**Frequency of Meningioma in Anatomical Pathology Department Dr. Hasan Sadikin General Hospital Bandung Period 2010­2013**

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**Frekuensi Meningioma di Departemen Patologi Anatomi RSHS Bandung Periode 2010**­**2013**

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**Abstrak**

**Latar Belakang**: Tumor otak merupakan penyebab kematian kedua terbanyak dalam kategori penyakit neurologis setelah stroke. Salah satu tumor otak yang paling banyak ditemukan adalah meningioma. Terdapat beberapa faktor yang memengaruhi prognosis meningioma, seperti: usia, jenis kelamin, lokasi tumor, dan tipe histopatologi meningioma. Penelitian ini dilakukan dengan tujuan mengetahui frekuensi meningioma berdasarkan usia, jenis kelamin, lokasi, dan tipe histopatologi.

**Metode**: Penelitian ini menggunakan metode deskriptif kuantitatif, dengan instrumen rekam medis pada Departemen Patologi Anatomi FKUP/RSHS selama 4 tahun terhitung dari tahun 2010­2013. Data yang diambil adalah usia, jenis kelamin, lokasi, dan tipe histopatologi meningioma.

**Hasil**: Selama tahun 2010­2013, tedapat 277 kasus meningioma dengan rata-rata kasus per tahunnya adalah 69 kasus. Rasio antara pria dan wanita adalah 1:6,4. Meningioma banyak ditemukan pada kelompok usia 41­50 tahun (38,9%), dan lokasi terbanyak ditemukannya meningioma adalah konveksitas (55.96%). Tipe *meningotheliomatous* (70%) adalah tipe histopatologi terbanyak.

**Simpulan**: Frekuensi meningioma lebih tinggi pada wanita dibandingkan pada pria, dan meningkat sampai usia 50 tahun, lalu menurun sampai usia 80 tahun. Meningioma paling banyak ditemukan pada konveksitas dan tipe histopatologi terbanyak adalah *meningotheliomatous*.

**Kata Kunci**: karakteristik histopatologi, meningioma, tumor otak

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**Abstract**

**Background:** In the category of neurological diseases, brain tumor is the second leading cause of death after stroke, and one of 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 determine the frequency of meningioma based on age, gender, location of tumor, and its histopathological type during the period of 2010­2013 in Dr. Hasan Sadikin General Hostpital Bandung.

**Methods**: This study was a quantitative descriptive study and data collected from medical records between January 2010­December 2013 in Department of Anatomic Pathology, Faculty of Medicine Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung. Age, gender, location, and histopathological type of meningioma were acquired.

**Results**: In 2010­2013, there were 277 eligible cases of meningioma with average number of cases per year were 69 cases. Ratio of men to women was 1:6.4. Meningioma was most commonly found in age group 41­50 years (38.9%), and mostly located in convexity (55.96%). The most common histopathological type of meningioma was meningotheliomatous meningioma (70%).

**Conclusion**: Frequency of meningioma is higher in women than men, and increases with age until 50 years, and then decreases. Meningioma is most commonly found in convexity, and meningotheliomatous meningioma is the most common histopathological type in this study.

**Keywords**: brain tumor, histopathological characteristic, meningioma

**Introduction**

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

In Indonesia, there are few data about central nervous system tumors, including meningioma.9 A research in 2009­2013 at RSUD Abdul Moeloek (RSUDAM) and RS. Imanuel Bandar Lampung showed 55.7% cases of central nervous system tumors were meningioma. In 1997­2001, average of meningioma cases in Department of Anatomic Pathology, FMUP/Dr. Hasan Sadikin General Hospital Bandung is 12 cases per year, and 51 cases per year in 2007­2009.9 Prognosis of meningioma is influenced by age, gender, location of tumor, and WHO grading of meningioma (Grade I­III) which is classified based on type of histopathology.10 Location at convexity in this study aimed at frontal, temporal, parietal, and occipital cortex.11 This study aimed to determine the frequency of meningioma based on age, gender, location, and histopathological type.

**Method**

This was a quantitative, descriptive study with retrospective data collection and was conducted at Department of Anatomy Pathologic, FMUP/ Dr. Hasan Sadikin General Hospital in August­October 2014. Population in this study was patients with central nervous system tumor who did histopathological examination in Department of Anatomy Pathologic FMUP/ Dr. Hasan Sadikin General Hospital Bandung at 2010­2013, and subject in this study was patient in the study population who had meningioma. The sampling method was total sampling and this study had been approved by the Health Research Ethics Committee at the Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital Bandung.

The inclusion criterion was patient diagnosed with meningioma based on histopathological examination in Department of Anatomy Pathologic FMUP/ Dr. Hasan Sadikin General Hospital at 2010­2013, with complete medical record (age, gender, location of tumor, and type of histopathological). Data were excluded if the medical records were not complete. After data had been collected, it presented in table form. Frequency measured by data tabulation program.

**Result**

There were 277 cases of meningioma during the period of 2010­2013 and 11 data excluded because of incomplete medical records.

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Meningioma | CNS Tumor | Frequency of Meningioma |
| 2010 | 15 | 85 | 17,65% |
| 2011 | 84 | 169 | 49,70% |
| 2012 | 92 | 193 | 47,67% |
| 2013 | 86 | 199 | 43,22% |
|  |  |  |  |
| Total | 277 | 646 | 42,87% |

Table 1 Total Cases and Frequency of Meningioma

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.

Table 2 Frequency of Meningioma Based on Age and Gender

|  |  |  |  |
| --- | --- | --- | --- |
| Age | Man | Woman | Total |
| 11­20 | 3 | 3 | 6 |
| 21­30 | 9 | 12 | 21 |
| 31­40 | 5 | 86 | 91 |
| 41­50 | 11 | 97 | 108 |
| 51­60 | 8 | 36 | 44 |
| 61­70 | 1 | 4 | 5 |
| 71­80 | 0 | 2 | 2 |
|  |  |  |  |
| Total | 37 (13.35%) | 240 (86.64%) | 277 (100%) |

In this study, meningioma was commonly found in reproductive age woman (21-60 years old) and more than 80% of meningioma found in woman.

Table 3 Frequency 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 |
| Tubercullum | 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 |

More than half of all meningioma cases were in convexity, and most of all were intracranial meningioma.

Table 4 Frequency 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% |

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

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 was not found in this study. Almost all of the cases were WHO grade I meningioma (90.22%), and WHO grade II meningioma was 4.69%, and WHO grade III meningioma was 5.04%.

Figure 1 Microscopic figure of meningotheliomatous meningioma12

**Discussion**

In this study, there was an increase in incidence rate of meningioma almost every year, but the frequency of meningioma increased in 2011, and decreased until 2013 because of increased in incidence of other CNS tumors. The average of meningioma cases was 69 cases per year. This number increase more than previous study in 2007­2009 at Department of Anatomic Pathology FMUP/Dr. Hasan Sadikin General Hospital with 51 cases per year. It may be happened because people and health providers is more concern about health nowadays, and people could have better health care because the development of referring system in Indonesia, so meningioma can be detected earlier and its cases in Dr. Hasan Sadikin General Hospital, as a referring hospital in West Java, increased every year.13

Meningioma was occurred more frequently in females with 240 cases (87%) than in males with 37 cases (13%). This result was same as a research from S. Shah, et al.6 resulted meningioma was dominant in women than in man with women and men ratio was 2:1.6 The result is related with hormonal factor as one of potential risk factors of meningioma. In the research from J. Wiemels, et al.7, it was said estrogen, androgen, and progesterone receptor was found in meningioma. Because of the findings, it was suggested hormonal factor was a risk factor for meningioma.7

J. Wiemels, et al.7 said there was increase of incidence rate of meningioma over age.7 In this study, increase of meningioma cases began at 21 year, especially in women, but decreased after 50 year, this result showed normal distribution, and the frequency of meningioma increased in productive women when the hormone production is high. The highest rate of meningioma cases was in 41­50 years with 108 cases and the lowest rate was in 71­80 years. There was none of meningioma cases found in 0­11 years, and more than 80 years. This may be happened because development of neuroimaging technology such as CT scan and MRI which make asymptomatic meningioma can be detected and high rate of possibility there were another disease in old patient responsible for increasing of mortality, so there was decrease in meningioma cases over age.14

The most common type of meningioma in this study was meningotheliomatous meningioma with 194 cases (70.03%), followed by fibrous type with 21 cases (7.58%), and psammomatous type with 16 cases (5.77%). 90.22% from all cases were WHO grade I meningioma. This result was same as previous study with WHO grade I meningioma was more than 90% of all cases, followed by WHO grade II, and WHO grade III. WHO grade III meningioma (5.04%) in this study was more common than WHO grade II meningioma (4.69%). In A.J. Kane, et al.8 research, intracranial meningioma was more common than intraspinal meningioma.8

Convexity, falx and parasagittal, and sphenoid wing were the most common location for meningioma.15 In this study, the most common location was convexity with 155 cases (55.96%), followed by sphenoid wing with 62 cases (22.38%), and retroorbital with 8 cases (2.89%). There was 1 case (0.36%) in falx and parasagittal.

Limitation of this study is there are 11 medical records excluded from study because of the incomplete data. To conclude, the average frequency of meningioma for 4 years (2009­2013) is 69 cases. Meningioma is more common in women and the most common type is meningotheliomatous meningioma. Convexity is the most common location for meningioma.

The completeness of medical records and diagnosis in medical record should be increased, especially the histopathological type and clinical symptoms. This study could be basic for next research about meningioma.

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