

The Distribution of Meningioma in Dr. Hasan Sadikin General Hospital Bandung Period 2010–2013

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Abstract

Background: In neurological diseases, brain tumor is the second leading cause of death after stroke, of which the most common types of brain tumor is meningioma. There are many factors affect the prognosis of meningioma patient, including age, gender, location, and histopathological type of tumor. This study aimed to explore the distribution of meningioma based on age, gender, location of the tumor, and its histopathological type during the period of 2010–2013 in Dr. Hasan Sadikin General Hospital Bandung.

Methods: This study was a quantitative descriptive study and data were collected from medical records of Department of Pathology between January 2010–December 2013. Age, gender, location, and histopathological type of meningioma were acquired.

Results: There were 277 eligible cases of meningioma with an average number of cases per year were 69 cases. The ratio of men to women was 1:6.4. Meningioma was most commonly found in the age group 41–50 years (38.9%), and mostly located in convexity (55.96%). The most common histopathological type of meningioma was meningotheliomatous meningioma (70%).

Conclusions: The frequency of meningioma is 6 times higher in women, predominantly around the age of 50 years old. Meningioma is most commonly found in convexity, and meningotheliomatous meningioma is the most common histopathological type.

Keywords: Brain tumor, histopathological characteristic, meningioma

Introduction

Meningioma is an encapsulated tumor in the central nervous system which originates from meningeothelial arachnoid cells.^{1,2} The majority of meningiomas are benign, yet it could be dangerous if the tumor expands and emerging causing an increase of intracranial pressure because of its intracranial location and often leads to headache, nausea, vomit, incoordination, and seizure.^{3,4} Based on WHO, meningioma can be classified into 3 grades, i.e. benign (grade I), atypical (grade II), and anaplastic (grade III).⁵ Women is twice as likely as men to develop meningioma and its incidence increases with age.^{6,7} Intracranial meningioma is more common than spinal meningioma.⁸

In Indonesia⁹, there are few data about central nervous system tumors, including meningioma. A research in 2009–2013 at RSUD Abdul Moeloek (RSUDAM) and RS. Imanuel

Bandar Lampung showed 55.7% cases of central nervous system tumors were meningiomas. In 1997–2001, the average of meningioma cases in the Department of Pathology, Faculty of Medicine Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital Bandung is 12 cases per year, and 51 cases per year in 2007–2009.⁹ Prognosis of meningioma is influenced by age, gender, location of tumor, and World Health Organization (WHO) grading of meningioma (Grade III) which is classified based on type of histopathology.¹⁰ Location at the convexity of the brain in this study is aimed at frontal, temporal, parietal, and occipital cortex.¹¹ This study aimed to explore the distribution of meningioma based on age, gender, location, and histopathological type.

Methods

This was a quantitative, descriptive study with retrospective data collection, conducted at the

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Table 1 The distribution of Central Nervous System Tumor and Meningioma in Dr. Hasan Sadikin General Hospital during the period of 2010–2013

Year	CNS tumor		Meningioma	
	n	%	n	%
2010	85	17.65	15	17.65
2011	169	49.70	84	49.70
2012	193	47.67	92	47.67
2013	199	43.22	86	43.22
Total	646	42.87	277	42.87

Note: CNS, central nervous system tumour

Department of Pathology, Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital Bandung in August–October 2014. The total data from 2010 to 2013 of patients with central nervous system tumor who had histopathological examinations at the Department of Pathology was collected. This study had been approved by the Health Research Ethics Committee Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital Bandung.

The inclusion criteria were patients diagnosed with meningioma based on histopathological examination, with a complete medical record of age, gender, the location of the tumor and the type of histopathological diagnosis. Incomplete data was not collected. Data was described and presented in table form.

Results

There were 277 cases of meningioma among Central Nervous system Tumor during the

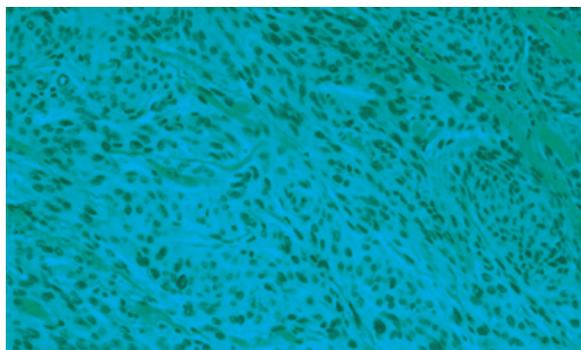


Figure Microscopic Figure of Meningotheliomatous Meningioma¹²

period of 2010–2013 of which 11 data were excluded due to incomplete medical records. The highest frequency of meningioma in all central nervous system tumors in this study was in 2011 (49.70%), but the highest incidence of meningioma was in 2012 with 92 cases as shown in Table 1. To illustrate, the microscopic figure of meningotheliomatous meningioma diagnosed in Department of Pathology was shown in figure 1.

In this study, meningioma was commonly found in reproductive age (21–60 years old) and more than 80% of meningioma found in women (Table 2). More than half of all meningioma cases were in convexity and most of all were an intracranial meningioma (table 3).

Meningotheliomatous meningioma was the most common type with 194 cases (70.03%) and followed by fibrous meningioma with 21 cases (7.58%). Chordoid, secretory, and lymphoplasmocyte-rich meningioma were not found in this study. Almost all of the cases were WHO grade I meningioma (90.22%), WHO grade II meningioma was 4.69%, and WHO

grade III meningioma was 5.04%.

Discussions

This study has explored the distribution of meningioma in Dr. Hasan Sadikin General Hospital Bandung, during the period 2010–2013. In this study, there is an increase in the incidence rate of meningioma in almost every year, however, the frequency of meningioma is increased in 2011 and decreased until 2013 because of an increased in the incidence of other CNS tumors. The average of meningioma cases was 69 cases per year. This number is higher than the previous study described in 2007–2009 with 51 cases per year. It might occur because people and health providers are

Table 2 The distribution of Meningioma Based on Age and Gender

Age	Man	Woman	Total
11–20	3	3	6
21–30	9	12	21
31–40	5	86	91
41–50	11	97	108
51–60	8	36	44
61–70	1	4	5
71–80	-	2	2
Total	37 (13.35%)	240 (86.64%)	277 (100%)

more concern about health nowadays. People could have better health care because of the development of referring system in Indonesia, therefore meningioma can be detected earlier and its cases in Dr. Hasan Sadikin General Hospital Bandung, as a referring hospital in West Java, might increase every year.¹³

Meningioma occurred more frequently in females with 240 cases (87%) than in males with 37 cases (13%). This result is similar to study by Shah, et al.⁶ which showed that

meningioma occurred predominantly in women with women and men ratio was 2:1.⁶ This result might be related with hormonal factors as one of the potential risk factors of meningioma such as estrogen, androgen, and progesterone receptor that are increasingly found in meningioma.⁷

The incidence rate of meningioma is increasing with age.⁷ In this study, an increase of meningioma cases has been shown at early 20 years old, especially in women, but decreased after age of 50 years. The frequency of meningioma is increased in productive women when the hormone production is high as shown in this study that the highest rate of meningioma cases is in the age group of 41–50 years and the lowest rate is in the age group of 71–80 years. Interestingly, none of the meningioma cases found in the early age group or the elderly. This may happen because asymptomatic meningioma can be only detected later by the neuroimaging technology such as CT scan and MRI.¹⁴

The most common type of meningioma in this study was meningotheliomatous meningioma (70.03%), followed by fibrous type (7.58%), and psammomatous type (5.77%), and 90.22% from all cases is categorized as WHO grade I meningioma. This result was similar as the previous study in which WHO grade I meningioma is prevalent in more than 90% of all cases, followed by WHO grade II, and WHO grade III. Furthermore, the prevalence of intracranial meningioma is more common than intraspinal meningioma, confirming the study conducted previously.³ Convexity, falx and parasagittal, and sphenoid wing are the most common locations for meningioma as shown in this study.¹⁵

The limitation of this study is that low meningioma in early years might not reflect the prevalence and incidence. It may be due to

Table 3 The Distribution of Meningioma Based on Location

Location	Total	Percentage (%)
Convexity	156	56.32
Sphenoid Wing	62	22.38
Retroorbital	8	2.89
Intraspinal	7	2.53
Retro bulbar	6	2.17
Olfactory Groove	5	1.81
Petroclival	5	1.81
Intraorbital	5	1.81
CPA	5	1.81
Suprasellar	4	1.44
Tuberculum	3	1.08
Posterior Fossa	3	1.08
Sellar Region	3	1.08
Extra cranial	2	0.72
Calvarial	1	0.36
Parasagittal	1	0.36
Cerebellum	1	0.36

Table 4 The Distribution of Meningioma Based on Histopathological Type

Histopathological Type	Total	Percentage
Meningotheliomatous	194	70.03%
Fibrous	21	7.58%
Transitional	5	1.80%
Psammomatous	16	5.77%
Angiomatous	9	3.24%
Microcystic	4	1.44%
Secretory	0	0%
Lymphoplasmocyte-rich	0	0%
Metaplastic	1	0.36%
Atypical	10	3.61%
Chordoid	0	0%
Clear Cell	3	1.08%
Papillary	1	0.36%
Rhabdoid	6	2.16%
Anaplastic	7	2.52%
Total	277	100%

Note: *Grade I: Meningotheliomatous, fibrous, transitional, psammomatous, angiomatous, microcystic, secretory, lymphoplasmocyte-rich, metaplastic; Grade II: chordoid, clear cell, atypical; Grade III: Papillary, Rhabdoid, Anaplastic

a lower capacity to diagnose in that period. A better medical record should be implemented.

To conclude, meningioma is more common in women and the most common type is meningotheliomatous meningioma with the convexity being the most common location for meningioma.

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