Editorial
Volume 13:03, 2022

Journal of
Health & Medical Informatics

ISSN: 2157-7420 Open Access

Editorial Note on the Treatment of Gliomas

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Editorial

Gliomas account for approximately 80% of malignant brain tumours and 30% of all CNS tumours. Glioma is a very diverse group of cancers that arise from the brain's supporting cells. In the United States, more than 18,500 newly diagnosed cases and 13,000 deaths from malignant glioma are reported each year. The World Health Organization divides glioma into four types: astrocytoma, ependymoma, pilocytic astrocytoma, and oligodendroglioma. Histopathological characteristics, specifically the levels of nuclear polymorphism, increased mitotic activity and cellularity, as well as the presence of neovascularization and necrosis, defines a second system of tumour grade (I–IV). Furthermore, recent advances in next-generation sequencing have enabled the identification of genetic abnormalities in glioma, which have been used to add another layer to glioma diagnosis [1].

Glioblastoma is a malignant cancer of the central nervous system (brain or spinal cord) caused by astrocytes. It is one of the most common primary brain cancers, with incidence rates of 2.05 per 100,000 patients in the United Kingdom and 3.19 cases per 100,000 patients in the United States. Glioblastoma treatment currently consists of surgical resection of the tumour, radiotherapy, and adjuvant chemotherapy with temozolomide. However, due to local invasion and infiltration of surrounding tissue, complete surgical resection of gliomas is extremely difficult; as a result, the tumour recurs, resulting in the death of patients with glioblastoma. Furthermore, the presence of the blood–brain barrier (BBB) reduces the efficacy of chemotherapy by impeding the delivery of chemotherapeutic agents to the CNS. Furthermore, the efficacy of chemotherapy drugs may be reduced further [2].

Conventional anticancer therapies, such as chemotherapy and radiotherapy, are cytotoxic, meaning they damage the DNA of cancer cells. However, due to the high heterogeneity of solid tumours and the deregulation of different cell signalling pathways, there are several limitations when these treatments are used as a single therapy. Glioblastoma is extremely difficult to treat due to tumour heterogeneity, aggressive invasiveness into surrounding tissues, and the presence of BBB. Multimodal therapeutic approaches, which involve the combination of different therapies or therapeutic agents with different molecular mechanisms in order to exert a better cytotoxic effect on tumour cells, can represent an effective strategy for the treatment of glioblastoma [3]. The multimodal therapeutic approach, in particular, can be effective by sensitising the DNA of tumour cells to the harmful effects of a second agent using a first agent. Several epidemiological studies have recently been conducted to assess the role of various natural compounds in influencing the development, progression, and metastasis of cancer. For many years, man has been fascinated by the use of natural products in the preservation of health, the improvement of physical and mental health, and the prevention of diseases [4].

Several studies have reported the radio/chemoprotective role of some natural compounds in combination with radiotherapy and chemotherapy, as well as synergistic effects in alleviating radiotherapy/chemotherapy complications and increasing the efficacy of cancer therapies. Furthermore, some of them can cross the BBB, which is an important consideration in the development of CNS therapies [5]. A wide range of natural compounds, including curcumin, epigallocatechin (EGCG), and resveratrol, has been shown to have antioxidant properties and chemopreventive potential against cancer (RES).

Conflict of Interest

None.

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How to cite this article: Mani, Shiva. "Editorial Note on the Treatment of Gliomas." J Health Med Informat 13 (2022): 410.

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Received 05 March, 2022, Manuscript No: jhmi-22-58002; **Editor Assigned:** 07 March, 2022, PreQC No: P-58002; **Reviewed:** 10 March, 2022, QC No: Q-58002; **Revised:** 15 March, 2022, Manuscript No: R-58002; **Published:** 20 March, 2022, DOI: 10.37421/jhmi.2022.13.410