



## Intracerebral Hemorrhage (ICH) Incidence Profile in Jemursari Islamic Hospital During The Period 2017-2019

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### Abstract

**Background:** Intracerebral hemorrhage or ICH or hemorrhagic stroke etiology is brain parenchymal bleeding. Riskesdas reported that patients with stroke in Indonesia is increase from 7 permil in 2013 to 10.9 permil in 2018. Mortality rate for ICH is estimated for 40% in 1 month and 54% in 1 year. Rumah sakit Islam Jemursari (RSI) is the only type B hospital in Wonocolo sub-district of Surabaya city. This study aimed to analyze the pattern of incidents and variations of ICH at RSI Jemursari Surabaya.

**Method:** This was a descriptive observational study. Medical record data is collected from 2017-2019. The data were obtained from medical records section of total number of ICH, gender, age and outcome of patients. Furthermore, data is analyzed and illustrated through a bar chart and the frequency of mortality is then calculated.

**Results:** Total ICH patients at Jemursari Hospital were 310, of 192 male patients and 118 female patients over 3 years. Meanwhile, the most groups experienced ICH were 45-64 years, followed by +65 age group. This is consistent with several epidemiological studies related to ICH, where the incidence of ICH increases with increasing of age. The mortality rate for ICH patients, in the 2017-2019 period, was around 23-30%.

**Conclusion:** It can be concluded that male is more susceptible to ICH than female subjects. Meanwhile, the mortality rate for ICH patients ranged from 23-30% in the 2017-2019 period. It is necessary to carry out further evaluation related to other data from the patient. However it could describe incidence rate as well as an overview of the ICH profile at RSI Jemursari.

**Keywords:** Intracerebral Hemorrhage, RSI Jemursari, ICH profile

### Introduction

Intracerebral hemorrhage or ICH or bleeding stroke is a term that refers to bleeding that occurs in brain parenchyma. It is usually caused by rupture of brain arteries due to hypertension or the presence of vascular abnormalities in the brain (An



et al, 2017). Cerebral bleeding can suddenly increase intracranial pressure and causing damage to brain cells around the ruptured blood vessels (The Internet Stroke Center, 2019).

Intracerebral hemorrhage (ICH) can occur spontaneously or because of cranial trauma. Overall, the incidence of ICH is 24.6 per 100,000 people worldwide with a range of 40,000 to 67,000 cases occurring in the United States (Van Asch, 2010; Aguilar and Freema, 2010). In the Indonesia, according to Riskesdas in 2018, stroke experienced an increase from 7 per mil in 2013 to 10.9 per mil in 2018, however, both of ischemic stroke and bleeding stroke.

The mortality rate for ICH is estimated for 40% in 1 month and 54% in 1 year. Epidemiological studies of stroke from around the world show the mortality rate for initial stroke cases (21 days-1 month) varies between countries. The study reported a stroke mortality rate of 25-30% in developed countries, while in developing countries, the mortality rate was higher, ranging from 30-48% (Feigin et al, 2009).

Rumah Sakit Islam Jemursari (RSI) is the type B hospital in Wonocolo district, Surabaya. RSI Jemursari occupies an area of 4.6 hectares, located in Jalan Jemursari No 51-57 Surabaya, inaugurated since 2002. In 2017, the capacity was 239 beds. This study aimed to mapping profile of ICH at RSI Jemursari in the period of 2017 to 2019 to find out the patterns and variations of the disease. Furthermore it could provide information to take promotive, preventive, diagnosis, management and rehabilitation actions.



## Methods

This study was descriptive observational. Patients who experienced ICH at RSI Jemursari were identified from January 2017 until December 2019 according to the medical records. Inclusion criteria for ICH diagnosis were established by neurologist and review from emergency department. Whereas, ischemic stroke and intracranial bleeding due to head injury were excluded.

First, we determined name, gender, age, outcomes from medical records. Total ICH incident was calculated by adding number of patients in 3 years. Hereafter, mortality rate of ICH was formulated by  $\frac{\text{Jumlah Kasus Kematian ICH}}{\text{Jumlah total kasus ICH}} \times 100\%$ . In addition, this study also described outcomes, death less and more the 48 hours, discharged, forced discharged, and referred. Descriptive statistic were calculated for all variables and presented as table and bars.

## Results

A total patients ICH from 2017-2019 were 310. The subjects consisted 192 males and 118 females. The cases occurred in 2017 was 109 and increased to 130 in 2018. Whereas, in 2019, it decreased to under 100 (table 1). According to age group, were divided into 5-14 years, 15-24 years, 25-44 years, 45-64 years and over 65 years. Most of cases were in 45-64 years group and the lowest were in 5-14 years and 15-24 years age group (table 2).

**Table 1 Details of the number of patients hospitalized due to ICH**

	2017	2018	2019	
<b>Male</b>	72	82	38	192
<b>Female</b>	37	48	33	118
<b>Total</b>	109	130	71	310

**Table 2 Distribution ICH based on age group (years)**

	2017	2018	2019	Total
<b>5-14</b>	1	1	1	3
<b>15-24</b>	1	0	2	3
<b>25-44</b>	15	7	4	26
<b>45-64</b>	50	83	45	178
<b>65+</b>	36	30	19	85

Furthermore, after underwent treatment, ICH patients experienced some of different outcomes. It was influenced by various comorbid factors possessed by patient. The outcomes of patients involved died less than and more than 48 hours, discharged from hospital, forced discharged, and referred. Table 3 showed outcomes of patients.

**Table 3 Various Outcomes of ICH patients at RSI Jemursari**

	Died < 48 jam	Died > 48 jam	Ds discharge	Forced discharge	Referred
<b>2017</b>	19	14	68	3	6
<b>2018</b>	14	17	86	1	5
<b>2019</b>	8	9	47	3	4
<b>Total</b>	41	40	201	7	15



Mortality rate of ICH patients in the last 3 years was:

- Mortality rate in 2017 was  $\frac{19+14}{109} \times 100\% = 30,27\%$
- Mortality rate 2018 was  $\frac{14+17}{130} \times 100\% = 23,85\%$
- Mortality rate in 2019 was  $\frac{8+9}{71} \times 100\% = 23,94\%$

Some of risk factors or comorbid diseases from medical record were atrial fibrillation, acute cerebral infarction, cavernoma, severe brain injury, moderate brain injury, minor brain injury, diabetes mellitus, parkinson's disease, chronic kidney disease, sepsis, cardiogenic shock, hypertension, etc.

## Discussion

In the period between 2017-2019, RSI Jemursari had totaled 310 patients ICH with 192 males and 118 females. The highest number of patients was in 2018, where the number of male patients was greater than female patients. Hsieh et al reported that men tend to be more prone to developing ICH than women. It was found in multi-ethnic of Asian populations. In contrast, for the western population, the neurological status of female patients was worsening at the time of hospitalization and there was no decrease in the mortality rate within 30 days (Hsieh et al., 2016).

In addition, other study was conducted in Asian and Native Hawaiians and other Pacific Islanders show male experienced ICH younger age than women. However, this gender and age difference was mainly found in Asian subjects and not in white subjects and Native Hawaiians and other Pacifics Islanders (Galati, King and Nakagawa, 2015). Study in Indonesia also supported of two previous study.



Gondowardojo reported in a two years period, the number of ICH patients involved in the study was 9 people, while women were 5 (Budiman Gondowardojo et al., 2018).

Cohort study in Netherlands showed that incidence of ICH increased with increasing age. Incidence of ICH per 100 000 was 5.9 at 35-54 years, 37.2 at 55-74 years and 176.3 at 75-94 years (Stein et al, 2012). Age determined outcome of patients after treatment because it played a role in physiological changes of the body, as well as the improvement of comorbid conditions such as hypertension, diabetes mellitus which contribute to the pathology of ICH. Some literature stated that there is an increase mortality and morbidities at 60-80 years (Camacho et al, 2015). Meanwhile, at a young age, ICH had different characteristics from older patients. The most common causes of ICH in young patients are structural abnormalities, hypertension, or the use of anticoagulant therapy, as well as cerebral amyloid angiopathy (Tatlisumak et al, 2018).

From this study, the number of patients who died due to ICH at RSI Jemursari was 81 patients. Meanwhile, 201 was discharged, 7 patients were forced to discharge, and 15 were referred. According to data, mortality rate for ICH patients at RSI Jemursari was 30.27% in 2017. Then it decreased in the following year, 23.85%. However, with an increasing number of patients (109 patients to 130 patients). Whereas in 2019, the number of ICH patients was below 100, it was 71 patients and the mortality rate did not change much, 23.94%. Darin et al reported although there was a decrease incidence of ICH, the fatality rate was still constant, so good management of ICH were still needed to treat ICH and reduce the risk of death



(Zahuranec et al., 2014). The ICH mortality rate is estimated to reach 40% in the first 1 month and 54% at 1 year (An, Kim and Yoon, 2017).

Medical record data of ICH patients at RSI Jemursari showed almost all ICH patients had risk factors or comorbid diseases, include atrial fibrillation, acute cerebral infarction, cavernoma, severe brain injury, moderate brain injury, minor brain injury, diabetes mellitus, Parkinson's disease, chronic kidney disease, sepsis, cardiogenic shock, hypertension, and so on. One of the most important risk factors for ICH is hypertension. One study reported the presence of hypertension is associated with spontaneous ICH and the increasing hospitalization duration of ICH patients (Hong et al., 2017).

## Conclusion

From this study, it could be concluded that ICH in the 2017-2019 period was more in men than in female subjects. In addition, most cases was 45-64 years followed by age of +65 years. Meanwhile, the mortality rate for ICH patients ranged from 23-30% in the 2017-2019 period. It is necessary to carry out further evaluation regarding other data from the patient. However it couldn describe the incidence rate as well as an overview of the ICH profile at RSI Jemursari.

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