

EDITORIAL

Survival of Patients with Primary Brain Tumor: A Data Analysis of 10 Years

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Abstract: Background: The prognosis for primary brain tumors, like other CNS tumors, can vary greatly based on several factors, such as treatment history, age and gender at diagnosis, ethnic background, and treatment plan.

Materials and Methods: A systematic review approach was used to gather relevant data from PubMed, ScienceDirect, Google Scholar, and other sources.

Results: The survival rate of primary brain tumors and other CNS tumors appears to be correlated with several variables, including treatment history, gender, age at evaluation, race/ethnicity, and treatment regimen; this emphasizes the importance of routinely updating epidemiological data on primary brain tumors to advance biological understanding.

Conclusion: This study draws attention to the variations in the median survival times of the various kinds of primary brain tumors, with oligodendroglioma having the longest median survival time (199 months, or approximately 16.6 years) and glioblastoma having the shortest (8 months).

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1. INTRODUCTION

1.1. Comprehensive Data Analysis of Survival of Primary Brain Tumor Patients

The diagnosis made in the US between 2014 and 2018 provided the most recent information on brain metastases and survival rates (Table 1) [1]. Along with other CNS tumors, the prognosis for primary brain tumors can differ significantly depending on several factors, including treatment history, age and gender at diagnosis, ethnic background, and treatment regimen. The average number of primary malignant and non-malignant CNS tumor cases diagnosed between 2014 and 2018 was 86,355, which corresponds to an age-adjusted incidence rate of 24.25 per year. Meningioma was the most common non-malignant cancer (39%), and glioblastoma was one of the most common malignant tumors (14.3%) (Fig. 1) [2-4]. With a median survival of 8 months, glioblastoma had the lowest survival, and oligodendroglioma had the highest at 199 months or roughly 16.6 years. The average rate of survival for pilocytic astrocytoma, distinct astrocytoma variants, ependymal cancers, additional neuroepithelial carcinomas, pineal region cancers, embryonal tumors, nerve sheath malignancies, tumors of germ cells, pituitary gland tumors, and many more could not be determined because over half of the affected patients survived the 15-year follow-up period [5].

2. THE CBTRUS STATISTICAL REPORT

Primary Brain Tumors, as well as Other CNS Tumors diagnosed in the US in 2015-2019 (Table 1), provide the most recent comprehensive information based on the population incidence, mortality rates, and comparative survival of primary malignant and non-malignant brain and other CNS tumors. The information of all US citizens was gathered and shared by the central cancer registry databases. Malignant primary brain tumors and other central nervous system tumors claimed 84,264 lives between 2015 and 2019. This translates to 16,853 annual deaths, or 4.41 deaths per 100,000 individuals on average (Table 2).

The five-year relative survival rate for non-malignant cerebral tumors and additional CNS tumors was 91.8%, while the five-year proportional survival rate was 35.7% after being diagnosed with a malignant primary brain tumor or other CNS tumor [6]. The two primary metrics used in survival statistics are relative survival rates and median survival times. The comparative survival rate is the proportion of cancer patients who, at any given point after diagnosis, would not have passed away for any other cause. While observed survival refers to the proportion of cancer patients who survive at any given point after diagnosis, estimated survival is the percentage of the general population expected to live to that point. These two variables are used in the calculation of relative survival [7]. Moreover, Croatia (42%) and Japan (46%) had the highest rates of survival among patients diagnosed between 2010 and 2014, while Thailand had the lowest overall 5-year survival rate (15%), according to the Global Surveillance of Trends in Cancer Survival [8]. As a result, as Fig. (2) illustrates, the survival rate varies over time.

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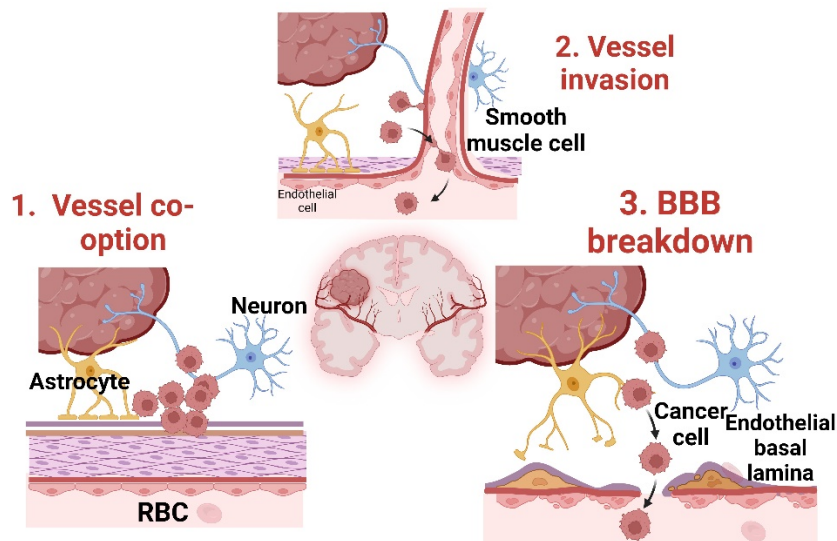


Fig. (1). Pictorial representation of pathophysiology of Glioblastoma navigating vessel co-option, vessel invasion, and BBB breakdown. (A higher resolution/colour version of this figure is available in the electronic copy of the article).

survival rates over Years :-

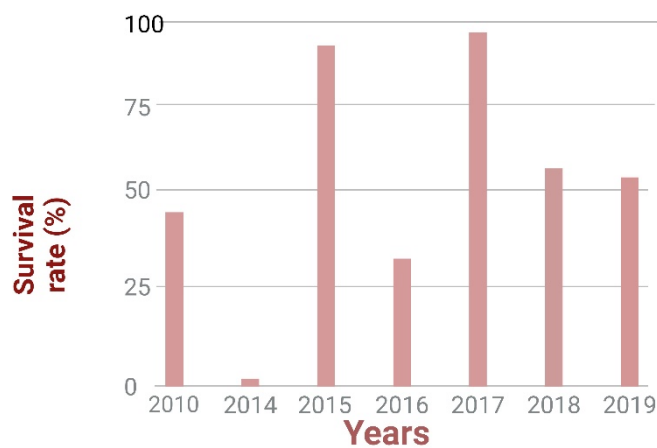


Fig. (2). A graphical representation of the survival rate of primary brain tumor changes over time. (A higher resolution/colour version of this figure is available in the electronic copy of the article).

Table 1. Global trends of survival rate of patients for different types of brain tumors.

S. No.	Year	Type of Primary Brain Tumor	Country	Number of Cases	Median Follow-up Time	Survival Rate	References
1	2014	Glioblastoma	U.S	1,00,000	10.4 months	0.76%	[9]
2	2015	Glioblastoma	U.S	4,45,976	12 months	91%	[10]
3	2016	CNS tumor	U.S	4,34,037	10 months	35.7%	[6]
4	2017-19	CNS tumor	U.S	13,283	2 years	91.8%	[6]
5	2010-2014	CNS tumor	Croatia	1,00,000	4 years	42%	[8]
6	2010-2014	lymphoma	Japan	4,19,321	4 years	46%	[8]
7	2015-2019	Non-Hodgkin lymphoma	Korea	4,17,767	5 years	64.5%	[11]
8	2014	Oligodendrogliomas	China, Israel, South Korea, Singapore, Taiwan, Turkey	1,00,000	5 years	20-29%	[12]
9	2014	Unspecified astrocytoma	Canada, Europe, Australia	67,776	10.6 months	30-39%	[12]
10	2015-19	Glioblastoma	Hongkong	1,00,000	4 years	63%	[13]

Table 2. Global trends of the death rate of patients for different types of brain tumors.

S. No.	Year	Type of Primary Brain Tumor	Average Death Rate Per Year	Total Population Observed
1	2014-2018	Glioblastoma	16,606	88,190
2	2015-2019	Lymphoma	16,853	1,00,000
3	2010-2014	Oligodendrogliomas	1,856	37,971
4	2017-2019	Unspecified astrocytoma	4,469	149,868
5	2014-2017	Meningioma	1,416	12,934
6	2016-2020	Malignant brain tumor	17,206	1,00,000

CONCLUSION

Primary brain tumors rank among the deadliest types of cancer and cause an enormous amount of suffering to Americans. To evaluate patient survival, population-based data from the US Central Primary Brain Tumor Registry were examined. Numerous case studies were discussed to analyze the survival rate according to the type of primary brain tumor, age, and sex by relative survival rates and median survival times. In a study from 2014-2018, Glioblastoma had the lowest median survival (8 months), while oligodendroglioma had the highest (199 months, or roughly 16.6 years). A different study conducted in 2015-2019 found that 91.8% of people with non-malignant tumors in the brain, along with other CNS tumors, would survive the malignancy. In conclusion, it is critical to continuously update the descriptive epidemiological tumors due to the aggressive nature of numerous malignant subtypes and the paucity of information regarding their etiology.

LIST OF ABBREVIATIONS

CNS = Central Nervous System

BBB = Blood Brain Barrier

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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