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Neuro-Oncology: A Brief Review

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Review Article

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ABSTRACT

Tumor is an abnormal cell formed in the brain. Tumors are generally malignant and benign. The study of brain and spinal cord related tumors or neoplasms are Neuro-Oncology. These tumors are generally life-threatening and very dangerous. A tumor that arises from glial cells in the brain or spinal cord is glioma. Majority of all the malignant brain tumors are of glioma. The glioblastoma multiforme has been classified by WHO as Glioblastoma or Grade IV Astrocytoma. Brain has glial cells which are star shaped and are known as astrocytes. The types of cancer of brain that originate from such cells are the astrocytomas.

INTRODUCTION

Tumor is an abnormal cell formed in the brain. Tumors are generally malignant and benign. The study of brain and spinal cord related tumors or neoplasms are Neuro-Oncology [1-3]. These tumors are generally life-threatening and very dangerous. Symptoms are based on tumor size, type and location or when the tumor presses a part of the brain [4-6]. Untreated tumors are generally few months to a year percentage of survival. Depending on the patient's condition, immune system, treatments being used and the type of malignant tumor affected, survival chance varies from year or more [7-8]. General treatment is done by surgery, but these brain tumors easily regenerate and emerge from remission easily. Most often, meningitis occurs in women where as the primary brain tumors occur in men [9-11]. Tumors occur at any age However, the most known malignant cancers of brain are gliomas, glioblastoma and astrocytoma [12-14].

TYPES OF NEUROLOGICAL CANCERS

Gliomas

A tumor that arises from glial cells in the brain or spinal cord is glioma [15-18]. Majority of all the malignant brain tumors are of glioma. Most commonly, gliomas occur in the brain [19-21]. One of the common malignant brain cancers is the gliomas of the brain stem and pons [22-25]. Gliomas are categorised based on grade (low and high grade based on pathologic evaluation of the tumor), location (based on above or below tentorium, the brain membrane) and cell type (astrocytoma's) [26-29]. Symptoms include nausea, seizures, cranial nerve disorders etc.

Although causes are unknown, certain genetic disorders like neurofibromatosis and tuberous sclerosis complex are known to predispose to their development [30-33]. Treatment of such tumors depends on the type of glioma. Mostly a combined approach of surgery and chemotherapy treatment is done [34-37].

Glioblastoma

The glioblastoma multiforme has been classified by WHO as Glioblastoma or Grade IV Astrocytoma. About 15% of the brain tumors are of glioblastoma which are the aggressive cancers that begin within the brain [38-41]. The causes of this type of cancer are really unknown although some studies report genetic disorders like neurofibromatosis and prior radiation therapy [42-44]. It can be diagnosed by combination of CT scan, tissue biopsy and MRI scan [45]. Initially non-specific signs and symptoms are seen which include headache, nausea and others which are similar to stroke [46]. Rapid worsening of symptoms is seen which gradually progress to unconsciousness [47]. It is only about 2-3 % from 1,00,000 develop this type of tumor. Treatment generally involves surgery or chemotherapy. Non treated tumor patients die in less than 3 months [48].

Astrocytomas

Brain has glial cells which are star shaped and are known as astrocytes. The types of cancer of brain that originate from such cells are the astrocytomas [49]. This type of cancer is the most common found in the brain than the spinal cord. This type usually does not affect other organs outside brain [50]. Generally two broad classes of astrocytoma's have been categorised i.e., Narrow zone and Diffuse zone of infiltration [51].

DIAGNOSIS

Diagnostic Imaging of the Brain and Spinal Cord

Diagnostic angiography, magnetic resonance imaging (MRI), positron emission tomography (PET), computed tomography (CT) and myelography are the most often used for imaging studies.

Lumbar Puncture and Cerebrospinal Fluid Analysis

Cerebrospinal fluid (CSF) analysis and Lumbar puncture (LP) analysis.

Pathologic Diagnosis

The tissue obtained surgically is needed for studying the histologic diagnosis.

TREATMENT

Surgery: As mentioned above the tissue obtained surgically is needed for studying the histologic diagnosis. With the new surgical techniques many tumors have been treated.

Chemotherapy: Use of drugs for treatment is Chemotherapy. As this procedure involves side effects, and toxicity administration of these drugs should be monitored by a supervisor.

Radiation therapy: It is considered one of the important types of treatment for not only in extending survival time but also in improving the quality of life.

Steroidal treatment: Generally corticosteroids are given to the patients with tumors having symptoms related to oedema and intracranial pressure.

APPROACH TO CLINICAL PROBLEMS IN NEURO-ONCOLOGY

- Headache
- Fever and neutropenia
- Nausea and vomiting
- Constipation
- Anorexia and weight loss
- Anxiety and depression
- Insomnia
- Mental status change
- Urinary problems
- Visual problems
- Seizures
- Brain tumors
- Central nervous system infections

PALLIATIVE CARE

Palliative care is the support care or also called comfort care ^[16]. The intention of palliative care is to prevent or treat at the earliest stage possible when diagnosed with symptoms and side effects of the treatment ^[23]. It is not to cure rather to prevent or treat and to improve the quality of life of the patients suffering from life threatening cancers ^[29].

PAIN MANAGEMENT

Generally pain medicines are given which are not addictive ^[25]. Yet pain care plan should be drawn for every patient as each patient is different ^[30]. Although controlling pain is a part of the treatment, pain management and plan control plan should be done. Patients should talk openly about ones pain to the physician ^[27]. It is best to control the pain by stopping it from starting ^[29].

IMPACT OF TREATMENT OF TUMORS IN CHILDREN

As mentioned earlier, if these brain tumors are not treated properly, they can be life threatening. Brain cancers are the most common type of cancers affecting children ^[31]. Treatment involves chemotherapy, surgical resection and radiation therapy. Curing rates are high with the mentioned methods ^[33].

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