Clinico-Epidemiological Profile of Intracerebral Hemorrhage

Tejas N Modi1, Santosh S A2, Falgun K Dhoreeyane3, Pankaj S Patil3

ABSTRACT

Introduction: Clinico-epidemiological spectrum plays key role in provisional diagnosis and prognosis of Intracerebral Hemorrhage (ICH). The objectives of this study were to evaluate clinico-epidemiological profile and to identify and analyze clinical determinants of In-hospital mortality.

Material and Methods: All patients (n=211), aged more than 12 years, diagnosed with ICH (based on CT scan/MRI) were studied for demographic profile, clinical profile, Glasgow Coma Scale (GCS) on admission and outcome.

Results: ICH was more common in >60 yr age group (52.13%). Mean Age (±SD) is 62.04 (±15.16). M: F ratio is 1.15:1. Its incidence increased during the winter season (53.55%) from the months of November to February and early morning hours (61.14%). Weakness (69.67%) and Loss of consciousness (LOC)/altered sensorium (59.72%) were the two most common presenting complaints on admission. In-Hospital mortality was 87(41.23%) with maximum mortality occurring within 72 hours.

Conclusion: In-hospital clinical mortality determinants of ICH on admission were: Loss of consciousness (LOC)/altered sensorium, headache, vomiting, addiction, tobacco, smoking, hyperglycemia, MAP >120, and GCS ≤ 8.

Key words: Intracerebral hemorrhage (ICH), Loss of consciousness (LOC), Glasgow Coma Scale (GCS), Mean arterial pressure (MAP).

INTRODUCTION

Intracerebral hemorrhage (ICH) is the 3rd most frequent cause of stroke, following cerebral embolism and thrombotic disease.1 Intracerebral hemorrhage is defined as acute spontaneous bleeding into the brain parenchyma.2 ICH accounts for approximately 10% of all strokes3,4 and about 35-45% of patients die within the 1st month.5 Primary ICH results from microscopic small-artery degeneration in the brain, caused by either chronic, poorly controlled hypertension(80% of cases) or amyloid angiopathy(20% of cases).6 Secondary ICH refers to intraparenchymal bleeding from a diagnosable anatomic vascular lesion or coagulopathy.7 The classic presentation in ICH is the progressive onset of focal neurological deficits over minutes to hours with accompanying headache, nausea, vomiting, decreased level of consciousness and elevated blood pressure.8,9 Factors that consistently predict death or functional disability at 30 days include a large volume of ICH, depressed level of consciousness, intraventricular hemorrhage, infratentorial location and older age.2 Global assessment with systematic review of clinico-epidemiological profile is must to have an insight for identification of modifiable/non-modifiable risk factor, its effect on functional outcome with ultimate aim to reduce mortality. The present research is conducted to study the clinico-epidemiological profile and to analyze the value of clinical parameters in accurately predicting the outcome of patients presenting with Intracerebral hemorrhage.

MATERIAL AND METHOD

The study was conducted on 211 patients admitted in PDUMC and Civil hospital, Rajkot, Gujarat, India from January 2014 to December 2016. The pa-
patients were selected as per protocol based on inclusion and exclusion criteria:

Inclusion Criteria: All patients above 12 years of age, presenting within 48 hours of symptom onset, with radiologically diagnosed (CT scan/MRI) Intracerebral hemorrhage irrespective of clinical presentation were included in the study.

Exclusion Criteria: 1. Patients age less than 12 years. 2. Patients presenting after 48 hours of symptom onset. 3. Patients with ICH due to other causes like head trauma, known bleeding tendency or coagulation disorder. 4. Patient with associated epidural hematoma and/or subdural hematoma were excluded from the study.

This was a retrospective analysis of charts of patients, selected from hospital records based on inclusion and exclusion criteria, admitted to tertiary care hospital, from January 2014 to December 2016. Data of the selected patients was collected from the medical records. Complete history, clinical findings and investigations as noted in the medical record were analyzed. Survival and Death were assessed as Good and Poor outcome respectively. P value <0.05 was taken as a point of minimal statistical significance.

RESULT

During the period of 1st Jan 2014 to 31st Dec 2016, 211 patients were included in the study.

Demographic profile (reference Table - 1)

Out of 211 patients of Intracerebral hemorrhage, 113 (53.55%) were males and 98 (46.45%) were females (refer TABLE - 1). Males (53.55%) were affected more than females (46.45%) in the present study with M: F ratio of 1.15:1. Patients of >60 years age group were affected the most (110, 52.13%) followed by 45 to 60 years age group (69, 32.70%), 30 to 45 years age group (25, 11.85%), ≤30 years age group (7, 3.32%). Mean age (±SD) is 62.04(±15.16).

In the present study of 211 cases of Intracerebral Hemorrhage, 113 (53.55%) were seen during winter season (November to February) and 129 (61.14%) were seen during early morning hours (4 AM to 8 AM).

Clinical Profile (reference Table 2)

In the present study, symptoms observed in descending order of frequency were: weakness (paralysis/paresis) 147 (69.67%), Loss of consciousness/ altered sensorium 126 (59.72%), Speech disturbance 81 (38.39%), Headache 46 (21.80%), Vomiting 42 (19.91%), Convulsion 33 (15.64%), h/o fall 29 (13.74%) and Giddiness 25 (11.85%). Mortality was observed maximum in 79.31% of patients presenting with LOC/ altered sensorium, followed by 66.67%, 32.18%, 27.59%, 17.24%, 14.94%, 9.20% of patients presenting with weakness (paralysis/paresis), speech disturbance, headache, vomiting, convulsion, h/o fall, and giddiness respectively.

Out of 211 patients, h/o HT was observed in 33.65% (71), h/o CVA in 18.48% (39), h/o DM in 9% (19), h/o IHD in 5.69% (12), h/o multiple (>1) risk factors (DM, HT, IHD, CVA) in 22.75% (48). 46 cases were post-menopausal (46.94%). Out of 87 (41.23%) cases with positive history of addiction, 47 (54.02%) were of tobacco chewing, 30 (34.48%) of smoking and 10 (11.49%) of alcohol.

Table -1: Demographic profile of Intracerebral Hemorrhage(ICH)

<table>
<thead>
<tr>
<th>Age Group (Years)</th>
<th>Total (%)</th>
<th>Total Exp* (%)</th>
<th>Male (%)</th>
<th>Male Exp (%)</th>
<th>Female (%)</th>
<th>Female Exp (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤30</td>
<td>7 (3.32)</td>
<td>4 (4.59)</td>
<td>5 (4.42)</td>
<td>3 (5.88)</td>
<td>2 (2.04)</td>
<td>1 (2.78)</td>
</tr>
<tr>
<td>30-45</td>
<td>25 (11.85)</td>
<td>11 (12.64)</td>
<td>14 (12.39)</td>
<td>7 (13.73)</td>
<td>11 (11.22)</td>
<td>4 (11.11)</td>
</tr>
<tr>
<td>45-60</td>
<td>69 (32.70)</td>
<td>25 (28.74)</td>
<td>42 (37.17)</td>
<td>16 (31.37)</td>
<td>27 (27.55)</td>
<td>9 (25.00)</td>
</tr>
<tr>
<td>&gt;60</td>
<td>110 (52.13)</td>
<td>47 (54.02)</td>
<td>52 (46.02)</td>
<td>25 (49.02)</td>
<td>58 (59.18)</td>
<td>22 (61.11)</td>
</tr>
<tr>
<td>Total</td>
<td>211</td>
<td>87 (41.23)</td>
<td>113 (53.55)</td>
<td>51 (58.62)</td>
<td>98 (46.45)</td>
<td>36 (41.38)</td>
</tr>
</tbody>
</table>

*EXP = Expired

Table – 2: Spectrum of clinical presentation on admission of Intracerebral Hemorrhage

<table>
<thead>
<tr>
<th>Clinical presentation</th>
<th>Total patients (%)</th>
<th>Good outcome (n=124)(%)</th>
<th>Poor outcome (n=87)(%)</th>
<th>p value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakness</td>
<td>147 (69.67)</td>
<td>89 (71.77)</td>
<td>58 (66.67)</td>
<td>0.4269</td>
</tr>
<tr>
<td>LOC*/Altered sensorium</td>
<td>126 (59.72)</td>
<td>57 (45.97)</td>
<td>69 (79.31)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Speech disturbance</td>
<td>81 (38.39)</td>
<td>53 (42.74)</td>
<td>28 (32.18)</td>
<td>0.1206</td>
</tr>
<tr>
<td>Headache</td>
<td>46 (21.80)</td>
<td>19 (15.32)</td>
<td>27 (31.03)</td>
<td>0.0065</td>
</tr>
<tr>
<td>Vomiting</td>
<td>42 (19.91)</td>
<td>18 (14.52)</td>
<td>24 (27.59)</td>
<td>0.0192</td>
</tr>
<tr>
<td>Convulsion</td>
<td>33 (15.64)</td>
<td>18 (14.52)</td>
<td>15 (17.24)</td>
<td>0.5916</td>
</tr>
<tr>
<td>h/o fall</td>
<td>29 (13.74)</td>
<td>16 (12.90)</td>
<td>13 (14.94)</td>
<td>0.6722</td>
</tr>
<tr>
<td>Giddiness</td>
<td>25 (11.85)</td>
<td>17 (15.71)</td>
<td>8 (9.20)</td>
<td>0.3178</td>
</tr>
</tbody>
</table>

*LOC=Loss of consciousness,**p value less than 0.05 was taken as level of minimum significance
Table – 3: Glasgow Coma Scale (GCS) on admission and its effect on outcome (N=211)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Patients (n=211)(%)</th>
<th>Mortality (n=87) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td>48(22.75)</td>
<td>48(100)</td>
</tr>
<tr>
<td>5-8</td>
<td>69(32.70)</td>
<td>35(50.72)</td>
</tr>
<tr>
<td>9-13</td>
<td>31(14.69)</td>
<td>3(9.68)</td>
</tr>
<tr>
<td>14-15</td>
<td>63(29.86)</td>
<td>1(1.59)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>211(100)</strong></td>
<td><strong>87(41.23)</strong></td>
</tr>
</tbody>
</table>

Group*

- Group A (GCS ≤ 8) 117 (55.45) 83 (70.94)
- Group B (GCS > 8) 94 (44.55) 4 (4.26)

Total 211(100) 87(41.23)

*GCS ≤ 8 and >8 were labeled as group A and B for statistical analysis. Chi-square value 92.923, p value <0.0001, degree of freedom (Df) =1 suggestive of significant statistical difference between group A and B indicates strong association of GCS on admission and patient outcome.

Blood Pressure on admission was recorded by mercury manometer.179 cases (84.83%) had documented BP ≥ 140/90 mm of Hg, of which mortality occurred in 74 cases (85.06%) and 32 cases (15.17%) had<140/90 mm Hg of which mortality was recorded in 13 cases (14.94%). MAP or mean arterial pressure, is defined as the average pressure in a patient’s arteries during one cardiac cycle.95 cases (45.02%) were recorded having MAP ≤ 120 and 116 cases (54.98%) having >120 with mortality of 35.63% and 64.37% respectively.

Random Blood Sugar on admission was ≤ 140 in 123 cases (58.29%) and >140 in 88 cases (41.71%) with mortality of 45.98 % and 54.02 % respectively.

Glasgow Coma Scale (GCS) on admission was recorded as 3-4, 5-8, 9-13 and 14-15 group with frequency of 22.75%, 32.70%, 14.69%, 29.86% patients in each group and corresponding mortality of 100%, 50.72%, 9.68%,1.59 %.(Table - 3).

In the present study mortality occurred in 87 cases (41.23%) during the hospital stay with maximum deaths occurring in first 3 days. 14 (16.09%), 26(29.89%), 12(13.79%) deaths occurred on day 1, 2 and 3 respectively.

In-hospital Mortality Determinants (Table- 2, 4): Univariate logistic regression of in-hospital mortality after ICH was performed for many variables including demographic (age and gender), alcohol, smoking and tobacco abuse, menopause, GCS on admission and outcome. Age>60 (p = 0.6453), male gender (p = 0.2171), convulsion (p = 0.5916), alcohol (p = 0.0736), menopause (p = 0.0871) is statistically not significant as mortality predictors in present study.

Statistically significant In-hospital mortality determinants of ICH on admission were: clinical presentation - Loss of consciousness (LOC)/altered sensorium (p < 0.0001), headache(p = 0.0065), vomiting(p = 0.0192), addiction(p < 0.0001),tobacco (p = 0.0277), smoking (p = 0.0272), hyperglycemia (RBS >140) (p = 0.0026), MAP >120 (p = 0.0223), low GCS (GCS ≤ 8)(p < 0.0001). (Table 2, 4).

Table – 4: Univariate Analysis of In-Hospital Mortality Determinants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Good Outcome (n=124) (%)</th>
<th>Poor Outcome (n=87) (%)</th>
<th>Odd’s Ratio</th>
<th>95% CI*</th>
<th>Significance (P)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age&gt;60</td>
<td>63 (50.81)</td>
<td>47 (54.02)</td>
<td>1.14</td>
<td>0.66 - 1.97</td>
<td>0.6453</td>
</tr>
<tr>
<td>Gender : Male</td>
<td>62 (50)</td>
<td>51 (58.62)</td>
<td>1.42</td>
<td>0.81 - 2.46</td>
<td>0.2171</td>
</tr>
<tr>
<td>Tobacco</td>
<td>21 (16.94)</td>
<td>26 (29.89)</td>
<td>2.09</td>
<td>1.08 - 4.03</td>
<td>0.0277</td>
</tr>
<tr>
<td>Smoking</td>
<td>12 (9.68)</td>
<td>18 (20.69)</td>
<td>2.43</td>
<td>1.11 - 5.36</td>
<td>0.0272</td>
</tr>
<tr>
<td>Alcohol</td>
<td>3 (2.42)</td>
<td>7 (8.04)</td>
<td>3.53</td>
<td>0.89 - 14.05</td>
<td>0.0736</td>
</tr>
<tr>
<td>Addiction</td>
<td>36 (29.03)</td>
<td>51 (58.62)</td>
<td>3.46</td>
<td>1.95 - 6.16</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Menopause***</td>
<td>25 (20.32)</td>
<td>21 (21.38)</td>
<td>2.07</td>
<td>0.9 - 4.77</td>
<td>0.0871</td>
</tr>
<tr>
<td>MAP&gt;120</td>
<td>60 (48.39)</td>
<td>56 (64.37)</td>
<td>1.93</td>
<td>1.1 - 3.38</td>
<td>0.0223</td>
</tr>
<tr>
<td>Hyperglycemia</td>
<td>41 (33.06)</td>
<td>47 (54.02)</td>
<td>2.38</td>
<td>1.35 - 4.18</td>
<td>0.0026</td>
</tr>
<tr>
<td>GCS ≤ 8</td>
<td>34 (27.42)</td>
<td>83 (95.40)</td>
<td>54.93</td>
<td>18.69-161.44</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*CI = confidence interval**p value less than 0.05 was taken as level of minimum significance.***Good outcome(n=62), poor outcome(n=36) in Menopause.

DISCUSSION

During the period of 1st January 2014 to 31st December 2016, 211 patients admitted to PDUMC and civil hospital, Rajkot were included in this study.

A steep rise in incidence of ICH with increasing age is noted in present study, (Table - 1) consistent with other studies.3,7 Death increased with age and is in agreement with the study of Daverat et al.8.
ICH.27, 28, 29 MAP >120 was reported in 54.98% (116 cases) of controlled hypertension in common etiology of stroke. Verbal communication, age and cigarette smoking. 7

The effect of menopause is difficult to disentangle from other factors, such as age and smoking. 20, 21

Headache in the early afternoon as reported by Sloan et al 17

Pressure in ICH cases with peak in midmorning to early afternoon was reported by Sloan et al 17

53.41% which constitute 54.02% (47 cases) of total mortality. Positive history of diabetes mellitus was reported in 9% (19 cases). Admission hyperglycemia appeared to be a stress response to the severity of the bleeding; whereas diabetes predicted early death. 29

High admission blood glucose is the result of a serious ICH. 31

Admission hyperglycemia is a potent predictor of 28-day mortality in both diabetic and non-diabetic patients with ICH. 31

GCS score on admission had an impact on mortality rate confirmed by JP Broderick et al. 32 Glasgow Coma Scale (GCS) on admission was recorded in >8, ≤8 group with frequency of 44.55%, 55.45% patients in each group and corresponding mortality of 4.26% (4 cases), 70.94% (83 cases) which constitutes 4.59%, 95.40% of total mortality indicating Higher GCS predicts better outcome. 22

Mortality was observed in 87 (41.23%) patients of ICH. Maximum (59.77% of total mortality) within 72 hour because of hematoma expansion and perihematoma oedema which is in accordance to Broderick et al 32, Brott et al 33 and Fogelholm et al 34.

LIMITATION

Limited resources, small-sized study population, retrospective, single centre hospital-based study does not aim to provide true prevalence or burden of ICH in the community. Prospective, multicentric, larger, well-designed studies with longer period of follow up will be necessary to draw more robust conclusions on various etiologies of ICH and their correlation to the clinical parameters and outcome in our population.

CONCLUSION

Burden of ICH is of greater magnitude in elderly population with summative effects of addictions, seasonal influence (winter season) and diurnal variation (early morning hours).

In-hospital clinical mortality determinants of ICH on admission were: clinical presentation (Loss of consciousness (LOC)/altered sensorium, headache, vomiting), addictions (tobacco, smoking), hyperglycemia (RBS >140), Mean Arterial Pressure (MAP >120), low GCS (GCS ≤8).

Role of addictions (tobacco, smoking, alcohol) and menopause as risk factors and predictors of outcome in ICH needs to be evaluated further.

REFERENCE


