

## "CLINICAL PROFILE AND PROGNOSTIC EVALUATION OF INTRACEREBRAL BLEEDS"

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### **ABSTRACT:**

*Introduction-Stroke due to Intra-cerebral hemorrhage is 2<sup>nd</sup> to ischemia among the pathologies of stroke.Spontaneous ICH accounts for 10%-15% of all strokes.<sup>1</sup> ICH, accounts to 30% of strokes,<sup>2</sup> with an overall mortality of 40% to 50%.<sup>3</sup>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.*

*Aims And Objectives-To study the Age, Sex distribution ,Clinical features ,Risk factors and Etiology in patients with Intracerebral Hemorrhage.To recognize the site, CT appearance, calculate the volume of hematoma,To identify the factors which determine the prognosis.Method- A descriptive study of all the patients having sudden onset of neurological deficit or signs and symptoms suggestive of stroke, who underwent plain CT brain within 4 hours of presentation.Results - Mean age was 50.97 +/- 14.96. 44.4% were putaminal bleeds,22(24.4%) were thalamic bleeds.66(73.3%) of patients werehypertensives.96% of the patients had a systolicBP of >150mm of Hg at presentation. Smoking was a major risk factor. Large volume hematomas(>40c.c) were seen in putaminal, lobar and thalamic hemorrhages.Mortality was 61.1% in the study. Larger volumes of hematoma had worse prognosis, and brainstem and cerebellar haemorrhages had 100% mortality.The results were comparable with other published studies from India and other countries.Focaldeficits were the commonest features.Conclusion:The demographic profile the present study was comparable with other published studies from India and other countries. Mortality was 61.1% in the present study.*

**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 2<sup>nd</sup> to ischemia among the pathologies of stroke.

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

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.

**AIMS AND OBJECTIVES** - To study the Agesex distribution Clinical features Risk factors Etiological factors in patients with Intracerebral Hemorrhage. To recognize the site, CT appearance, calculate the volume of hematoma of ICH. To identify the factors which determine the prognosis, in these patients (both clinical and radiological).

**MATERIAL AND METHODS**-The study was done on patients who presented to emergency room of Wenlock hospital and KMC hospital , Mangalore in Dept. of General Medicine for a period of 2 years , is a prospective study done between August 2014 and July 2016. 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

**RESULTS:**

**Age And Sex Distribution Of ICH:** Mean age was 50.97 +/- 14.96. Most of the patients (51%) were between 41 – 60 years of age. 21(23.3%) were stroke in young (< 40 yrs.). There was only 2 patient in 18 - 20 yrs. 37(74%) patients were >40 yrs. Male preponderance was seen in all age groups.

Age Range	Male (n=60)	Female (n=30)	Total	% Of Patients
18-20	2(100%)	0 (-)	2	2.2%
21-30	5 (50%)	5 (50%)	10	11.1%
31-40	9(81.2%)	2 (18.8%)	11	12.2%
41-50	16 (76.2%)	5 (23.8%)	21	23.3%
51-60	18(66.6%)	9 (33.4%)	27	30%
61-70	8 (50%)	8 (50%)	16	17.8%
71-80	1 (33.4%)	2 (66.6%)	3	3.4%
81-90	0	0	0	-

**Site Of Hemorrhage:** In a total of 90 patients with ICH, 40 (44.4%) were in putamen, 19 (21.1%) were lobar, 22 (24.4%) were in thalamus, 6 (6.66%) were in brainstem, 3 (2.22%) were cerebellar hemorrhages. 60 (66%) were males and 30 (34%) were females.

Site of Hemorrhage	Males (n = 60)	Female (n = 30)	Total
Putaminal	26(65.%)	16 (35%)	40
Lobar	14 (73.6%)	5 (26.7%)	19
Thalamic	13(58.33)%	9(41.6%)	22

<b>Cerebellar</b>	<b>3 (100%)</b>	<b>-</b>	<b>3</b>
<b>Brainstem</b>	<b>4 (66.6%)</b>	<b>2 (33.3%)</b>	<b>6</b>
<b>Total</b>	<b>33 (66%)</b>	<b>17 (34%)</b>	<b>90</b>

**Aetiology And Risk Factors Of Intracerebral Hemorrhage:** Hypertension is the most common cause of ICH among the study population, seen in 66 (73.3%) of patients. Hypertension was the most common risk factor seen in 66 (73.3%) of patients. Smoking was the second most common risk factor seen in 64 (71%) of patients.

<b>Aetiology</b>	<b>No. of cases</b>
<b>Hypertension</b>	<b>56(62.2%)</b>
<b>Hypertension &amp; Diabetes</b>	<b>10 (11.1%)</b>
<b>Anti - Coagulants</b>	<b>4(4.44%)</b>
<b>AV Malformation</b>	<b>5 (5.55%)</b>
<b>Diabetes</b>	<b>1 (1.11%)</b>
<b>Tumor</b>	<b>1 (1.11%)</b>
<b>Unknown and others</b>	<b>13 (14.44%)</b>

**Risk Factors In The Study Population:**

<b>Risk factors</b>	<b>Number of patients</b>	<b>% of patients</b>
<b>Hypertension</b>	<b>66</b>	<b>73.3%</b>
<b>Smoking</b>	<b>64</b>	<b>71.7%</b>
<b>Alcohol</b>	<b>47</b>	<b>52.2%</b>
<b>Diabetes mellitus</b>	<b>6</b>	<b>6.66%</b>

**Clinical Features:**

The most common feature noticed was hemiparesis, seen 80(88.9%) of the patients. All the patients with lobar and brainstem hemorrhage invariably had hemiparesis. Hemiparesis was followed by LOC which was seen in 72(80%) of patients. Patients with thalamic hemorrhage had lesser incidence of LOC(66.6%) compared to others. Headache was seen in 66(74.8%) of patients, all the cerebellar hemorrhage had headache, was seldom seen in lobar and thalamic hemorrhages. Vomiting were seen in 63(70%) patients, all the patients with brainstem and cerebellar hemorrhage had vomiting. Only 50 (61.7) 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%).

**Systolic B.P At Presentation:** Most of the patients had their systolic blood pressure  $\geq$  150 mm Hg. (96%). Only 4 % of the patients had their systolic B.P less than 150, and those were lobar and thalamic. Average systolic BP was measured to be 172 mm of Hg.

Systolic BP	Putaminal (40)	Lobar (19)	Thalamic (22)	Brainstem (6)	Cerebellar (3)	Total (90)
120 – 149	-	4 (10.5%)	4 (9%)	-	-	4
150 – 179	22 (55%)	13 (68.42%)	10 (45.5%)	2 (33.3%)	-	47
180 and above	18 (45%)	4(21.05%)	10 (45.5%)	4 (66.6%)	3(100%)	39

**CT – Findings:** Midline shift was the most common finding seen in 66 (73.3%) of the cases in varying grades, all patients with lobar and cerebellar hemorrhage had midline shift, most of the cases 35 (87.5%) of putaminal hemorrhage had midline shift, only 10(52.6%) of patients with thalamic hemorrhage had midline shift. Mass effect is seen in 65 (72.2%) of cases, all patients with lobar and cerebellar hemorrhage had mass effect, a significant number (78.2%) of putaminal hemorrhage also showed mass effect, only 12(63.15%) patients with thalamic hemorrhage had mass effect. Edema is seen in 60 (66.7%) of cases, all the patients with cerebellar and brainstem hemorrhage had surrounding edema, 34 (85%) of patients with putaminal hemorrhage had edema, 11 (57.9%) patients with lobar hemorrhage had edema, only 8 (36.36%) of the thalamic hemorrhage patients had edema. 53 (58.9%) of the patients had evidence of intraventricular extension, it was seen in all cerebellar hemorrhage patients. Only 50% of lobar and thalamic hemorrhage patients had I.V extension.

**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.

CT parameter	Putaminal (40)	Lobar (19)	Thalamic (22)	Brainstem (6)	Cerebellar (3)	Total (90)
IV extension	28(70%) 33 (82.5%)	10 (52.6%) 19 (100%)	12 (54.54%) 12	- -	3 (100%) 3 (100%)	53 (58.8%)
Mass effect	36 (90%) 34 (85%)	19 (100%) 11(57.89%)	12 (54.54%) 10	- 6 (100%)	3 (100%) 3 (100%)	65 (72%) 66 (74%)
Midline shift			10 (45.45%)			60 (68%)
Edema			8 (36.3%)			

Volume in C.C	Putaminal (40)	Lobar (19)	Thalamic (22)	Brainstem (6)	Cerebellar (3)	Total (90)
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<b>0-20 CC</b>	<b>5 (17.3%)</b>	<b>-</b>	<b>8 (33.3%)</b>	<b>4 (66.7%)</b>	<b>-</b>	<b>17(22%)</b>
<b>21-40 CC</b>	<b>7 (17.3%)</b>	<b>8 (40%)</b>	<b>12 (50%)</b>	<b>-</b>	<b>3 (100%)</b>	<b>28 (32%)</b>
<b>41-60 CC</b>	<b>17</b>	<b>7 (40%)</b>	<b>2 (16.6%)</b>	<b>2(33.3)</b>	<b>-</b>	<b>28 (30%)</b>
<b>&gt;60 CC</b>	<b>11</b>	<b>4 (20%)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>15 (16%)</b>
	<b>(39.1%)</b>					
	<b>(26.1%)</b>					

**Mortality:** Highest incidence of mortality was in seventh decade followed by fifth and sixth decades. Mortality was more in males (63.6%) when compared with females (58.8%). Average mortality is 62%. 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%.

**Mortality - Age Incidence:**

Age range	Total No. of cases	No. of deaths
<b>18-20</b>	<b>2</b>	<b>-</b>
<b>21-30</b>	<b>10</b>	<b>2 (20%)</b>
<b>31-40</b>	<b>10</b>	<b>4 (40%)</b>
<b>41-50</b>	<b>23</b>	<b>17 (73.9%)</b>
<b>51-60</b>	<b>25</b>	<b>19 (76%)</b>
<b>61-70</b>	<b>17</b>	<b>13 (76.4%)</b>
<b>71-80</b>	<b>3</b>	<b>-</b>
<b>81-90</b>	<b>0</b>	<b>-</b>

**Mortality - Sex Incidence:**

Gender	Number of cases	Number of Deaths	% of deaths
<b>Male cases</b>	<b>60</b>	<b>38</b>	<b>63.3%</b>
<b>Female cases</b>	<b>30</b>	<b>17</b>	<b>56.67%</b>
<b>Total cases</b>	<b>90</b>	<b>55</b>	<b>61.1%</b>

**Mortality – Gcs Score At Admission:**

GCS Score	Total cases	Deaths	% of deaths
<b>&lt;6</b>	<b>26</b>	<b>26</b>	<b>100%</b>
<b>6-10</b>	<b>39</b>	<b>23</b>	<b>59%</b>
<b>&gt;10</b>	<b>25</b>	<b>6</b>	<b>24%</b>

**Mortality – Systolic B.P At Admission:** Mortality was nil among the patients who presented with S.B.P less than 150 mm Hg., was significantly high among patients with S.B.P >= 180 mm Hg. (78.5%), and was 58.8% among patients with S.B.P ranging between 150 and 180 mm Hg.

SBP mmHg	Total cases	Number of deaths	% of deaths
120 – 149	4	0	-
150 – 180	47	20	58.8%
180 and above	39	11	78.5%

**Mortality - Site Of Hemorrhage:** 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.

**Mortality - Site Of Hemorrhage:**

Site	Total cases	No. of deaths	% of deaths
Putaminal	40	23	57.5%
Lobar	19	15	78.9%
Thalamic	22	8	36.3%
Brainstem	6	6	100%
Cerebellar	3	3	100%

**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%).

Volume (in c.c.)	Total cases	No. of deaths	% of deaths
<20	19	4	21%
21-40	29	14	48.2%
41-60	28	23	82.1%
>60	14	14	100%

**Mortality – Intraventricular Extension:** Intraventricular extension of hemorrhage was seen in majority of putaminal, thalamic and cerebellar hemorrhages and most of these cases succumbed to death. Mortality in patients without Intraventricular extension was 42.8% only. Mortality in patients with Intraventricular extension was 75.8%.

	With Intraventricular Extension	Without Intraventricular Extension
No. Of Cases	53	37
No. Of Deaths	40	15
% Of Deaths	75.4%	40.54%

**DISCUSSION:**

In the present study 74.5% 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<sup>4</sup> was 57.9±15.2 years. The findings of the present study are comparable with other study done by Sunil K. Narayan<sup>5</sup> et al. 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.<sup>6</sup>

<b>Study</b>	<b>Sunil K. Narayan et al. % of pts &gt;40 years</b>	<b>Yun-zhen Hu % of patients &gt;45 years</b>	<b>Present study % of patients &gt;40 years</b>
<b>% of patients</b>	<b>76.4%</b>	<b>81.2%</b>	<b>74.5%</b>

**Sex Distribution – In Different Clinical Series:**

<b>Study</b>	<b>Sunil K. Narayan et al No. of Pts (%)</b>	<b>Yun-zhen Hu et al. No. of Pts (%)</b>	<b>Present study No. of Pts (%)</b>
<b>Sex</b>			
<b>Male</b>	<b>38(63.3%)</b>	<b>179(67.3%)</b>	<b>60(66.6%)</b>
<b>Female</b>	<b>22(36.6%)</b>	<b>87(32.7%)</b>	<b>30(33.3%)</b>

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 & Sunil K. Narayan et al studies. Stroke appears to be more common in males than in females.

**Aetiologies Of ICH According To Clinical Series:**

<b>Series</b>	<b>Sunil K. Narayan et al. % of cases</b>	<b>Present study % of cases</b>
<b>HTN</b>	<b>86.7%</b>	<b>73.3%</b>
<b>AVM</b>	<b>-</b>	<b>6%</b>
<b>TUMOUR</b>	<b>-</b>	<b>2%</b>
<b>Anticoagulant therapy</b>	<b>5%</b>	<b>4%</b>
<b>Antiplatelet therapy</b>	<b>-</b>	<b>-</b>
<b>Coagulopathy</b>	<b>6.67%</b>	<b>-</b>
<b>Cerebral venous sinus thrombosis</b>	<b>1.67%</b>	<b>-</b>
<b>Unknown /others</b>	<b>-</b>	<b>13%</b>

These studies show that systemic hypertension is the single most frequent associated risk factor. The incidence of hypertension in the present study was 73.3%. Hypertension was

seldom seen in lobar hemorrhages, this was also seen in the study conducted by Yun-zhen Hu et al.<sup>46</sup> 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, Halpinet al.<sup>49</sup> documented AVMs in 23. This finding tells that AV malformations pose an important risk for intracerebral haemorrhage.

**Systolic B.P At Presentation:** Most of the patients had their systolic blood pressure  $\geq$  150 mm Hg. (96%). Only 4 % of the patients had their systolic B.P less than 150, and those were lobar and thalamic. Most of the patients with brainstem hemorrhage had their S.B.P  $>$  180 mm Hg. Of the patients with their S.B.P  $\geq$  150, most of them (68%) had their S.B.P ranging from 150-180. Qureshi AI, et al.<sup>8</sup> have found that the initial systolic blood pressure was  $<$ 140 mm Hg in 31% patients, 140–184 mm Hg in 56% patients, 185–219 mm Hg in 13% patients. This difference may be because of the sample size taken by them.

**Site of ICH in Different Clinical Series:**

Study	Kase& Mohr % of cases	A.K.Thakur et al. % of cases	Present study % of cases
Site			
Putaminal	35%	48%	44.4%
Lobar	25%	10%	21.1%
Cerebellar	10%	12%	3.33%
Thalamic	15%	16%	24.4%
Brainstem	5%	6%	6.67%
Others	10%	8%	-

In the present study Putaminal Hemorrhages (44.4%) constitute the majority of cases of ICH, followed by Thalamic (24.4%) and Lobar ICH (21.1%). In studies by A.K.Thakur et al<sup>9</sup> and Kase& Mohr<sup>10</sup>, Putaminal hematomas were the commonest site of ICH.

**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 Toghet al.<sup>11</sup>

**SUMMARY:** 90 cases of CT proven non – traumatic ICH aged between 18 to 90 years presenting within 48 hours of illness were prospectively analysed both clinically and radiologically from August 2014 to July 2016.

- The highest incidence was seen in the fifth and sixth and seventh decades.
- The most common location was Putaminal followed by Thalamic, Lobar, Pontine and Cerebellar haemorrhages, with predilection towards male sex.



- Paresis was the most common presenting complaint followed by loss of consciousness, headache and vomiting. Most of the events occurred during early morning when the patient was awake and active.
- Hypertension and smoking appears to major risk factors for ICH
- Hypertension was the most common aetiological factor, followed by hypertension and diabetes present concomitantly in the same patient. Anticoagulants taken for treatment of CRHD appears to be a causative agent of ICH.
- CT scan is of great value in detecting hematomas, helping in identifying their location, assessment of volume, IV extension and brain herniation reliably.
- Mortality was high in patients with brainstem, cerebellar hematomas. Survival was better in putaminal and thalamic hematomas.
- The volume of hematomas, IV extension and GCS Score at admission seems to an important prognostic and mortality indicators.

### **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 61.1% in our case study.
- All cases with cerebellar and midbrain haemorrhages died.

### **BIBLIOGRAPHY**

1. Qureshi AI, Tuhrim ST, Broderick JP, Batjer HH, Hondo H, Hanley DF. Spontaneous intracerebralhemorrhage. *N Engl J Med.* 2001;344:1450–60
2. Zhang LF, Yang J, Hong Z, Yuan GG, Zhou BF, Zhao LC, et al. For the collaborative group of China multicentre study of cardiovascular epidemiology. Proportion of different types of subtypes of stroke in China. *Stroke.* 2003;34:2091–6.
3. Fogelholm R, Nuutila M, Vuorela AL. Primary intracerebralhemorrhage in the Jyvaskyla region, Central Finland, 1985-89: Incidence, case fatality rate, and functional outcome. *J NeurolNeurosurg Psychiatry.* 1992;55:546–52.
4. Yun-zhen Hu, Jian-wen Wang, and Ben-yanLuo. Epidemiological and clinical characteristics of 266 cases of intracerebralhemorrhage in Hangzhou, China, *J Zhejiang UnivSci B.* 2013 June; 14(6): 496–504.
5. Sunil K. Narayan, P. Sivaprasad, Sharma Sushma, Ratnakar K. Sahoo, and Tarun Kumar Dutta. Etiology and outcome determinants of intracerebralhemorrhage in a south Indian population, A hospital-based study, *Ann Indian Acad Neurol.* 2012 Oct-Dec; 15(4): 263–266
6. Jose Biller, Betsy B. Love, Michael J Schneck, *Vascular Diseases of the Nervous System A. ISCHEMIC CEREBROVASCULAR DISEASE.* In: Walter G. Bradley et al., editor. *Neurology in Clinical Practice.* 5th ed. Philadelphia (PA): Butterworth-Heinemann; 2012. P. 1166 (vol.2)

7. Halpin, S. 1". S., Rmton, |. A., Byrne, J, V., et al. 1994,"Prospective evaluation of cerebral angiography and computedtomography in cerebral haematoma," J NeurolNeurosurgPsychiatry, vol. 57, pp. 1180-1186
8. Qureshi AI, Ezzeddine MA, Nasar A, et al. Prevalence of elevated blood pressure in 563,704 adult patients with stroke presenting to the ED in the United States. Am J Emerg Med. 2007;25:32–8
9. A.K.Thaker, K.Radhakrishnan et al, Clinical and computed tomographic analysis of ICH. JAPI vol.39, April 1991,317-319.
10. Kase. C.S, Williams J.P, Wyatt D.A, Lobar ICH – Clinical and CT analysis of 22 cases. Neurology (NY)1982;32;1146-50.
11. MansoorehTogha and KhadigehBakhtavar. Factors associated with in-hospital mortality following intracerebralhemorrhage: a three-year study in Tehran, Iran. BMC Neurol. 2004; 4: 9.