talenta PUBLISHER

AANHS Journal

Journal of Medical Science

AANHS Asian Australasian Neuro & Health Science Journal
Universitas Sumatera Utara - Indonesia

Recent Updates on Experience, Treatment and Prevalence of Adult Brain Tumor : Single Center Study

Tommy Rizky Hutagalung[1], Ridha Dharmajaya[1]
[1]Department of Neurosurgery, Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia

Introduction : Brain tumor is a disease with high morbidity and mortality rates. Treating brain tumors requiring medical providers to have basic understanding of brain tumor diagnosis and management. The most common brain tumors are meningiomas, gliomas, pituitary adenomas and brain metastasis. The treatment of each type of brain tumor is different and multidisciplinary involving other scientific fields besides neurosurgery.
Case Series : We reported 131 cases of brain tumors at the Haji Adam Malik Hospital in the period January 2018-December 2019, consisting of 52 cases (40%) of meningioma, 34 cases (26%) of Glioma , 12 cases (9%) of pituitary adenomas and 33 cases (25%) of brain metastasis. Meningiomas were mostly treated with surgery alone in 38% of cases, gliomas with surgery followed by chemo-radiation in 41% of cases, all of pituitary adenomas were treated with endonasal transfenoid surgery, while brain metastasis in 70% of cases required whole brain radiation with controlled primary tumors.
Discussion : The modalities for treating brain tumor patients has been increasing recently. Meningiomas are mostly benign and managed by surgical resection only, chemo-radiation reserved for high risk or refractory case of meningiomas. Glioblastoma is the most common glioma and aggressive malignant primary brain tumor, limited response to gross surgical tumor and chemo-radiation. Pituitary adenomas mostly treated with endonasal transfenoid surgery, radiotherapy use in recurrent case. Brain metastasis may require complex multidisciplinary care with neurosurgery, radiation oncology, and medical oncology.
Conclusion: The treatment of brain tumors is influenced by various considerations such as age, patient condition,neurological deficits, location of the tumor, comorbidities, experience of the neurosurgeon and available modalities. Treatment methods for brain tumors continue to evolve.

Keyword : Brain tumor, Neurosurgery, Neurooncology

Introduction

Brain tumors refers to a mixed group of neoplasms originating from intracranial parenchym and meninges with degrees of malignancy ranging from benign to aggressive. Each type of tumour has its own biology, treatment, and prognosis and each is likely to be caused by different risk factors. Brain tumor is a disease with high morbidity and mortality rates. [1]

In the current era, where life expectancy is increasing, the incidence of brain tumors is also increasing. Technological developments have also helped early detection of brain tumors, because of that the number of cases found has also increased. World data state that the annual global age standardized incidence of primary malignant brain

Corresponding author at: Department of Neurosurgery, Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia

Copyright © 2021 Published by Talenta Publisher, ISSN: 2686-0848 ; DOI : 10.32734
Journal Homepage: http://aanhsj.usu.ac.id

tumors is 3.7 per 100,000 for males and 2.6 per 100,000 for females. Rates appear to be higher more developed countries than in less developed countries. Approximately 20,500 individuals (11,170 males and 9,330 females) were diagnosed with primary malignant brain tumors in 2007 in the US. [2], [3]

Treating brain tumors requiring medical providers to have basic understanding of brain tumor diagnosis and management. The most common brain tumors are meningiomas, gliomas, pituitary adenomas and brain metastasis. The treatment of each type of brain tumor is different and multidisciplinary involving other scientific fields besides neurosurgery. [1], [2]

This paper discusses about the development and experience of treatment in brain tumor cases at General Hospital Haji Adam Malik Medan. This paper will describe the types of brain tumors that were found. Then it will also explain about the demography and choice of treatment in these patients based on the clinical conditions and applicable guidelines.

Case Series

This study is a descriptive study that describes the types of brain tumors obtained at the Haji Adam Malik General Hospital Medan during the 2018-2019 period. This study analyzed the type of brain tumor, the demographics of the sample, the histopathological results and the treatment selected for each type of brain tumor.

We reported 131 cases of brain tumors at the Haji Adam Malik Hospital in the period January 2018-December 2019, consisting of 52 cases (40%) of meningioma, 34 cases (26%) of Glioma , 12 cases (9%) of pituitary adenomas and 33 cases (25%) of brain metastasis.

Table 1. Type of Brain Tumor

Brain Tumor Type	Number of Cases	Percentage
Meningiomas	52	40%
Gliomas	34	26%
Pituitary Adenomas	12	9%
Brain Metastasis	33	25%
Total	131	100%

Based on demographic data obtained, the most age in cases of meningioma and glioma is age between 51-60 years, the most age in pituitary cases is 41-50 years, while brain metastases mostly at age > 60 years. Most of the gender in all brain tumor types are male. Most of the sample GCS condition was GCS 14-15, with Karnofsky Performance Score > 60.

Table 2. Demographic of Patients

	Meningiomas	**Gliomas**	**Pituitary Adenomas**	**Brain Metastasis**
		Age (y.o)		
20-30	-	-	-	-
31-40	2	2	-	-
41-50	20	7	6	5
51-60	26	22	5	14
> 60	4	3	1	14
		Gender		
Male	30	20	9	20
Female	22	14	3	13
		GCS		
3-8	-	2	-	3
9-12	4	4	-	10
13-15	48	28	12	20
		KPS		
< 60	6	10	-	8
> 60	46	24	12	25
Total	52	34	12	33

Based on the choice of treatment, meningiomas were mostly treated with surgery alone in 38% of cases. Gliomas with surgery followed by chemo-radiation in 41% of cases,especially in high grade glioma cases. All of pituitary adenomas were treated with endonasal transfenoid surgery, while brain metastasis in 70% of cases required whole brain radiation with controlled primary tumors.

Based on the results of histopathological examination, it was found that most of meningiomas was grade I (73%). High grade glioma was found in 59% of glioma cases.

Primary tumors that cause brain metastases mostly originate from the lungs cancer (45%).

Table 3. Histopathology of Brain Tumor

Brain Tumor Type	Number of Cases	Percentage
Meningioma		
Grade I	38	73%
Grade II	12	23%
Grade III	2	4%
Glioma		
Low Grade	14	41%
High Grade	20	59%
Pituitary Adenomas		
Source of Brain metastasis		
Lung	15	45%
Breast	10	30%
Thyroid	3	9%
Gastro-Intestinal Tract	2	7%
Other	3	9%

Table 4. Treatment Based on Brain Tumor Type

Brain Tumor	Treatment			
	Conservative	Surgical	Surgical + Chemo-radiation	Chemo-radiation Alone
Meningioma	-	38 (73%)	14 (27%)	-
Glioma	6 (18%)	14 (41%)	14 (41%)	-
Pituitary Adenomas	-	12 (100%)	-	-
Brain metastasis	8 (24%)	-	2 (6%)	23 (70%)

Discussion

There have been reports of increasing incidence of primary brain tumours in recent decades which need to be interpreted with caution. Trends over time can only be considered valid when based upon data collected according to the same definitions and reporting practice. Inconsistencies and changes over time may be the explanation for the observed rises which have been attributed to various factors. Improved diagnostic imaging, following introduction of radio isotope imaging computed tomography, and magnetic resonance imaging in the 1970s and 1980s, will have resulted in higher detection rates and better differential diagnosis of brain tumours which might have previously been diagnosed as strokes or metastatic tumours. Access to services will have improved, making it more likely that a patient with a tumour is registered. In addition, histopathological technology has increased the specificity of tumour diagnosis and thus an apparent increase in specific tumour types. [4], [5]

Meningiomas are believed to derive from the arachnoid cap cells around arachnoid granulations near venous sinuses, cisterns, ventricles, and brain. They can be found anywhere there is known pia, arachnoid, or dura. These tumors exhibit a wide variety of behaviors from benign to extremely aggressive A wide spectrum of surgical approaches can be employed to radically excise a meningioma. Preoperative embolization can decrease intraoperative blood loss in selected patients. Postoperative radiation therapy, radiosurgery, and hormonal therapy is required for incompletely resected lesions or those with malignant characteristics.[6], [7]

In glioma cases, the extent of surgical resection probably correlates with a better survival, but resection must be tempered by their location close to the eloquent area. Motor-sensory mapping, language mapping, and diffusion tensor imaging should be used to assess tumors adjacent to critical regions.[6], [8]. Factors such as a younger age group, lower tumor histological grade, and higher KPS score are associated with a better prognosis for gliomas. The extent of resection has a probable influence on survival. Both radiotherapy and temozolomide chemotherapy significantly increase survival time of these patients. [9]

Pituitary tumors present in various ways as a result of excess or deficient secretion of pituitary hormones or extrinsic compression on the pituitary stalk or adjacent structures. Approximately 75% of pituitary adenomas are functioning tumors. Transsphenoidal adenomectomy is the first line of treatment. Medical therapy is the first line of treatment for prolactinomas. Other functioning adenomas generally require surgical resection, medical treatment, or radiation therapy for recurrent case. Surgery

through the microscopic, extended transsphenoidal, or endoscopic route is safe and effective in experienced hands. Craniotomy may be required for a tumor extending beyond the sellar region.[6], [10]

Cerebral metastatic disease represents a serious progression of systemic cancer Therapies for brain metastases are roughly equivalent, with local recurrence rate of 40% to 50% at 1 year. Therefore, the choice of therapy must be tailored to the individual patient, taking into account Karnofsky performance scale (KPS) score, medical comorbid conditions, systemic disease status, number of metastases, size and location of metastases, and symptoms. As long as brain metastases undergo some form of treatment, the vast majority of patients will succumb to progression of systemic disease as opposed to brain metastases.It is essential that treatment decisions for this lethal disease be made as a multidisciplinary team of oncologists, radiation oncologists, and neurosurgeons, as well as the patient and the patient's family. .Currently, the most effective options for treatment of cerebral metastatic disease include whole-brain radiation therapy, surgical resection, and stereotactic radiosurgery.[6], [11]

Conclusion

We reported 131 cases of brain tumors at the Haji Adam Malik Hospital in the period January 2018-December 2019. These cases consisted of several types of brain tumors, namely, meningiomas, gliomas, pituitary adenomas and brain metastases.The treatment of brain tumors is influenced by various considerations such as age, patient condition,neurological deficits, location of the tumor, comorbidities, experience of the neurosurgeon and available modalities.

The modalities for treating brain tumor patients has been increasing recently. Meningiomas are mostly benign and managed by surgical resection only, chemo-radiation reserved for high risk or refractory case of meningiomas. Glioblastoma is the most common glioma and aggressive malignant primary brain tumor, limited response to gross surgical tumor and chemo-radiation. Pituitary adenomas mostly treated with endonasal transfenoid surgery, radiotherapy use in recurrent case. Brain metastasis may require complex multidisciplinary care with neurosurgery, radiation oncology, and medical oncology. Treatment methods for brain tumors continue to evolve.

References:

[1] McKinney. Brain Tumours : Incidence, survival, and aetiology. J Neurol Neurosurg Psychiatry 2004;75

[2] Melissa L. Bondy, Ph.D., Michael E. Scheurer, Ph.D., Beatrice Malmer. Brain Tumor Epidemiology: Consensus from the Brain Tumor Epidemiology Consortium (BTEC). Cancer. 2008 October 1; 113(7 Suppl): 1953–1968

[3] CBTRUS. Statistical Report: Primary brain tumors in the United States, 1998–2002. Hinsdale, IL: Central Brain Tumor Registry of the United States; 2005.

[4] Youmans, Julian R., and H. Richard Winn. Youmans neurological surgery. Philadelphia, PA: Saunders.2011.

[5] Wrensch M, Minn Y, Chew T, et al. Epidemiology of primary brain tumours: current concepts and review of the literature. Neuro-oncology 2002;4:278–99.

[6] Ali Ravanpay, Andrew L. Ko, Daniel L. Silbergeld. Low-Grade Gliomas, Editor(s): Richard G. Ellenbogen, Laligam N. Sekhar, Neil D. Kitchen, Harley Brito da Silva. Principles of Neurological Surgery (Fourth Edition), Elsevier,2018, p573-579

[7] Pamir N, Black P, Fahlbusch R. Meningiomas: A Comprehensive Text. New York: Elsevier; 2010.

[8] Chaichana KL, McGirt MJ, Laterra J, et al. Recurrence and malignant degeneration after resection of adult hemispheric low-grade gliomas. J Neurosurg. 2009;111(2):203-210.

[9] Athanassiou H, Synodinou M, Maragoudakis E, et al. Randomized phase II study of temozolomide and radiotherapy compared with radiotherapy alone in newly diagnosed glioblastoma multiforme. J Clin Oncol. 2005;23:2372-2377.

[10] Liu JK, Weiss MH, Couldwell WT. Surgical approaches to pituitary tumors. Neurosurg Clin North Am. 2003;14:93-107.

[11] Kalkanis SN, Kondziolka D, Gaspar LE, et al. The role of surgical resection in the management of newly diagnosed brain metastases: a systematic review and evidence-based clinical practice guideline. J Neurooncol. 2010;96:33-43.