Annals of Clinical Medicine and Research

Research Article
Published: 06 Aug, 2021

Demographic Profiles, Distribution of Lesion on CT Brain and Outcome in Patients with Spontaneous Intracerebral Hemorrhage (ICH) in a Tertiary Care Hospital: A Cross Sectional Study

Md Shoriful Islam[1], Richmond Ronald Gomes[2], Monjur Hasan FM[3]*

[1]DNCC dedicated COVID Hospital Dhaka , Dhaka, Bangladesh

[2]Ad-Din Women's Medical College Hospital, Dhaka, Bangladesh

[3]Ad-Din Sakina Women's Medical College Hospital, Jashore, Bangladesh

Abstract

Spontaneous Intracerebral Hemorrhage (ICH) has remained is the least treatable form of stroke despite recent improvements in medical treatment. Treatment usually supportive and medical such as ventilatory support, blood pressure reduction, osmotherapy, fever control, seizure control and nutritional support and treatment of comorbid conditions. This study was carried out to see demographic variability, clinical presentation, causes and outcome of spontaneous intracerebral hemorrhage.

Methods and Materials: This were a cross sectional observational prospective in study on 50 spontaneous ICH patients admitted in Medicine department of Khulna Medical College Hospital from November 2020 to April 2021.

Result: The study showed that spontaneous ICH was most common in between 41 to 70 years. Their age frequency was 14 (28%) in 41 to 50 years, 15 (30%) in 51 to 60 years, 12 (24%) in 61 to 70 years, 5 (10%) in 71 to 80 years and 4 (8%) in more than 81 years age group. Among the patients, 64% (32) were male and 36% (18) were female. Hemorrhage in the right cerebral hemisphere was in 52% (26) & in left cerebral hemisphere in 48% (24) patients. Hemorrhage was more common in the basal ganglia 60% (30), thalamus 14% (7), lobar in 14% (7), pontine in 6% (3), internal capsule in 6% (3) patients. Ventricular hemorrhage was present in 36% (18) & absent in 64% (32) patients. Among 50 cases 88% (44) survived and died 12% (6) and good recovery was in 24% (12), moderately disable 22% (11) severely disable 26% (13), vegetative 16% (8) and death 12% (6) patients. Among the cases GCS Score 8 or less 30% were alive and 12% died and. Among those cases Glasgow coma scale score 9 or more all were alive. Among patients with Glasgow coma scale score 8 or less good recovery was (00), moderately disable (03), severely disable (04), vegetative (08), dead (06). There were statistically significant association (p-value =0.002) between low (8 or less) Glasgow coma scale Score and outcome of patients with spontaneous ICH. Among patients with Glasgow coma scale score 9 or more good recovery (12), moderately disable (08), severely disable (09), vegetative (00), dead (00). Among 36% (18) patients of ventricular hemorrhage 26% (13) were alive and 10% (05) died. Among 64% (32) patients without ventricular hemorrhage 62% (31) were alive and 2% (01) died. There is statistically significant association (p-value =0.01) between ventricular hemorrhage and outcome of patients with spontaneous ICH.

Conclusion: Spontaneous ICH is common in Indian subcontinent. As death occur due to ICH itself, associated co morbidities or due to complications, management in stroke care unit, High dependency unit and Intensive care unit is required.

Keywords: Spontaneous; Intracerebral Hemorrhage; Osmotherapy; Seizure; Glasgow coma scale

OPEN ACCESS

Correspondence:
Richmond Ronald Gomes, Ad-Din Women's Medical College Hospital, Dhaka, Bangladesh,
E-mail: rrichi.dmc.k56@gmail.com

Received Date: *12 Jul 2021*
Accepted Date*: 03 Aug 2021*
Published Date*: 06 Aug 2021*

Citation:
Shoriful Islam Md, Gomes RR, Monjur Hasan FM. Demographic Pro iles, Distribution of Lesion on CT Brain and Outcome in Patients with Spontaneous Intracerebral Hemorrhage (ICH) in a Tertiary Care Hospital: A Cross Sectional Study. Ann Clin Med Res. 2021; 2(4): 1034.

Introduction

Cerebrovascular diseases are the third leading cause of death after heart disease and cancer in developed countries. They also come first in terms of causing death and disability in neurologic

diseases in adults [2]. Non-traumatic intracerebral hemorrhage is bleeding into the parenchyma of the brain that may extend into the ventricles and, in rare cases, the subarachnoid space. Spontaneous intracerebral hemorrhage is second most common causes of stroke following ischemic stroke. Depending on the underlying cause of bleeding, intracerebral hemorrhage is classified as either primary or secondary. Primary intracerebral hemorrhage accounting for 78% to 88% of all cases, originates from the spontaneous rupture of small vessels damaged by chronic hypertension or amyloid angiopathy [5]. The world-wide incidence of intracerebral hemorrhage from 10 to 20 cases per 100,000 population, [6,7] and increases with age [6,8]. Intracerebral hemorrhage is more common in men than women, particularly those older than 55 years of age [8,9], and in certain populations, including blacks and Japanese [6,10].

Hypertension is the most important risk factor for spontaneous intracerebral hemorrhage [11]. Intracerebral hemorrhage commonly affects cerebral lobes, basal ganglia, the thalamus, the brain stem (predominantly the pons), and the cerebellum as a result of ruptured vessels [14]. Extension into the ventricles occurs in association with deep, large hematomas. The classic presentation of intracerebral hemorrhage is sudden onset of a focal neurological deficit that progress over minutes to hours with accompanying headache, nausea, vomiting, decreased consciousness and elevated blood pressure. Computed tomography is the key part of the initial diagnostic evaluation. First, it clearly differentiates hemorrhage from ischemic strokes. In addition, computed tomography demonstrates the side and location of the hemorrhage and may reveal structural abnormality as well as structural complications such as herniation, intraventricular hemorrhage or hydrocephalus [4]. Initial management should first be directed toward the basics of air way, breathing, and circulation, and detection of focal neurological deficits [4].

Other supportive medical care includes reduction of the intracranial pressure by diuretics (Mannitol 20% and furosemide, use of anticonvulsants (Diazepam, Midazolam or Phenobarbital) and control of hyperthermia (In order to decrease the neural metabolism) achieved by: External refrigeration, cold saline, sedation, and mechanical ventilation [19]. The optimal level of patients' blood pressure should be based on individual factors such as chronic hypertension, elevated intracranial pressure, age, presumed cause of hemorrhage, and interval since onset [18]. In general recommendations for treatment of elevated blood pressure in patients with ICH are more aggressive than those for patients with ischemic stroke [19]. Antihypertensive agents recommended for treatment of blood pressure in ICH: Nitroprusside, labetalol, enalapril, esmolol, hydralazine [4]. In one fourth of patients with intracerebral hemorrhage who are initially alert, a deterioration in the level of consciousness occurs within first 24 h after onset of hemorrhage [20,21]. Expansion of the hematoma is the most common cause of underlying neurologic deterioration within the first three hours the onset of hemorrhage. Worsening cerebral edema is also implicated in neurologic deterioration that occurs within 24 h to 48 h after the onset of hemorrhage [21].

Materials and Method

This cross sectional, observational, prospective study was carried out in Medicine Department of Khulna Medical College Hospital from November 2020 to April 2021. Total 50 cases of spontaneous ICH were selected. Diagnosis was made by CT scan of brain. Data were processed and analyzed using SPSS (Statistical Package for Social Science) 17.0.

Inclusion criteria:

1. All patients with Spontaneous intracerebral hemorrhage admitted in Medicine wards of KMCH.

2. Voluntarily given consent.

Exclusion criteria:

1. Patients of traumatic intracerebral hemorrhage

2. Recurrent stroke.

3. Not willing to give informed consent.

Results

Table 1 showing age distribution of patients with spontaneous ICH. It was most common in between 41 to 70 years. Their age frequency 14 (28%) were in 41 to 50 years, 15 (30%) were in 51 to 60 years, 12 (24%) were in 61 to 70 years, 5 (10%) were in 71 to 80 years, 4 (8%) were more than 81 years old.

Chi-square (χ^2) test was employed to analyses the data. P-value <0.05 was considered statistically significant.

Discussion

Spontaneous ICH is a third leading cause of death worldwide. It also common in developing country like Bangladesh. In our study, age of the patients with spontaneous ICH was above 40 years. It most commonly occurred in 40 to 70 years age group with 82% (41) and number of patients above 70 years of age with spontaneous ICH was 18% (9) Doctor M et al. [15], in their study found the maximum number of cases i.e. 38 (76%) were between the age groups 45 to 74 years and age ranged from 35 to 74 years. Thacker et al. reported, out of 50 cases of ICH, 39 (78%) were in the age group of 41 to 70 years and age ranged from 16 to 85 years Kafle R [16]. Age distribution of patient's presentation with spontaneous intracerebral bleeding was as follows. Less than 20 years of age: 1 patient. 20 to 29:1 patient. 30 to

Table 1: Frequency of age distribution of the participants.

Age group (Yrs.)	Frequency (No.)	Percentage (%)
41-50	14	28
51-60	15	30
61-70	12	24
71-80	5	10
More than 80	4	8
Total	50	100

Table 1 showing age distribution of patients with spontaneous ICH. It was most common in between 41 to 70 years. Their age frequency 14 (28%) were in 41 to 50 years, 15 (30%) were in 51 to 60 years, 12 (24%) were in 61 to 70 years, 5 (10%) were in 71 to 80 years, 4 (8%) were more than 81 years old.

Table 2: Socio-economic condition of the participants.

Socio economic condition	Frequency	Percent
Poor	20	40
Middle class	29	58
High class	1	2
Total	50	100

Table 2 demonstrates that spontaneous ICH is common in poor and middle-class family. Among the patients, poor (monthly income less than 10000 taka) is 40% (20), middle class (monthly income 10000-50000 taka) is 58% (29), high class ((monthly income more than 50000 taka) is 2% (1).

Table 3: Hemorrhage site distribution of the participants.

Hemorrhage site	Frequency	Percent
Lobar	7	14
Pontine	3	6
Internal capsule	3	6
Basal ganglia	30	60
Thalamus	7	14
Total	50	100

Table 3 shows that hemorrhage occur commonly in the basal ganglia. Hemorrhage site distribution - basal ganglia 60% (30), thalamus 14% (7), lobar 14% (7), pontine 6% (3) and internal capsule 6% (3).

Table 4: Ventricular hemorrhage of the participants.

Ventricular hemorrhage	Frequency	Percent
Present	18	36
Absent	32	64
Total	50	100

Table 4 shows that ventricular hemorrhage was present in 36% (18) & absent in 64% (32) patients.

Table 5: Patient's condition with spontaneous intracerebral hemorrhage.

Patient's condition	Frequency	Percent
Alive	44	88
Dead	6	12
Total	50	100

Table 5 shows patient's condition with spontaneous intracerebral hemorrhage. Among 50 cases more were alive 88% (44) and died 12% (6).

Table 6: Relation between GCS^ score and outcome of the patients.

	Outcome of patient			
GCS Score	Alive	Death	Total	P-Value
8 or less	15	6	21	
9 or more	29	0	29	0.002
Total	44	6	50	

Table 6 shows relation between GCS score and outcome of the patients. Among 21 patients with GCS Score 8 or less survived 15 and died 06. Rests of the 29 patients with GCS Score 9 or more all were alive. There were statistically significant association (p-value =0.002) between low (8 or less) GCS Score and outcome of patients with spontaneous intracerebral hemorrhage.

Table 7: Relation between ventricular hemorrhage and outcome of the patients.

Outcome of patient				
Ventricular hemorrhage	Alive	Death	Total	P-Value
Present	13	5	18	
Absent	31	1	32	0.01
Total	44	6	50	

Table 7 presents relation between ventricular hemorrhage and outcome of the patients. Among 36% (18) patients with ventricular hemorrhage 26% (13) were alive and 10% (05) died. Among 64% (32) patients without ventricular hemorrhage 62% (31) were alive and 2% (01) died. There is statistically significant association (p-value =0.01) between ventricular hemorrhage and outcome of patients with spontaneous intracerebral hemorrhage.

39:2 patients. 40 to 49:11 patients. 50 to 59:19 patients. 60 to 69:29 patients. 70 to 79:20 patients. Above 80 years: 17 patients. In study by Bhatia et al. [17]. The mean age was 57.32 ± 12.84 years and 140 (65.4%) were males Hsiang et al [18]. in a study of 60 consecutive Chinese patients showed that unlike the western studies, the majority of their patients were about a decade younger. Ong and Raymond [19], in a study found the median age was 65 years [20]. Conducted a prospective study of 156 consecutive patients with an age range of 16 to 60 years. Study by Adnan et al. [21] showed that compared with woman, men had a younger age of onset. All studies have shown a steep rise in incidence with increasing age.

Table 8: Relation between GCS Score and outcome of the patients.

Outcome of patients	GCS score			
	8 or less	9 or more	Total	P-Value
Good recovery	0	12	12	
Moderately disable	3	8	11	
Severely disable	4	9	13	

Table 8 represents those relations between GCS score and outcome of spontaneous intracerebral hemorrhage. Where GCS Score was 8 or less good recovery (00), moderately disable (03), severely disable (04), vegetative (08), death (06). Hemorrhage with GCS Score 9 or more good recovery (12), moderately disable (08), severely disable (09), vegetative (00), dead (00). There is statistically significant association (p-value =0.000) between GCS score and outcome of patients with spontaneous intracerebral hemorrhage.

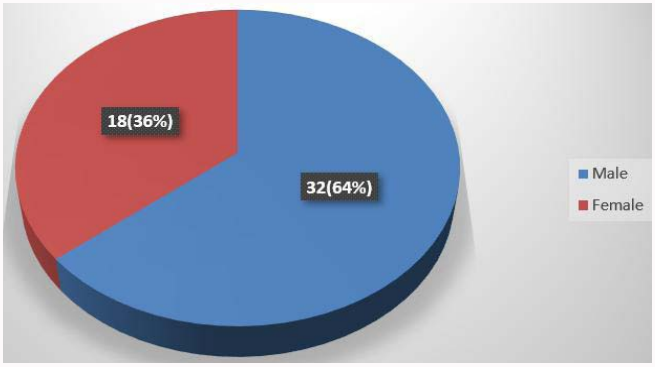

Figure 1: Sex distribution of the patients.
Figure 1 showing spontaneous ICH is more common in male than female. Among 50 cases, 64% (32) were male whereas 36% (18) were female.

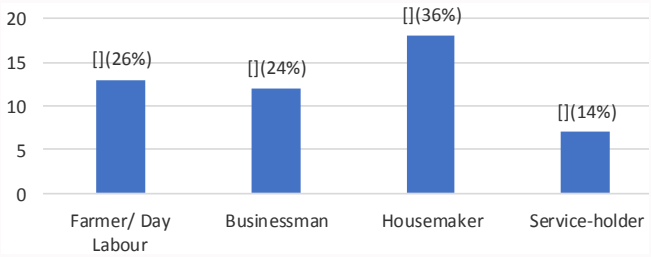

Figure 2: Occupation of the patients.
Figure 2 demonstrates that spontaneous intracerebral hemorrhage was found in farmer/day labor 26% (13), businessman 24% (12), and housemaker 36% (18), and service holder 14% (7).

In this study, spontaneous ICH is more common in male 64% (32) than female 36% (18). In study by Ong [19] showed that male to female ratio was 1:0.77. Adnan [21], in a study showed that compared with woman, men had a younger age of onset (54 *vs.* 60 years; p<0.001). Juvela [20] in a study of consecutive patients, 96 were men and 60 were women where male female ratio was 1:0.63. Zaharia [11] studied, from 93 studied cases 51 were men and 42, women. 52.6% were in the 5th and 6th decade. Results of all the above studies regarding age distribution correspond with our study.

In the study regarding the occupation of the patients having Spontaneous ICH, farmer/day labor was 26% (13), businessman was 24% (12), and house-wife was 36% (18), and service holder was14% (7).

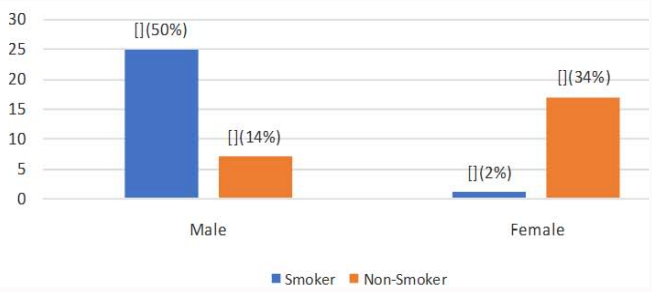

Figure 3: Showing distribution of smoker of the participants.
Figure 3 represents spontaneous ICH more common in smoker. Among 50 cases male smoker 25 (50%) and female 1 (2%) and nonsmoker male 7 (14%) and female 17 (34%).

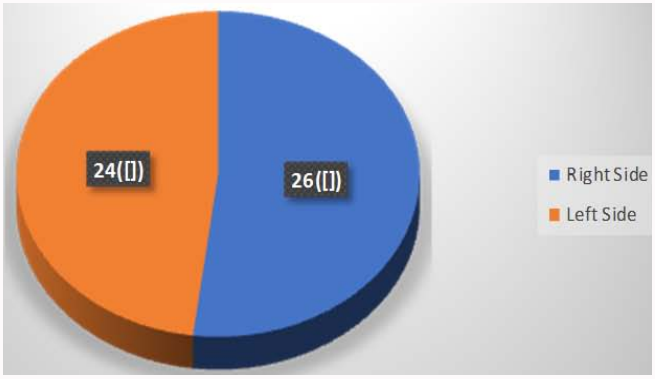

Figure 4: Hemorrhage side of the participants.
Figure 4 presents hemorrhage side distribution which was 52% (26) in the right side and 48% (24) in the left side.

Giulia [22] found men with low SEP (Socioeconomic Position) with an ischemic event were more likely to be hospitalized for a new stroke than men with high SEP. Women with low SEP with hemorrhagic stroke were more likely to be hospitalized for cardiovascular disease compared with women with high SEP.

In our study, we found that spontaneous ICH was common in poor and middle-class family. Among the patients, poor was 40% (20), solvent 58% (29), very good 2% (1). In a study by Giulia [22] showed that stroke incidence strongly differs between socioeconomic groups reflecting a heterogeneous distribution of lifestyle and clinical risk factors. Strategies for primary prevention should target less affluent people.

In this study, we found that spontaneous ICH was more common in smoker. Among 50 cases, male smoker was 25 (50%) and female 1 (2%) and nonsmoker male was 7 (14%) and female was 17 (34%). Kafle [16] showed that 21 percent of patients were smoker. In study by Zaharia et al. [11] found that, cigarette smoker (13.1%). Doctor et al. [15] showed in their study, history of smoking was present in 24 cases (48%), all were male and 17 patients (34%) were currently smoking. Craig S Anderson reported history of smoking in 29% of patients and ex-smoking in 19% of patients out of 60% cases of spontaneous intracerebral hemorrhage.

In our study we found that right sided hemorrhage was in 52% (26) & left sided was in 48% (24) cases. Hemorrhages were more common in the basal ganglia. Hemorrhage site distributions were basal ganglia 60% (30), thalamus 14% (7), lobar 14% (7), pontine 6% (3) and internal capsule 6% (3). Kafle [16], in their study CT

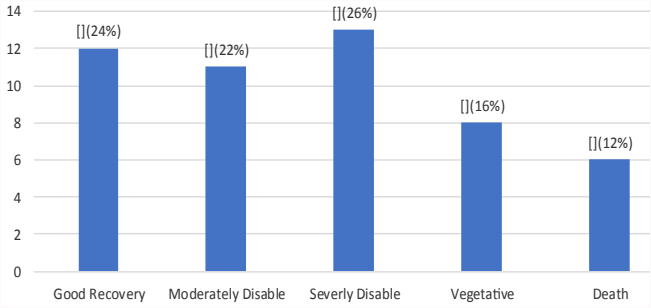

Figure 5: Outcome of treatment of spontaneous intracerebral hemorrhage.
Figure 5 shows patients outcome after treatment of spontaneous intracerebral hemorrhage. Among 50 cases good recovery 24% (12), moderately disable 22% (11) severely disable 26% (13), vegetative 16% (8) and death 12% (6).

scan was done in all the patients at the time of admission. 46% of the patients had primarily putaminal bleeding. Lobar bleeding was present in 28% of patients. Thalamic bleeding in 13% of the patients, cerebellar bleeding in 3% and pontine bleeding in 4%of patients [15]. Hemorrhage found in ganglio-thalamic 23 (46%), ganglio-capsular 10 (20%), lobar 14 (28%) cerebellar 1(2%) and pontine 2(4%). In study by Bhatia et al. [17] showed the sites of hematoma included ganglionic (70.6%), thalamic (16.8%), lobar (4.2), brainstem (7%) and cerebellar (1.4%).

We found ventricular hemorrhage were present in 36% (18) & absent in 64% (32) patients. In the study, Kafle [16] showed that 26% cases had intraventricular extension.

In our study we found outcome of patients with spontaneous intracerebral hemorrhage, 88% (44) were alive and 12% (6) died. Kafle [16] showed 90% of the patients who were admitted improved and were discharged from the hospital. The mortality rate was 6%. Condition of 4% patients deteriorated and were taken to home on family member's request. In a study by Yonghong et al. [23] concluded that increased systolic and diastolic blood pressures were significantly and positively associated with death and disability among patient with acute hemorrhagic stroke, but not acute ischemic stroke. Ong and Raymond [19] found the mortality at one month was 20.3%. A recent study by Zia et al., found that for those younger than 75 years of age, male sex predicted a poor outcome.

In our study we found patients with GCS Score 9 or more all were alive. Among 42% patients with GCS Score 8 or less, 30% (15) were alive and 12% (06) died. All death was among those having GCS score were 8 or less. Among patients with GCS Score 8 or less were good recovery in 0% (00), moderately disable in 6% (03), severely disable in 8% (04), vegetative in 16% (08) and death in 12% (06). In rest of the cases with GCS Score 9 or more were good recovery in 24% (12), moderately disable in 16% (08), severely disable in 18% (09), vegetative in 0% (00), death in 0% (00). There is statistically significant association (p-value =0.000) between GCS score and outcome of patients with spontaneous intracerebral hemorrhage. There was statistically significant association (p-value =0.002) between low (8 or less) GCS Score and outcome of patients with spontaneous intracerebral hemorrhage.

Most of all deaths in our study occurred among patients with ventricular hemorrhage. Among 36% patients of ventricular hemorrhage 10% (05) died and 26% (13) were alive. Among those patients without ventricular hemorrhage 62% (31) were alive and

only 2% (01) died. There is statistically significant association (p-value =0.01) between ventricular hemorrhage and outcome of patients with spontaneous intracerebral hemorrhage.

Conclusion

Spontaneous ICH is a major cause of morbidity and mortality among stroke patients. Hypertension is the most common cause of spontaneous ICH; others are smoking, dyslipidemia, diabetes mellitus and family history of stroke. Mainstay of treatment is supportive, including airway maintenance, diabetes control, blood pressure control, treatment and prophylaxis of convulsion, temperature control, nutritional support, careful fluid therapy and rehabilitation is also needed for improved mortality and morbidity.

Limitation of Study

The present study did not represent the actual scenario of spontaneous ICH in Bangladesh because the study was conducted in one tertiary level hospital (Khulna Medical College and Hospital (KMCH). Sample size and duration of the study was short. Actual measurement of intracranial pressure was not possible. Advanced investigation facilities (Cerebral angiogram, MRI of brain) were limited. There was no advanced life support available.

References

1. Sacco RL. Risk factors, outcomes, and stroke subtypes for ischemic stroke. Neurology. 1997;49(5 suppl 4):S39-44.
2. Foulkes MA, Wolf PA, Price TR, Mohr JP, Hier DB. The Stroke Data Bank: Design, methods, and baseline characteristics. Stroke. 1988;19(5):547-54.
3. Broderick JP, Brott T, Tomsick T, Huster G, Miller R. The risk of subarachnoid and intracerebral hemorrhages in blacks as compared with whites. N Engl J Med. 1992;326:733-6.
4. Furlan AJ, Whisnant JP, Elveback LR. The decreasing incidence of primary intracerebral hemorrhage: A population study. Ann Neurol. 1979;5(4):367-73.
5. Giroud M, Gras P, Chadan N, Beuriat P, Milan C, Arveux P, et al. Cerebral hemorrhage in a French prospective population study. J Neurol Neurosurg Psychiatry. 1991;54:595-598.
6. Sacco RL, Mayer SA. Epidemiology of intracerebral hemorrhage. In: Feldmann E, editor. Intracerebral hemorrhage. Armonk, N.Y.: Futura Publishing. 1994:3-23.
7. Suzuki K, Kutsuzawa T, Takita K, Ito M, Sakamoto T, Hirayama A, et al. Clinico-epidemiologic study of stroke in Akita, Japan. Stroke 1987;18(2):402-6.
8. Brott T, Thalinger K, Hertzberg V. Hypertension as a risk factor for spontaneous intracerebral hemorrhage. Stroke 1986;17(6):1078-83.
9. Mutlu N, Berry RG, Alpers BJ. Massive cerebral hemorrhage: Clinical and pathological correlations. Arch Neurol. 1963;8:644-61.
10. Broderick JP, Adams HP, Barsan W, Feinberg W, Feldmann E, Grotta J, et al. Guidelines for the management of spontaneous intracerebral hemorrhage: A statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association. Stroke. 1999;30(4):905-15.
11. Zaharia B, Plesea IE, Georgescu CC, Camenta A, Georgescu CV, Enache SD, et al. morphoclinical study of intracerabral hemorrhage with intraventricular extention. Romanian J Morphol and Embryol. 2005;46(3):199-206.
12. Adams HP Jr, Brott TG, Furlan AJ, Gomez CR, Grotta J, Helgason CM, et al. Guidelines for thrombolytic therapy for acute stroke: A supplement to the guidelines for the management of patients with acute ischemic stroke: A statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association. Circulation. 1996;94(5):1167-74.
13. Qureshi AI, Safdar K, Weil J, Barch C, Bliwise DL, Colohan AR, et al. Predictors of early deterioration and mortality in black Americans with spontaneous intracerebral hemorrhage. Stroke. 1995;26(10):1764-7.
14. Mayer SA, Sacco RL, Shi T, Mohr JP. Neurologic deterioration in noncomatose patients with supratentorial intracerebral hemorrhage. Neurology. 1994;44(8):1379-84.
15. Doctor NM, Pandya RB, Vaghani CV, Marwadi MR, Gheewala GK, Barfiwala VA. A study on clinical profile, risk factors and mortality in hypertensive intracerebral hemorrhage in a tertiary care hospital in Surat city. National J Med Res. 2013;4(3):381-4.
16. Kafle DR. Outcome of patients with spontaneous intracerebral hemorrhage at a tertiary care hospital in Nepal. J Nobel Med College. 2013;4(2):35-43.
17. Bhatia R, Singh H, Singh S, Padma MV, Prasad K, Tripathi M, et al. A prospective study of in-hospital mortality and discharge outcome in spontaneous intracerebral hemorrhage. Neurol India. 2013;61(3):244-8.
18. Hsiang J, Zhu X, Wong L, Kay R, Poom W. Putaminal and thalamic hemorrhage in ethnic Chinese living in Hong Kong. Surg Neurol. 2009;46(5):441-5.
19. Ong TZ and Raymond AA. Risk factors for stroke and predictors of one-month morality. Singapore Med J. 2002;43(10):517-21.
20. Juvela S. Risk factors for impaired outcome after spontaneous intracerebral hemorrhage. Arch Neutol. 1995;52(12):1193-200.
21. Adnan IQ, Suri MA, Safdar K, Jeffery RO, Robert SJ, Michael RF. Intracerebral hemorrhage in blacks: Risk factors, subtypes, and outcome. Stroke. 1997;28(5):961-4.
22. Giulia C, Nera A, Francesco F, Alberto PC. Socioeconomic differences in stroke incidence and prognosis under a universal healthcare system. Stroke. 2009;40(8):2812-9.
23. Yonghong Z, Reilly KH, Tong W, Tan Xu, Chen J, Bazzano LA. Blood pressure and clinical outcome among patients with acute stroke in linner Mongolia, China. J hypertens. 2008;26(7):1446-52.