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RESEARCH ARTICLE

PRIMARY SPONTANEOUS INTRACEREBRAL HAEMORRHAGE IN A TEACHING HOSPITAL IN JOHANNESBURG, SOUTH AFRICA: DEMOGRAPHIC PROFILE, CLINICAL OBSERVATIONS AND REVIEW OF THE LITERATURE

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ABSTRACT

Aim: To determine the demographics and clinical presentation of patients with primary spontaneous intracerebral haemorrhage (PSICH) referred for neurosurgical management. ***Patients and Methods:*** Consecutive patients (45) with a Computed Tomography (CT) scan confirmed diagnosis of PSICH over a 6-month were recruited for the study. ***Results:*** The patients were 13 (28.89%) females and 32 (71.11%) males. The mean age was 52 ± 11.44 yrs. There were 32 (71.11%) black patients, 8 (17.78%) Whites, 4 (8.89%) Coloured and 1 (2.22%) Indian. Collapse [19 (42.22%)] and weakness [18 (40%)] were the most common symptoms. The Glasgow Coma Score (GCS) of patients was mild (GCS 13 – 15) in 19 (42.22%), severe (GCS 3 – 8) in 16 (35.56%) and moderate (GCS 9 – 12) in 10 (22.22%). The ICH Score of patients was 0 in 11 (24.44%), 1 in 12 (26.67%), 2 in 8 (17.78%), 3 in 6 (13.33%) and 4 in 8 (17.78%). No ICH Score of 5 or 6 were documented. ***Conclusion:*** Our study has shown that SICH presents a common clinical problem in our environment with a male preponderance. Our patients are younger than in studies in developed nations. Collapse and decreased GCS were the most common forms of presentation.

INTRODUCTION

Primary spontaneous intracerebral haemorrhage (SICH) refers to haemorrhage inside cerebral parenchyma or ventricles, without an underlying causative pathology, such as trauma, tumour, vascular malformation, or aneurysm (Qureshi, 2001; Amenta, 2017). SICH affects more than a million people annually worldwide and accounts for 10% – 15% of all strokes in USA (Qureshi, 2001; Dastur, 2017), 18 – 24% in Japan (Toyoda, 2013) and Korea (Hong *et al*., 2013). Sub-Saharan African studies show an even greater proportion of spontaneous intracerebral haemorrhage as a percentage of all strokes (Nakibuuka, 2012; Atadzhanov, 2012; Gebremariam, 2016; Damasceno *et al*., 2010; Sagui *et al*., 2005; Owolabi, 2013 and Connor, 2007). SICH causes a higher level of morbidity and mortality as compared to ischaemic stroke (Qureshi, 2001; Amenta, 2017 and Dastur, 2017). SICH mortality varies between countries and time periods. High income countries report lower mortality rates, 20 – 30%, compared to low income countries, 40 -50% (Feigin, 2009). In high income countries the trend has been for this mortality rate to decrease. Some studies report mortality rate of up to 70% (Atadzhanov, 2012; Damasceno *et al*., 2010; Deresse, 2015). Of the patients who survive 75% will be left functionally dependent and less than 20% will achieve functional independence (Amenta, 2017; Dastur, 2017).

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ICH incidence differs depending on geographic region ranging from 10 per 100 000 person years in developed countries to double this in developing countries (Feigin, 2009). Furthermore, these incidences are increasing in poor countries compared to wealthy countries where the trend is to show a decline. The highest number of ICH cases and mortality is in Sub-Saharan Africa and Asia (Krishnamurthi *et al*., 2014). Very few studies have been conducted in Sub Saharan Africa looking specifically at SICH. Most of the data on SICH comes from studies which were looking at Stroke overall. Historically strokes, both ischaemic and haemorrhagic, were more common in high income countries compared to low-income ones. However, in recent times there has been a change in this pattern with stroke rates declining in developed countries while rates increase in developing countries. South Africa is regarded as a developing country and this means stroke rates are bound to be an increasing problem on the already overburdened healthcare system. Due to this we decided to conduct a prospective hospital-based study looking at the clinical profile of SICH patients in our setting.

PATIENTS AND METHODS

We conducted a prospective descriptive study over a period of 6 months. The study was approved by the University of the Witwatersrand Human Research Ethics committee. The study was conducted at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), a tertiary level academic hospital in Johannesburg. It serves the northern part of Johannesburg. Our study included all patients who were referred to the

neurosurgical unit at CMJAH with a CT scan confirmed diagnosis of ICH. Secondary causes of ICH were excluded by; CTA, MRI or in certain instances DSA. The cases were referred from emergency units or medical wards of CMJAH or surrounding referral hospitals. All consecutive patients during the study period were added. Exclusion criteria included; history of trauma, secondary causes of ICH identified on other imaging modalities and bleeding dyscrasias. Hematoma volume was calculated using the A*B*C/2 method (Broderick, 1993). A structured questionnaire was used to capture clinical and radiological details of the participants in the study. Demographic and clinical data was captured and analysed. The data was analysed, with a statistician, by the use of computer aided statistical analysis of the variables. The data was entered into an Excel spreadsheet and then exported to the Stata (Version 15) Statistical Software. Categorical variables such as gender were described as frequency, percentages or charts. While nominally distributed continuous variables such as age were reported as mean ± standard deviation but non-nominally distributed variables were presented as median (interquartile range).

RESULTS

Demographics: Forty-five (45) patients (see Table 1) were enrolled into the study during the 6-month study period. All these patients met our study inclusion criteria. Thirty-two (71.11%) patients were males while 13 (28.89%) patients were females. The age of participants ranged from 21 – 81 years with a mean age of 52 ± 11.44 years, and a median of 52 years. The age of males ranged from 39 – 77 years with a mean age of 53.72 ± 9.26 years, and a median age of 52 years. The age of females ranged from 21-81 years with a mean age of 48.15 ± 15.32 years, and a median age of 45 years. Thirty-two (71.11%) patients (see Table 1) were blacks, 8 (17.78%) patients were whites, 1 (2.22%) patient was Indian while the remaining 4 (8.89%) patients were Coloured.

Table 1. Demographic profile of study participants

Variable	Characteristics	Frequency	Percent (%)
Gender			
	Female	13	28.89
	Male	32	71.11
Age in years			
	19 – 30	1	2.22
	31 – 50	19	42.22
	51 – 80	24	53.33
	>80	1	2.22
Ethnicity			
	Black	32	71.11
	White	8	17.78
	Indian	1	2.22
	Coloured	4	8.89

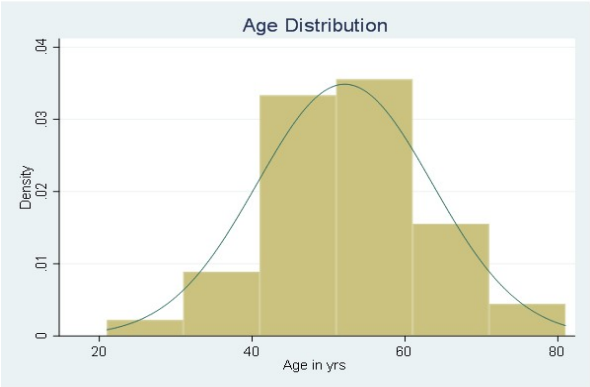

Figure 1. Age distribution profile of study participants

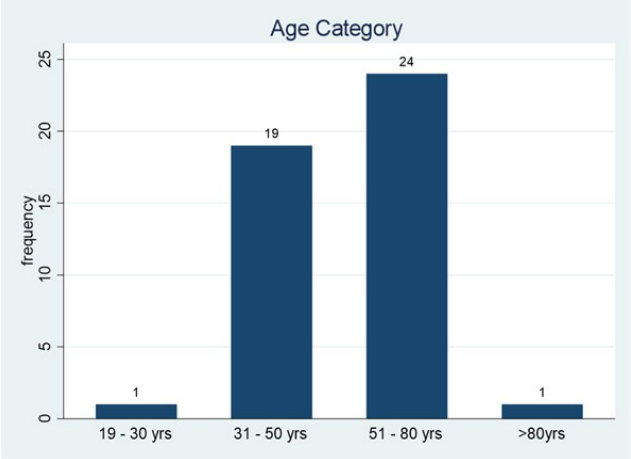

Figure 2. Age category profile of study participants

Clinical Presentation: Collapse (see Table 2) was the presenting symptom in 19 (42.22%) patients, followed by weakness 18 (40%), headache 3 (6.67%), seizures 3 (6.67%) and speech difficulty 2 (4.44%). The ICH Score was 0 in 11 patients (24.44%), 1 in 12 patients (26.67%), 2 in 8 patients (17.78%), 3 in 6 patients (13.33%) and 4 in 8 patients (17.78%). No ICH Score of 5 or 6 were documented. Nineteen patients (42.22%) presented with mild GCS (GCS 13 – 15), 10 patients (22.22%) presented with moderate GCS (GCS 9 – 12) and 16 patients (35.56%) presented with severe GCS (GCS 3 – 8).

Table 2. Clinical presentation profile of study participants

Variable	Characteristics	Frequency	Percent **(%)**
Presenting symptom			
	Collapse	19	42.22
	Weakness	18	40.00
	Headache	3	6.67
	Seizure	3	6.67
	Speech difficulty	2	4.44
GCS			
	13-15	19	42.22
	9-12	10	22.22
	3-8	16	35.56
ICH Score			
	0	11	24.44
	1	12	26.67
	2	8	17.78
	3	6	13.33
	4	8	17.78

Figure 3. Glasgow Coma Score distribution of study participants

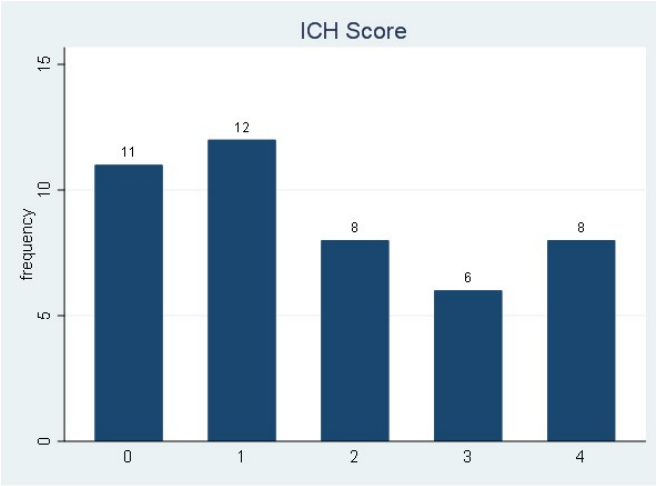

Figure 4. ICH Score distribution of study participants

DISCUSSION

Demographics

Gender: SICH has a higher incidence in males than females. In a Dutch study, the annual incidence was higher in males than females for all ages (Jolink, 2015). A study conducted in Sweden showed that incidence rates of ICH were higher in males than in females (Fahlström *et al*., 2019). In our study 71.11% of the patients were males and 28.89% were females. These findings are in keeping with other studies reported in the literature. In a meta-analysis representing 36 studies, men were found to have higher incidence of ICH compared to females. The difference was more pronounced in Japanese studies (van Asch, 2010). A Chilean study reported 56.5% of participants were males (Soto, 2019). Sub-Saharan Africa studies have shown different trends. Erkabu et al, carried out a study in Ethiopia which had 57.7% male participants (Getachew Erkabu, 2018). Albertino et al, in a study conducted in Maputo, Mozambique reported more females (55.2%) than males (44.2%), one of two studies to show this reversal (Damasceno *et al*., 2010). A Zambian study carried out in Lusaka reported that 40.9% of the participants were males (Atadzhanov, 2012). A study from Ibadan in Nigeria reported that 60.3% of their participants were males (Adeleye, 2015). Nkusi et al, in a study carried out in Kigali, Rwanda had 54.1% of the patients who were males (Nkusi *et al.*, 2017). A study from Dakar Senegal reported that 56.25% were males (Sagui *et al*., 2005). A Malaysian study had a 50 – 50 gender split (Sia *et al*., 2007). In a Texas community study 50% of the participants were males (Zahuranec *et al*., 2006). It is clear that the overwhelming majority of cases of ICH are in males. What is not clear is the reason for this propensity.

Age: The incidence of SICH increases with increasing age. Jolink et al, reported increasing incidence rates with ageing (Jolink, 2015). Our findings showed that the mean age for the study was 52 years. Patients in the Maputo study had a mean age of 54.7 years (Damasceno, 2010). In the Zambian study the mean age was 56 years (Atadzhanov *et al*., 2012). Soto et al, in the Chilean study reported a mean age of 66 years (Soto, 2019). Adeleye et al reported a mean age of 55.7 years (Adeleye, 2015). Nkusi et al, in Rwanda reported a mean age of 59.7 years (Nkusi *et al*., 2017). Sagui et al, in Senegal reported a mean age of 51 years (Sagui *et al*., 2015). A community-based study in Texas, USA indicated that the mean age was 73 years (Zahuranec *et al*., 2006). The study by Sia et al, had a mean age of 61.6 years (Sia, 2017). It seems that studies in developed world have a higher mean age as compared to the studies from developing nations. Our findings are consistent with studies from developing nations.

Race/Ethnicity: Differences in the incidence of spontaneous ICH, among ethnicities, have been reported. Flaherty et al, in a study in USA found that African Americans had a higher reported incidence rates compared to white people (Flaherty *et al*., 2005). Asians however have higher reported rates of ICH than either race in the US (Flaherty *et al*., 2005). The high frequency of ICH among the black race (71.11%) in our study may reflect the predominantly black population in our environment. Whites had the next highest frequency (17.78%) followed by coloureds (8.89%). Indians had the lowest rate (2.22%). It is difficult to draw any conclusions on our findings due to the confounding. Race is a proxy for economic differences especially in our setting. Our study population is not a true reflection of the demographics of the country. Furthermore, hospital-based population does not reflect the general population outside the hospital. Taking this into account it is difficult to make any conclusions.

Clinical Presentation: In our study, collapse was the most common presenting symptom (42.22%) followed by weakness (40%), seizure (6.67%), headache (6.67%) and speech difficulty (4.44%). Most literature report weakness as the most common presenting symptom which correlates with the anatomical location of the haemorrhage being basal ganglia. Adeleye et al, reported limb paresis, headache and vomiting as the most common presenting symptoms (Adeleye, 2015). Nkusi et al, reported that collapse was the most common presentation followed by hemiparesis, disturbed speech and headache (Nkusi *et al*., 2017). Erkabu et al, reported hemiparesis as the most common presentation (52.8%) followed by loss of consciousness (26%), aphasia (17%), headache (4%) and seizure (0.8%) (Getachew Erkabu, 2018). Sia et al, reported weakness as the most common presentation followed by loss of consciousness, headache and speech disturbance. Taking these findings into account shows that our findings are similar to other studies (Sia, 2007). The mean GCS at presentation of our study participants was 10. This correlated with 35.56% of our patients presenting with a severe GCS (3 – 8), 22.22% with a moderate GCS (9 – 12) and 42.22% with a mild GCS (13 – 15). These findings were comparable to other studies especially those from Sub-Saharan Africa. Zahuranec et al, reported a mean GCS of 12.5 (Zahuranec *et al*., 2006). Adeleye reported that 57% of patient presented in a coma with GCS less or equal to 8 (Adeleye, 2015). Our findings correlate with collapse as the most frequent form of presentation.

CONCLUSION

Our hospital-based study has shown that spontaneous ICH presents a common clinical problem in our environment. Our patient demographic profile is similar to that of other published data. There were more men in our study which is in keeping with international trends in both Western and Sub-Saharan Africa. The average age of our patients seems younger as compared to studies coming out of the developed world. However, comparing this to Sub-Saharan African studies, we have similarities with our peers. Collapse and weakness were the most common presenting symptoms. Most patients

presented with a declining level of consciousness and hence collapse featuring very highly in their clinical presentation. These findings are consistent with published literature.

REFERENCES

Qureshi AI, Tuhrim S, Broderick JP, Batjer HH, Hondo H, Hanley DF. 2001. Spontaneous Intracerebral Hemorrhage. *N Engl J Med.,* 344:1450–60.

Amenta PS, Morcos JJ. 2017. Nonlesional Spontaneous Intracerebral Hemorrhage. In: Winn HR, editor. Youmans Neurological Surgery 7th Edition. p. 3186–97.

Dastur CK, Yu W. 2017. Current management of spontaneous intracerebral haemorrhage. *Stroke Vasc Neurol*., 2:21–9.

Toyoda K. 2013. Epidemiology and Registry Studies of Stroke in Japan. *J Stroke*.,15:21–6.

Hong K-S, Bang OY, Kang D-W, Yu K-H, Bae H-J, Lee JS, et al., 2013. Stroke Statistics in Korea: Part I. Epidemiology and Risk Factors: A Report from the Korean Stroke Society and Clinical Research Center for Stroke. *J Stroke*., 15:2–20.

Nakibuuka Jane, Abwooli Nyakoojo, Namala Alice, Blondin Nicholas A DE. 2012. A Descriptive Epidemiological Study on Stroke in Kampala, Uganda: a hospital based study. *African J Neurol Sci*.,31:41–8.

Atadzhanov M. 2012. Stroke Characteristics and Outcomes of Adult Patients Admitted to the University Teaching Hospital, Lusaka, Zambia. *Open Gen Intern Med J.,* 5:3–8.

Gebremariam SA, Yang HS. 2016. Types, risk profiles, and outcomes of stroke patients in a tertiary teaching hospital in northern Ethiopia. *eNeurologicalSci*.3:41–7.

Damasceno A, Gomes J, Azevedo A, Carrilho C, Lobo V, Lopes H, et al. An epidemiological study of stroke hospitalizations in maputo, mozambique: A high burden of disease in a resource-poor country. *Stroke*. 2010;41:2463–9.

Sagui E, M'Baye PS, Dubecq C, Fall KB, Niang A, Gning S, et al., 2005. Ischemic and hemorrhagic strokes in Dakar, Senegal: A hospital-based study. Stroke.36:1844–7.

Owolabi MO, Agunloye AM. 2013. Which risk factors are more associated with ischemic rather than hemorrhagic stroke in black Africans? *Clin Neurol Neurosurg*., 115:2069–74.

Connor MD. 2007. A Racial And Urban-Rural Comparison of the Nature of Stroke in South Africa. Faculty of Health Sciences, University of Witwatersrand.

Feigin VL, Lawes CM, Bennett DA, Barker-Collo SL, Parag V. 2009. Worldwide stroke incidence and early case fatality reported in 56 population-based studies: a systematic review. *Lancet Neurol*., 8:355–69.

Deresse B, Shaweno D. 2015. Epidemiology and in-hospital outcome of stroke in South Ethiopia. *J Neurol Sci*., 355:138–42.

Krishnamurthi R V., Moran AE, Forouzanfar MH, Bennett DA, Mensah GA, Lawes CMM, et al. 2014. The global burden of hemorrhagic stroke: A summary of findings from the GBD 2010 study. *Glob Heart*.9:101–6.

Broderick JP, Brott TG, Duldner JE, Tomsick T, Huster G. 1993. Volume of intracerebral hemorrhage: A powerful and easy-to-use predictor of 30-day mortality. *Stroke*., 24:987–93.

Jolink WMT, Klijn CJM, Brouwers PJAM, Kappelle LJ, Vaartjes I. 2015. Time trends in incidence, case fatality, and mortality of intracerebral hemorrhage. *Neurology*., 85:1318–24.

Fahlström A, Tobieson L, Redebrandt HN, Zeberg H, Bartek J, Bartley A. et al., 2019. Differences in neurosurgical treatment of intracerebral haemorrhage: a nation-wide observational study of 578 consecutive patients. *Acta Neurochir (Wien).*161:955–65.

van Asch CJ, Luitse MJ, Rinkel GJ, van der Tweel I, Algra A, Klijn CJ. 2010. Incidence, case fatality, and functional outcome of intracerebral haemorrhage over time, according to age, sex, and ethnic origin: a systematic review and meta-analysis. *Lancet Neurol*., 9:167–76.

Soto Á, Peldoza M, Pollak D. 2019. Epidemiology and Management of Intracerebral Hemorrhage in Chile. In: Aging - Life Span and Life Expectancy [Working Title]. *Intech Open*.

Getachew Erkabu S, Agedie Y, Mihretu DD, Semere A, Alemu YM. 2018. Ischemic and Hemorrhagic Stroke in Bahir Dar, Ethiopia: A Retrospective Hospital-Based Study. *J Stroke Cerebrovasc Dis*., 27:1533–8.

Adeleye AO, Osazuwa UA, Ogbole GI. 2015. The clinical epidemiology of spontaneous ICH in a sub-Sahara African country in the CT scan era: A neurosurgical in-hospital cross-sectional survey. *Front Neurol.,* 6:1–6.

Nkusi AE, Muneza S, Nshuti S, Hakizimana D, Munyemana P, Nkeshimana M. et al., 2017. Stroke Burden in Rwanda: A Multicenter Study of Stroke Management and Outcome. *World Neurosurg*.,106:462–9.

Sia SF, Tan KS, Waran V. 2007. Primary intracerebral haemorrhage in Malaysia: In-hospital mortality and outcome in patients from a hospital based registry. *Med J Malaysia.,* 62:308–12.

Zahuranec DB, Gonzales NR, Brown DL, Lisabeth LD, Longwell PJ, Eden S V. et al. 2006. Presentation of intracerebral haemorrhage in a community. *J Neurol Neurosurg Psychiatry.,*77:340–4.

Flaherty ML, Woo D, Haverbusch M, Sekar P, Khoury J, Sauerbeck L, et al. 2005. Racial variations in location and risk of intracerebral hemorrhage. *Stroke.* 36:934–7.

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