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Original Research Article

A hospital based follow up study on predictors of mortality in patients with Intra cranial hemorrhage

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ABSTRACT

Background: Intra-cerebral hemorrhages account for approximately 10-15 percent of all stroke cases and are associated with the highest mortality rate (30-40%). Study of predictors can modify the mortality rates. The objective of the present study the predictors of mortality in patients with intra cranial hemorrhage.
Methods: Hospital based cross sectional study was carried out. Forty patients with CT scan evidence of intra cranial hemorrhage admitted to our hospital were randomly selected. All investigations were done. Patient characteristics were noted down.
Results: In the present study among 40 patients, 16 patients died. The mortality was 40%. As the age increased, the mortality rate increased. But there was no difference between the mortality among males and females. Mortality was more than twice among those with SBP more than 180 mmHg i.e. 58.8% compared to only 26.1% among those with SBP less than 180 mmHg. Similar findings were noted for DBP and MAP. As the severity of motor weakness increased, the mortality increased. Patients with presence of bilateral plantar extensor response were found to be more at risk of death with a death rate of 66.7% compared to only 18.2% among those without presence of bilateral plantar extensor response. As the Glasgow coma scale increased, the mortality decreased from 100% in patients with a score of 3-4 to only 31.2% in patients with a score of 9-13. Intra-ventricular extension of haemorrhage, presence of hydrocephalus, volume of hematoma >30 ml, decreased consciousness level was important predictors.
Conclusions: Bad prognosis i.e. death can be expected if the patient is older, low GCS, hematoma size > 30 ml, gaze palsy, severe motor neuron weakness, abnormal pupils, ataxic respiration etc. hence intensive care should be given to such patients to bring down the mortality.

Keywords: Age, Gender, Mortality, Predictors

INTRODUCTION

Stroke is defined as a rapidly developing focal disturbance of cerebral function of presumed vascular origin and lasting for more than 24 hours (WHO).[1] In the western world, cardiovascular accidents are ranked as the third most common cause of mortality. Heart disease deaths are number one. In adults among the neurological causes, cerebrovascular accidents are number one cause of deaths. It also accounts for more than half of inpatient admissions to hospitals. It not only causes mortality but also causes morbidity.[2]

Intra-cerebral hemorrhages account for approximately 10-15 percent of all stroke cases and are associated with the highest mortality rate (30-40%). CVA has been associated with very high rates of morbidity and mortality. In spite of efforts to avert the problem and

prompt medical and nursing care still it is an important cause for increased morbidity and mortality among stroke patients.[3]

The causes of intra-cerebral hemorrhages are multiple. "Hypertension is the most important risk factor for spontaneous intra-cerebral hemorrhage." [4] Other potential risk factors for intra-cerebral hemorrhage includes excessive alcohol consumption, smoking, diabetes mellitus, anticoagulant therapy, genetic factors, chronic amyloid angiopathy, bleeding from vascular abnormalities (arteriovenous malformations, aneurysms), drugs like cocaine/ amphetamine abuse, bleeding into the tumor and others.[5,6,7] ICH has still remained a serious disease despite attempts at improving outcome by medical and neuro-surgical treatment. There are many clinical/neuro-radiological parameters like Glasgow Coma Scale, severity of neurological deficit, site, and size, volume of hemorrhage, presence of intra-ventricular extension, hydrocephalous and others that would predict the outcome of ICH.[8,9] In the light of above present study was carried out to study the predictors of mortality in patients with intra cranial hemorrhage.

METHODS

Study design: Present study was hospital based follow up study. The study was conducted between November 2016 to October 2017

Study sample: A total of 40 patients were included in the present study. All these patients had intra cranial hemorrhage as evident from CT scan

Place of study: Present study was carried out at inpatient wards of Department of General Medicine, Malla Reddy Institute of Medical Sciences, Hyderabad

Inclusion Criteria:

- Above the age of 18 years
- Both sexes
- Intra cranial hemorrhage as evident from CT scan

Exclusion Criteria:

The following patients were excluded from present study-

- Traumatic intra-cerebral haemorrhage.
- Primary subarachnoid haemorrhage.
- Haemorrhagic transformation of infarction.
- History of bleeding diathesis.

Detailed history was taken from all patients. Thorough clinical examination was carried out. All baseline investigations were carried out. CT scan, ECG, X ray chest was done in all study patients. All patients were followed for up to six months and outcome was recorded as alive or dead.

Conservative management was sought in the beginning by giving mannitol, oral glycerol to treat the cerebral edema. Patients with hypertension were given suitable anti-hypertensive therapy. Anti-epileptics were given to all patients to prevent occurrence of seizures. Similarly, to prevent occurrence of bleeding in the GIT, all patients were given antacids. Unconscious patients received insertion of nasogastric tube and feeding was given through it. All patients received proper physiotherapy.

All patients were screened using "Glasgow Coma Scale". A score of 4 was considered if eye opening was spontaneous, three if the patient responded to speech, two in response to pain and one if no response. Patient was given a score of five if found oriented to verbal response, four if confused, three if inappropriate words, two if incomprehensible sounds and one if nil. Patient was given a score of six if he obeys the best motor response, five if localizes, four if withdraws, three if abnormal flexion, two if extensor response, and one if nil.

CT scan findings were analyzed pertaining to the site, volume of hematoma, mid-line shift; if any intra-ventricular hemorrhage at all, hydrocephalus if present. Volume of hematoma was measured with standard protocol and standard guidelines. The data was recorded and analyzed using appropriate statistical tests. Contingency coefficient was calculated to significantly decide the predictors of outcome.

RESULTS

In present study among 40 patients, 16 patients died. The mortality was 40%.

Table 1: Distribution of patients with respect to age, sex and outcome.

Age and sex		Total cases		Alive		Dead		CC and P value
		No.	%	No.	%	No.	%	
Age (years)	35-49	8	20	7	87.5	1	12.5	0.380, P < 0.034
	50-69	20	50	13	65	7	35	
	> 70	12	30	4	33.3	8	66.7	
Sex	Male	24	60	14	58.3	10	41.7	0.042 P < 0.792
	Female	16	40	10	62.5	6	37.5	

As the age increased, the mortality rate increased from 12.5% in the age group of 35-49 year to 66.7% in the age group of more than 70 years. This difference or trend was found to be significant. But there was no difference between the mortality among males and females. Males carried a slightly more mortality than females, but the difference was not significant.

Table 2: Hypertension and outcome.

Blood pressure	Total cases	Alive		Dead	
		Number	%	Number	%
Systolic BP in mmHg > 180	17	7	41.18	10	58.82
< 180	23	17	73.92	6	26.08
CC=.314; P<.037 (S)					
Diastolic BP in mmHg > 110	19	8	42.11	11	57.89
< 110	21	16	76.19	5	23.80
CC=.328; P<.028 (S)					
MAP in mmHg > 140	17	6	35.29	11	64.70
< 140	23	18	78.26	5	21.73
CC=.398; P<.006 (S)					

Mortality was more than twice among those with SBP more than 180 mmHg i.e. 58.8% compared to only 26.1% among those with SBP less than 180 mmHg. This difference in mortality was found to be statistically significant. Similar findings were noted from above table in case of diastolic blood pressure with a cutoff at 110 mmHg. and similarly, the mortality rate was more with MAP > 140 mmHg.

Table 3: Gaze palsy, severity of motor weakness and outcome.

Gaze palsy, severity of motor weakness		Total cases		Alive		Dead		CC and P value
		No.	%	No.	%	No.	%	
Severity of motor weakness	Mild	8	20	8	100	0	0	0.471 P < 0.003
	Moderate	18	45	12	66.7	6	33.3	
	Severe	14	35	4	28.6	10	71.4	
Gaze palsy	Present	12	30	4	33.3	8	66.7	0.336 P < 0.024
	Female	16	40	10	62.5	6	37.5	

Table 4: Bilateral plantar extensor response, abnormal pupils and outcome.

Bilateral plantar extensor response, abnormal pupils		Total cases		Alive		Dead		CC and P value
Bilateral plantar extensor response		No.	%	No.	%	No.	%	
	Present	18	45	6	33.3	12	66.7	0.442 P < 0.001
	Absent	22	55	18	81.9	4	18.2	
Abnormal pupils	Present	4	10	0	0	4	100	0.378 P < 0.010
	Female	16	40	10	62.5	6	37.5	

As the severity of motor weakness increased, the mortality increased. In mild cases of eight patients, no one died but in 14 severe cases, 71.4% died. Gaze palsy was also found to be a strong predictor of mortality with death rate of 66.7% in those with presence of gaze palsy.

Patients with presence of bilateral plantar extensor response were found to be more at risk of death with a death rate of 66.7% compared to only 18.2% among those without presence of bilateral plantar extensor response. There were four patients with abnormal pupils and all of them died. As the Glasgow coma scale increased, the mortality decreased from 100% in patients with a score of 3-4 to only 31.2% in patients with a score of 9-13. Ataxic respiration was found in six patients and all of them died compared to only 37.5% among whom the ataxic respiration was absent.

Table 5: Glasgow coma scale, ataxic respiration and outcome.

Glasgow coma scale, ataxic respiration		Total cases		Alive		Dead		CC and P value
Glasgow coma Scale		No.	%	No.	%	No.	%	
	3-4	4	10	0	0	4	100	0.542
	5-8	6	15	1	16.7	5	83.3	P < 0.001
	9-13	22	55	15	68.2	7	31.2	
Ataxic respiration	Present	6	15	0	0	6	100	0.457
	Absent	16	40	10	62.5	6	37.5	P < 0.001

Table 6: Consciousness level, site of hematoma and outcome.

Consciousness level, side of hematoma		Total cases		Alive		Dead		CC and P value
Consciousness level		No.	%	No.	%	No.	%	
	Alert	8	20	8	100	0	0	0.582
	Drowsy	16	40	13	81.3	3	18.9	P < 0.001
	Stupor	12	30	3	25	9	75	
	Coma	4	10	0	0	4	100	
Site of hematoma	Basal ganglia	17	42.5	10	58.9	7	41.2	0.065
	Thalamus	8	20	5	62.5	3	37.5	P < 0.997
	Lobar	10	25	6	60	4	40	
	Cerebellar	2	5	1	50	1	50	
	Pons	3	7.5	2	66.7	1	33.3	

Table 7: Volume of hematoma, Midline shift and outcome.

Volume of haematoma, midline shift		Total cases		Alive		Dead		CC and P value
Volume of haematoma (cm^3)		No.	%	No.	%	No.	%	
	> 30	14	35	3	21.4	11	78.6	0.500
	< 30	26	65	21	80.8	5	19.2	P < 0.001
Midline shift	Present	14	35	4	28.6	10	71.4	0.426
	Absent	26	65	20	76.9	6	23.1	P < 0.006

Table 8: Intra-ventricular extension of hemorrhage and outcome.

Intra-ventricular extension of hemorrhage	Total		Alive		Dead	
	No.	%	No.	%	No.	%
Present	16	40	4	25	12	75
Absent	24	60	20	83.33	4	16.67
Total	40	100	24	60	16	40

As the consciousness level decreased the mortality rate increased from zero percent in alert cases to 75% in patients with stupor to 100% comatose patients. Site of hematoma was not found to be affecting the mortality.

Whatever the site of hematoma, the mortality rate was found to be similar in all types of cases. When the volume of hematoma was > 30 ml the mortality rate was 78.6% compared to only 19.2% when the volume of hematoma was < 30 ml.

Table 9: Hydrocephalus and outcome.

Hydrocephalus	Total		Alive		Dead	
	No.	%	No.	%	No.	%
Present	10	25	3	30	7	70
Absent	30	75	21	70	9	30
Total	40	100	24	60	16	40

CC=.333; P<.025 (S)

Table 10: Mean value of prognostic factors in different mortality groups.

Prognostic Indicators	Mortality			
	Within 3 days	Within 2 weeks	Within 1 month	Within 6 months
Systolic BP (Mean)	212±23	188±26	172±29	166±23
Diastolic BP (Mean)	128±20.6	108±24.4	98±23.4	90±20.4
MAP (Mean)	156±10.5	135±15.5	122±20.5	120±18.5
(Mean) GCS- /15	4±1.5	7.83±1.8	8.5±2.1	9±0
Volume of Hematoma (Ml)	54±5.36	38±7.37	27±4.52	24±4.68

Similarly, the mortality rate was very high in patients with presence of midline shift i.e. 71.4% compared to only 23.1% in patients without midline shift. Intra-ventricular extension of hemorrhage was found to be a significant risk factor for death. 75% of the patients died with intra-ventricular extension of hemorrhage compared to only 40% without intra-ventricular extension of hemorrhage. Presence of hydrocephalus was also found to be a significant risk factor with 70% mortality compared to only 30% without hydrocephalus. Those with low mean SBP survived for longer time. SBP mean more than 200 died within three days of admission. Those with mean SBP of 170-200 died within two weeks. Those with mean SBP less than 165 survived for up to six months. Similar findings were noted for DBP and MAP. Patients with higher Glasgow coma scale values survived longer compared to patients with low values. Volume of hematoma was also found to be very significant. As the volume decreased, the survival chances for the patients increased.

DISCUSSION

As the age increased, the mortality rate increased from 12.5% in the age group of 35-49 year to 66.7% in the age group of more than 70 years. This difference or trend was found to be significant. But there was no difference between the mortality among males and females. Males carried a slightly more mortality than females, but the difference was not significant. Similar findings were noted by Daverat et al and Hemphill et al who found that the death rate was 66.66% in patients with age >80 years.[10,11] It was 56% as reported by Qureshi et al, Lorenz et al and Kanaya et al respectively from Europe and Japan also confirmed the higher mortality in elder age groups. [12,13,14]

We reported that sex should not be considered as a prognostic factor in the outcome of intra-cerebral hemorrhage. Similar findings were given by Hemphill et al and Daverat et al.[10,11]

Mortality was more than twice among those with SBP more than 180 mmHg i.e. 58.8% compared to only 26.1% among those with SBP less than 180 mmHg. This difference in mortality was found to be statistically significant. Similar findings were noted from above table in case of diastolic blood pressure with a cutoff at 110 mmHg. And similarly, the mortality rate was more with MAP >140 mmHg. Similar reports were given by Shanmugam et al who reported a mortality of 60% in patients with blood pressure more than 180/110 mm Hg.[14,15] Kumaravelu et al reported a mortality of 70% in patients with blood pressure more than 180/110 mmHg.[16] Our MAP findings were also confirmed by Qureshi et al 12 who reported a mortality of 60% in patients with MAP more than 140 mmHg.

As the severity of motor weakness increased, the mortality increased. In mild cases of eight patients, no one died but in 14 severe cases, 71.4% died. Gaze palsy was also found to be a strong predictor of mortality with death rate of 66.7% in those with presence of gaze palsy. Patients with presence of bilateral plantar extensor response were found to be more at risk of death with a death rate of 66.7% compared to only 18.2% among those without presence of bilateral plantar extensor response. There were four patients with abnormal pupils and all of them died. As the Glasgow coma scale increased, the mortality decreased from 100% in patients with a score of 3-4 to only 31.2% in patients with a score of 9-13. Ataxic respiration was found in six patients and all of them died compared to only 37.5% among whom the ataxic respiration was absent. Similar finding was reported by Portenoy et al who found that about 95% of the patients had bad prognosis with low GCS. Gambhir et al found in his study that when the GCS score was less than eight, the mortality was more than 80%.[17,18]

As the consciousness level decreased the mortality rate increased from zero percent in alert cases to 75% in patients with stupor to 100% comatose patients. Site of hematoma was not found to be affecting the mortality. Whatever the site of hematoma, the mortality rate was found to be similar in all types of cases. Hemphill et al and even Daverat et al and Qureshi et al reported similar findings.[10,11,12]

When the volume of hematoma was > 30 ml the mortality rate was 78.6% compared to only 19.2% when the volume of hematoma was < 30 ml. similarly the mortality rate was very high in patients with presence of midline shift i.e. 71.4% compared to only 23.1% in patients without midline shift. Similar findings were given by Qureshi et al and Daverat et al.[10,12] Intra-ventricular extension of hemorrhage was found to be a significant

risk factor for death. 75% of the patients died with intra-ventricular extension of hemorrhage compared to only 40% without intra-ventricular extension of hemorrhage. Presence of hydrocephalus was also found to be a significant risk factor with 70% mortality compared to only 30% without hydrocephalus.

Those with low mean SBP survived for longer time. SBP mean more than 200 died within three days of admission. Those with mean SBP of 170-200 died within two weeks. Those with mean SBP less than 165 survived for up to six months. Similar findings were noted for DBP and MAP. Patients with higher Glasgow coma scale values survived longer compared to patients with low values. Volume of hematoma was also found to be very significant. As the volume decreased, the survival chances for the patients increased. Doifode et al observed a death rate of 70% having severe motor neuron weakness, gaze palsy and bilateral plantar extensor response.[8] Portenoy et al found that patients with abnormal pupils, ataxic respiration and those with coma were at high risk of death and this finding is similar to the finding of the present study.[17]

CONCLUSION

Bad prognosis i.e. death can be expected if the patient is older, low GCS, hematoma size > 30 ml, gaze palsy, severe motor neuron weakness, abnormal pupils, ataxic respiration etc. hence intensive care should be given to such patients to bring down the mortality.

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