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Letter to Editor

An Audit of Patients with Intracranial Hemorrhage Admitted to the Surgical Intensive Care Unit of a Tertiary Hospital in Singapore

Sir,

Intracranial hemorrhage (ICH) is a serious condition that can be caused by trauma, hypertension, aneurysmal ruptures, as well as spontaneously. Despite advances in neurological medicine, both traumatic and spontaneous ICH remains associated with a high mortality and poor neurological outcomes.[1] The reported incidence is 24 in 100,000 population, with a 40% mortality rate. The predictors of bad outcomes have also been variable and remain unreported in Asian studies.[2] Recent studies indicate the risk factors for ICHs to be male sex, older age group, and Asian ethnicity. The overall incidence of ICH is less and tends to occur in younger patients, compared to ischemic stroke patients.[3] Diagnosis is mostly made by computed tomography scan of the brain. The incidence of ICH in Singapore is not well studied.[4] The objective of this study was to conduct an audit of patients admitted to the surgical intensive care unit (SICU) of a Singapore tertiary care hospital with ICH and to report their demographic distribution and outcomes. After obtaining ethics approval, a retrospective review of all consecutive SICU admissions for ICHs to the hospital was conducted from January to November 2017. Two hundred and seventy-three patients were identified.[5] The data recorded included their demographics, diagnosis, and length of stay (LOS), mortality, inotropic support, tracheostomy, Glasgow coma scale (GCS) scores, and days on invasive ventilation. Appropriate generalized linear models were selected for modeling outcomes including mortality, LOS, tracheostomy, and the use of inotropic based on the data types of outcomes. Linear regression was used for continuous data, such as Glasgow coma scale change, mortality, tracheostomy and the use of inotropes. Length of stay was analysed using negative binomial regression.

Majority of the patients were male (68.9%), and of Chinese ethnicity (69.2%), followed by Malays (14.7%) and Indians (10.3%). The median age was 58 years, with all patients falling between the ages of 48 and 65 years old. A sizable portion (28.2%) of patients were 50 years and younger. 164 (60.1%) of the patients had a spontaneous ICH (possibly due to uncontrolled hypertension); 79 (28.9%) had traumatic brain injury (TBI); and 54 (19.8%) had subarachnoid hemorrhage (SAH). The mortality rate in the ICU was 7.7% (21 patients). Of the ones discharged to the ward, another 40% expired within 6 months. Of the ones who died in the ICU, 17 had ICH, 5 had TBI, and 1 had SAH. The median age of those who passed away was 65, with the majority of deaths occurring in the 51–80 years old age group (76.1% of deaths). The median GCS score on admission and discharge was 11 and 13, respectively. The LOS ranged from 1 to 34 days, with a median stay of 3 days. Patients with ICH had the longest median LOS at 5.38 days, while TBI had the shortest mean stay of 4.58 days. 35 patients (12.8%) received a tracheostomy. A larger proportion of ICH patients required a tracheostomy compared to TBI and SAH patients. 82 patients (30%) required inotropic support. About 35.4% of TBI patients required inotropic support; as compared to 24.1% of SAH patients and 29.3% of ICH patients. 154 (53.1%) of patients did not require any invasive ventilation. The median length of invasive ventilation was 0, with a mean length of 2.93 days. Using logistic regression and receiver operating curves, the predictors of outcomes were analyzed further. Comparing the demographics (age, gender, and race), diagnosis, and GCS on admission, to mortality, LOS, tracheostomy, change in GCS and inotropic support, the following results were observed. A low GCS on admission was significant for mortality ($P = 0.002$, odds ratio [OR] 0.533, 95% confidence interval [CI] 0.361–0.789), and a longer LOS (incidence rate ratio = 0.913, 95% CI 0.889–0.938, $P < 0.001$); a poor GCS on discharge was predicted by a low GCS on admission ($P < 0.001$), spontaneous ICH ($P = 0.01$), Malay race ($P = 0.03$), and older age ($P = 0.01$). Low GCS on admission (OR 0.768, 95% CI 0.693–0.851, $P < 0.001$), spontaneous ICH, OR 12.151, 95% CI 0.213–69.13, $P < 0.001$), and male sex (OR 2.3, 95% CI 0.904–6.24, $P = 0.08$) favored having a tracheostomy done; and inotropic support was predicted by a low GCS on admission OR 0.697, 95% CI 0.64–0.75, $P < 0.001$). A larger sample size would be needed to distinguish between outcomes for spontaneous ICH due to hypertension, aneurysmal bleeds, or TBI. There is no explanation for a higher incidence among younger patients or Malays, other than poor control of essential hypertension or undiagnosed hypertension in these groups.

Overall, it can be concluded that the majority of ICH patients in our setting are male, Chinese, younger than reported in the West (in their 50 s), with spontaneous ICHs. Statistical analysis reveals that having a low GCS on arrival, having a spontaneous ICH, being male and Malay had poorer outcomes. Further large studies are required to corroborate these findings, with more rigorous methodological design as well as genomic evaluation.

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Conflicts of interest

There are no conflicts of interest.

Daniel Yong En Lee, Shahla Siddiqui[1], Lynn Yeo[1], Jiexun Wang[1]

Yong Loo Lin School of Medicine, National University of Singapore, [1]Department of Anaesthesia and Intensive Care, Khoo Teck Puat Hospital, Singapore

Address for correspondence: *Dr. Shahla Siddiqui, Department of Anaesthesia and Intensive Care, Khoo Teck Puat Hospital, Singapore. E-mail: shahlasi@yahoo.com*

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