provide a comprehensive view on the individual tumor entities, we included crucial epidemiologic, clinical, and neuroradiologic aspects as well. In addition we illustrate neuroimaging and histologic characteristics of the various tumor types. In this way we aim to provide concise up-to-date insight into the nature and classification of brain tumors.

KEYWORDS: Brain tumor typing; Clinical neuropathology; Integrated diagnostics; Molecular markers; WHO classification.

INTRODUCTION

The possibility of being diagnosed with a brain tumor is a shocking and life-changing event. If your doctor suspects a brain tumor, it is important to seek out other doctors specialized in diagnosing and treating brain tumors. The brain is a complex and vital organ, and treatment often causes life-long changes. It is important to get specialists' opinions and updated medical information about treatment options for the specific type of brain tumor. The brain and spinal

column make up the central ervous system (CNS), where all vital functions are controlled. These functions include thought, speech, and body movements. This means that when a tumor grows in the CNS, it can affect a person's thought processes or the way they talk or move.

For decades, in patients with brain tumors, changes of contrast enhancement extent on MRI are traditionally used as an indicator of therapy response or tumor relapse.[1] However, contrast enhancement resulting from increased blood-brain barrier (BBB) permeability is nonspecific and may not always be an accurate surrogate of neoplastic tissue, tumor extent or treatment effect.[2] In order to overcome the limitations of the assessment of tumor response to antiangiogenic treatment by evaluation of contrast enhancement changes only, the Response Assessment in Neuro-Oncology (RANO) group suggested in 2010 new recommendations for evaluating response.[3]

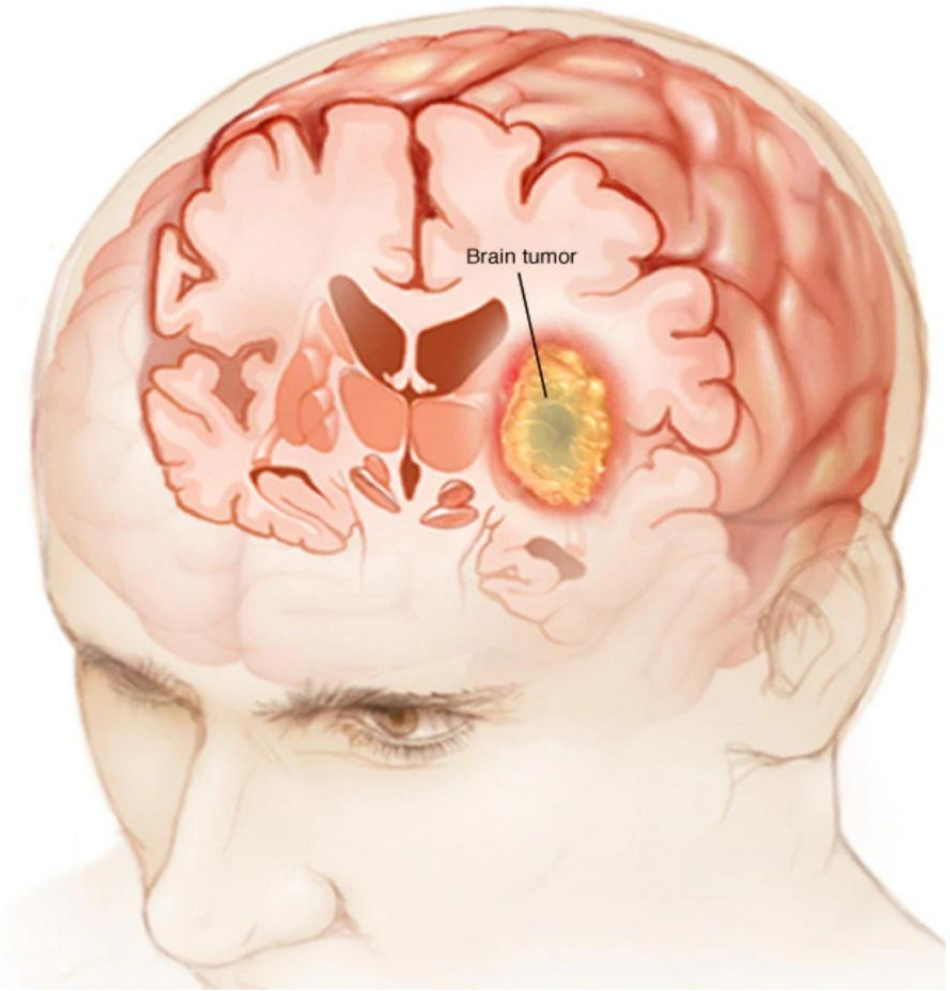

Figure No. 1: Brain tumor.

CAUSES OF BRAIN TUMOR

1) Primary brain tumors originate in the brain itself or in tissues close to it, such as in the brain-covering membranes (meninges[4]), cranial nerves, pituitary gland or pineal gland.
2) Primary brain tumors begin when normal cells acquire errors (mutations) in their DNA. These mutations allow cells to grow and divide at increased rates and to continue living when healthy cells would die. The result is a mass of abnormal cells, which forms a tumor.
3) In adults, primary brain tumors are much less common than are secondary brain tumors, in which cancer begins elsewhere and spreads to the brain.

Location of Different Types of Brain Tumors

Many different types of primary brain tumors exist. Each gets its name from the type of cells involved. Examples include:

Gliomas[5]: These tumors begin in the brain or spinal cord and include astrocytomas, ependymomas, glioblastomas, oligoastrocytomas and oligodendrogliomas.

- **Meningiomas[6]:** A meningioma is a tumor that arises from the membranes that surround your brain and spinal cord (meninges). Most meningiomas are noncancerous.
- **Acoustic neuromas (schwannomas):** These are benign tumors that develop on the nerves that control balance and hearing leading from your inner ear to your brain.
- **Pituitary adenoma: These are mostly benign tumors that develop in the pituitary gland at the base of the br**ain. These tumors can affect the pituitary hormones with effects throughout the body.
- **Medulloblastomas**: These are the most common cancerous brain tumors in children. A medulloblastoma starts in the lower back part of the brain and tends to spread through the spinal fluid. These tumors are less common in adults, but they do occur.
- **Germ cell tumors:** Germ cell tumors may develop during childhood where the testicles or ovaries will form. But sometimes germ cell tumors affect other parts of the body, such as the brain. Primary mediastinal nonseminomatous germ cell tumors represent a rare but important.[7]
- **Craniopharyngiomas[8]:** These rare, noncancerous tumors start near the brain's pituitary gland, which secretes hormones that control many body functions. As the craniopharyngioma slowly grows, it can affect the pituitary gland and other structures near the brain.

Types of Brain Tumor

Acoustic neuroma

- Astrocytoma
- Brain metastases
- Choroid plexus carcinoma
- Craniopharyngioma
- Embryonal tumors
- Ependymoma
- Glioblastoma
- Glioma
- Medulloblastoma
- Meningioma
- Oligodendroglia
- Pediatric brain tumors
- Pineoblastoma
- Pituitary tumors

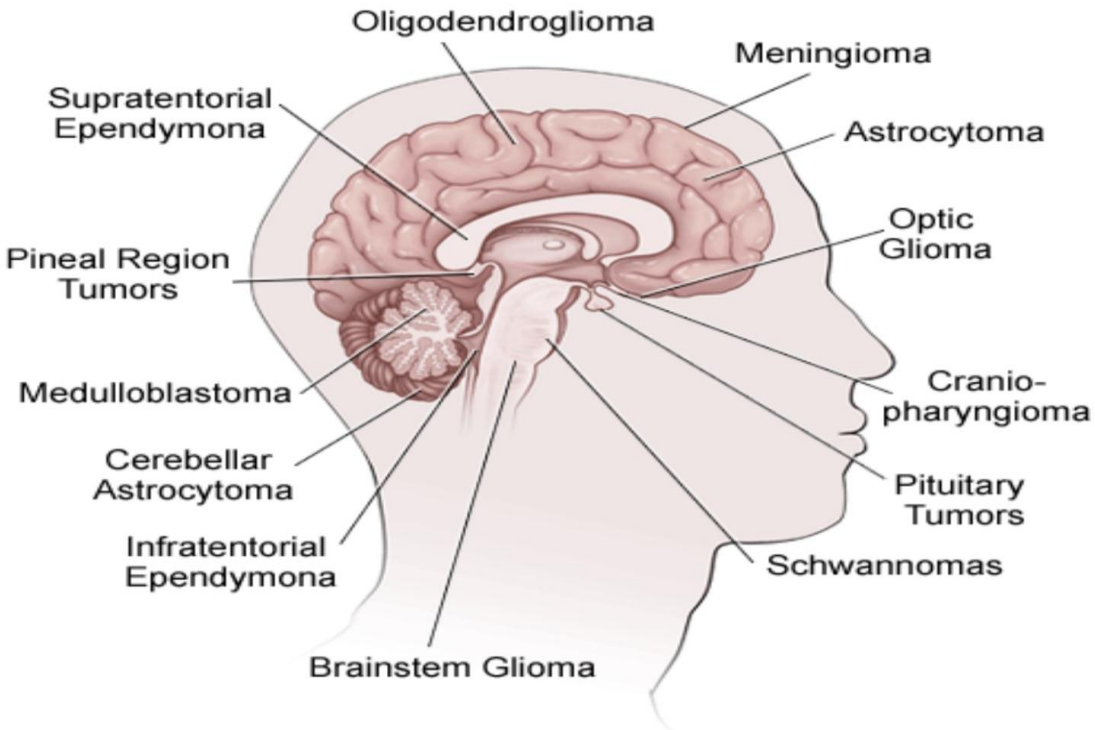

Figure No. 2: Location of Different Types of Brain Tumors.

Common symptoms

General signs and symptoms caused by brain tumors may include:

1) New onset or change in pattern of headaches
2) Headaches that gradually become more frequent and more severe
3) Unexplained nausea or vomiting
4) Vision problems, such as blurred vision, double vision or loss of peripheral vision
5) Gradual loss of sensation or movement in an arm or a leg
6) Difficulty with balance
7) Speech difficulties
8) Confusion in everyday matters
9) Personality or behavior changes
10) Seizures, especially in someone who doesn't have a history of seizures
11) Hearing problems.[9]

TREATMENT

Treatment for brain tumors depends on a number of factors including the type, location and size of the tumor as well as the patient's age and general health. Treatment methods and schedules differ for children and adults.

Brain tumors are treated with surgery, radiation therapy and chemotherapy. Our doctors also are studying a vaccine for treating a recurrent cancer of the central nervous system that occurs primarily in the brain, known as glioma.

Depending on your needs, several methods may be used. Our team includes neurosurgeons, medical oncologists, radiation oncologists, nurses, a dietitian and a social worker, who work together to provide the best possible care.

Before treatment begins, most patients are given steroids, drugs that relieve swelling or edema. You may receive anticonvulsant medicine to prevent or control seizures.

1) SURGERY

Surgery is the usual treatment for most brain tumors. To remove a brain tumor, a neurosurgeon makes an opening in the skull. This operation is called a craniotomy. Whenever possible, the surgeon attempts to remove the entire tumor. If the tumor cannot be completely removed without damaging vital brain tissue, your doctor may remove as much of the tumor

as possible. Partial removal helps to relieve symptoms by reducing pressure on the brain and reduces the amount of tumor to be treated by radiation therapy or chemotherapy.

Some tumors cannot be removed. In such cases, your doctor may do only a biopsy. A small piece of the tumor is removed so that a pathologist can examine it under a microscope to determine the type of cells it contains. This helps your doctor decide which treatment to use.

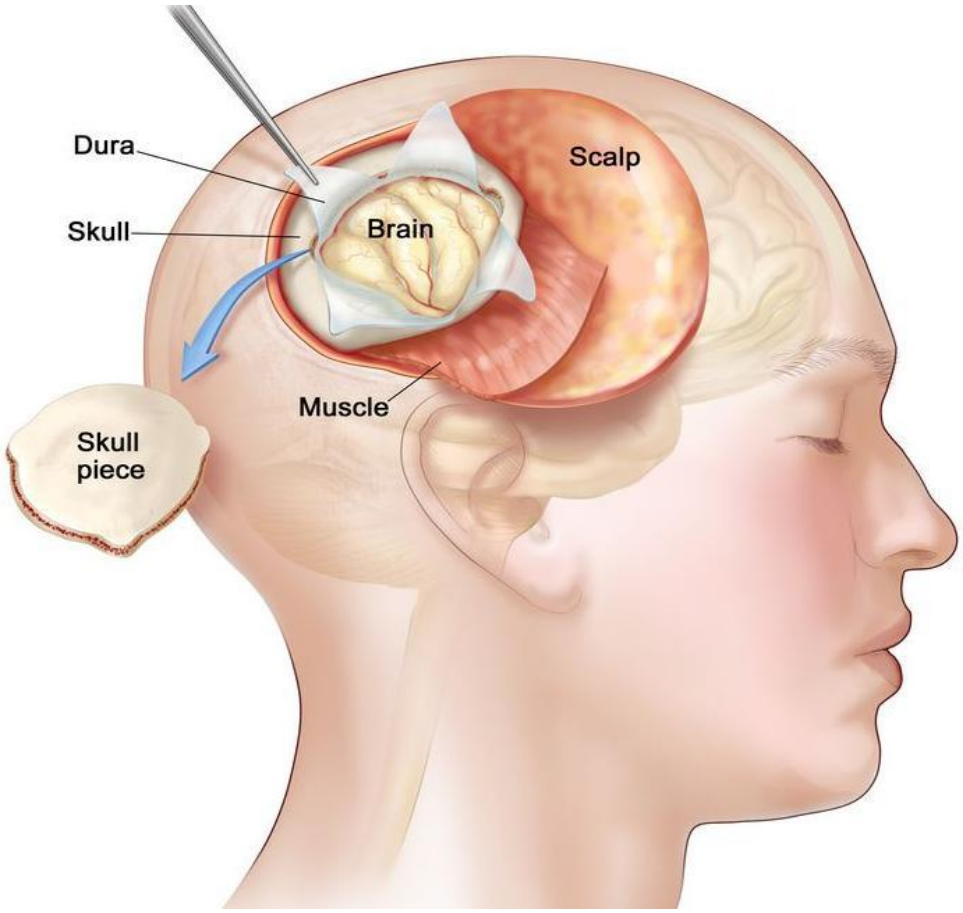

Figure No. 3: Craniotomy.

Sometimes, a biopsy is done with a needle. Doctors use a special head frame (like a halo) and CT scans or MRI to pinpoint the exact location of the tumor. The surgeon makes a small hole in the skull and then guides a needle to the tumor. Using this technique to do a biopsy or for treatment is called stereotaxis.

2) RADIATION THERAPY[10]

Radiation therapy, also called radiotherapy, is the use of high-powered rays to damage cancer cells and stop them from growing. It is often used to destroy tumor tissue that cannot be removed with surgery or to kill cancer cells that may remain after surgery. Radiation therapy

also is used when surgery is not possible. The Gamma Knife, or stereotactic radiosurgery, is another way to treat brain tumors. The Gamma Knife isn't actually a knife, but a radiation therapy technique that delivers a single, finely focused, high dose of radiation precisely to its target. Treatment is given in just one session. High-energy rays are aimed at the tumor from many angles. In this way, a high dose of radiation reaches the tumor without damaging other brain tissue.

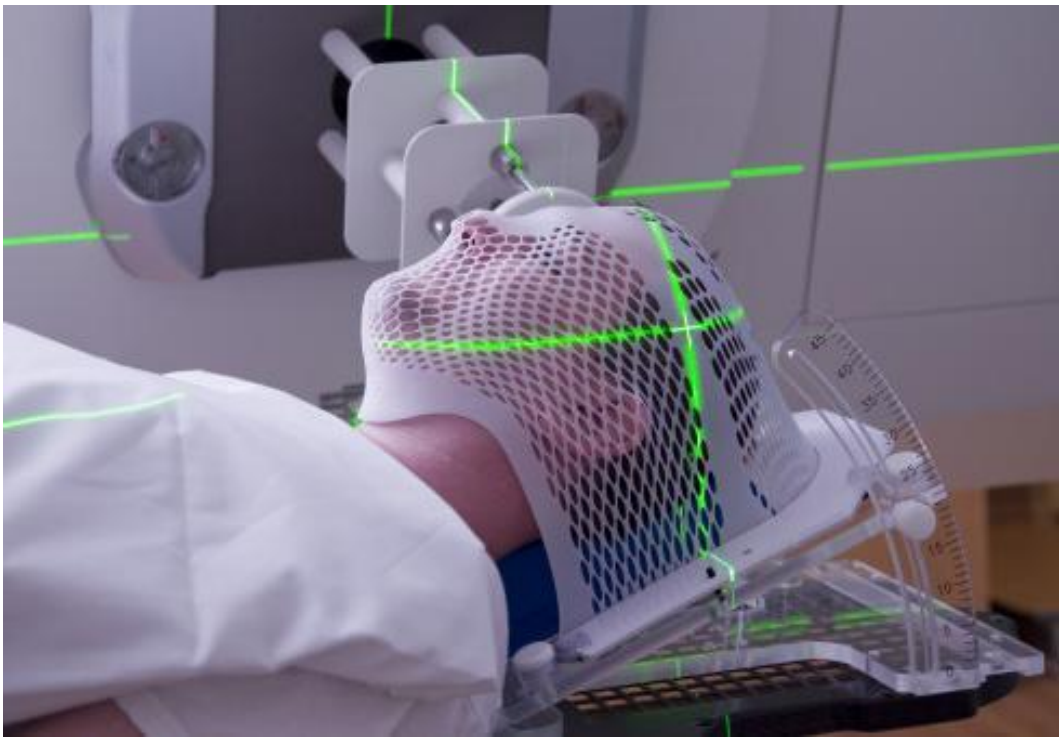

Figure No. 4: Radiation Therapy.

3) CHEMOTHERAPY

Is an aggressive form of chemical drug therapy meant to destroy rapidly growing cells in the body. It's usually used to treat cancer, as cancer cells[11] grow and divide faster than other cells. A doctor who specializes in cancer treatment is known as an oncologist.[12] They'll work with you to come up with your treatment plan. Chemotherapy is the use of drugs to kill cancer cells. The doctor may use just one drug or a combination, usually giving the drugs orally or by injection into a blood vessel or muscle. Intrathecal chemotherapy involves injecting the drugs into the cerebrospinal fluid.

Chemotherapy is usually given in cycles. A treatment period is followed by a recovery period, then another treatment period and so on.

How does chemotherapy work?

Chemotherapy works by stopping or slowing the growth of cancer cells, which grow and divide quickly. It can also harm healthy cells that divide quickly, such as those that line your mouth and intestines or cause your hair to grow. It targets cells that grow and divide quickly, as cancer cells do. Unlike radiation or surgery, which target specific areas, chemo can work throughout your body. But it can also affect some fast-growing healthy cells, like those of the skin, hair, intestines, and bone marrow. That's what causes some of the side effects from the treatment.

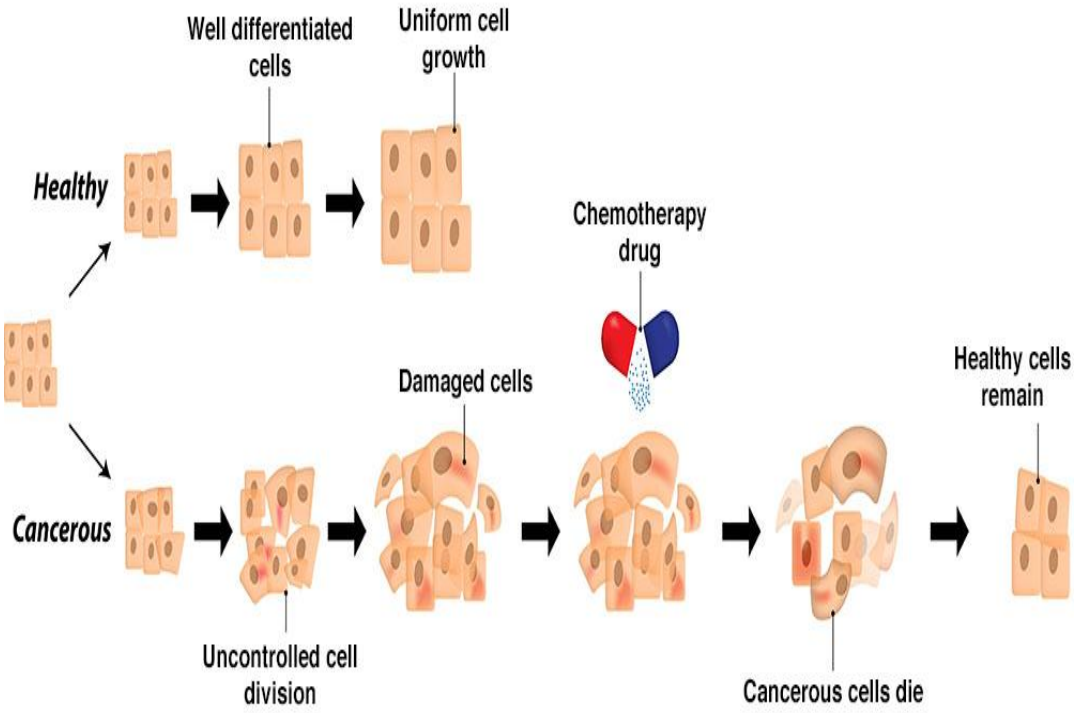

Figure No. 5: How chemotherapy work.

How can you prevent a brain tumor?

There's no way to prevent brain cancer, but you can reduce your risk of getting it if you:

- avoid exposure to pesticides and insecticides
- avoid exposure to carcinogenic chemicals
- avoid smoking
- avoid unnecessary exposure to radiation

Who is at risk of developing a brain tumor?

People who have higher risk for brain tumors include those who have:

- Family history of cancer.

- Genetic mutation that causes abnormal cell growth.
- Long-term exposure to radiation from X-rays or treatment for other cancers.
- Exposure to certain chemicals (possible cause).

CONCLUSION

From the above review study, it is easy and clear information about Brain tumour. It also help in knowing about what is Brain tumor, how it is, treatment methods as well as Cause and prevention. Patients who suffers from brain tumor which is not well known about Brain tumour and it's symptoms they can easily get knowledge about Brain tumour from above Review study.

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