Clinical Research

Characteristic of Central Nervous System Tumours from 2011-2015: A Single Institution Study

Febrihardita Dwinovitch[1], Nadya Aisyah Widowati[1], Erna Kristiani[2]

[1] Faculty of Medicine, Pelita Harapan University, Karawaci, Tangerang, Indonesia.

[2] Anatomical Pathology, Pelita Harapan University, Siloam Hospital Lippo Village, Karawaci, Tangerang, Indonesia.

Abstract

Background: Central nervous system (CNS) tumours affect the quality of life of patients since its neurological deficits. Data from Globocan 2012 reveals that there are 256,000 cases of CNS tumour. Epidemiology of the CNS tumours is very important for diagnosis and treatment, but data in Indonesia is still not fully reported.

Objective: The aim of this study was to determine the exact amount of the incidence, histologic type of the tumour and the characteristic of patient in our institution.

Methods: This is an observational study, all pathology report of CNS tumours that underwent surgery at Siloam Hospitals Lippo Village from 2011 until 2015. We classified based on gender, age, location of the tumour, and the histologic type according to WHO Classification of CNS tumour 2007.

Results and Discussion: There were 913 patients of CNS tumours from 2011 until 2015. The most common tumours were meningioma (32.96%) followed by glioma (21.35%) and pituitary adenoma (16.10%). In meningioma, most occur in women, 41 - 50 years old, located in the frontal region and the most common subtype is transitional meningioma. In glioma, most occur in men, 31 - 40 years old, located in the frontal region and the most common subtype is glioblastoma. In adenoma hipofisis, most occur in men, 41 - 50 years old.

Conclusion: The result of this study was accordance with the literature so this data could be a reference for further research.

Keywords: characteristic, central nervous system, tumours

INTRODUCTION

Tumors of the central nervous system (CNS) are tumors that attacks neuro-epithelial tissue, membrane that covering the brain and spinal cord, pituitary gland tumor and the cells derived from hematopoietic cell.[1] According to Globocan's data there are approximately as many as 256,000 cases of tumors was recorded in 2012 worldwide.[2] Symptoms of CNS tumors that extremely affects the quality of life of patients, such as impaired vision, impaired balance and motor skills, speech disturbances and others. Symptoms most often complained is dizziness, seizures and nausea.[3] Early detection and proper treatment may improve the prognosis of patients.

To comprehend the epidemiology of the CNS tumors are essential for early detection and diagnosis that will influence the selection of appropriate therapies and improve prognosis of patients as well.

Research on the epidemiology of brain tumors in Indonesia infrequently because much of the data is not fully collect by related association. This lead to lots of patients who are not helped in time because of the detection are late and than the patient's diagnosis is known when the disease is already at an advanced stage. Therefore, researchers wanted to know the characteristics of the distribution and incidence of CNS tumors in Siloam Hospital Lippo Village.

MATERIAL AND METHOD

Data were collected using retrospective methods of medical records of patients who underwent surgery at the Siloam Hospitals Lippo Village (SHLV) since 2011-2015. The results were taken at one time, so the patient prognosis is not included. The medical record contain with the basic information that needed for sequencing patient demographic data such as name, age, gender, location of the tumor, and the description of histological or anatomical pathology diagnosis. Then once collected, there are 913 patients diagnosed with acquired disease of the central nervous system tumors. Researchers did not include the number of patients died, or cases recovered after treatment or surgery.

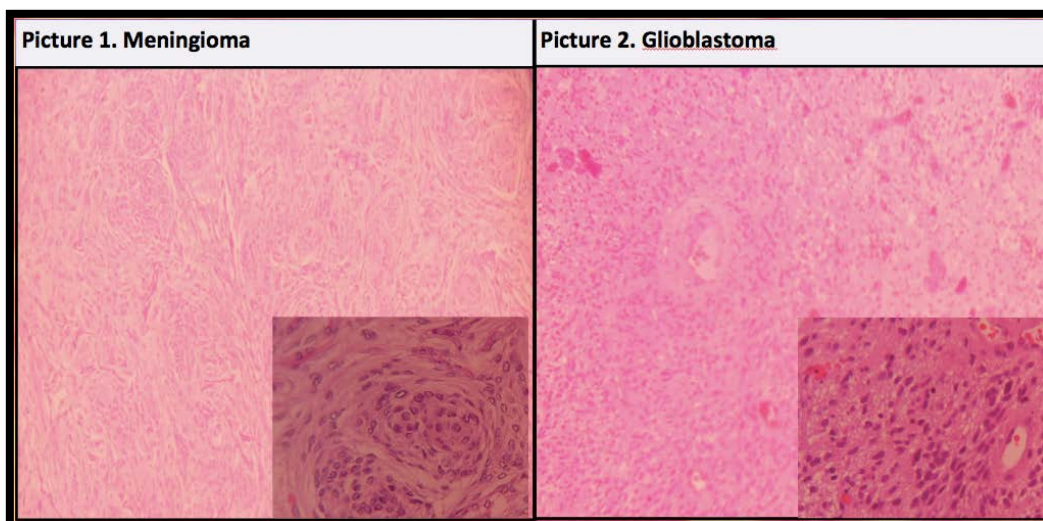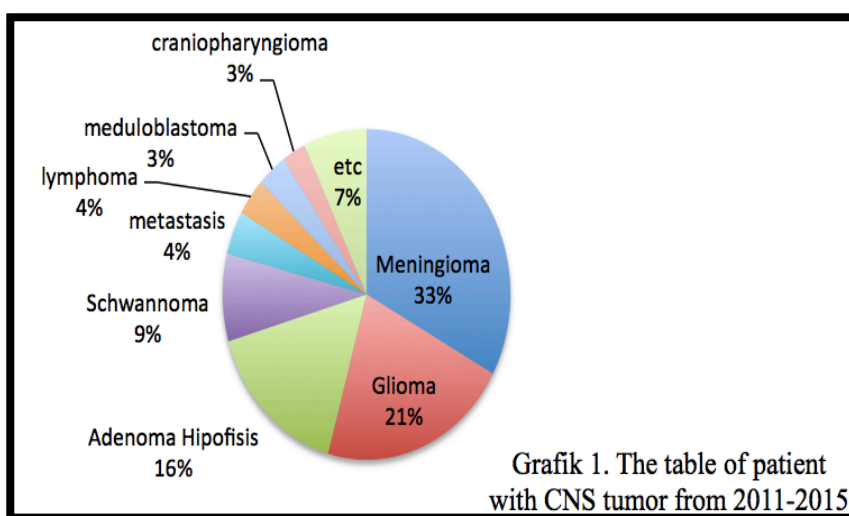**Corresponding Author:**

Erna Kristiani (✉)

Faculty of Medicine Universitas Pelita Harapan Jl. Boulevard Jend.Sudirman, Lippo Karawaci, Tangerang, Indonesia. Tel: +62-21-54210130; Fax: +62-21-54210133; Email: erna.kristiani@uph.edu

The data have been collected and categorized according to age, sex, tumor location and histological picture based on the WHO classification of CNS tumors 2007. Then the data were sorting starts from the most common tumor. After researcher know the most common diseases that occur, then the data clarified based on subtypes of the disease if there are subtypes in the diagnosis. Then researcher, searching for the distribution of the disease, whether more in men or women, the average age of disease occur, and also the most common sites of the disease. At the age classification of patients the researchers divided into eight major groups that is <10 years old, 11-20 years old, 21-30 years old, 31-40 years old, 41-50 years old, 51-60 years old, 61-70 years old and >70 years old. Then we elaborated data only from the 10 most common diseases. Once sorted, in every picture histological seen the average spread on age, sex and location of the tumor, and compared to the existing theory as reference materials.

RESULT

There were 913 patients of CNS tumour at SHLV that were completed inclusion and exclusion criteria. From the data, women (52%) is more dominant than man (48%) for this case. There are the following data and photos of the most common CNS tumor at SHLV :

Grafik 1. The table of patient with CNS tumor from 2011-2015


Picture 1. Meningioma

Picture 2. Glioblastoma

In meningioma, there were 301 patients were diagnosed with this tumour. Most occurred at women than men. The average age of patient was 41-50 years old when diagnosed.

The most common site was at frontal lobe. Transitional meningioma was the most common subtype for meningioma.

Chart 2. Comparison gender in meningioma	Chart 3. Comparison average of age in meningioma
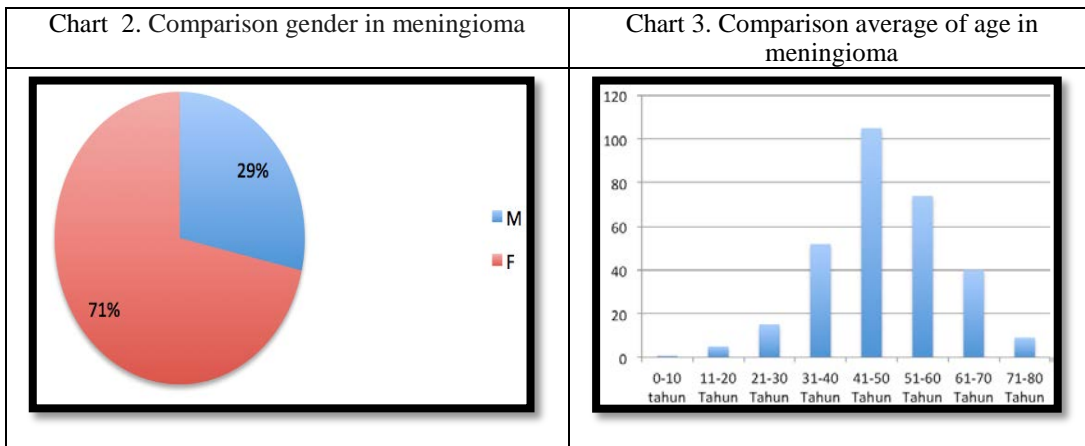
For the second rank was glioma with 195 patients. The glioma was common occur in men than women. The average age was 31-40 years old. The most common site is frontal lobe and for the subtype glioblastoma, diffuse astrocytom, epedymoma were the most common for glioma.

Chart 4. The Data of Glioma's Patient

Chart 5. Comparison gender in glioma	Chart 6. Comparison average of age in glioma
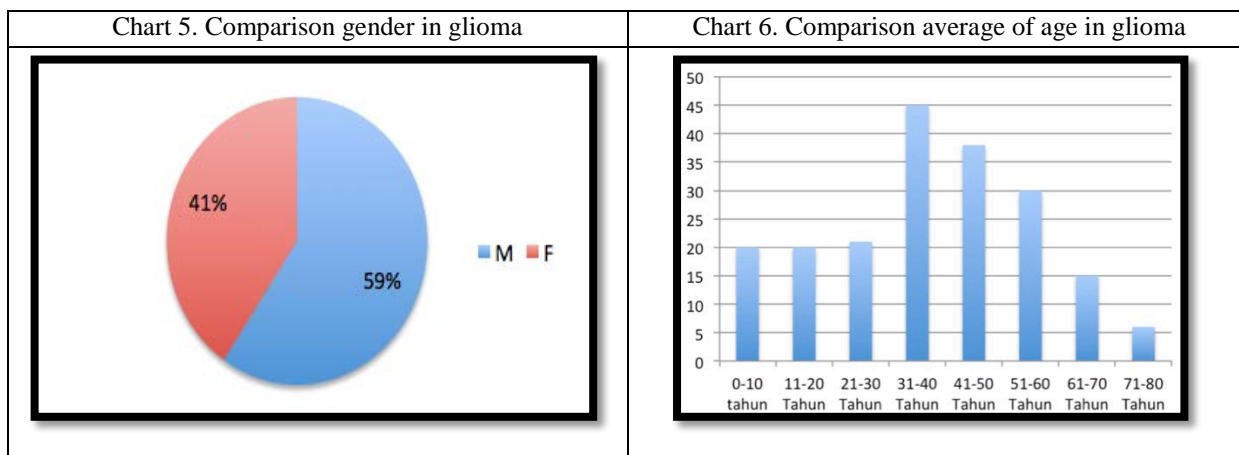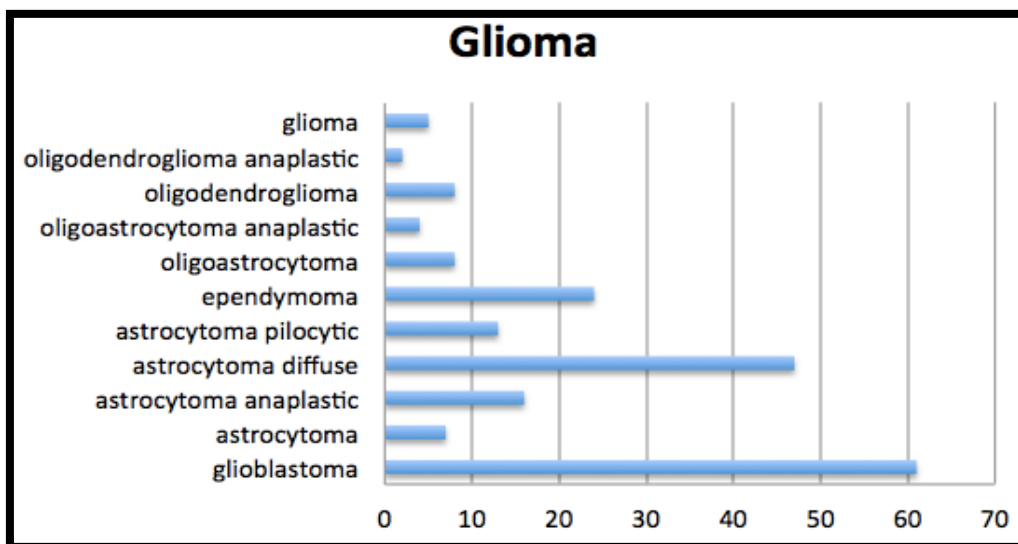
Pituitary adenoma was the third rank at SHLV. There were 147 patients with this tumour. Men was most common than women.

The average age was 41-50 years old when the patient was diagnoses with this tumour.

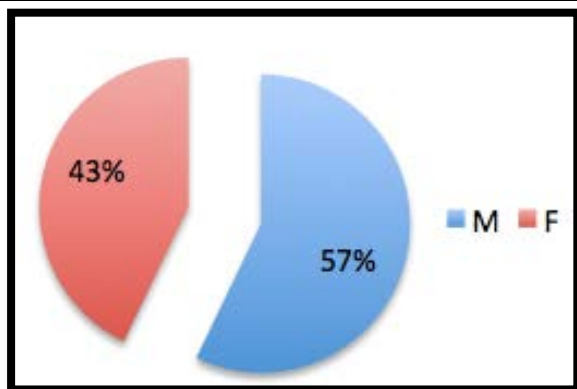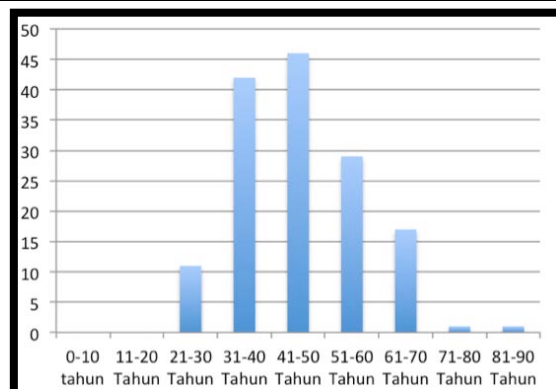| Chart 7. Comparison gender in adenoma hipofisis	Chart 8. Comparison average of age in adenoma hipofisis

In schwannoma, there were 78 patients were diagnosed with this tumor. From the data, women were more dominant than man and the

average age for this case was 31-40 years old. The most common site was at *Cerebellopontine Angle*.
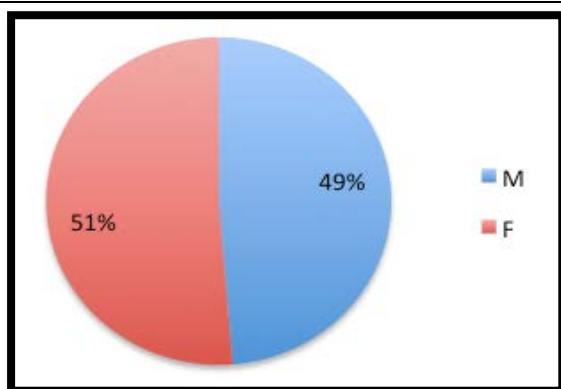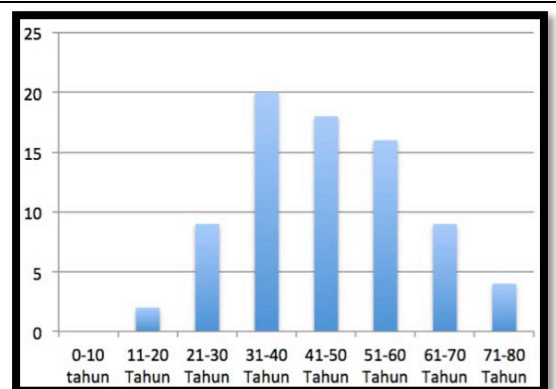
Chart 9. Comparison gender in schwannoma	Chart 10. Comparison average of age in schwannoma

For metastasis, there were 39 patient were diagnosed. Women were more dominant than man. The average age of patient was 51-70

years old when diagnosed. The most common site was at vetebra with metastasis.
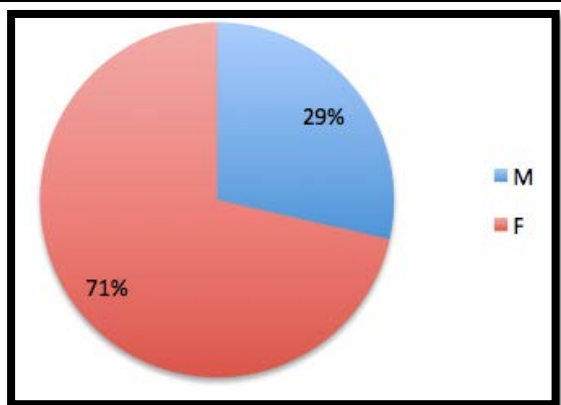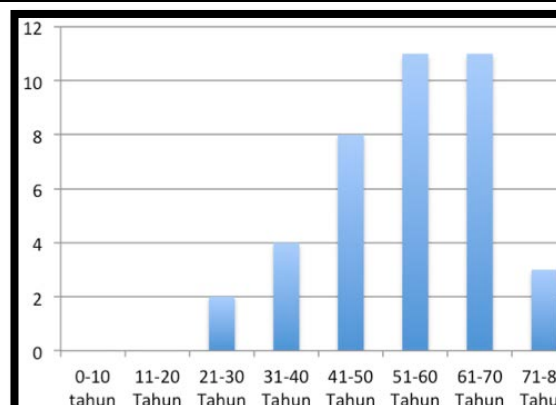
| Chart 11. Comparison gender in metastasis	Chart 12. Comparison average of age in metastasis

In Lymphoma, there were 33 patients were diagnosed. Men were frequent than women at this case.

The average age was between 41-50 years old when diagnosed. The most common site was frontal lobe.

| Chart 13. Comparison gender in lymphoma	Chart 14. Comparison average of age in lymphoma
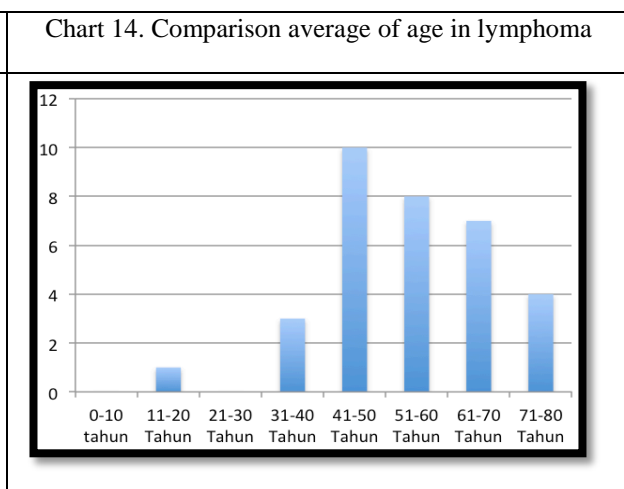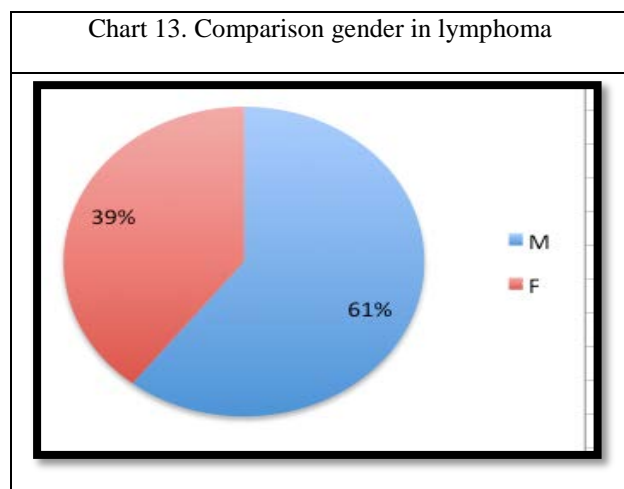
Medulloblastoma was at the seventh rank from the data. There were 31 patients were diagnosed with this tumour.

Men were more dominant than women and the average age was 0-10 years old. The most common site was posterior fossa.

Chart 15. Comparison gender in medulloblastoma	Chart 16. Comparison average of age in medulloblastoma
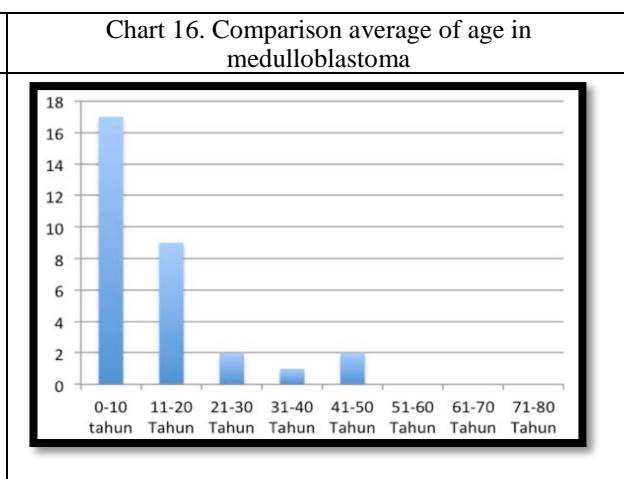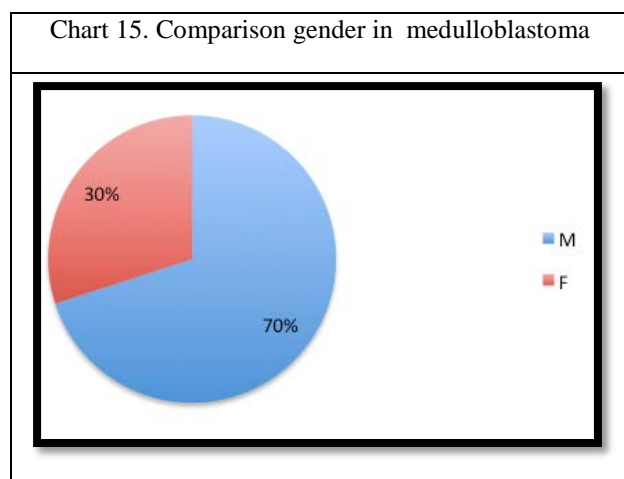
In Craniopharyngioma, there were 24 patients were diagnosed. All of the patients were men.

The average age at this case was 0-10 years old. The most common site was sellae tursica.

Chart 17. Comparison gender in craniopharyngioma	Chart 18. Comparison average of age in craniopharyngioma
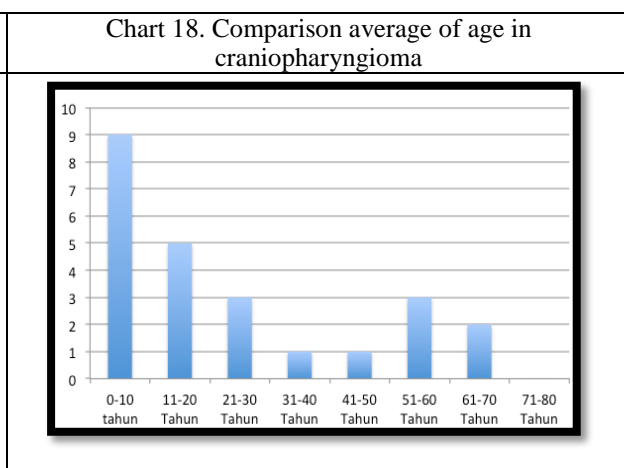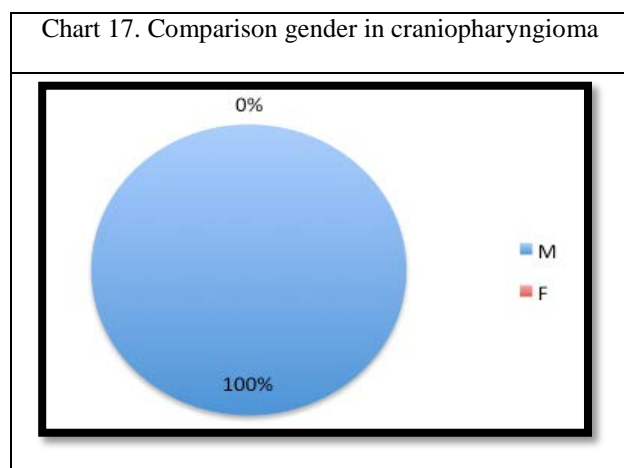
Furthermore, there were 65 patients diagnosed as patients with others diagnoses such as haemangioblastoma, germinoma, choroid

plexus papilloma, chordoma, etc. The average numbers of diagnoses patients above comprise are less than 10 patients.

Discussion and Conclusion

This research classified as descriptive type of number and distribution of CNS tumors. And become as the first performed at Siloam Hospital Lippo Vilage. Based on the data

according to the Central Brain Tumor Registry of the United State (CBTRUS)[5] and research by Lee[6] known that the central nervous system tumors are most often suffered by patients is as follows :
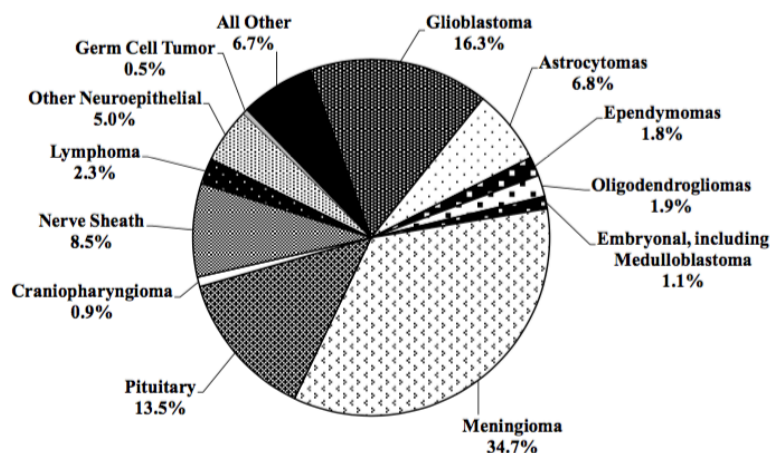
Chart 19. Based on CBTRUS[5]

Table 1. Based on Lee[6]

Histological group	Total count		Histology (+)	
	n	%	n	%
Meningioma	1739	30.6	1,026	31.1
Glioma	1008	17.7	865	26.2
Pituitary tumor	788	13.8	532	16.1
Nerve sheath tumor	634	11.1	408	12.3
Lymphoma	104	1.8	97	2.9
Germ cell tumors, cysts and heterotopias	102	1.8	95	2.9
Craniopharyngioma	113	2.0	85	2.6
Other mesenchymal, non-malignant and malignant	36	0.6	32	1.0
Embryonal/Primitive/Medulloblastoma	73	1.3	73	2.2
Hemangioma	52	0.9	30	0.9
Choroid plexus	15	0.3	14	0.4
Chordoma/Chondrosarcoma	16	0.3	12	0.4
Neoplasm, unspecified	997	17.5	25	0.8
All others	15	0.3	11	0.3
Total	5,692	100.0	3,305	100.0

Histology (+) : histologically confirmed cases

From the graphic and the table above can be seen that there is a similarity of outcomes dissemination of data researchers collect with data from CBTRUS and research in Korea. Most common tumor was meningioma

followed with glioma, pituitary and others. Then generally known central nervous system tumors more suffered by women compared to men. There are similarities with the data obtained from CBTRUS and Lee.

In terms of age, based on the data the researchers collected CNS tumors are more common in patients with ages ranging from 41-50 years old, while the data based CBTRUS discovered that the average age of patients with CNS tumors approximately 85 years old and above, then by Lee's discovered that the average age CNS tumor patients around 52 years old and above. From the data processing as a whole is found, the researchers collected data at Siloam Hospitals Lippo Village are more likely with research conducted by Lee in Korea. This could happen because there are similarities between the patient's races at Siloam Hospital with patients at the Hospital in Korea. Differences in the distribution of the results of the tumor can be caused by various factors, such as genetic, environmental, customs, and others.

Acknowledgement

-

Conflict of interest

None

References

1. Brown M, Schrot R, Bauer K dan Letendre D. "Incidence of first primary central nervous system tumors in California, 2001-2005." J Neurooncol. 2009;94:249-61.

2. World Health Organization. Globocan 2012: Estimated Cancer Incidence, Mortality, and Prevalence Worldwide 2012, Lyon (France): International Agency for Research on Cancer.

3. Strong MJ, Garces J, Vera JC, Mathkour M, Emerson N, Ware ML. (2015) Brain Tumors: Epidemiology and Current Trends in Treatment. Brain Tumors Neurooncol 1:102. doi: 10.4172/2475-3203.1000102.

4. Lapau, Buchari. Metode Penelitian Kesehatan: Metode Ilmiah Penulisan Skripsi, Tesis dan Disertasi. Jakarta: Yayasan Pustaka Obor Indonesia, 2012.

5. Central Brain Tumor Registry of the United States. "Statistical report: primary brain tumors diagnosed in the United States in 2004-2008." 2012.(cited 2016 July 14); Available from URL:http://www.cbtrus.org.

6. Lee C-H, Jung K-W, Yoo H, Park S, Lee SH. Epidemiology of Primary Brain and Central Nervous System Tumors in Korea. Journal of Korean Neurosurgical Society. 2010;48(2):145-152. doi:10.3340/jkns.2010.48.2.145.