

Research Article**Clinical Profile and Mortality in Patients Presenting with Intra-cerebral Hemorrhage in a Tertiary Care Centre****Ganesh Namani^{1*}, Dilip M Rampure², Murali M³**¹Postgraduate, Department of General Medicine, Mamata Medical College, Khammam, Telangana State, India²Professor and Head, Department of General Medicine, Mamata Medical College, Khammam, Telangana State, India³Department of General Medicine, Mamata Medical College, Khammam, Telangana State, India***Corresponding author**

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Abstract: Stroke is one of the most common causes of morbidity and mortality in the world, constituting a major challenge in the occupational and neuro-rehabilitation programs of stroke survivors. Stroke due to Intra-cerebral hemorrhage is 2nd to ischemia among the pathologies of stroke. A prospective study was done with all the patients who are suspected to have suffered a stroke and were underwent plain Computerized Tomography (C.T) Scan. Inclusion criteria: Patients between 18 – 90 years of age who are diagnosed to have ICH on CT scan and those presented within 48 hours of onset of symptoms. A total of 276 admissions to the emergency room suggestive of stroke, of which 52 patients were diagnosed to have ICH. Of 50 patients with ICH, 23 (46%) were in putamen, 10 (20%) were lobar, 12 (24%) were in thalamus, 3 (6%) were in brainstem, 2 (4%) were cerebellar hemorrhages. The most common feature noticed was hemiparesis, seen 44 (88%) of the patients. All the patients with lobar and brainstem hemorrhage invariably had hemiparesis. Mortality reaches 100% in patients whose hematoma volume exceed 60cc. 86.9 % of the patients with hematomas above 40cc were dead. Mortality was considerably less with volumes less than 40 cc (40.7%). Putamen was the commonest site, with a male preponderance. Focal neurologic signs were the commonest presenting feature. CT scan was of great value in diagnosis and also for prognosticating the outcome. Mortality was 61% in our case study.**Keywords:** Stroke, ICH, Mortality, CT.**INTRODUCTION**

Stroke is one of the most common causes of morbidity and mortality in the world, constituting a major challenge in the occupational and neuro-rehabilitation programs of stroke survivors. Stroke due to Intra-cerebral hemorrhage is 2nd to ischemia among the pathologies of stroke.

Spontaneous intracerebral hemorrhage (ICH) accounts for 10% to 15% of all strokes [1]. ICH appears to be more common in eastern countries, accounting up to 30% of strokes [2], with an overall mortality of 40% to 50% [3].

Identification of the factors that determine and modify the clinical presentation and outcome of ICH is, important. There were very few prospective studies on ICH in India.

MATERIAL AND METHODS

The study was done on patients who presented to emergency room of Mamata general hospital, Khammam in Dept. of General Medicine for a period of

6 months, is a prospective study done between 1st January 2014 and 1st July 2014.

The study population consisted of all the patients who had sudden onset of neurological deficit or signs and symptoms suggestive of stroke. All the patients who are suspected to have suffered a stroke underwent plain Computerized Tomography (C.T) Scan of brain within 4 hours of presentation.

Inclusion criteria

- Patients between 18 – 90 years of age who are diagnosed to have ICH on CT scan
- Those presented within 48 hours of onset of symptoms.

Exclusion criteria

- Age < 18 years, > 90 years
- Patients presented after 48 hours of onset of symptoms
- Patients with history of head injury
- Patients not willing to participate in the study

For all those patients who met the inclusion criteria were subjected to detailed history and underwent General and Systemic examination with a detailed neurological examination.

The scans of those patients with ICH were evaluated for site of the hemorrhages, the presence of intraventricular extension (IVE), midline shift, mass effect & surrounding brain edema. The epicenter of each hematoma was used to define their location into lobar, putaminal, thalamic, cerebellar and brainstem hemorrhages. Volume of the hematoma was calculated.

Patients were then followed till the time of discharge (4 weeks maximum) or till death. The study protocol was approved by the ethics committee, written and informed consent was taken from all the patients.

RESULTS

There were a total of 276 admissions to the emergency room suggestive of stroke, all of them underwent plain C.T scan, out of which 52 patients were diagnosed to have ICH, 2 cases were excluded as

they are not meeting the inclusion criteria (2 cases were less than 18 yrs. of age).

Age and Sex Distribution of ICH

The age distribution of all cases ranged from 18 to 80 years. Mean age was 50.9 +/- 14.96. Most of the patients (52%) were between 41 – 60 years of age. 11(22%) were stroke in young (< 40 yrs.). There was only 1 patient in 18 - 20 yrs. Age group and none in 81 – 90 years age group. It appears that ICH is more common in elderly individuals. 74% patients were > 40 yrs. of age. In all age groups, there was a male preponderance in the incidence of intracerebral hemorrhage.

Site of Hemorrhage

In a total of 50 patients with ICH, 23 (46%) were in putamen, 10 (20%) were lobar, 12 (24%) were in thalamus, 3 (6%) were in brainstem, 2 (4%) were cerebellar hemorrhages. 33 (66%) were males and 17 (34%) were females.

Table 1: Age and Sex Distribution of ICH

Age Range	Male (n=33)	Female (n=17)	Total	% Of Patients
18-20	1 (100%)	0 (-)	1	2%
21-30	3 (50%)	3 (50%)	6	12%
31-40	5 (83.3%)	1 (16.6%)	6	12%
41-50	9 (75%)	3 (25%)	12	24%
51-60	9 (64.2%)	5 (35.7%)	14	28%
61-70	5 (55.5%)	4 (44.4%)	9	18%
71-80	1 (50%)	1 (50%)	2	4%
81-90	0	0	0	-

Table 2: Site of hemorrhage and sex distribution

Site of Hemorrhage	Males (n = 33)	Female (n = 17)	Total
Putaminal	15 (65.2%)	8 (34.8%)	23
Lobar	7 (70%)	3 (30%)	10
Thalamic	7 (58.33%)	5(41.6%)	12
Cerebellar	2 (100%)	-	2
Brainstem	2 (66.6%)	1 (33.3%)	3
Total	33 (66%)	17 (34%)	50

Aetiology of Intracerebral Hemorrhage

Hypertension is the most common cause of ICH among the study population, seen in 36 (72%) of patients, followed by Hypertension and diabetes in 5 (10%) of patients. In 2 (4%) of patients use of anti-coagulant contributed to ICH. AV Malformation was seen in 3 (6%). One patient of lobar hemorrhage was diagnosed as having an intracranial tumor.

Risk Factors in the Study Population

Hypertension was the most common risk factor seen in 36 (72%) of patients. Smoking was the second most common risk factor seen in 32 (64%) of patients. Alcoholism and Diabetes mellitus were the other associated risk factors in 26 (52%) and 6 (12%) patients respectively.

Table 3: Aetiology of intracerebral hemorrhage

Aetiology	No. of cases
Hypertension	36 (72%)
Hypertension & Diabetes	5 (10%)
Anti - Coagulants	2 (4%)
AV Malformation	3 (6%)
Diabetes	1 (2%)
Tumor	1 (2%)
Unknown and others	7 (14%)

Table 4: Risk factors in the study population

Risk factors	Number of patients	% of patients
Hypertension	36	72%
Smoking	32	64%
Alcohol	26	52%
Diabetes mellitus	6	12%

Clinical Features in ICH

The most common feature noticed was hemiparesis, seen 44 (88%) of the patients. All the patients with lobar and brainstem hemorrhage invariably had hemiparesis.

Hemiparesis was followed by LOC which was seen in 40 (80%) of patients. Patients with thalamic hemorrhage had lesser incidence of LOC (66.6%) compared to others.

Headache was seen in 38 (76%) of patients, all the cerebellar hemorrhage had headache, was seldom seen in lobar and thalamic hemorrhages.

Vomiting's were seen in 35 (70%) patients, all the patients with brainstem and cerebellar hemorrhage had vomiting. Only 13 (56.5) of putaminal hemorrhage had vomiting. Eye signs, seizures and sensory disturbances occupied the next place with 46%, 34%, 16% respectively. Eye signs were seen all the patients with brainstem hemorrhage. Seizures were seen most of the lobar hemorrhage (80%). Sensory disturbances were seen only in lobar and thalamic hemorrhages, much commonly in thalamic (50%) than lobar (20%).

Neck stiffness was seen mainly in putaminal, lobar and thalamic hemorrhages, more commonly in lobar and thalamic hemorrhages.

In patients with putaminal hemorrhages 21 (91.3%) had hemiparesis, 20 (86.9%) had headache and 19 (82.6%) LOC, 13 (56.5%) had vomiting's. only 10 (43.4%), 7 (30.4%) had eye signs and seizures respectively. none of the patients had sensory disturbances.

In patients with lobar hemorrhage all the patients had hemiparesis, 8 (80%) had Seizures and LOC, 7 (70%) had headache and vomiting, 5 (50%) had eye signs, 4 (40%) had neck stiffness, 2 (20%) had sensory disturbances.

In patient with thalamic hemorrhages 10 (83.3%) had hemiparesis and vomiting, 9 (75%) had headache, 8(66.6%) had LOC, 6 (50%) has sensory disturbances, 4 (41.6%) had neck stiffness and eye signs.

All the patients with brainstem hemorrhage has vomiting's, LOC, eye signs and hemiparesis. All the patients with cerebellar hemorrhage had headache, vomiting's, LOC, cerebellar signs.

Table 5: Clinical features in ICH

Clinical features	Putaminal (n=23)	Lobar (n=10)	Thalamic (n=12)	Brainstem (n=3)	Cerebellar (n=2)	Total (n=50)
Headache	20 (86.9%)	7 (70%)	9 (75%)	-	2 (100%)	38 (76%)
Vomiting	13 (56.5%)	7(70%)	10(83.3%)	3(100%)	2 (100%)	35 (70%)
Seizures	7 (30.4%)	8(80%)	2(16.6%)	-	-	17 (34%)
LOC	19 (82.6%)	8(80%)	8(66.6%)	3 (100%)	2 (100%)	40 (80%)
Paresis	21 (91.3%)	10(100%)	10(83.3%)	3 (100%)	-	44 (88%)
Eye signs	10 (43.4%)	5(50%)	5(41.6%)	3(100%)	-	23 (46%)
Sensory disturbances	-	2(20%)	6(50%)	-	-	8 (16%)
Cerebellar signs	-	-	-	-	2 (100%)	2 (4%)
Neck stiffness	4(17.3%)	4(40%)	5(41.6%)	-	-	13 (26%)

Time of Onset of Complaints

Most of the patients had the onset of ictus during morning hours 27 (54%). 15 (30%) of patients

had it during the latter part of the day. 8 (16%) had the event even during sleep.

In all groups of hemorrhages the onset was more frequently seen in the morning. A significant number of putaminal 8 (34.7%) and thalamic 4 (33.3%)

hemorrhages occurred during afternoon. All the Cerebellar hemorrhage patients had it during sleep and brainstem hemorrhages occurred in the morning hours.

Table 6: Time of onset of complaints

Time of onset	Putaminal (n=23)	Lobar (n=10)	Thalamic (n=12)	Brainstem (n=3)	Cerebellar (n=2)	Total (50)
Morning	12 (52.1%)	6 (60%)	6 (50%)	3(100%)	-	27 (54%)
Afternoon	8 (34.7%)	3 (30%)	4 (33.3%)	-	-	15 (30%)
During sleep	3 (13.04%)	1 (10%)	2 (16.6%)	-	2 (100%)	8 (16%)

CT - Volume of Hematoma

Large volume hematomas (>40c.c) are seen in putaminal, lobar and thalamic hemorrhages. Patients

with brainstem hemorrhages had smaller volumes of hematoma.

Table 7: CT-volume of hematoma

Volume in C.C	Putaminal (23)	Lobar (10)	Thalamic (12)	Brainstem (3)	Cerebellar (2)	Total (50)
0-20 CC	4 (17.3%)	-	4 (33.3%)	3 (100%)	-	11(22%)
21-40 CC	4 (17.3%)	4 (40%)	6 (50%)	-	2 (100%)	16 (32%)
41-60 CC	9 (39.1%)	4 (40%)	2 (16.6%)	-	-	15 (30%)
>60 CC	6 (26.1%)	2 (20%)	-	-	-	8 (16%)

Mortality

Mortality-GCS score at admission

Mortality was 100% in patients with GCS Score <6 at the time of admission. In those with GCS Score

between 6 and 10, mortality was 59.1%, while in patients with GCS Score >11, the mortality was only 22.8%.

Table 8: Mortality-GCS score at admission

GCS Score	Total cases	Deaths	% of deaths
<6	15	15	100%
6-10	22	13	59.1%
>10	13	3	23.8%

Mortality – volume of hematoma

Mortality reaches 100% in patients whose hematoma volume exceed 60cc. 86.9 % of the patients

with hematomas above 40cc were dead. Mortality was considerably less with volumes less than 40 cc (40.7%).

Table 9: Mortality – volume of hematoma

Volume (in c.c.)	Total cases	No. of deaths	% of deaths
<20	11	3	27.2%
21-40	16	8	50%
41-60	15	12	80%
>60	8	8	100%

DISCUSSION

In the present study 74% of patients with intra-cerebral hemorrhage were aged over 40 years. The mean age was 50.9+/- 14.6 years. The mean age of 266 cases of intra-cerebral hemorrhage studied by Yun-zhen Hu [4] was 57.9±15.2 years. The findings of the present

study are comparable with other study done by Sunil K. Narayan *et al.* [5] in South India.

Age is the most powerful predictor of stroke. The incidence of stroke doubles each decade past 55 years of age. Half of all strokes occur in people older than 70 to 75 years [6].

Table 10: Sex distribution – in different clinical series

Study	Sunil K. Narayan <i>et al.</i> [5]	Yun-zhen Hu <i>et al.</i> [4]	Present study
Sex	No. of Pts (%)	No. of Pts (%)	No. of Pts (%)
Male	38(63.3%)	179(67.3%)	33(66.6%)
Female	22(36.6%)	87(32.7%)	17(33.3%)

In our study of Intra-cerebral Hemorrhage there was a male preponderance. This is compatible with similar figures in the Yun-zhen Hu *et al.* [4] & Sunil K. Narayan *et al.* [5] studies.

Stroke appears to be more common in males than in females.

Table 11: Aetiologies of ICH according to clinical series

Series	Sunil K. Narayan <i>et al.</i> [5] % of cases	Present study % of cases
HTN	86.7%	72%
AVM	-	6%
TUMOUR	-	2%
Anticoagulant therapy	5%	4%
Antiplatelet therapy	-	-
Coagulopathy	6.67%	-
Cerebral venous sinus thrombosis	1.67%	-
Unknown /others	-	14%

These studies show that systemic hypertension is the single most frequent associated risk factor. The incidence of hypertension in the present study was 72%. Hypertension was seldom seen in lobar hemorrhages, this was also seen in the study conducted by Yun-zhen Hu *et al.* [4]. The next identifiable cause was AV malformations which were present in 6% of the patients. In a group of 38 young ICH patients subjected to angiography, Halpin *et al.* [7] documented AVMs in 23. This finding tells that AV malformations pose an important risk for intracerebral haemorrhage.

Robert G. Hart *et al.* [8] had found that anticoagulation to conventional intensities increases the risk of intracranial hemorrhage 7- to 10-fold, to an absolute rate of nearly 1% per year. Most (70%) anticoagulant-related intracranial hemorrhages are intracerebral hematomas (approximately 60% are fatal). In our study there were 2 patients who were on oral anticoagulants (warfarin) and one patient was having an INR of higher than recommended.

The tumor types most likely to lead to ICH are glioblastoma multiforme or metastases from melanoma, bronchogenic carcinoma, choriocarcinoma, or renal cell carcinoma [9]. In our study there was only one case of ICH due to an underlying tumor, and was also a known case of glioblastoma.

Risk Factors

In a review of risk factors in our study population, hypertension was the commonest factor (72%). It was followed by cigarette smoking. Smajlović D *et al.* [10] have found that the leading risk factor for ICH was Hypertension, heart disease followed by smoking. Articles citing smoking as a risk factor of ICH were few, in our study we have found that 64% of our

patients were smokers. Alcohol consumption was seen in 52% of patients. There appears to be a dose response relation between moderate alcohol consumption and the risk of ICH [11].

Smajlović D *et al.* [10] have found that 14% of their cases with ICH had Diabetes, in our study we had 12% of patients with diabetes and only 2% of them having only diabetes, the rest 10% were also having concomitant hypertension.

Clinical Features in Different Clinical Series

The commonest clinical sign in our study was paresis seen in 88% of the cases. Hemiplegia was seen in more than 80% of putaminal, thalamic and lobar hematomas while pontine hematoma presented with quadriplegia. The second commonest clinical finding was LOC seen in 80% of the cases, it was followed by headache (76%) and vomiting (70%). Eye signs were seen in 46% of the cases, these included horizontal and vertical gaze palsies, skew deviation of eyes papillary abnormalities like pin point pupils, nonreacting pupils and Horner's syndrome and unequal pupils. Abnormal eye signs were present in 100% of pontine hemorrhages. A hemisensory syndrome was seen in 50% of thalamic hematomas and 20% of lobar hematoma patients. As expected, patients with cerebellar hemorrhage had abnormal neurological signs pointing to cerebellar dysfunction.

Yacoub G. Bahou [12] had found that 80% of their patients with ICH had hemiparesis/plegia during their presentation, it was followed by LOC, headache and vomiting.

Mortality in Different Clinical Series

Mortality in our case series was 62%. The mortality was highest in cerebellar and brainstem

hematomas (100%), followed by lobar (80%), putaminal (56.5%) and thalamic (41.6%) hemorrhages. Survival was better in thalamic hematomas. Thalamic hematoma and lobar hematoma patients fared better with higher survival rates. Smajlović D *et al.* [10] had a mortality rate of 42% with highest in brainstem hematoma patients (83%). Yun-zhen Hu *et al.* [4] had found that the highest mortality was observed in patients with ICH of the brainstem (100.0%), followed by patients with ICHs in multiple sites (50.0%). Most cases of ICH in the basal ganglia and parietal lobe improved (62.6% and 62.5%, respectively).

Mortality – GCS Score At Admission

Patients with GCS score less than 6 at admission had 100% mortality; In those with GCS Score between 6 and 10, mortality was 59.1%, while in patients with GCS Score >11, the mortality was only 23.8%. It seems that GCS Score at admission had an impact on the mortality rate. These findings have been confirmed by J P Broderick *et al.* [13] Among the criteria for short term prognosis, the state of consciousness at admission is undoubtedly the most important.

Mortality – IV Extension

Outcome was also influenced by the volume of hematoma. Very large volumes greater than 40cc were invariably associated with 100% mortality. With small volumes of hematoma high mortality was seen only in brainstem hemorrhages.

In the present study 75.8% of patients with IV extension died. These findings have been similar to those found by Mansooreh Togh *et al.* [14].

Extension of hematoma into ventricular system is a common feature of caudate, thalamic hematomas and of large putaminal and lobar hematomas. Ventricular extension carries an invariably poor prognosis in putaminal and lobar hemorrhages. This probably reflects the larger size of hematomas that tracks from laterally placed putamen to medially placed ventricular system. In thalamic hematomas there is early communication of medially located hematoma with third ventricle hence, it does not relate to poor prognosis in these patients.

CONCLUSION

The mean age, sex distribution and site predilection of ICH in the present study was comparable with other published studies from India and other countries. Putamen was the commonest site, with a male preponderance. Hypertension was the major risk factor except in lobar haemorrhages. Focal neurologic signs were the commonest presenting feature. CT scan was of great value in diagnosis and also for prognosticating the outcome. Mortality was 61% in our case study.

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