

CHAPTER I

INTRODUCTION

1.1. Background

Intracranial haemorrhage (ICrH) is a worldwide, life-threatening disease with high mortality and morbidity, encompassing four types of haemorrhage, termed according to the anatomical location of the haemorrhage, namely epidural haemorrhage, subdural haemorrhage, subarachnoid haemorrhage (SAH), and intracerebral haemorrhage (ICH). This study, however, was mainly focused on ICH and SAH. In a RISKESDAS study in 2018, the overall prevalence of stroke was recorded at 10.9% with differing rates among various provinces in Indonesia. While incidence rates of ICH have been decreasing in developed countries, the economic burden ICH has in Indonesia has been gradually increasing. SAH have relatively lower incidence rates, nevertheless, their fatality rates demand the utmost attention (Etminan et al., 2019). Amongst developing countries, the incidence of ICrH is further exacerbated by the high burden of modifiable risk factors (Bender et al., 2017). Studies suggest that ICH and SAH form 19.9% of strokes, found in Indonesia, with an overall prevalence of 0.8%. Hypertension, smoking and hypercholesterolaemia are noted to be the main risk factors (Kusuma et al., 2009).

Hypertension is a vital risk factor in the development of ICrH. By 2018, public health studies revealed the prevalence rate of hypertension in Indonesia to be 34.1% among adults (Indonesia Ministry of Health, 2018). A multicentred study, conducted in 2011, on patients admitted with primary neurological diagnosis as a result of hypertensive crisis denoted SAH (38%), ICH (31%) and acute ischemic stroke (18%) as the most common diagnosis (Mayer et al., 2011). This is particularly evident in individuals with blood pressures above 160/90 mmHg (O'Donnell et al., 2010).

Type 2 diabetes mellitus (T2DM) are also amongst the modifiable factors associated with ICrH. Contributing mechanisms involve vascular disorders and dyslipidaemia which lead to pathologic changes in cerebral blood vessels prior to rupture. In fact, by 2013, the prevalence of hypercholesterolaemia among adults reached 35.9% at 2013 (Ministry of Health of Republic of Indonesia, 2013). Studies have suggested that uncontrolled hyperglycaemia is associated with increased mortality and poorer prognosis. The underlying mechanisms responsible for this may be derived from the activation of protein kinase C (PKC) resulting in the production of proinflammatory and proatherogenic cytokines. However, the correlation of controlled hyperglycaemia and improved outcomes remains under study (Chen, Ovbiagele and Feng, 2017).

Lastly, demographic factors associated with increased risk of ICrHs are age and gender. The incidence of ICH exhibited their respective peaks in the elderly as compared to the youth. This may be attributed to the various comorbidities and chronic health conditions encountered with advancing age (Jolink et al., 2015). ICH occurrence was also noted to be more prevalent amongst men rather than women; however, neurologic symptoms on arrival were more severe amongst women, possibly explained by the increased diastolic blood pressure amongst women. Accordingly, however, its influence on ICH progression is unclear (Hsieh et al., 2016). The reduced incidence of ICH amongst women may be attributed to gonadal hormones as preclinical research suggests that progesterone and oestrogen may alter the course of diseases such as SAH and ICH (Young, Karri and Ogilvy, 2012; Nakamura et al., 2005).

Taking into account the high mortality and morbidity of ICrH, it becomes paramount that they are also recognized swiftly and appropriately. This may be accomplished by proper understanding of the signs and symptoms associated with ICH

and SAH respectively. ICH can typically be recognized by the presence of headache, nausea/vomiting, depressed level of consciousness extreme hypertension and/or seizures alongside sudden-onset focal neurological deficits. Likewise, SAH may present with similar symptoms, however, it is often associated with the presence of a thunderclap headache, otherwise regarded as ‘the worst of their life’. Computed Tomography may be requested for definitive diagnosis (Berkowitz, 2017).

Considering the prevalence of the various risk factors (i.e., T2DM, smoking, and hypertension) alongside the incidence of ICrH in Indonesia, it becomes imperative that analysis of their influence on the outcomes of ICrH is performed. Whilst previous studies primarily focused on single variable correlation, research performed on their collective influence on ICrH is scarce. This study aims to introduce novel information concerning the association of multiple risk factors and clinical characteristics in adult patients with ICrH in Indonesia.

1.2. Research Question

What are the risk factors and clinical characteristics of adult patients with primary ICrH at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia in 2020; and how do they correlate in ICH and SAH cases?

1.3.Objective of Study

1.3.1. General Objectives

To analyse the risk factors and clinical characteristics of adult patients with primary ICrH at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia in 2020; and how they correlate in ICH and SAH cases.

1.3.2. Specific Objectives

1. To analyse the risk factors (i.e., history taking of age, sex, and diabetes mellitus and hypertension stages) of adult patients (> 18 years old) with ICH

and SAH at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia in 2020.

2. To analyse clinical characteristics (i.e., history taking of headache, vomiting, seizure and hemiparesis also Glasgow Coma Scale/GCS from emergency department physical diagnostics) of adult patients (> 18 years old) with ICH and SAH at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia in 2020.
3. To analyse the correlations between risk factors and the clinical characteristics of adult patients (> 18 years old) with ICH and SAH Dr. Soetomo General Academic Hospital, Surabaya, Indonesia in 2020.

1.4. Significance of Study

1.4.1. Theoretical Significance

To provide information regarding the association of various risk factors and the clinical characteristics of adult patients with ICrH at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia in 2020 which can, henceforth, be used for the further development of research and at least, in part, helping physicians in the management of ICrH cases.

1.4.2. Practical Significance

To provide information for medical practitioners, medical professionals, public health services and surgeons regarding the association of various risk factors and clinical characteristics of adult patients with ICrH in order to decide on an appropriate therapy with respect to the underlying risk factors and to further develop preventive strategies to reduce the incidence of ICrH in the public. More specifically, this study may be used to assist medical practitioners, working in remote areas without the

availability of radiological examinations, in early recognition and diagnosis of ICH and SAH among adult patients, thus, improving their functional outcome and prognosis.