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Brain Tumor

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Introduction:

About 500 children and adolescents in the UK are affected by brain tumors each year, making them the most prevalent solid tumor in children [1]. They currently account for the majority of pediatric cancer-related mortality [2]. Their symptom interval, or the amount of time between the beginning of symptoms and the diagnosis, reflects the challenges their condition presents. Some brain tumors can still be identified with ease [3]. Malignant neoplasms are thought to have caused 123,782 deaths in England and Wales in 1975, or 21% of all fatalities.

Brain tumors make up 2% of all tumor while neuroectodermal tumors make up approximately 0.7% of adult malignancies. A review of gliomas in the Wessex Region of Southern England (Barker, Weller, & Garfield, 1976) found that the annual incidence of malignant glial tumors peaked in the sixth decade at 7.3/100,000, with a rate of 3.94/100,000. There are multiple primary classifications for intracerebral tumors [4].

The complexity of treating patients with brain tumors presents a challenge for primary care physicians, even though they play a vital role in prompt identification and care coordination. Due to the higher alterations in the tumor region's texture, shape, discontinuity, irregularity, and borderline gliomas, brain tumors are more challenging to identify. Manually evaluating the medical photos is a time-consuming and error-prone process . Gliomas are glial cell-derived tumors that fall within the grade I to IV category.

History of brain tumor:

The history of brain tumors includes:

- **Skull trepanation**

- Doctors employed skull trepanation to lower intracranial pressure; it most likely started in ancient Africa and South America.

- The first brain tumor to be successfully removed William Macewan successfully removed the first brain tumor from a young woman in 1879.
- In 1886, Dr. Hirschfelder and Morse performed the first known excision of a primary brain tumor in San Francisco [6].

- **Brain Tumour Society**

- n 1989, Bonnie and Sid Feldman, Richard B. Ross, and other volunteers founded the BTS to raise funds for brain tumor research.

- **Neuroimaging**

- The first major advancement in modern neuroimaging was contrast agent-enhanced computed tomography. Other noteworthy advancements were magnetic resonance imaging and diffusion-weighted sequencing. [7]

Symptoms Of Brain Tumour:

- Headaches.
- Seizures (fits)
- Persistently feeling sick (nausea)
- Being sick (vomiting)
- Drowsiness.
- Mental or behavioural changes, such as memory problems or changes in personality[28].
- Progressive weakness or paralysis on one side of the body.
- Vision or speech problems[8].

Cause of brain tumor:

- **Age**: The ages between 85 and 89 people are acquire brain tumor, and the risk rises with age.
- **Radiation**: A number of genetic disorders, including Turner syndrome, neurofibromatosis type 1, and tuberous sclerosis, can raise the chance of getting brain tumor.
- **Exposure**: The chance of developing a brain tumor may be raised by exposure to high-dose radiation therapy, CT scans, or head X-rays [9].
- **Hereditary conditions**: Turner syndrome, neurofibromatosis type 1, and tuberous sclerosis are among the hereditary abnormalities that can raise the risk of brain tumor development.
- **Immune system disorders**: Individuals affected by brain and spinal cord lymphomas [27].
- **Chemicals:** The risk of brain tumor development may be raised by exposure to specific solvents and pesticides, including benzene, toluene, xylene, organophosphates, and carbamates.

- **Cancers that metastasize**: Adult brain tumors are more likely to be metastases of cancers which began elsewhere and moved to the brain. For instance, brain metastases occur in roughly 10% to 15% of patients with stage IV breast cancer [10].
- A balanced diet full of fruits, vegetables, and whole grains will lower brain tumor[11] Steer clear of sweets and processed meals [12]

Types of brain tumor :

- Brain tumors that resemble gliomas: Gliomas are growths of cells that resemble glial cells. In the brain tissue, glial cells envelop and sustain nerve cells [13].
- The cells that produce the fluid that envelops the brain and spinal cord are the initial site of choroid plexus malignancies. We refer to this fluid as cerebrospinal fluid. Tumors of the choroid plexus are found in the brain's ventricles, which are fluid-filled chambers. Tumors of the choroid plexus may be benign or malignant. The malignant variant of this kind of brain tumor is called choroid plexus carcinoma. Children are more likely to have it [14].
- Tumors of the embryo: Cells leftover from fatal development are where embryonal cancers start. After birth, the cells—known as embryonal cells—remain in the brain. Malignant brain tumors known as embryonal tumors typically affect infants and young children. Medulloblastoma is the most prevalent kind of embryonal malignancy. It is typically found in the cerebellum, a region of the brain in the lower back [15].
- **Germ cell tumors:** Germ cell tumors start during reproductive phase [16]
- **Pineal tumors**: Pineal tumors originate in the area surrounding the pineal gland in the brain. The brain's centre is home to the pineal gland. It produces melatonin, a hormone that promotes sleep. Both benign and malignant pineal tumors are possible. Children are most commonly affected by pine blastoma , a malignant form of pineal tumor [17].
- The brain tumors known as meningiomas originate in the membranes surrounding the brain and spinal cord. Although they are typically benign, meningiomas can occasionally be cancerous. The most prevalent kind of benign brain tumor is a meningioma [18].
- **Nerve tumors**: Growths in and around nerves are known as nerve tumors. Acoustic neuromas, also known as schwannomas, are the most prevalent kind that occur in the head. The primary nerve that links the brain and inner ear is where this benign tumor is situated [19].
- **Pituitary tumors**: The pituitary gland and its surroundings can be the site of brain cancers. This little gland is situated close to the brain's base. The majority of pituitary gland tumors are benign in nature. The pituitary gland itself is the site of pituitary tumors. One kind of brain tumor that develops close to the pituitary gland is called a craniopharyngioma.[20]

Etiology of brain tumor:

- No clear factor.
- Familial tendency.
- Immuno suppression.
- Environmental factors.
- Research studies show use of cellular phones,hair dyes,and head trauma can lead to brain tumors.

Diagnosis

It is usually diagnosed through combination of tests, including:

- **Neurological examination**: A physician assesses your reflexes, muscle strength, coordination, hearing, vision, and balance. They might also test your capacity to discriminate between heat and cold and to feel pinpricks.
- **Imaging scans**: To produce fine-grained pictures of your brain, a physician may employ an MRI, PET-CT, or CT scan. An MRI uses a powerful magnetic field.
- **Biopsy**: Examine tumor, a physician may take a sample of tissue. This can assist find biomarkers that can help tailor treatment and help assess the grade of the tumor. Typically, a biopsy is only performed when it is safe [21].
  Electrodes are affixed to your scalp to record brain activity during an electroencephalogram (EEG). If you are suspected of experiencing epileptic fits, this can assist identify anomalies [22].
- **Ophthalmoscope:** A physician uses this tool to examine your optic nerve, which may protrude if your skull is under pressure.
  The test results might be used by a physician to establish a treatment plan and validate your diagnosis.

Treatment

Brain tumour treatment options are determined by the tumor's kind, size, location, and grade in addition to the patient's preferences and general health. Typical therapies include the following:

- **Surgery**
  The most popular method of treating brain tumors. Through surgery, the tumors can be removed entirely, as much of it as possible, or a sample can be taken for diagnosis [23].
- **Radiation therapy**
  It can reduce the tumor's size, halt its growth, or stop it from returning. Proton treatment, stereotactic radiosurgery, and external beam radiation therapy are a few forms of radiation therapy [29].
- **Chemotherapy**
  It minimizes harm to healthy cells while using medications to harm or kill cancer cells. Following surgery, chemotherapy may be given, occasionally in conjunction with radiation therapy [24].
- **Targeted treatment**
  It focuses on particular characteristics of cancer cells in order to shield healthy cells from harm.
- Additional therapies include clinical trials, supportive care, active surveillance, tumor treatment, and rehabilitation and follow-up care.
  Small, asymptomatic, non-cancerous brain tumors may not require immediate treatment [25].
- Immunotherapy fight against cancer [30

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