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Predictors of 1 Month Survival of Spontaneous Intracerabral Hemorrhagic Patients in Tertiary Care Hospital, Birgunj, Nepal

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ABSTRACT

General objectives

To evaluate the Predictors Of Survival Of 1 Month Of Intracerebral Hemorrhagic Patient

1. *To access the condition of ICH patient*
2. *To determine the risk factors of survival of ICH patient*
3. *To stabilize the patients with basic treatments*
4. *To observe the patients for 30 days providing basis required managements*

METHODS

Fifty six patient with CT scan evidence of SICH admitted to our hospital were randomly selected for this study conducted between 1st August 2013 to 31st July 2014.

Data regarding different risk factors in detail was collected from all patients. Clinical parameters at the time of admission like level of consciousness, GCS score, blood pressure, plegia, bilateralnplanter extensor response, pupillary abnormalities, were assessed in all cases.

CT Scan was analysed for parameters like site, volume of hematoma, presence of mid-line shift, hydrocephalus and intraventricular extension of hemorrhage.

Follow up was done for 1 month period and outcome was assessed in terms of mortality.

RESULTS

Hypertension (71.4%) was the major risk factor in our study. Majority of the hypertensive were on irregular treatment (87.5%). The other common risk factors were alcohol consumption (39.3%).

The overall mortality in our study group was 69.64%. The lethal outcome was significantly associated with age >70 years (82.2%), GCS score <8 (100%) (p<0.001), SBP>=180 mmHg (p<0.043), DBP>=110 mmHg (p<0.05), bilateral extensor planter response (p<0.001), coma (p<0.001), plegia (p<0.04).

Patients with volume of hematoma > 30cm^3 (p<0.001), presence of mid-line shift (p<0.001), intraventricular extension of hemorrhage (p<0.001) and ventricular enlargement (p0.001) in CT Scan had significant poor outcome in our study.

INTERPRETATION AND CONCLUSION

Incidence of Spontaneous intracerebral hemorrhage (SICH) can be reduced by modification of risk factors like control of hypertension and abstinence from alcohol/smoking. The probability of lethal outcome can be calculated on admission in all patient with ICH by using clinical/ neuro-radiology parameters that allow risk stratification of patients and appropriate care.

Keywords: *Spontaneous intracerebral, Hypertension, Outcome.*

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]

CVA is the third commonest cause of death in the west after heart disease and cancer. It ranks first in all neurological disease of adults, with more than 50 percent of all hospital admission being of stroke. Not in the mortality associated with stroke, but also the morbidity puts the heavy emotional, psychological and financial burden both on the patient, as well as on the family and the state.[2]

Intracerebral hemorrhage is defined as a focal collection of blood within the brain parenchyma or ventricular system that is not caused by trauma.[3]

Cerebral hemorrhage, although less common than ischemic stroke and TIA, still have a significant public health impact because of higher mortality and morbidity associated with them. ICH alone has a nearly 40% case-fatality rate at 30 days.[3]

Intracerebral hemorrhage (ICH) accounts for 10% to 15% of all strokes Intracerebral hemorrhage may present with a sudden focal neurological deficit or a reduced level of consciousness, after which it kills about half of those affected within one month and leaves most survivors disabled.[5]

Spontaneous 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 Scale, severity of neurological deficit, site, size, volume of hemorrhage, presence of intraventricular extension, hydrocephalous and others that would predict the outcome of ICH.[6,7]

Hence this study was performed to evaluate the predictors of survival of 1 month of intracerebral hemorrhagic patients and to evaluate different risk factors and to determine whether cliniclal/neuro-radiological parameters would predict the outcome of ICH.

METHODOLOGY

SOURCE OF DATA

This study was conducted in National Medical College and Teaching Hospital, Birgunjbetween 1st August 2012 to 31st July 2013.

Fifty six patients of age group more than 20 years including both sexes with CT evidence of spontaneous intracerebral hemorrhage admitted to medical ward and ICU were included in the study.

Type of study:

- Prospective study

Inclusion criteria:

- Spontaneous ICH confirmed by CT scan head.
- Age >20 year.
- Patients admitted in ICU and Medical Ward of NMCTH, Birgunj.

Exclusion criteria:

- Age <20 years.
- Trauma.
- Subdural hematoma.
- Subarachnoid hemorrhage.
- Hemorrhage due to coagulopathy.

Initial workup of these patients included

- CT Scan head
- Hb%, TC, DC, ESR
- Complete Haemogram
- BT, CT, PT, Platelet count
- Urine-sugar, albumin, microscopy
- RBS, Blood urea, serum creatinine
- Serum electrolytes
- ECG
- Other investigations like

Chest X-Ray, Echocardiography, liver function testd, connective tissue workup are done whenever needed.

Initially all patients were treated conservatively with anti-crebral edema

Measures which comprised of:

Mannitol 1 gm/kg in three divided doses/day

Those patients whose blood pressure was high were treated with antihypertensive agents appropriate to the degree of hypertension. All patients received antacids as prophylaxis against gastric bleed. Nutrition was maintained in all unconscious patient by nasogastric feeding and parentral alimentation. Vigorous respiratory care and physiotherapy was instituted in all patients right from the time of admission.

Data regarding risk factors in detail has been collected by interviewing patient's attenders/relatives/patient himself. The proforma used for collection of data is in the annexures.

- Patients were considered as hypertensive if they met the following criteria. Presence of hypertension based on history, previous documentation medication, presence of retinopathy or presence of left ventricular hypertrophy by ECG or echocardiography.
- Blood pressure recorded at the time of admission was for assessing prognosis. Pulse Pressure is calculated by using the formula PP=SBP=DBP
- Detailed clinical examination for vital parameters and neurological deficit were done for all patients as per proforma.

In all patients at admission Glasgow coma scale scoring was done by using the following variables.

Table No. 1

Variable	Score
Eye opening	
Spontenaneous	4
To speech	3
To pain	2
Nil	1
Verbal response	
Oriented	5
Confused conversation	4
Inappropriate words	3
Incomprehensible sounds	2
Nil	1
Best motor response	
Obeys	6
Localizes	5
Withdraws	4
Abnormal flexion	3
Extensor response	2
Nil	1

The following data were extracted by a radiologist from the patient's CT Scan obtained at the time of admission.

1. Site of hematoma.
2. Volume of hematoma.
3. Presence of mid-line shift.
4. Presence of associated intraventricular hemorrhage.
5. Presence of Intraventricular enlargement.

MEASUREMENT OF VOLUME OF HAEMATOMA

Volume of haematoma was collected in the following manner. On the CT Scan slice with the largest area of ICH, the longest diameter (A) of the hematoma was measured from the centimeter scale on the film. The largest possible diameter perpendicular to the longest diameter represented the second diameter (B).

The height of the hematoma was calculated by multiplying the number of slices involved by slice thickness, providing the third diameter (C). Each diameter was determined to half a centimeter. Hemorrhage within the ventricular system was not measured. The three diameters were multiplied and then divided by two {(A x B x C)/2} to obtain the volume of ICH. Kothari and Co-authors have found that this formula (Ax B x C)/2 correlates highly with volumes calculated by planimetric methods.

Data Analysis

The data will be processed in the statistical package for social sciences (SPSS) software for windows. It will be entered into the SPSS and Microsoft excel. The associastion will be tested using the test of the statistical significance t- test will be used and a p value <0.05 will be considered as significant. Findings will be expressed in the form of tables and charts where feasible.

All cases were followed up twice a weekly for one month as out-patient or by communication through telephone/email/getting information by close relatives/patient himself.

RESULTS

One hundred and sixty cases of cerebrovascular accident were admitted during our study period to National Medical College and Teaching Hospital. Among them 80 cases had intracerebral hemorrhage. They constituted 32 percent of total cerebrovascular accidents.

During the study period 56 cases of C.T. Scan proven spontaneous intracerebral hemorrhage cases were taken by SIMPLE RANDOM SAMPLING and studied to determine the risk factors of survival of ICH patient and to evaluate the predictors of survival of 1 month of intracerebral hemorrhagic patients.

Table 3: Distrubution of patients with respect to age and sex

Age	Male no	Male %	Female no	Female%	Total no	Total %
30-49	4	7.14	4	7.14	8	14.28
50-69	13	23.21	8	14.29	21	37.5
>=70	19	33.93	8	14.29	21	48.22
Total	36	64.28	20	35.72	56	100

Among 56 cases, 27 (48.22%) patients were in the age group >=70 years, 21 (37.5%) in 50-69 years age group and only 8 (14.28%) patients were in 30-45 years age group. The youngest patient was 34 years old and the oldest patient was 83 years old, with a mean age of 66.14 and standard deviation of 11.88.

In our study 85.72% of the study group belonged to above 50 years age.

Table 4: Sex distribution

Sex	Number	Percentage
Male	36	64.29
Female	20	35.71

Of the 56 cases studied, 36 (64.29%) cases were males and 20 cases (35.71%) were females.

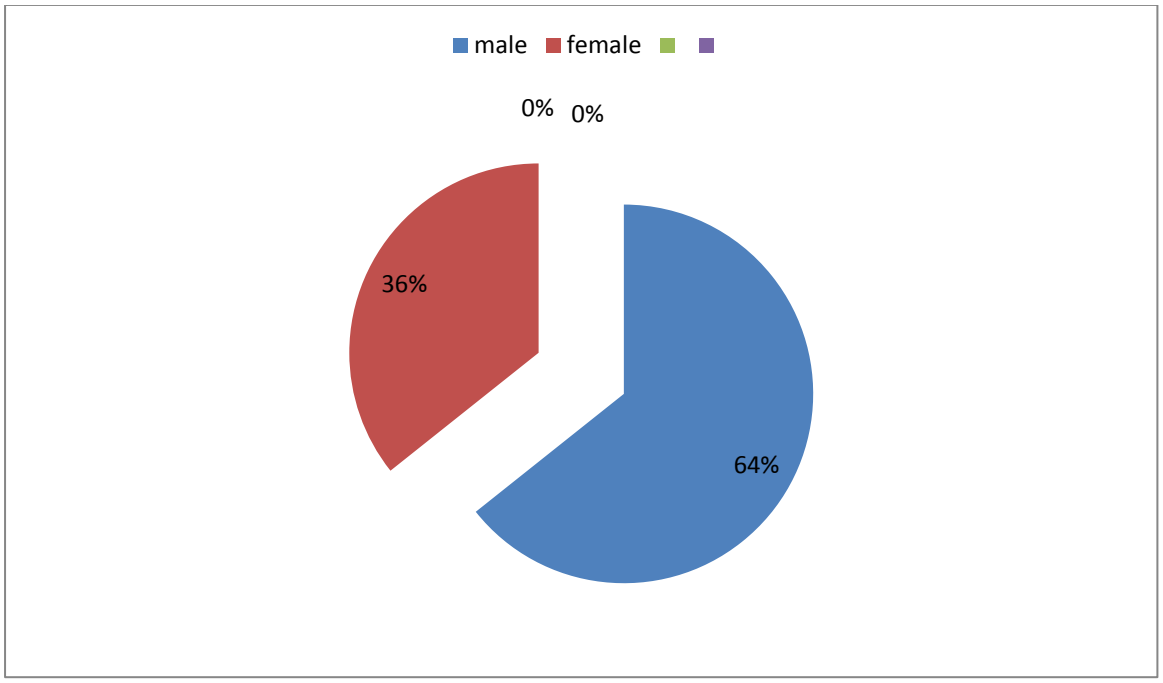

Figure 5: Sex distribution

Table 5: Categorization of hypertensive patients

Category	Number	Percentage
Regular treatment	3	7.5
Irregular treatment	35	87.5
Newly Diagnosed	2	5
Total	40	100

Among the patients who had hypertension,

- 2 were newly detected hypertensive
- 38 were known hypertensive of which 35 (87.5%) patients were on irregular treatment. Only 3 (7.5%) patients were on regular treatment.

Majority (87.5%) of the hypertensive were on irregular treatment, which was responsible for fluctuation in blood pressure which could have been the cause for intracerebral hemorrhage.

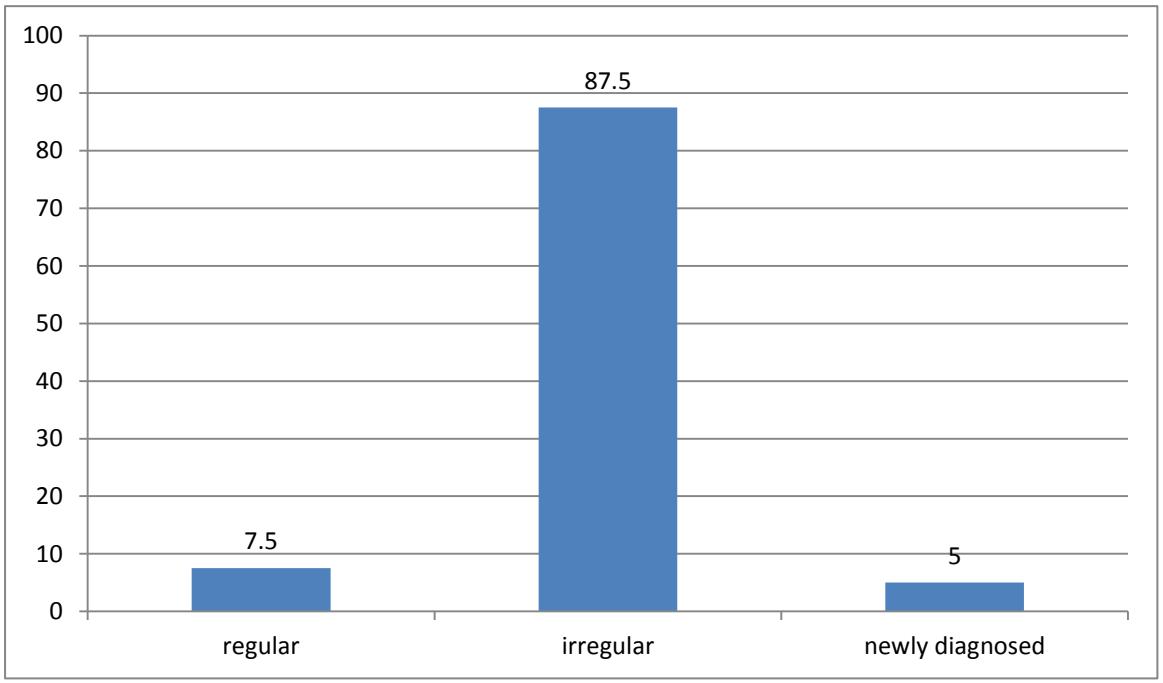

Figure 8: categorization of Hypertensive patient

Table 6: Risk factor distribution among sex

Sex	Total number of cases	Risk factors					
		Hypertension		Alcohol		Smoking	
		No.	%	No.	%	No.	%
Male	36	25	69.4	17	47.2	17	47.2
Female	20	15	75	5	25	5	25

From the table it is evident that hypertension was a common and major risk factor for both sexes. Among males,69.4% were hypertensive, 47.2% were alcoholic and 47.2% were smokers. Among females, 75% were hypertensive, 25%were alcoholic and 255 were smokers. Alcohol consumption and smoking were more common in males.

ASSESSMENT OF FACTORS FOR PROGNOSTIC OUTCOME

In our study among 56 patients, 39 patients died. The mortality was 69.6%.

Table 7: Distribution of patients with respect to age and outcome

Age	Total cases		Alive		Death	
	No	%	No	%	No	%
30-49	8	14.29	4	50	4	50
50-69	21	37.5	9	42.9	12	57.1
>=70	27	48.1	4	14.8	23	85.2

P value 0.047

The mortality in the age group of 30-49 years was 50%, 50-69 years was 57.1% and more than 70 years was 85.2%. as the age increased, mortality increased linearly.

A statistically significant association was found between old age and mortality.

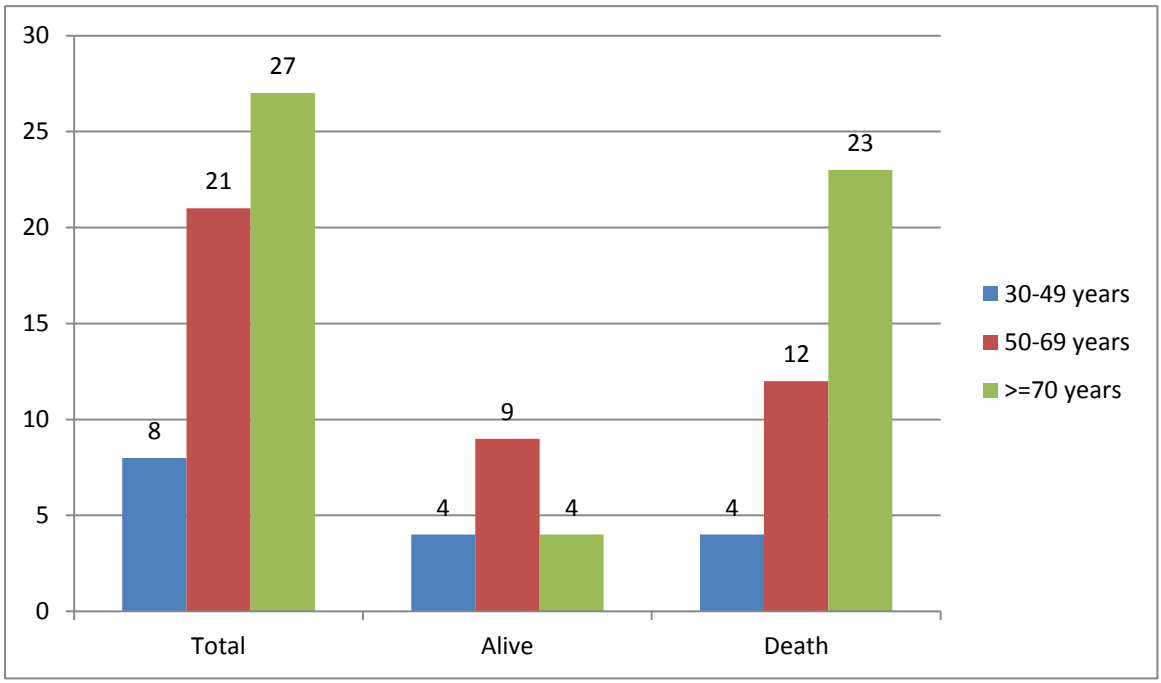

Figure 9: Distribution of patients with respect to age and outcome

Table 8: Distribution of patient with respect to sex and outcome

Sex	Total cases		Alive		Death	
	No	%	No	%	No	%
Male	36	64.29	10	27.8	26	72.2
Female	20	35.71	7	35	13	65

Among 36 male patients, 26 patients (72.2%) died. Among 20 female patients, 13 patients died (65%). No significant association was observed between sex and mortality (P value 0.57) indicating that mortality pattern were same in both sexes.

Table 9: Hypertension and outcome

Blood pressure	Total cases	Alive		Death	
		Number	%	Number	%
Systolic BP in mm of Hg >=180	21	3	14.3	18	85.7
<180	35	14	40	21	60
P value 0.043					
Diastolic BP in mm of Hg >=110	13	2	15.3	11	84.6
<110	43	15	34.8	28	65.1
P value 0.05					

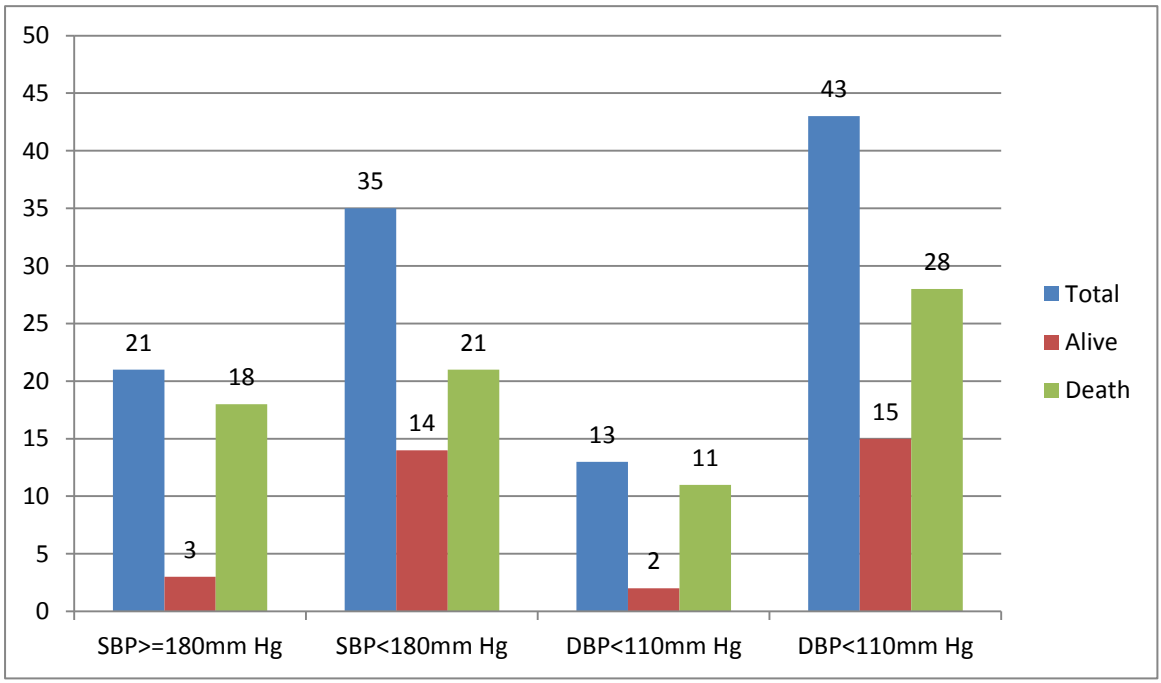

Figure 10: Hypertension and outcome

The mortality was more (85.7%) among patients who had systolic B.P >=180 mmHg compared to those who had systolic BP <180 mmHg (60%). The mortality was more (84.6%) among patients who had diastolic BP >=110 mmHg compared to those who had diastolic BP<110 mmHg (65.1%).

Table 10: Comparison of Patients with Plegia and Outcome

Plegia	Total		Alive		Death	
	No.	%	No.	%	No.	%
Present	52	92.86	14	26.9	38	73.1
Absent	4	7.14	3	75	1	25

P value 0.044

Among 56 cases, 520patients had plegia (92.86%) and 4 patients had no plegia (7.14%). Mortality was high (73.1%) who had plegia. It was statistically significant. Presence of plegia in patient with ICH had higher mortality risk.

Table 11: Bilateral plantar extensor response and outcome

Bilateral plantar extensor response	Total cases		Alive		Death	
	No.	%	No.	%	No.	%
Present	21	37.5	0	0	21	100
Absent	35	62.5	17	48.6	18	51.4

P value <0.001

Twenty one patients had bilateral plantar extensor response. The mortality higher (100%) in patients who had bilateral plantar extensor response which indicated presence of midline shift a false localizing sign of compression of opposite cerebral peduncle.

Table 12: Glasgow coma scale and outcome

GCS Score	Total cases		Alive		Death	
	No.	%	No.	%	No.	%
3-4	10	17.86	0	0	10	100
5-8	22	39.29	0	0	22	100

9-13	15	26.78	8	53.3	7	46.7
14-15	9	16.07	9	100	0	0

P value <0.001

The mortality was 100% in patients who had GCS score 3-4, 100% in patients who had GCS score 5-8, 46.7% in patients who had GCS score 9-13. No mortality was found in patients who had GCS score 14-15. Thus, low GCS score was found to be a good indicator of worst prognosis.

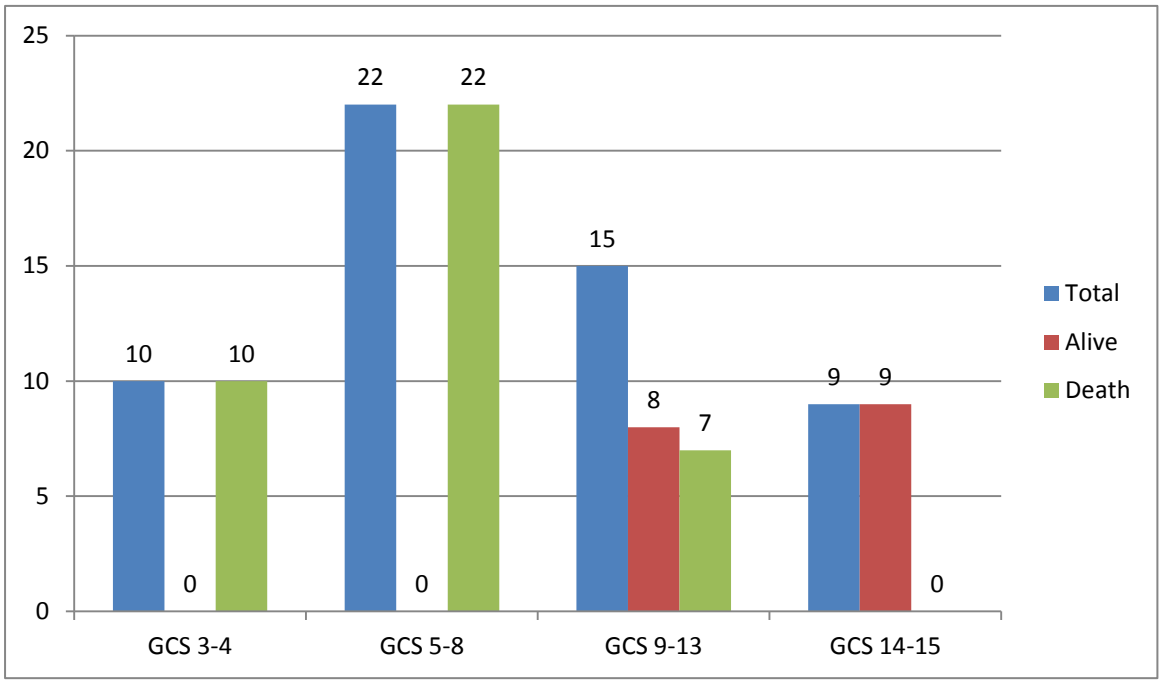

Figure 11: Glasgow coma scale and outcome

Table 13: Consciousness level and outcome

Consciousness level	Total Cases		Alive		Death	
	No.	%	No.	%	No.	%
Alert	9	16.07	7	77.8	2	22.2
Drowsy	24	42.85	10	41.7	14	58.3
Semicoma	15	26.78	0	0	15	100
Coma	8	14.28	0	0	8	100

P value <0.001

In our study among 56 patients, 8 were comatose, 15 were semicomatose, 24 were drowsy and 9 were alert at presentation. The mortality was 100% in comatose and semicomatose patients, while 58.3% patients were drowsy and 22.2% patients were alert at presentation. Hence level of consciousness at presentation was a good indicator of prognosis.

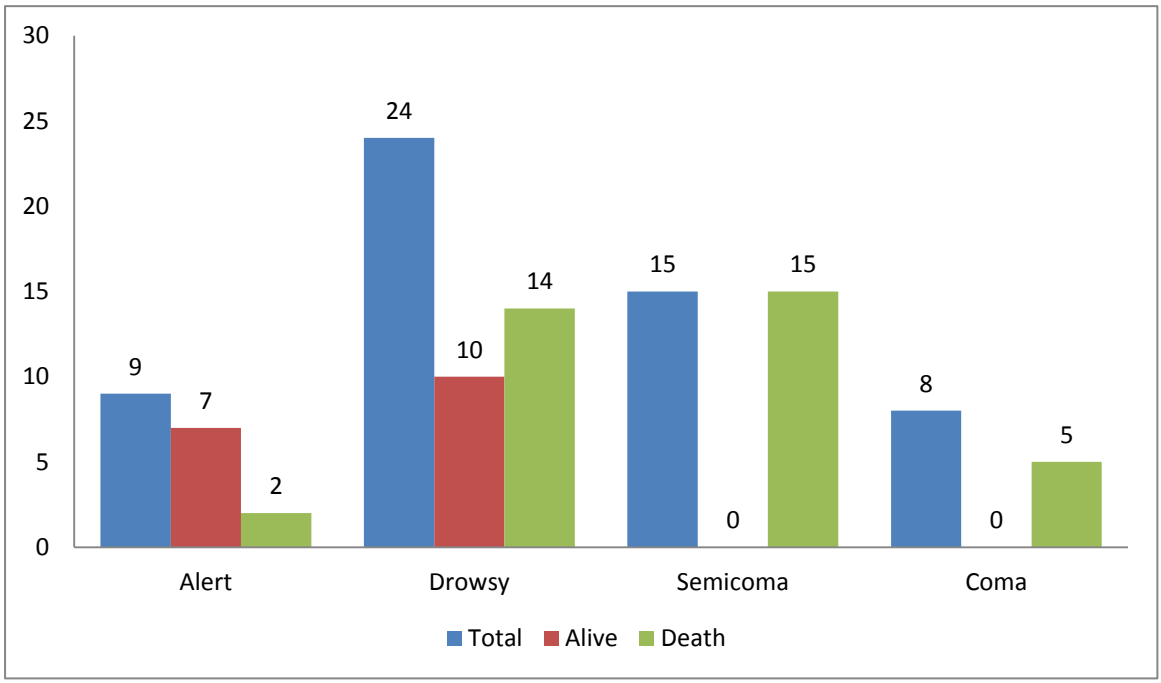

Figure 12: Consciousness level and outcome

CT SCAN FINDING AND OUTCOME

Site of hematoma	Total cases		Alive		Death	
	No.	%	No.	%	No.	%
Basal ganglia	18	32.14	6	33.33	12	66.67
Thalamus	9	16.1	2	22.22	7	77.79
Lobar	20	35.72	6	0.3	14	70
Cerebellar	5	8.9	2	0.4	3	60
Pons	4	7.14	1	0.25	3	75

P value 0.28

In our study the incidence of hematoma as per site as follows: Basal ganglia (32.14%), Thalamus (16.1%), Lobar (35.72%), Cerebellar (8.9%), Pons (7.14%).

The most common site was lobar followed by Basal ganglia and Thalamus. The mortality was 77.79% in Thalamus, 75% in Pons, 70% in Lobar, 66.67% in Basal ganglia, 60% in Cerebellar. There was no statistically difference found in the outcome with respect to site of hematoma.

Table 15: Volume of hematoma and outcome

Volume	Total cases		Alive		Death	
	No.	%	No.	%	No.	%
<30	22	39.29	15	68.2	7	31.8
>30	34	60.71	2	5.9	32	94.1

P value <0.001

Twenty two patients had volume of hematoma <30cm^3 and 34 patients volume >30cm^3. The mortality was 31.8% in patients who had hematoma volume <30cm^3 and 94.1% in patients in whom the volume of hematoma was >30cm^3. There was statistically significant increase in mortality in patients who had volume of hematoma >30cm^3.

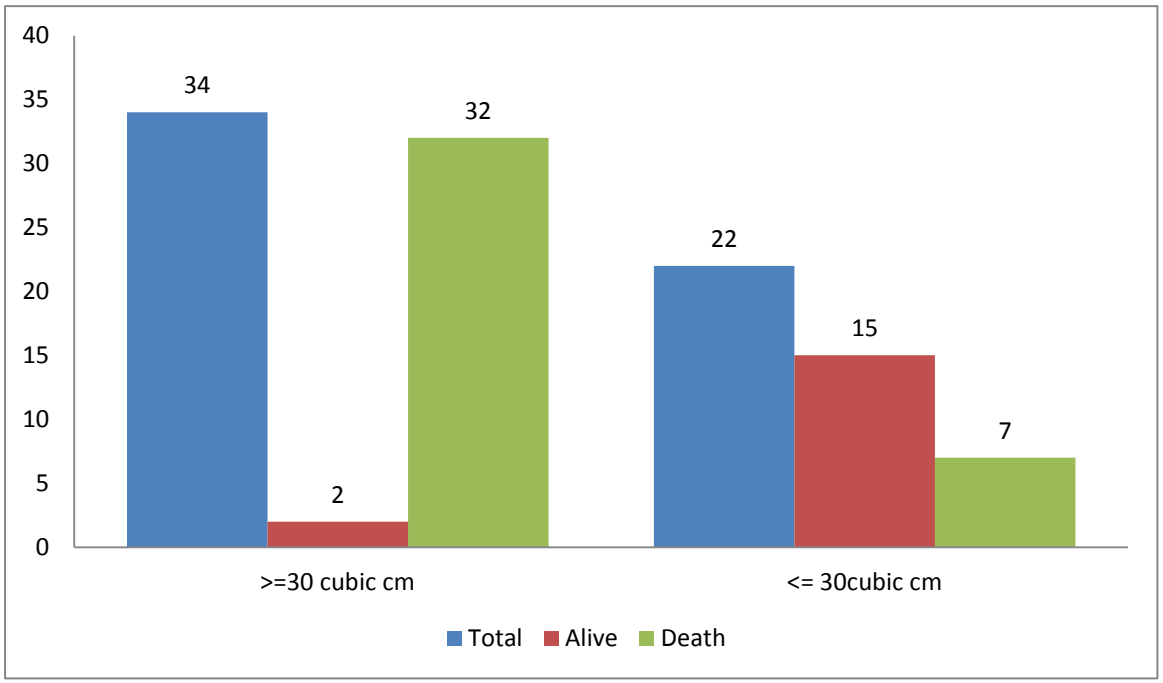

Figure 13: Volume of hematoma and outcome

Table 16: Midline shift and outcome

Midline shift	Total cases		Alive		Death	
	No.	%	No.	%	No.	%
Present	28	50	1	3.6	27	96.4
Absent	28	50	16	57.1	12	42.9

P value <0.001

Among 28 patients who had midline shift 27 patient died (96.4%) indicating poor prognosis in patient who had midline shift. It was statistically significant.

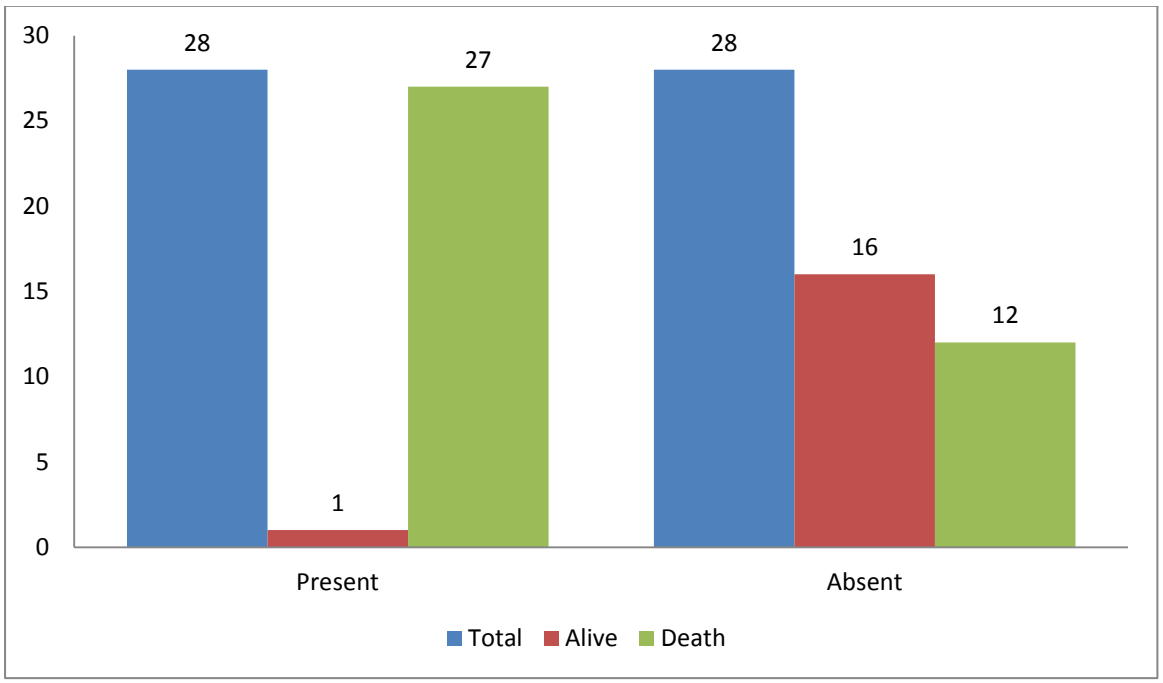

Figure 14: Midline shift and outcome

Table 17: Intraventricular extension of hemorrhage and outcome

Intraventricular extension of hemorrhage	Total Cases		Alive		Death	
	No.	%	No.	%	No.	%
Present	31	55.35	3	9.7	28	90.3
Absent	25	44.65	14	56	11	44

P value <0.001

Patients who had intraventricular extension of hemorrhage had poor outcome. 31 patients had intraventricular extension and among them 28 died (90.3%). It was statistically significant.

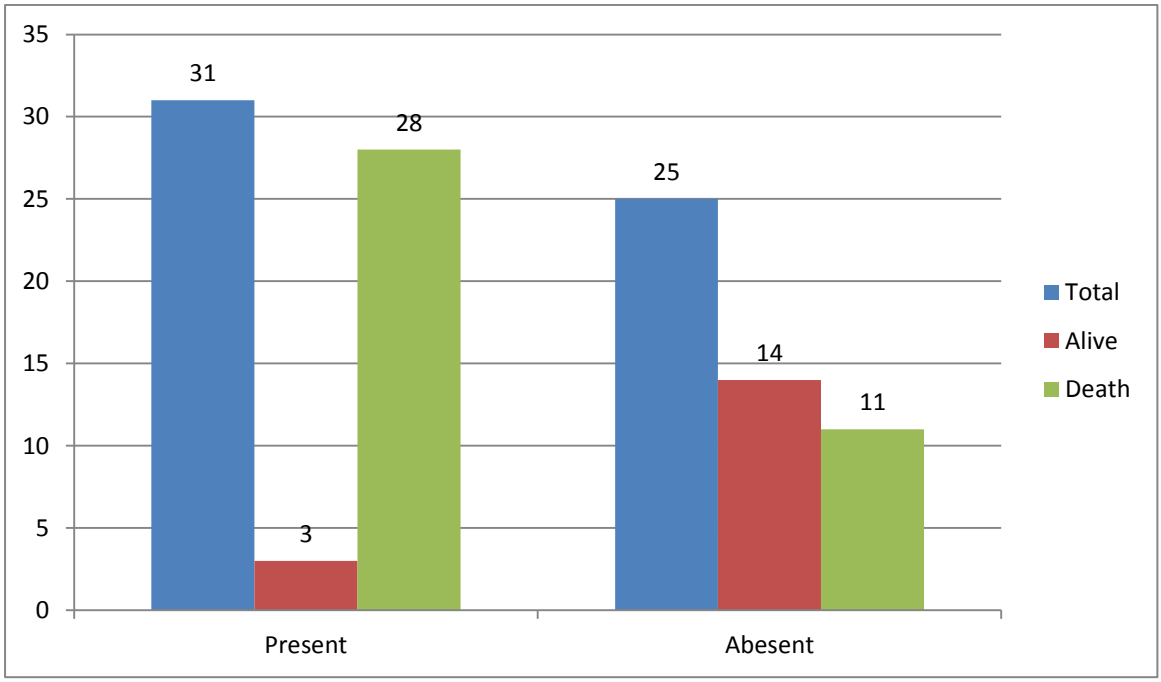

Figure 15: Intraventricular extension of hemorrhage and outcome

Table 18: Ventricular enlargement and outcome

Ventricular enlargement	Total Cases		Alive		Death	
	No.	%	No.	%	No.	%
Present	22	39.29	1	4.5	21	95.5
Absent	34	60.71	16	47.1	18	52.9

P value 0.001

22 patients had ventricular enlargement and among them 21 died (95.9%). Presence of ventricular enlargement had statistically poor outcome in our study group.

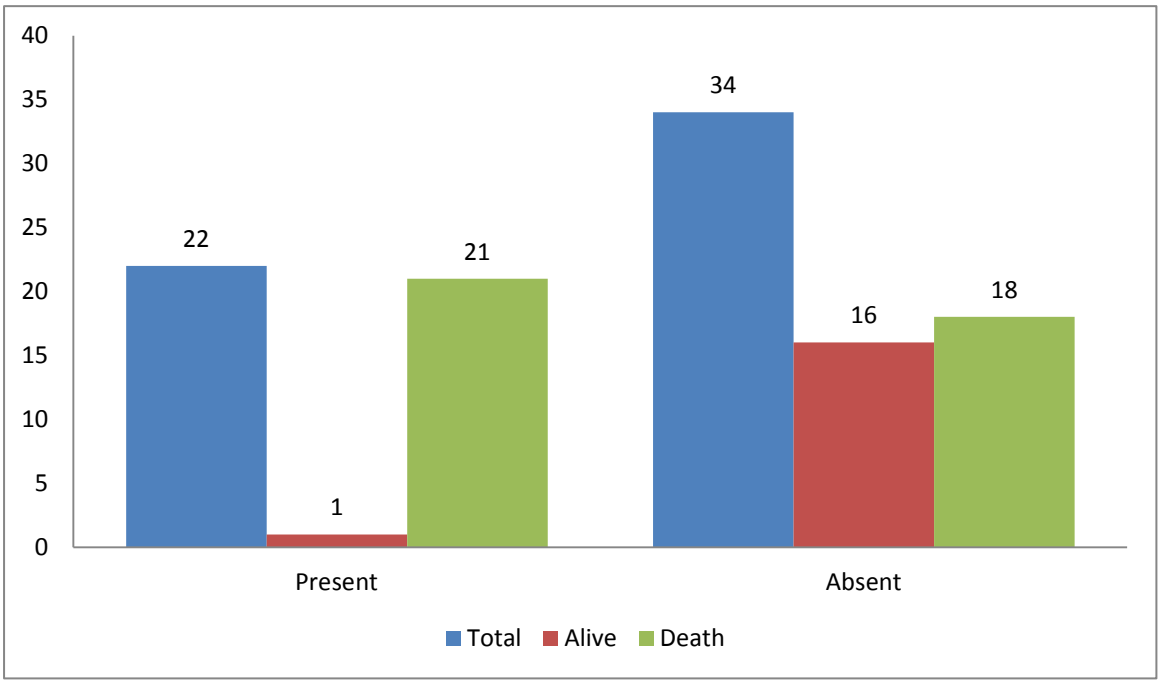

Figure 16: Ventricular enlargement and outcome

Table 19: Mortality with respect to time since admission

Time of death since admission	Number of Death
Within 3 days	15
Within 2 weeks	20
Within 1 month	4
Total	39

Among 56 cases, 39 cases died (69.64% mortality).

Among 39 cases died, 45 died during hospital stay (15 cases died within 3 days, 20 cases died within two weeks).

DISCUSSION

Age and ICH

Among 56 cases we studied, the incidence of intracerebral hemorrhage increased as the age advanced.

In our study more than 72% of ICH occurred in the age group of more than 50 years.

It is comparable to other studies.

In Qureshiet al[8], 85% of the cases were of age more than 50 years.

In Daveratet al[9], 87% patients were of age more than 50 years.

The mean age in our study was 66 years. It is comparable to other studies. In Qureshiet al[8] mean age was 56.4 years and in Deverat et al[9] mean age was 61 years.

Sex and ICH

64.29% of cases were male and 37.71% were female in our study. It is comparable with Deverat et al[9] (male 68%, female 32%) and Qureshi et al[8] (male 58%, female 42%).

Though males outnumbered females, it is statistically insignificant.

Risk Factors

Comparison for major risk factors

The most common risk factor in our study was hypertension (69.4%). It was followed by alcohol consumption (47.2%) and smoking (47.2%).

It is comparable with Qureshiet al[8] (hypertension 77%, alcohol 40%, smoking 30%).

Comparison for hypertensive patients

Among hypertensive 87.5% were on irregular treatment and only 7.5% were taking regular treatment.

Among hypertensive irregular treatment, non compliance was a major problem found in our study. This is comparable to similar study done by Qureshiet al[8]

Thus most of the intracerebral hemorrhage can be prevented, if patient were educated about the compliance of the treatment.

Comparison of distribution of risk factor between sex

In our studyhypertension was the major risk factor in both sexes. Alcoholism and smoking were equal in both sexes. It is quite similar to Qureshi et al[8] (hypertension in male 78%, hypertension in female 77%, alcoholism in male 54%, alcoholism in female 22%, smoking in male 31%, smoking in female 17%).

Hypertension was an important major risk factor in all age group which is similar to Qureshiet al[8].

PROGNOSTIC OUTCOME IN INTRACEREBRAL HEMORRHAGE

The outcome in terms of mortality was analyzed with respect to following clinical/ neuro-

Comparison for age group of patient and outcome

The mortality in the age group more than 70 years was 85.2% in age group 50-69 years mortality was 57.1% and in age group 30-49 years the mortality was 50%. The data is comparable to Daverat et al[9](mortality in age group 30-49 years was 23%. 50-69 years was 40% and more than 70 years was 62.8%).

It is evident in our study that as the age advances the mortality increases.

Comparison for sex and outcome

Mortality in male patients was 72.2% and in female patient was 65%. Data is comparable to Deveratet al[9] (mortality in male patients was 45.13% and in female was 37.7%). It is evident that sex should not be considered as a prognostic factor in the outcome of intracerebral hemorrhage.

Blood pressure at the time of admission and outcome

It is evident in our study that patients who had SBP >=180mm Hg and DBP >=110 had mortality of 85.7% and 84.6% respectively.

So the initial blood pressure plays a major role in the outcome.

Both increase in SBP and DBP have poor prognostic outcome. Data is comparable to Hamdyet al[10] (BP >=180/110 mm Hg had mortality of 70.6%)

The initial SBP and DBP can be considered as a prognostic indicators of mortality.

Comparison of GCS score and outcome

The GCS score is inversely proportional to the mortality. In our study the patients who had GCS score of 3-4 had mortality of 100% which is comparable with Portenoyet al[11] (GCS score of 3-4 had mortality of 100%).

In our study the patients who had GCS score of >9 had mortality of 46.7% which is comparable with Portenoyet al[11] (GCS score of >9 had mortality of 34%).

Thus low GCS score was found to be a good indicator of worst prognosis.

CT SCAN AND OUTCOME

Comparison for site of hematoma and outcome

In our study the Thalamus hematoma constituted 77.79% followed by Pons (75%), Lobar (70%), basal ganglia (66.67%)and cerebellar (60%). In Hemphill et al[12] thalamus (45%), pons (50%), lobar (36%), basal ganglia (45%) and cerebellar (47%).

In our study the outcome was not related to site of hematoma.

Comparison for volume of hematoma and outcome

In our study, as the volume of hematoma increased, the mortality increased and it is statistically significant.

There is a direct significant relationship with volume of hematoma and outcome.

In our study, 94.1% of patients with volume of hematoma >30cm^3 had poor outcome. It is comparable to Qureshiet al[13] (volume of hematoma >30cm^3 was 83.3%).

Comparison of midline shift and outcome

Midline shift was present in 96.4%. it is comparable to Deverat et al[9].

It indicates the severity of compression and its presence indicates poor prognosis and is statistically significant.

Comparison for intraventricular extension of hemorrhage and outcome

The presence of intraventricular extension of hemorrhage (90.3%) had significant p value (p< 0.001) in predicting outcome. It is comparable to Qureshiet al[13] (presence of intraventricular extension of hemorrhage was 79.5%) and Deverat et al[9] (presence of intraventricular extension of hemorrhage was 68%).

Comparison for ventricular enlargement and outcome

The presence of ventricular enlargement (95.9%) is significant poor prognostic indicator. It is comparable to Diringeret al[14].

CONCLUSION

Spontaneous intracerebral hemorrhage (SICH) has remained a serious disease despite recent improvements in management. So efforts must be directed towards better understanding and modification of risk factors.

The major risk factor in our study was hypertension. The other common risk factors were alcohol consumption and smoking. Thus, measures to ensure adequate control of hypertension/ compliance of treatment among hypertensive, abstinence from alcohol and smoking may reduce the incidence of SICH.

Old age, low GCS score, high SBP, high DBP, biletral extensor plantar response, would indicate bad prognosis in SICH.

In addition to diagnosis of ICH, CT Scan can also be used as an useful tool in assessing prognostic outcome of ICH, by using radiological parameters like larger volume of hematoma, presence of midline shift, intraventricular extension of hemorrhage and hydrocephalus which indicated bad prognosis.

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