

Hemifacial Spasms

An e-book

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Edition : 1

Published on : 1st June 2018

Introduction

With the rapid advances in neurosurgery, brain tumours have become increasingly more treatable.

Early diagnosis and high degree of suspicion are the key elements for aiming a cure. Also....getting treatment in specialised centres which treat brain tumours frequently is essential, as these centres are likely to be having expertise and modern equipments to treat these difficult conditions.

FAQs: Frequently Asked Questions

What is the incidence of brain and CNS tumours?

Exact incidence is unknown in India, but with increasing awareness and scanning facilities the incidence is showing a rapid upward trend.

2014 CBTRUS (Central Brain Tumour Registry of the United States) data estimates that in 2015 around 70,000 new cases of brain and CNS(Central Nervous System) tumours are expected to be diagnosed in the USA.

An approximate extrapolation would tell us that in India about 300,000 new cases will be diagnosed and to this will be added 12,00,000 cases of secondary brain and CNS tumours....making a total of about 15,00,000 tumours to deal with per year.

Considering that Maharashtra harbours about 9.5 percent of Indian population, this figure becomes 150,000 brain and CNS tumours to deal with per year.

This is a very large number considering the total number of neurosurgeons properly trained in handling these tumours.

(This is an approximate estimate, but gives a general idea in the absence of the faithful statistics.)

What are the symptoms of brain tumours?

The symptoms can broadly be divided in three groups

I) RAISED ICP (INTRA CRANIAL PRESSURE) SYMPTOMS

Unlike other organs in human body such as stomach, the brain is housed in a rigid cavity (skull). As a tumour grows in size, the bony skull cannot expand to accommodate it and the pressure inside skyrockets. This is called raised Intra Cranial Pressure (ICP).

The symptoms of raised ICP are varied and include :

- Headache
- Nausea and vomiting
- Double vision
- Irritability
- Drowsiness or loss of consciousness

II) SYMPTOMS DUE TO LOSS OF A PARTICULAR BRAIN FUNCTION

As the brain tumours progressively increase in size, they hamper the function of the part of the brain where they grow. This set of symptoms varies greatly depending on the area the tumour occupies.

Examples-

- A tumour in the right parietal motor area will cause progressive loss of power in the opposite side...i.e....left sided limbs and face.
- A tumour in the dominant-sided (usually the left) posterior temporal area will severely hamper the language function and cause inability to comprehend language.
- A tumour in the pituitary gland will cause hormonal imbalances and will press on the optic chiasma....causing vision to fail.
- A tumour in the cerebellum will cause loss of balance and inability to carry out co-ordinated tasks.

III) SYMPTOMS DUE TO THE TUMOUR CAUSING INCREASED IRRITABILITY OF THE SURROUNDING BRAIN STRUCTURES.

The most important example of this is known as seizures, epileptic attacks or simply, 'fits'.

Other symptoms of irritation of surrounding area include:

- Tinnitus (buzzing or humming sound in the ear),
- Facial twitching and
- Trigeminal neuralgia pain

An estimated 55 to 60 percent of brain tumours will have fits sometime or the other during the course of the disease.

During a seizure or 'fit', one or more of the following symptoms may arise....

- Repeated jerking of one or more limbs
- Violent jerking of the entire body and a fall
- Repeated and uncontrollable lip smacking or automatic chewing movements
- Loss of contact with the surroundings
- Loss of consciousness
- Experiencing extreme fear
- Experiencing bad smell
- Frothing at the mouth
- Passing urine involuntarily
- Tongue bite.
- Backward arching of the body
- Repeated eyeball movements or up-rolls.
- Production of loud sounds involuntarily

- Shallow and rapid breathing

IV) SUDDEN LOSS OF CONSCIOUSNESS OR DEEP COMA:

The fourth type of the clinical presentation is rare but very serious. It may be avoided if the tumours are diagnosed early in the course of their development. But if left untreated, or if the tumour is asymptomatic, patients may suddenly decompensate and become comatose. Indeed, there can be sudden death. Luckily these cases are rare.

Frequent causes of such presentation are

1. Sudden massive internal bleeding in the tumour.
2. Sudden blockage in the flow of the watery fluid (the cerebro spinal fluid) due to sudden obstruction by a critically located tumour. Commonest example is a colloid cyst blocking the foramen of Monro.
3. A particularly violent seizure causing sudden death (a rare instance).

What are the risk factors and causative agents for brain tumours?

Only a few risk factors and causative agents have been identified. But in most cases, the exact reason remains unknown.

1. Genetic susceptibility for developing brain tumours is heightened in some Familial disorders (Gene abnormalities running in the family)
 - a. Neurofibromatosis type 1 and 2
 - b. Von Hippel Lindau Disease
 - c. Turcot syndrome type 1 and 2
 - d. Tuberous sclerosis
 - e. Li-Fraumeni syndrome
2. Chronic exposure to some agents
 - a. Vinyl Chloride – This is a highly unstable and combustible chemical in-between product. Final product is stable and is called as polyvinyl chloride or PVC. It is used in pipes and bottles. Also used in some vehicular parts and seat covers, furniture and domestic appliances.
 - b. Viruses – People with HIV infections and Epstein-Barr viral infections have higher incidence of primary brain lymphoma.
 - c. Radiation – People subjected to medical or industrial radiation have a higher incidence of some types of brain tumours (Meningioma and glioma).
3. Hormonal therapy
 - a. Hormonal receptors have been found on certain tumours called Meningiomas and women on HRT (Hormone Replacement Therapy) could have a slightly higher risk of developing these tumours.

Are radiofrequency waves responsible for brain tumours?

Though a lot of research is still on-going, no conclusive cause-effect relationship has yet emerged. Even laboratory studies have failed to demonstrate definitive carcinogenic effects on the cells.

Are brain tumours hereditary?

The word “hereditary” has many meanings. For example answer to the question “Is baldness hereditary?” Is a “Yes”....Because there is a very high chance of this being transmitted from father to his son.

Brain tumours are not hereditary in that sense. However, in a very small percentage of genetic conditions including the ones enumerated in the previous section, the possibility of the tumour gene getting transmitted is higher than the normal population. This does not mean that one should become overly anxious if your family member has a brain tumour.

Does excessive thinking cause brain tumour?

This is a very commonly asked question in our brain tumour center and the answer is a big NO.

At least till date there is no evidence for this kind of premise.

Does a chronic psychiatric disease cause brain tumour?

Certainly not. But it will be worthwhile remembering that some brain tumours can and do present with psychiatric symptoms and behaviour changes.

Especially the tumours growing in the frontal and temporal lobes are notorious for this. Pituitary tumours, due to the hormonal imbalances they induce, can present with behavioral changes.

Does talking excessively on the mobile phones cause brain tumours?

As stated in the previous section.....though a lot of research has already gone into this ...and indeed still going on, there is no clear evidence to sound a serious alarm and as of today, one can assume that there is no clear cut cause and effect relationship between the two.

What are the Principal categories of brain tumours(How are brain tumours classified)?

Brain tumours are classified in three main ways:

1. Cancerous (Malignant) V/S non-cancerous (Benign)
All the brain tumours are not malignant and some are benign. However as both occur in brain.....they are dangerous even when small in size and generally need treatment.
2. Primary (Developing only in the brain) V/S Secondary or Metastatic (which spread to the brain from outside organs...common being lungs, breast, colon, kidney, thyroid and skin.)
3. The third classification is based on the exact anatomical location inside the skull.
The exact location of the tumour inside the skull will have a very specific set of symptoms, surgical challenges and outcomes.....and hence this classification is important.

Broad categories would be:

- Skull Base tumours
- Foramen Magnum tumours
- Orbital tumours
- Falcine and parafalcine tumours
- Tentorial tumours
- Posterior Fossa tumours
- Cerebello-Pontine angle tumours
- Pineal region tumours
- Sellar-Suprasellar tumours
- Intra-ventricular tumours
- Foramen of Monro tumours
- Anterior Cranial fossa tumours
- Middle Cranial Fossa Tumours
- Parietal Tumours
- Temporal tumours
- Occipital tumours

Which are the pathological types of primary brain tumours?

Pathologically, the brain tumours are classified in multiple varieties. There are more than a hundred types of these tumours. (About 120 types in the WHO classification)

Except for the metastatic tumours, these tumours primarily arise from various structures inside the skull.

- Neurons or the nerve cells or the progenitor cell.
eg. Ganglio-gliomas
Medulloblastomas

- Glial cells or the supporting cells for the neurons
eg. Astrocytoma
Oligodendroglioma
- Cells of the meninges or the three coverings of the brain. (Pia, arachnoid and dura mater)
eg. Meningioma
- Cells of the blood vessels of the brain
eg. Haemangioma
Haemangioblastoma
- The inner and the middle portion of the skull bone
eg. Osteoma
- Part of the skull at the Base of the brain
eg. Chordoma (from notochord remnant)
- Cells lining the ventricular chambers inside the brain (Ependyma)
eg. Ependymoma
- Cells of the Choroid Plexus, which is normally responsible for production of the water-like liquid called CSF.
eg. Choroid Plexus papilloma
- Pituitary cells
eg. Pituitary adenoma
- Pineal gland cells
eg. Pineocytoma

If someone is diagnosed with a brain tumourdoes it mean that person's days are numbered?

No. We cannot definitely say this as a sweeping statement.

In the last few years with modern neurosurgical techniques, many brain tumours can be successfully removed, radiated and potentially cured.

Does that mean there is a cure?

It depends on three factors:

1. How malignant is the tumour. ..or. simply....how cancerous is the tumour
2. How early is it detected?
3. Early detection of the tumour can allow for complete removal with optimal sparing of the surrounding brain functions.
4. How well equipped is the treating center and how well-trained are the staff in this particular field?

This statement, though true about any medical condition, is particularly true about brain and spine surgery. This is because these delicate organs need a high degree of technological support and multidisciplinary presence.....preferably at one place.

Human expertise and training needs no further emphasis.

How are brain tumours treated? Can Chemotherapy be given for brain tumours?

Various modalities can be used to treat brain tumours depending on the type, grade and location of the tumour.

One important caveat in brain tumour treatment is the fact that the blood vessels of the brain have what is called as the “blood-brain barrier”.

In simple words, it means that these blood vessels are highly selective in deciding which chemicals they are going to allow to cross over to the brain matter. This is nature’s way of ensuring that the delicate brain tissue is not exposed to the toxic chemicals carried by the blood. This maintains chemical sanctity of the brain tissue....ensuring it’s smooth functioning. But this is bad news for chemotherapeutic chemicals which are otherwise used in the cancers elsewhere in the body....because the very same blood brain barrier doesn’t allow many chemotherapeutic agents to cross across to the brain and the tumour tissue.

Although the barrier weakens in the abnormal blood vessels present in the tumour, it is not entirely absent.

This is the reason that chemotherapy has severe limitations in the treatment of the brain tumours.

This is also the reason that the best results are usually achieved when surgical resection is complete and is followed....if necessary by radiation therapy and perhaps limited chemotherapy.

What are different options for treatment of brain tumours?

The modalities used in the treatment are as follows :

1) Complete surgical resection

With the availability of high-standard Microscopes, Endoscopes and other instruments, complete surgical resection of brain tumours has become a possibility in selected tumours. In brain and spine surgery.....one has to keep a very fine balance between complete tumour resection on the one hand, and preservation of critical brain function on the other.



2) Only biopsy

In some tumours which are deeply located and are infiltrating the important brain centres.....a computer-guided stereotactic biopsy done through a small hole of about half a centimetre diameter isif necessaryfollowed by radiation therapy and other modalities.

However this is a compromise as the tumour is not surgically removed in this method.



3) Radiation Therapy

This is an important adjuvant in the management of brain tumours. In the last few years the quality of radiation therapy has rapidly advanced.

Some types of radiation therapy like Gamma knife or Cyberknife, are particularly focused high-dose, short duration radiation therapies.

But normally, the radiation therapy has to be fractionated into smaller doses and is administered over a period of weeks to reduce its adverse effects.

4) Chemotherapy

As mentioned earlier, the chances of chemotherapy reaching the brain tumours is seriously hampered due to the blood brain barrier.

However a limited number of chemotherapy agents are available today for use in selected cases and selected tumour types. In some selected brain and spinal tumours, chemotherapy is directly given through the CSF route.

As with surgery one has to be constantly mindful of the risk benefit ratio and possible adverse effects of the chemicals.

The above mentioned treatments are the mainstays of the brain tumour treatment.

Many other types of therapies have been used experimentally or with only limited success. They are briefly enumerated below :

- Immunotherapy
- Gene therapy
- Intra-tumoral chemotherapy
- Brachytherapy (Implanting the radiation producing material inside the tumours)