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Research Article
Hypertensive

# Clinical outcome in cases of hypertensive intra-cerebral haemorrhage in relation to size of haemorrhage

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**Introduction:** Stroke is amongst the leading causes of death exceeded only by heart disease and cancer. Those who survive are usually left with permanent disability. Cerebral infarction is responsible for about 80 percent of all strokes, primary intra-cerebral haemorrhage for 10 percent, subarachnoid haemorrhage for 5 percent and 5 percent cases are due to uncertain causes. Predictors of prognosis in primary intraparenchymal haemorrhage have been evaluated in numerous studies. **Objective:** To observed the effect of different sizes of hematoma and utilizing them, if feasible as a marker of prognostic significance. **Material and methods:** In this study we observed 60 patients from the time of admission till 30$^{th}$ day in various wards of Department of Medicine RIMS with hypertensive intra-cerebral haemorrhage, during the period of 2008-2009. A simple method of measuring the volume of haematoma (in cc) on the CT scan is by using the following formula: A*B*C A = longest diameter of the haematoma (in cm.), B = Diameter perpendicular to A (in cm.), C = Height (in cm) which is measured by No. of slices showing the haematoma x thickness of each slide. **Result:** Total 60 patient were taken into study out of which 33(55%) were alive and 27(45%) were dead in 30 days follow up. In our study, 38 were male and 22 were female out of 38 male 22(66.66%) were alive and 16 (59.2%) dead and in 22 female 11(33.33%) were alive and 11 (40.7%) were dead. Outcome with volume of ICH using the $\chi^2$ had shown significant correlation ($p < 0.005$) with GCS at the time stroke onset ($P<0.01$), IVH/VE ($P<0.01$), midline shift test ($P<0.01$), B.P. at the time of admission ($P<0.01$). **Conclusion:** In these study patients with hematoma volume exceeds 60 cm$^3$, the mortality was 100%. Mean volume of hematoma in our study was 35.21 cm$^3$.

**Keywords:** Stroke, Intra-cerebral haemorrhage, GCS, Haematoma

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# Introduction

Stroke is the second leading cause of preventable death worldwide and the fourth leading cause of lost productivity [1]. Those who survive are usually left with permanent disability. Cerebral infarction is responsible for about 80 percent of all strokes, primary intra-cerebral hemorrhage for 10 percent, subarachnoid hemorrhage for 5 percent and 5 percent cases are due to uncertain causes [2]. Patients with primary intra-cerebral hemorrhage and subarachnoid hemorrhage are more likely to be admitted to hospital and these conditions result in the highest early cases of fatality.

The accurate determination of prognosis in medically treated intracerebral hemorrhage is an essential step. Predictors of prognosis in primary intra-parenchymal hemorrhage have been evaluated in numerous studies. Multivariate analysis using the technique of logistic regression identified three variables, the Glasgow Coma Scale score, haemorrhage size and intra-ventricular extension of blood which were most predictive of prognosis.

Keeping these facts in view, the present study attempts to assess and correlate the volume, site of primary intra-parenchymal haemorrhage and Glasgow Coma Scale score at time of ictus/ presentation with the clinical picture and prognosis. The prognosis in each case evaluated in terms of mortality and morbidity.

The Advent of CT in 1974 represented dramatic and important breakthrough in medicine. CT is capable of imaging the specific morphologic appearance of cerebral infarcts and hematomas early enough and with sufficient accuracy to influence the further clinical work up, care and treatment of these patients.

In present scenario of radiologic diagnostic possibilities in acute stroke, CT is still the method of choice for most of these patients. CT is a good diagnostic instrument even in early phase of acute haemorrhagic stroke. The diagnosis of intra-cerebral hemorrhage is also mainly CT based.

According to A.R. Massaro et. Alpatients with either Lobar Haemorrhage or deep haemorrhage have got similar prognosis. Further Broderick, et alhad reported that 30 day mortality for lobar Haemorrhage (39%) was slightly less than for deep haemorrhage (45%), Pontine Haemorrhage and Cerebellar Haemorrhage [3,4].

Similarly J.P. Broderick et.alhad reported that for Intra-cerebral Haemorrhage with volume of more than 60 cm3 the 30 day mortality for Deep Haemorrhage was 93% and for Lobar haemorrhage was 71% [4].

In the same study it was seen that for volume of less than 30 cm3, the 30 day mortality was 23%, for deep haemorrhage, 7% for lobar Haemorrhage and 57% for cerebellar Haemorrhage. The intra-cerebral Haemorrhage thus remains an area where different confuting views on size of hematoma and its effects are prevalent. This work has been undertaken to resolve some of the confusion and try to reach a better insight into the complex problem. We observed the effect of different sizes of hematoma and utilizing them, if feasible as a marker of prognostic significance.

# Material and Methods

**Study design:** It was a cross sectional study.

**Study place and duration:** Patients admitted in various wards of Department of Medicine RIMS, Ranchi Jharkhand with hypertensive intra-cerebral haemorrhage, during the period of 2008-2009 were evaluated for observation of clinical outcome by various parameters.

**Sample size**: In this study we observed 60 patients from the time of admission till 30th day. The various parameters for observation were Age, Sex, Haemorrhagic side (Right or left), Haemorrhagic location, Haemorrhagic volume, B.P. at time of admission, Intra-ventricular extension of blood, Midline shift in CT scan and Glasgow come scale. All the patients who are admitted for the first time with hypertensive intracerebral haemorrhage are included. Patients with intracranial haemorrhage due to Trauma, Aneurysm, Coagulopathy, and recurrent ICH are excluded.

**Procedure:** All patients were evaluated on admission through emergency or medical OPD. All patients were assessed within hours of their presentation then follow up done in wards and after discharge at 30th day in OPD.

Maximum parameters were derived fromCT scan viz. Volume of haematoma, Side of haemorrhage, Location of haemorrhage, Midline shift, Intraventricular spread of the haemorrhage. A simple method of measuring the volume of haematorna (in cc) on the CT scan is by using the following formula:

A*B*C

A = longest diameter ofthe haematoma (in cm.)

B = Diameter perpendicular to A (in cm.)

C = Height (in cm) which is measured by No. of slices showing the haematoma x thickness ofeach slide. Annual conference of Indian Society of critical care Medicine [3]

**Other parameters observed in this study**: Age (<60 years, 60-70 yrs., >70 yrs.), Sex (Male/Female), Haemorrhagic side (Rt. /Lt.), Haemorrhagic location (DH/LH/Cerebellum/Pontine/Mid brain), Haemorrhagic volume (<30 $cm^3$, 30-60 $cm^3$, 61 or more $cm^3$), B.P. at the time of admission (<180/104,180-230 / 104-140, >230/>140), Intraventricular extension (Present/Absent), Midline shift (<3 mm, 3-5 mm, >5mm), GCS(≤8,≥9).

**Statistical analysis:** Statistical analysis was performed to correlate the patient's outcome and each prognostic factor using the $X^2$test (Chi square test).

Probability values of 0.05 or *less* were consideredstatistically significant.

# Results

Total 60 patient were taken into study out of which 33(55%) were alive, and 27(45%) were dead in 30 days follow up. In my study 38 were male and 22 were female out of 38 male 22(66.66%) were alive and 16 (59.2%) dead and in 22 female 11(33.33%) were alive and 11 (40.7%) were dead (**table.1**).

**Table-1: Clinical profile of the sample population.**

| Variable | Parameters | Total | Dead | Alive (Survival during 30 days course) |
|---|---|---|---|---|
| Mortality or survival at the end of 30 days | | 60 | 27(45%) | 33(55%) |
| Age | <60 yrs. | 15 | 6 (22.2%) | 9 (27.27%) |
| | 60-70 yrs. | 37 | 17 (62.9%) | 20 (60.60%) |
| | >70 yrs. | 8 | 4 (14.8%) | 4 (12.12%) |
| Sex | Male | 38 | 16 (59.2%) | 22 (66.66%) |
| | female | 22 | 11 (40.7%) | 11 (33.33%) |
| Haemorrhage Volume | <30 cm3 | 39 | 7 (25.9%) | 32 (96.9%) |
| | 30-60 cm3 | 10 | 9 (33.3%) | 1 (3%) |
| | 61 or more cm3 | 11 | 11(40.74%) | 0 (0%) |
| B.P. at the time of admission | <180/105 | 39 | 7 (25.9%) | 32 (96.9%) |
| | >230/240 | 10 | 9 (33.3%) | 1 (3%) |
| | | 11 | 11 (40.74%) | 0 (0%) |
| Midline shift | <3 mm | 22 | 3 (11.1%) | 19 (57.57%) |
| | 3-5 mm | 12 | 3 (11.0%) | 9 (27.27%) |
| | >5 mm | 26 | 21 (77.7%) | 5 (15.15%) |
| Intraventricular Haemorrhage | Present | 27 | 18 (66.66%) | 9 (27.27%) |
| | Absent | 33 | 9 (33.35%) | 24 (12.72%) |
| Glasgow scale at the time of admission | ≤8 | 28 | 23 (85.1%) | 5 (15.15%) |
| | ≥9 | 32 | 4 (14.8%) | 28 (84.84%) |
| site of haemorrhage | DH | 44 | 22 (48.14 %) | 22 (66.66%) |
| | LH | 11 | 4 (14.8%) | 7 (21.21%) |
| | Cerebellum | 2 | 0 (0%) | 2 (6.06%) |
| | Pontine/Midbrain | 3 | 1 (3.7%) | 2 (6.06%) |

**Table-2: Association of risk factors.**

| Variable | Number | % |
|---|---|---|
| Hypertension(HTN) | 30 | 50 |
| Diabetes Mellitus (DM) | 5 | 8.33 |
| Smoking | 5 | 8.33 |
| Obesity | 6 | 10 |
| Prior cardio vascular disease | 14 | 23.33 |
| No risk factor | 9 | 15 |

HTN, DM, smoking, obesity, prior cardiovascular dis.are risk factor A history of HTN was found in 50% of patients. In some patients no risk factors found (table.2).

**Table-3: Clinical presentation at the onset of haemorrhage stroke**

| Clinical Presentations | Number | % |
|---|---|---|
| Headache | 17 | 28.33 |
| Vomiting | 18 | 30 |
| Loss of consciousness | 41 | 68.33 |
| Seizure / convulsions | 7 | 11.66 |
| Aphasia/ Slurring of Speech | 5 | 8 |
| Weakness of limbs or focal neurologic deficit | 48 | 80 |
| Ataxia | 1 | 1.66 |
| Other Cranial nr. Palsy | 4 | 6.66 |

Weakness of limbs or focal neurological deficit in 80% of cases, loss of consciousness in 68.33%, vomiting 30%, Headache 28.33%, seizure / convulsion in 11.66%, Aphasia / slurring of speech in 8%, Ataxia in 1.66% others like cranial nerve palsy in 6.66% (table.3).

**Table-4: Shows statistical analysis to correlate the patient's outcome and the baseline variables (Potential prognostic factor).**

| Variable | Parameters | Total | Dead | Alive (Survival during 30 days course) | X2 | P |
|---|---|---|---|---|---|---|
| Age | <60 yrs. | 15 | 6 (22.2%) | 9 (27.27%) | 0.21 | P>0.50 |
| | 60-70 yrs. | 37 | 17 (62.9%) | 20 (60.60%) | | |
| | >70 yrs. | 8 | 4 (14.8%) | 4 (12.12%) | | |
| Sex | Male | 38 | 16 (59.2%) | 22 (66.66%) | 0.08 | P>0.50 |
| | female | 22 | 11 (40.7%) | 11 (33.33%) | | |
| Haemorrhage Volume | <30 cm3 | 39 | 7 (25.9%) | 32 (96.9%) | 34.72 | P<0.005 |
| | 30-60 cm3 | 10 | 9 (33.3%) | 1 (3%) | | |
| | 61 or more cm3 | 11 | 11(40.74%) | 0 (0%) | | |
| B.P. at the time of admission | <180/105 | 39 | 7 (25.9%) | 32 (96.9%) | 34.72 | P<0.005 |
| | >230/240 | 10 | 9 (33.3%) | 1 (3%) | | |
| | | 11 | 11 (40.74%) | 0 (0%) | | |
| Midline shift | <3 mm | 22 | 3 (11.1%) | 19 (57.57%) | 20.96 | P<0.01 |
| | 3-5 mm | 12 | 3 (11.0%) | 9 (27.27%) | | |
| | >5 mm | 26 | 21 (77.7%) | 5 (15.15%) | | |
| Intraventricular Haemorrhage | Present | 27 | 18 (66.66%) | 9 (27.27%) | 10.40 | P<0.01 |
| | Absent | 33 | 9 (33.35%) | 24 (12.72%) | | |
| Glasgow scale at the time of admission | ≤8 | 28 | 23 (85.1%) | 5 (15.15%) | 20.96 | P<0.01 |
| | ≥9 | 32 | 4 (14.8%) | 28 (84.84%) | | |
| site of haemorrhage | DH | 44 | 22 (48.14%) | 22 (66.66%) | 1.33 | P>0.50 |
| | LH | 11 | 4 (14.8%) | 7 (21.21%) | | |
| | Cerebellum | 2 | 0 (0%) | 2 (6.06%) | | |
| | Pontine/Midbrain | 3 | 1 (3.7%) | 2 (6.06%) | | |

Outcome with volume of ICH using the $\chi^2$ had shown significant correlation ($p < 0.005$) with GCS at the time stroke onset (P<0.01), IVH/VE (P<0.01), midline shift test (P<0.01), B.P. at the time of admission (P<0.01). (**table4**).

# Discussion

The present study entitled "observation of clinical outcome by various parameters in Hypertensive ICH" was done on 60 patients in the departmentof medicine, RIMS from 2008-2009. The purpose of this hospital based prospective study was to correlate volume & location of lesion (hemorrhage) with clinical picture & prognosis, and to determine clinical (viz. B.P at the time of admission, GCS) CT parameters or findings that could predict prognosis.

In our study, out of total 60 patients 38 (63.33%) were male and 22 (36.66%) were female. Age ranged between < 60 yrs. to > 70 yrs. Mean age was 63.83 years, 24 patients had right sided haemorrhage, 33 patients had left sided hemorrhage, 3 patients had midline hemorrhage. 44 patients had DH, 11 patients had LH, 2 patients had cerebellar hemorrhage, 3 patients had pontine/Mid brain haemorrhage. Hemorrhagic volume was kept under 3 categories :-< 30 c.m3, 30-60 c.m3 and > 61 c.m3. Mean volume of haemorrhage was 35.21 cm3.

Blood pressure at the time of admission was taken and kept under 3 categories < 180/104, 180-250 / 104-140 and > 230 / 140. 27 patients had intra-ventricular extension and 33 patients had no intraventricular extension.

Midline shift was determined dry CT scan and kept under 3 categories: <3 mm, 3-5 mm and >5 mm.GCS taken at the timeof admission and dept under 2 categories :≤ 8 and ≥ 9. The morality rate in 30 days follow up was 45% remaining 55% survived during my 30 days follow up course. ICH has 30 daymortality of 44% to 51% in population studied [4].

In our study, clinical presentation showed weakness of limbs or focal neurological deficit in 80% of cases, loss of consciousness in 68.33%, vomiting 30%, Headache 28.33%, seizure / convulsion in 11.66% Aphasia/ slurring of speech in 8%, Ataxiain 1.66% others like cranial nr palsy in 6.66%.

In our studyrisk factors assessed were HTN, DM, smoking, obesity, prior cardiovascular dis. A history of HTN was found in 50% of patients. In some patients no risk factors found.

In the present study the hematoma volume ranged from <30cm3 to >60 cm3 volume ranged between 12 cm3 to 80 cm3. Mean volume of haemorrhage was 35.21 c.m3, When hematoma volume exceeded 61 cm3, the mortality was 100%, Kase et al regarded 50 ml as the critical size, and Heiweg Lars. br et alfound a mortality of 90% when the volume exceeded 50 ml. Bolander et alhad only one survivor when the hematoma volume was>80 ml [5-7].

The statistical analysis performed to correlate the patients. Outcome with volume of ICH using the $X^2$ had shown significantcorrelation ($p < 0.005$) in my present study. S.E. Funk etal in acomparative Meta Analysis, 2008 found significant correlation of volume of haematoma with mortality.

Level of consciousness is an important determinant of outcome in patients with ICH. In my present study I kept patients into two groups GCS > 8 & GCS <9.

The present study reveals that 85.1% patients died with GCS>8. A study carried by B.R. Huang et al in, showed mortality in77.3% when GCS>8. The statistical analysis performed to correlate the patient's outcomewith GCS at the time of admission using X2 test shown a significantcorrelation (p <0, 01) [8].

In our study, 44 patients had DH, 11 patients had LH, 2 patients had cerebellar haemorrhage and 3 patients had pontine/ Midbrain haemorrhage. No significant correlation found according tosite of haemorrhage (p> 0.50). 24 patients had right sided haemorrhage, 33 patients had left sided haemorrhage, 3 patients had bleed in midline. Nosignificant correlation found based on side of haemorrhage (p> 0.50).

In our study, three age groups were taken. Age ranged between 42 yrs. to 84 yrs. Mean age of patients was 63.83 correlation found according to age of presentation (p> 0.50). 38 patients were Male and 22 patients were female. No significant correlation found in mortality according to sex of patients (p> 0.50).

B.P, at the time of admission was recorded 3 categories were divided :<180/104, 180-230 / 104-140 and >230/140. 11 patients had B.P.> 230 / 140, all died. So statistically significant correlation was found (p<0.005) with the B.P. at the time of admission and ICH. Similar reports were found by A.R. Massero [3].

In our study, 27 patients had intraventricular extension and 33 patients had not, 66.66% patients died who had intraventricular extension. Statistically significant correlation found (p<0.01) with theintra-ventricular extension and ICH. J kirn et al found almost similar results (60% mortality) Goldstein JN etal inshows significant mortality(p<.01) [9].

In our study, 3 groups were kept according to midline Shift in CT scan: <3mm, 3-5mm and >5mm, statistically significant correlation found (p < 0.01) with midline shift and ICH. So in our study Haemorrhagic volume, B.P. at the time of admission, Intraventricular extension of blood, Midline shift in CT scan and, GCS at the time of admission correlate significantly with the outcome of spontaneous ICH.

# Conclusion

As cerebrovascular disease is very serious group of disorder predominant mainly in the middle and late years of life and are one of the leading causes of mortality and morbidity in our society.

Our study shows HTN, size of hematoma, intra-ventricular extension as independent indicator of prognosis. HTN which has direct with outcome everyone should educated about the early symptoms and long-term adverse effect of this disease.

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