Clinico-Epidemiological Profile of Intracerebral Hemorrhage

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ABSTRACT

Introduction: Clinico-epidemiological spectrum plays key role in provisional diagnosis and prognosis of Intracerebral Hemorrhage (ICH). The objectives of this study were to evaluateclinico-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 strokes[3,4] and about 35-45% of patients die within the 1st month.[3] 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).[2] secondary ICH refers to intraparenchymal bleeding from a diagnosable anatomic vascular lesion or coagulopathy.[2] 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.[5,6] 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 clinicalparametersin 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-

tients 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 af-

fected 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%, 31.03%, 27.59%, 17.24%, 14.94%, 9.20% of patients presenting with weakness (paralysis/paresis), speech disturbance, headache, vomiting, convulsion, h/o fall, and giddinessrespectively.

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)

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

*EXP = Expired

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

Clinical presentation	Total patients (%)	Good outcome (n=124)(%)	Poor outcome (n=87) (%)	p value**
Weakness	147 (69.67)	89 (71.77)	58 (66.67)	0.4269
LOC*/Altered sensorium	126 (59.72)	57 (45.97)	69 (79.31)	**<0.0001**
Speech disturbance	81 (38.39)	53 (42.74)	28 (32.18)	0.1206
Headache	46 (21.80)	19 (15.32)	27 (31.03)	**0.0065**
Vomiting	42 (19.91)	18 (14.52)	24 (27.59)	**0.0192**
Convulsion	33 (15.64)	18 (14.52)	15 (17.24)	0.5916
h/o fall	29 (13.74)	16 (12.90)	13 (14.94)	0.6722
Giddiness	25 (11.85)	17 (13.71)	8 (9.20)	0.3178

*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)

Variables	Patients (n=211)(%)	Mortality (n=87) (%)
GCS		
3-4	48(22.75)	48(100)
5-8	69(32.70)	35(50.72)
9-13	31(14.69)	3(9.68)
14-15	63(29.86)	1(1.59)
Total	211(100)	87(41.23)
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

Variables	Good Outcome (n=124) (%)	Poor Outcome (n=87) (%)	Odd's Ratio	95% CI*	Significance (P)**
Age>60	63 (50.81)	47 (54.02)	1.14	0.66 - 1.97	0.6453
Gender : Male	62 (50)	51 (58.62)	1.42	0.81 - 2.46	0.2171
Tobacco	21 (16.94)	26 (29.89)	2.09	1.08 - 4.03	**0.0277**
Smoking	12 (9.68)	18 (20.69)	2.43	1.11 - 5.36	**0.0272**
Alcohol	3 (2.42)	7 (8.04)	3.53	0.89 - 14.05	0.0736
Addiction	36 (29.03)	51 (58.62)	3.46	1.95 - 6.16	**<0.0001**
Menopause***	25 (40.32)	21 (58.33)	2.07	0.9 - 4.77	0.0871
MAP>120	60 (48.39)	56 (64.37)	1.93	1.1 - 3.38	**0.0223**
Hyperglycemia	41 (33.06)	47 (54.02)	2.38	1.35 - 4.18	**0.0026**
GCS≤ 8	34 (27.42)	83 (95.40)	54.93	18.69-161.44	**<0.0001**

*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].

The high percentage of female patients (59.18%) among the oldest old (>60) was consistent with other studies.[9,10] M:F ratio of 1.15:1 and Mean Age of 62.04±15.16 was in accordance with other studies.[11,12,13,14] 53.55% cases were seen during winter season (November to February) suggesting a seasonal variation with characteristic winter peak in incidence of Intracerebral Hemorrhage. Both stroke mortality (46, 52.87%) and hospital admission rates

(113, 53.55%) were higher in winter (Nov to Feb) than summer in similarity to Douglas et al1991[15], Feigin Weibers et al 1997[16]. 61.14% of cases were seen during early morning hours (4 AM to 8 AM) suggesting a diurnal variation in occurrence of ICH probably related to diurnal variation in Blood Pressure in ICH cases with peak in midmorning to early afternoon as reported by Sloan et al[17]

Weakness(paresis/paralysis) (69.67%),loss of consciousness/altered sensorium (59.72%) were the two most frequent symptoms on admission in present study, which is in similarity to other studies.[18,19,12] Reduced alertness in intracerebral hemorrhage is either due to a generalized increase in intracranial pressure, or to compromise both hemispheres or the reticular activating system bilaterally in brainstem tegmentum.[20,21]Headache in 21.80% and vomiting in 19.91% at onset indicates that absence of headache or vomiting does not rule out intracerebral hemorrhage but presence of these symptoms is suggestive of intracerebral hemorrhage as the most likely diagnosis.

Current smoking and increased frequency of smoking also raises the risk of Intracerebral hemorrhage.[22] Addiction (tobacco, smoking, alcohol) was reported in 87(47,30,10)cases with corresponding mortality of 51 (26,18,7) cases respectively. In present study, addiction (tobacco, smoking) were mortality determinant in ICH statistically. (Table-4)

Menopause was reported in 46 cases with corresponding mortality of 21 cases. Stroke severity is related to Oestrogen levels (Jeppesen et al 1996[24]). The effect of menopause is difficult to disentangle from confounding by age and cigarette smoking.[7] Role of Menopause in ICH needs further evaluation.

In present study, 84.83 %(179) cases presented with blood pressure >140/90 mmHg (Hypertension[23,25]). Positive history of Hypertensionwas reported in 33.65 %(71 cases). Virtually all patients with intracerebral hemorrhage are hypertensive immediately after the stroke because of generalized sympatho-adrenal response.[1]Blood pressure elevation has been associated with poor clinical outcome including death and dependency.[26] Uncontrolled Hypertension in common etiology of ICH.[27,28,29] MAP>120 was reported in 54.98%(116 cases) with corresponding mortality of 48.28% which constitute 64.37%(56 cases) of total mortality. A high MAP on admission was found to be an independent predictor of early death in patients with ICH, history of hypertension was not responsible for this effect.[30]

In present study, 41.71 %(88 cases) presented with hyperglycemia with corresponding mortality of 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.[30]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 etal[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.

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