

Characteristics of Seizures in Pregnancy at Dr. Soetomo General Academic Hospital Surabaya in 2016-2019

Bayu Priangga^a, Budi Wicaksono^b

^abayupriangga@outlook.com

^a Resident of Obstetric and Gynecology Department at dr. Soetomo General Academic Hospital Surabaya, Mayjend Prof. dr. Moestopo
6-8, Surabaya, 60285, Indonesia

^b Lecturer of Obstetric and Gynecology Department at dr. Soetomo General Academic Hospital Surabaya, Mayjend Prof. dr. Moestopo
6-8, Surabaya, 60285, Indonesia

Abstract

Introduction:

Three causes of maternal death worldwide are bleeding, preeclampsia-eclampsia, and infection. Increased risk of seizures by 15-30% during pregnancy. Structural and metabolic changes can trigger the new onset of seizures while pregnant. Neurovascular adaptation during pregnancy includes decreased brain size and volume during pregnancy, increased after childbirth, lateral ventricular size increases, but this hypothesis is still unknown.

Objectives :

Explaining the Characteristics of Seizures in Pregnancy at dr. Soetomo General Academic Hospital Surabaya in 2016-2019

Methods :

This study is a retrospective descriptive study on seizures in pregnancy treated at dr. Soetomo General Academic Hospital Surabaya during January 2016 - December 2019. The data was obtained from the hospital's medical records.

Results:

In this study, there were 281 cases of seizures in pregnancy reported at dr. Soetomo General Academic Hospital Surabaya in 2016-2019. A total of 32 maternal deaths were related to this case. Most of the patients were caused

by eclampsia (81.49%). The onset of seizures occurs most while pregnant (75%). Most childbirth, in this case, is carried out by cesarean section (74.4%). Based on CT-Scan, the most results were obtained with normal results (28.8%).

Conclusion:

Seizures in pregnancy that we found at dr. Soetomo General Academic Hospital Surabaya in 2016-2019, where most cases were caused by eclampsia, one of the highest maternal causes of death in Indonesia.

Keywords : Seizure, Pregnancy, Characteristics

Introduction

The Maternal Mortality Rate (MMR) in Indonesia in 2015 was recorded at 305 cases per 100,000 live births, where this figure decreased from 2012 as many as 359 cases per 100,000 live births (SUPAS, 2015). There are three causes of maternal death worldwide, namely hemorrhage, preeclampsia-eclampsia, and infection. Increased risk of seizures by 15-30% during pregnancy. Structural and metabolic changes can trigger the new onset of seizures during pregnancy (Structural: Brain hemorrhage, Thrombosis; Metabolic: Hyperemesis Gravidarum, Infection, AFLP)(1). Most new-onset seizures in pregnancy are caused by eclampsia. There are three categories of seizures in pregnancy, including:

- Exacerbation of a history of pre-existing seizures (Epilepsy)
- New onset of seizures not related to pregnancy (tumor, infection, vascular malformation)
- Neurological disorders related to pregnancy (Eclampsia, Amniotic fluid embolism)(2)

The causes of seizures in pregnancy were divided into 4, namely neurovascular factors, metabolic factors, pregnancy-related factors, and psychogenic factors (3). Neurovascular adaptations during pregnancy include a decrease in brain size and volume during pregnancy, an increase after delivery, an increase in lateral ventricular size, but this hypothesis is still unknown. (4).

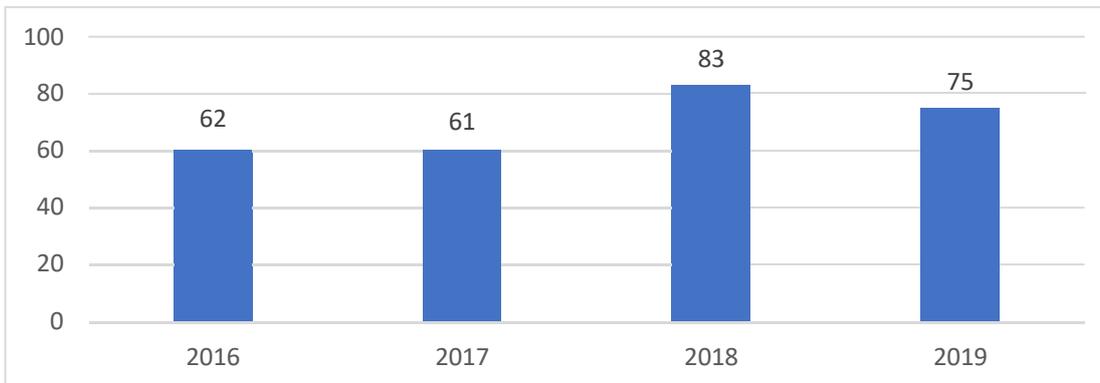
A previous study explained that pregnancy has an increased susceptibility to seizures caused by increased levels of neurosteroids and decreased GABA-A receptors, increasing neuronal excitability and decreasing seizure threshold values. In mid to late pregnancy, blood-brain barrier permeability does not increase due to selective binding of VEGF-PlGF with sFlt-1, which regulates blood-brain barrier homeostasis. The increased vascular volume of the cerebral circulation coupled with high blood flow (Acute Hypertension) can cause cerebral edema, which results in(5). Therefore, the researchers wanted to know the characteristics of seizure cases in pregnancy in dr. Soetomo General Academic Hospital Surabaya is based on the literature described above.

Method

This study is a retrospective descriptive study on patients with seizures in pregnancy treated at dr. Soetomo General Academic Hospital Surabaya during January 2016 - December 2019. Data were obtained from hospital medical records.

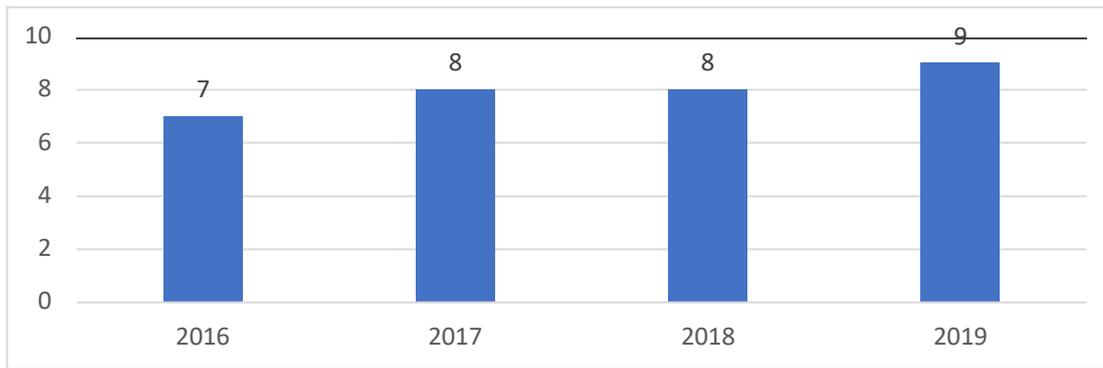
Results

The total cases of seizures in pregnancy in dr. Soetomo General Academic Surabaya has as many as 281 patients, where the most cases in 2018 were 83 cases.



Graph 1. Cases of Seizures in Pregnancy at dr. Soetomo General Academic Hospital Surabaya 2016-2019

Maternal deaths during 2016-2019 were 11.3% (32 cases) of the total cases of seizures in pregnancy, of which the most cases were found in 2019 with nine patients.



Graph 2. Maternal Death Related to Seizures in Pregnancy at dr. Soetomo General Academic Hospital Surabaya 2016-2019

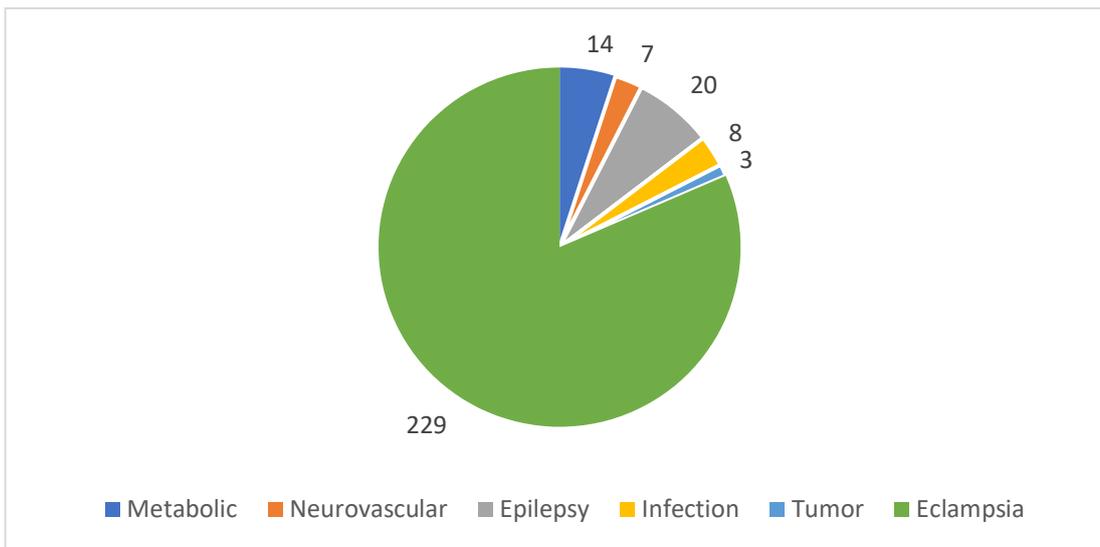
Table 1. Characteristics of Seizure Cases in Pregnancy at dr. Soetomo General Academic Hospital Surabaya 2016-2019

	Seizure Case (N = 281)	All Cases (N = 5514)	Incidence (5.09%)
Age			
16 yrs old	4	41	9.7%
17-34 yrs old	231	3921	5.8%
35 years old	46	1552	2.9%
Single	270	5195	5.1%
Gemelli	11	307	3.5%
Triplet	-	12	-
Primigravida	119	1545	7.7%
multigravida	162	3969	4.0%

Most cases were found in the age range of 17-34 years, with 231 patients. However, when compared with all obstetric cases in dr. Soetomo General Academic Hospital Surabaya in 2016-2019, the highest incidence rate occurred in the age range 16 years by 9.7% (4 of 41 obstetric cases). Based on the number of fetuses, the most were single fetuses, with as many as 270 cases, where the incidence was 5.7%. Patients with multigravida as many as 162 cases, but the highest incidence occurred in primigravida by 7.7% (119 of 1545 obstetric cases).

Based on the causes of seizures in pregnancy, according to the previous 2018 Bollig study, it was found

that most cases of seizures in pregnancy were caused by eclampsia, as many as 229 patients (81.4%).



Graph 3. Causes of Seizures in Pregnancy in dr. Soetomo General Academic Hospital Surabaya 2016-2019

Table 2. Characteristics of Seizure Cases in Pregnancy Based on Causes in dr. Soetomo General Academic Hospital Surabaya 2016-2019

	Metabolic (N=14)	Neurovascular (N=7)	Epilepsy (N=20)	Infection (N=8)	Tumor (N=3)	Eclampsia (N=229)	Total (N = 281)	Incidence Rate (N = 5514)
Blood pressure								
- Normal (TD < 140/90)	10	4	12	6	2	2	79 (28.1%)	1.8% (79/4,235)
-Hypertension (TD 140/90)	1	2	4	-	-	195	202 (71.9%)	15.7% (202/1,279)
BMI:								
- Non-Obesity (BMI < 30 kg/m)	14	5	16	8	3	151	197 (70.1%)	4.5% (197/4,310)
- Obesity (BMI 30 kg/m2)	-	2	4	-	-	78	84 (29.9%)	6.9% (84/1,204)
Method of delivery:								
Vaginal	6	1	5	5	-	44	61 (21.7%)	
Cesarean	5	4	14	2	3	181	209 (74.4%)	
Not born yet	3	2	1	1	-	4	11 (3.9%)	
CT scan results:								
- Normal	5	-	7	1	-	68	81 (28.8%)	

- Brain Edema	-	-	-	-	-	42	42 (14.9%)
- Encephalopathy (PRES, Acute Hypertensive Encephalopathy)	2	-	-	-	-	30	32 (11.3%)
- Infarct	-	1	2	1	-	27	31 (11%)
- Bleeding	-	5	-	-	-	8	13 (4.6%)
- Infection	-	-	-	6	-	0	6 (2.1%)
- Tumor	-	-	-	-	3	0	3 (1%)
- Not done yet	7	1	11	-	-	54	73 (26.3%)

Table 2 shows the characteristics of cases of seizures in pregnancy, the highest was found in the blood pressure category of hypertension as many as 202 cases (71.9%), of which 195 cases were cases of eclampsia. Of the total obstetric cases with obesity, the incidence was higher in cases with hypertension by 15.7% (202 of 1,279 cases). Most were found in the normal BMI range (below 30 kg/m²) as many as 151 cases (70.1%). However, when viewed from the incidence, the most cases of seizures were in the obese group (BMI 30 kg/m²) by 6.9% (84 cases of seizures from a total of 1,204 obstetric cases with obesity). Delivery by the abdominal method was mainly performed in these seizure cases (209 cases; 74.4%), which was also found to be the most in cases of eclampsia. Based on the results of the CT-Scan performed, we obtained numbers that vary in the images found. However, about 73 cases (26.3%) of these seizure cases were not subjected to a CT scan. However, in most seizure cases that were carried out this examination, 28.8% (81 cases) obtained normal results.

Conclusion :

Seizures in pregnancy that we found in dr. Soetomo General Academic Hospital Surabaya in 2016-2019, where the most cases were caused by eclampsia, one of the highest causes of maternal mortality in Indonesia.

Acknowledgements

The authors would like to acknowledge dr. Soetomo General Academic Hospital Surabaya Team for their assistance to finished this research

References

1. Beach RL, Kaplan PW. Chapter 15 Seizures in Pregnancy. In: International Review of Neurobiology [Internet]. Elsevier; 2008 [cited 2021 May 23]. p. 259–71. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0074774208000159>
2. Aya AGM, Ondze B, Ripart J, Cu villon P. Seizures in the peripartum period: Epidemiology, diagnosis and management. *Anaesthesia Critical Care & Pain Medicine*. 2016 Oct;35:S13–21.
3. Bollig KJ, Jackson DL. Seizures in Pregnancy. *Obstetrics and Gynecology Clinics of North America*. 2018 Jun;45(2):349–67.
4. Oatridge A, Holdcroft A, Saeed N, Hajnal JV, Puri BK, Fusion L, et al. Change in Brain Size during and after Pregnancy: Study in Healthy Women and Women with Preeclampsia. 2002;8.
5. Johnson AC, Cipolla MJ. The Cerebral Circulation During Pregnancy: Adapting to Preserve Normalcy. *Physiology*. 2015 Mar;30(2):139–47.