**Glioblastoma: rare brain and spinal cord cancer**

**Introduction**

Glioblastoma is considered to be among the most aggressive types of cancer that mostly begin in the brain or the spinal code. The danger of Glioblastoma is associated with the fact that it forms from the astrocytes cells. Astrocytes cells are important because they support nerve cells. Despite the fact that glioblastoma cells occur in individuals of different ages, they are more common among older adults (Turkington & Harris, 2009). The treatment of glioblastoma can be very difficult, and most of the patients who are diagnosed with glioblastoma end up dying.

Glioblastoma always forms star-shaped cells in the astrocytes cells that are found in the brain. Among most of patients, the development of glioblastoma starts in the cerebrum. The cerebrum is the largest part of the brain. Glioblastoma affects the brain through the creation of their own blood supply. As a result of the creation of their own blood supply, they always grow at a fast rate. As a result of the fast growth, glioblastoma cells always find it easy to invade the normal brain tissues. Unlike tumors in other parts of the body, the confined space within the skull is an implication that a minimal increase in the size of glioblastoma cells can affect the normal functioning of the brain.

The impact of glioblastoma on the spinal cord is referred to as drop metastases, which are the Intradural extramedullary spinal metastases (Mashimo, Pichumani, Vemireddy, Hatanpaa, Singh, Sirasanagandla & Huang, 2014). This is an implication that when the presence of glioblastoma cells in the spinal cord is advanced, the cancer can render the spinal cord completely ineffective.

**How rare are Glioblastomas?**

 Glioblastoma is considered to be rare because of the low number of documented cases. There is sufficient statistical data to back the assertion that glioblastomas are rare. Glioblastomas 14.9% make only of the primary brain tumors that were diagnosed in 2017. However, glioblastomas are still the most common types of malignant tumors. Approximately 12,000 cases of glioblastomas were diagnosed in the US in 2017. Patients who were diagnosed with and received maximal therapy indicated median survival rate of “14.6, 16.1 or 16.8 months” according to the three phases of the tumor respectively. Spinal glioblastoma is rarer as compared to the brain glioblastoma. Less than 10% of glioblastoma cases end up affecting the spinal cord. However, more than 75% cases of spinal glioblastoma have so far been diagnosed among adults with both genders being affected at the same rate. This is an implication that spinal glioblastoma might have some association with age.

**Symptoms**

There are various symptoms that should always be watched for in association to glioblastoma. The symptoms can be categorized into when the glioblastoma cells are in the head and when they are in the spinal cord.

The symptoms for glioblastoma cells in the head include headaches, nausea, vomiting, a decline in the functionality of the brain or confusion, loss of memory, irritability, inconsistency in urination, blurred vision, loss of peripheral vision, double vision, difficulty in speech, and seizures. The intensity of these symptoms might vary depending on the phase of the glioblastoma (Wilson, Karajannis & Harter, 2014). Furthermore, the lack of any of the symptoms does not imply that someone does not have glioblastoma.

When someone has glioblastoma in the spinal cord the symptoms might include difficulty in balance, irritability, urinary inconsistency, radicular pain in the lower and lower limbs, lower back, neck, and interscapular area.  The diagnosis of spinal glioblastoma is rare because for it to get to the level of spinal glioblastoma, it must have started from the brain. Therefore, by the time the symptoms of spinal glioblastoma are being noted the symptoms of head glioblastoma would have experienced.

 **How does the disease progress?**

So far none of the studies that have been carried out on glioblastoma cells have been helpful in the identification of the origin of these cells. However, the similarities in [immunostaining](https://en.wikipedia.org/wiki/Immunostaining) glioblastoma cells and glial cells has led to the suspicion that glioblastoma might originate from cells that are glial in nature. The glioblastoma cells always form in the white matter in the cerebrum. Their impact on the function is always attributed to the size of the cerebrum (Parsons, Jones, Zhang, Lin, Leary, Angenendt & Olivi, 2008). However, it should be noted that the rate at which glioblastoma cells grow is very high. They always grow very large before they start producing any symptoms. Glioblastoma is known to spread by local invasion and is disseminated through cerebrospinal fluid in cases where it gets to the spinal cord.

However, less than 10% of glioblastoma cells experience slower growth because of the degeneration of [anaplastic astrocytoma](https://en.wikipedia.org/wiki/Anaplastic_astrocytoma) or [low-grade astrocytoma](https://en.wikipedia.org/wiki/Fibrillary_astrocytoma). This kind of glioblastoma cells is more common among younger glioblastoma patients. Depending on the time taken before the glioblastoma cells are diagnosed or treatment is given, the glioblastoma cells can extend to the ventricular walls or the meninges. This is a process that always leads to an increase in the protein content in the [cerebrospinal fluid](https://en.wikipedia.org/wiki/Cerebrospinal_fluid). In some cases, it can lead to [pleocytosis](https://en.wikipedia.org/wiki/Pleocytosis). The glioblastoma cells that are carried in the CSF might find their way to the spinal cord. However, the spread of the glioblastoma cells to the spinal cord is very rare and is less likely to happen, especially among the younger glioblastoma patients. The appearances of glioblastoma cells are always different depending on various factors including the age of the cells, necrosis, or the amount of hemorrhage in the cells.

**Diagnosis**

For someone to be treated of glioblastoma they have to be diagnosed. The diagnosis is always carried out by neurologists who are specialists in the treatment of brain and nervous system disorders. There are a number of tests that can be carried out with the intent of determining whether an individual has neurologist.

One of the tests that can be carried out to diagnose glioblastoma is a neurological exam. During such exams, the neurologist may check for symptoms of glioblastoma such as vision problems, hearing, balance, strength, coordination, and reflexes. Though these tests are not always conclusive, they can give a clue on whether there is need for further tests. Neurological exams might also include the review of medical history of the patient being diagnosed.

Diagnosis of glioblastoma can also take place in the form of image tests. Magnetic resonance imaging (MRI) has often proved to be helpful in the identification of brain tumors. In some cases, there is the injection of dye into the vein of the patient being diagnosed so that there is easy identification of the tumor (Gevaert, Mitchell, Achrol, Xu, Echegaray, Steinberg & Plevritis, 2014). This is the most used method when it comes to the diagnosis of glioblastoma.



**Image 1: sample image from an MRI scan**

A biopsy can also be carried out with the intent of determining whether an individual has glioblastoma cells. Biopsy refers to the process that is used in the removal if small sizes of tumor so that they can go through further analysis. A biopsy is always dependent on the location of the tumor as sometimes both the removal and biopsy can be carried out at the same time. However, it a neurologist is convinced that they cannot undertake a biopsy, they can suggest treatment based on the other tests. A biopsy is often used in the diagnosis of glioblastoma when there is certainty that there is tumor but no clarity on whether the cells are glioblastoma or not. Biopsy can also be used in the determination of the stage in which the glioblastoma cells are in.

**Treatment**

There are various approaches that can be used in the treatment of glioblastoma. However, the most appropriate treatment of glioblastoma is dependent on the grade. This is the reasons as to why proper and accurate diagnosis is always needed before the treatment process commences.  The treatment can also be determined by the size and location of the Timor.

Given the nature of glioblastoma, the most preferred treatment is surgery. Surgeries are always undertaken with the intent of easing pressure from the brain because of the fast rate at which the glioblastoma cells grow (Weller, van den Bent, Hopkins, Tonn, Stupp, Falini & Chinot, 2014). However, the saddest part about the treatment of glioblastoma is that even surgery does not guarantee a complete removal of the glioblastoma cells from the brain. This is highly attributed to the finger-like tentacles nature of the glioblastoma cells. Therefore, in most cases, the removal of glioblastoma cells through does not mark the end of the treatment for glioblastoma. Most of the patients have to continue with treatment so that they can make sure that the remaining pieces of glioblastoma cells do not grow to the extent that the surgeries that they went through become pointless. The remaining pieces are always left because of the risks that are involved in removing them. Removing these pieces is associated with complications such as the loss of cognitive abilities or even death (Cloughesy, Cavenee & Mischel, 2014).

In addition to the surgeries, chemotherapy and radiation can be used with the intent slowing the growth of the glioblastoma cells that remain in the brain after surgery.  In the absence of chemotherapy and radiation it would not take long before the patient needs another surgery because of the fast rate at which the glioblastoma cells grow.

Given the nature of glioblastoma treatment through surgery and the low possibility of the tumor being fully removed, doctors might prescribe drugs that make the situation bearable for the patients by reducing the uncomfortable signs and symptoms that are associated with glioblastoma. There are cases whereby steroids can be prescribed to reduce swelling thus relieving the pressure that is always exerted on the brain as result of the presence of the glioblastoma cells (Somasundaram, 2017). Anti-epileptic drugs can also be effective in the control of seizures. Furthermore, the patents often need rehabilitation after going through the treatment process because the tumors can grow in parts of the brain that control motor skills, vision, speech, and thinking.  This means that there is the need for various forms of therapy before the patients are able to proceed with their normal lives.

Given the possibilities of treatment that have been discussed herein, it is evident that glioblastoma is not curable. All that is possible is extending the lives of the patients involved through surgeries, chemotherapy, radiation, and medication. The possibility of glioblastoma cells being completely removed is too slim to be counted on. The average period of survival for someone with glioblastoma is between 14.6 months and two years. However, there are cases whereby patients have survived for more than 5 years as long as they are getting the right treatment and are leading the right kind of lifestyles which has minimal stress.

**Conclusion**

Evidently, glioblastoma is a unique type of illness. The fact that it affects the brain and possibly the spinal cord makes it a disease that everyone should be worried about. However, it is a rare type of tumor that is more likely to be found in older people is compared to the younger ones. The fact that the exact causes have not yet been identified is an implication that there is nothing that can be done in relation to advising members of the public on the risk factors. People can, however, avoid the risk factors for the other tumors just to be safe. In addition to the lack of information on the causes of glioblastoma, there is no ascertained treatment for glioblastoma. The most used treatment is surgery. Surgery does not eliminate the entire glioblastoma cell because of the nature of the cells which make complete removal risky and can lead to loss of cognitive abilities or even death. Therefore, glioblastoma patients always settle for the use of surgery, in addition to chemotherapy and radiation to control the growth of the remaining cells. Drugs can be used to control the symptoms. Therefore, glioblastoma should be one of the most dreaded diseases because it lacks cure and subjects the patients to suffering.

**Reference**

Cloughesy, T. F., Cavenee, W. K., & Mischel, P. S. (2014). Glioblastoma: from molecular pathology to targeted treatment. *Annual Review of Pathology: Mechanisms of Disease*, *9*, 1-25.

Gevaert, O., Mitchell, L. A., Achrol, A. S., Xu, J., Echegaray, S., Steinberg, G. K., ... & Plevritis, S. K. (2014). Glioblastoma multiforme: exploratory radiogenomic analysis by using quantitative image features. *Radiology*, *273*(1), 168-174.

Mashimo, T., Pichumani, K., Vemireddy, V., Hatanpaa, K. J., Singh, D. K., Sirasanagandla, S., ... & Huang, Z. (2014). Acetate is a bioenergetic substrate for human glioblastoma and brain metastases. *Cell*, *159*(7), 1603-1614.

Parsons, D. W., Jones, S., Zhang, X., Lin, J. C. H., Leary, R. J., Angenendt, P., ... & Olivi, A. (2008). An integrated genomic analysis of human glioblastoma multiforme. *Science*, *321*(5897), 1807-1812.

Somasundaram, K. (2017). *Advances in Biology and Treatment of Glioblastoma*. Cham: Springer.

Turkington, C., & Harris, J. (2009). *The encyclopedia of the brain and brain disorders*. New York: Facts On File.

Weller, M., van den Bent, M., Hopkins, K., Tonn, J. C., Stupp, R., Falini, A., ... & Chinot, O. (2014). EANO guideline for the diagnosis and treatment of anaplastic gliomas and glioblastoma. *The lancet oncology*, *15*(9), e395-e403.

Wilson, T. A., Karajannis, M. A., & Harter, D. H. (2014). Glioblastoma multiforme: State of the art and future therapeutics. *Surgical neurology international*, *5*.