

MANAGEMENT AND ASSESSMENT OF PROGNOSIS OF INFRATENTORIAL HAEMORRHAGE CASES OF STROKE IN A TERTIARY CARE HOSPITAL, CHENNAI

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ABSTRACT: BACKGROUND: It is estimated that every year, 15 million people suffer from stroke in the world out of which six million die and another five million are permanently disabled. There are limited studies on the infratentorial haemorrhage cases of stroke especially in India. In this context, this present study was conducted to find out management and prognosis assessment of infratentorial haemorrhage cases admitted in a tertiary care hospital in Chennai, India. **METHODS:** This is a prospective observational study conducted on the stroke cases admitted to the neurology department of Sri Ramachandra Medical College Hospital (SRMC), Chennai during August 2010 to February 2013. The prognosis of the patients was assessed through National Institutes of Health Stroke scale and Modified Rankin Prognostic Score. **RESULTS:** A total of 1, 809 cases of stroke were admitted during this period out of which 43 were infratentorial haemorrhage cases (2.4%). It was found that 88.3% undergone treatment for reduction of cerebral edema, 83.7% for prevention of seizures, 81.4% for reduction of systemic hypertension, 79.0% were given antibiotic therapy while 39.5% required ventilatory support. Majority of the patients were in the first category of Modified Rankin Prognosis score (37.2%) while as per National Institutes of Health Stroke Scale scoring, it was found that a majority of the patents were in moderate category of stroke (60.5%). The case fatality rate was found to be 25.6%. The case fatality rate was found to be insignificantly higher in cerebellar haemorrhage cases (23.8%) compared to pontine hemorrhage cases (19.1%). **CONCLUSIONS:** The proportion of infratentorial type of haemorrhage is comparatively less common type than supratentorial type and ischaemic type of cerebral stroke. The case fatality rate was found to be 25.6% which was similar to other studies. There is a need for further studies on infratentorial haemorrhage.

KEYWORDS: Infratentorial haemorrhage, Intracerebral haemorrhage, Case fatality rate, Modified Rankin Prognosis scale.

INTRODUCTION: It is estimated that every year, 15 million people suffer from stroke in the world out of which six million die and another five million are permanently disabled. Globally, stroke is the second leading cause of death after 60 years and fifth leading cause of death in people aged 15-60 years.⁽¹⁾ Several studies around the world revealed that the global burden of stroke is high especially in low and middle income countries.⁽²⁾

During 1990-2010, the age standardized incidence of stroke significantly decreased by 12% in high income countries while it increased by 12% in low and middle income countries. The mortality due to stroke however has decreased in all countries especially in high income countries.⁽³⁾

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The estimated adjusted prevalence rate of stroke in India ranges from 84-262 per 1 lakh population in rural areas and 334-424 per 1 lakh population in urban areas.⁽⁴⁾ Uncontrolled hypertension is considered as the most common etiological factor for both ischaemic and haemorrhagic strokes. Intracerebral haemorrhage (ICH) accounts for 10-15% of all strokes with increased mortality and morbidity compared to that of ischaemic strokes.⁽⁵⁾ It has been reported that primary ICH due to chronic hypertension or amyloid angiopathy accounted for 78-88% of all cases.⁽⁶⁾ Other risk factors for ICH include diabetes mellitus, smoking, cardiac disease, hyperlipidaemias, alcoholism, anticoagulant use, haematological disorders and aneurysms.^(7,8)

The intracerebral haemorrhage can be supratentorial (Which is more common of the two) than infratentorial. There are few studies on the infratentorial haemorrhage cases of stroke especially in India. In this context, this present study was conducted to find out the management and prognosis assessment of infratentorial cases admitted in a tertiary care hospital in Chennai, India.

MATERIALS AND METHODS: This is a prospective observational study conducted on the stroke cases admitted electively or in an emergency to the neurology department of Sri Ramachandra Medical College Hospital (SRMC), Chennai during August 2010 to February 2013. This hospital is one of the prestigious private tertiary care hospitals in India with facilities for medical as well as postgraduate and super specialist courses. It was found that a total of 1,809 cases of stroke were admitted during this period out of which 255 were cases of Intracerebral haemorrhage with a proportional prevalence of 14.1%. Out of a total of 255 cases of ICH, there were 43 cases of infratentorial haemorrhage cases with a proportion of 16.9%. Overall, the proportion of infratentorial haemorrhage stroke in the study was found to be 2.4% out of all stroke cases admitted in the hospital.

A pretested questionnaire was used for collecting the necessary information from the subjects after taking informed consent from them or their relatives (in the case of unconscious patients). The mean arterial pressure (MAP) was calculated based on the formula, $MAP = \text{Diastolic pressure} + \frac{1}{3} \text{Pulse pressure}$. The prognosis of the patients was determined using Modified Rankin Prognostic scale (MRP scale),⁽⁹⁾ which is calculated as given below:

Scale	Description
0	No symptom at all
1	No significant disability despite symptoms, able to carry out all usual duties and activities
2	Slight disability, unable to carry out all previous activities but able to look after own affairs
3	Moderate disability, requiring some help but able to walk without assistance
4	Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance
5	Severe disability, bedridden, incontinent and requiring constant nursing care and attention
6	Dead

Table 1: Modified Rankin Prognosis (Mrp) Scale

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The number of days of hospital stay was studied. The NIHSS (National Institutes of Health Stroke) scale,⁽¹⁰⁾ was also used for assessing prognosis. National Institutes of Health Stroke Scale (NIHSS) is a tool used by healthcare providers to objectively quantify the impairment caused by a stroke. The NIHSS is composed of 11 items, each of which scores a specific ability between a 0 and 4.

For each item, a score of 0 typically indicates normal function in that specific ability, while a higher score is indicative of some level of impairment. The individual scores from each item are summed in order to calculate a patient's total NIHSS score. The maximum possible score is 42, with the minimum score being zero. The following is the range of score and assessment of severity.

Score	Severity of stroke
0	No Stroke Symptoms
0-4	Minor Stroke
5-15	Moderate Stroke
16-20	Moderate to Severe Stroke
21-42	Severe Stroke
NIHSS (National Institutes of Health Stroke) Scale	

The data analysis was done using Epi-info software 7.0 version (Centres for Disease Control (CDC), Atlanta, USA). The descriptive data were analyzed using usual methods like proportion or percentages while the significance of differences between proportions was determined using Pearson's Chi-square test and a probability value of less than 0.05 was considered as statistically significant.

RESULTS: It was found that 88.3% underwent treatment for reduction of cerebral edema, 83.7% for prevention of seizures, 81.4% for reduction of systemic hypertension, 79.0% were given antibiotic therapy while 39.5% required ventilatory support (Table 1). Majority of the patients were in the first category of Modified Rankin Prognosis score (37.2%) while 23.4% were in the second category. The case fatality rate (sixth category) was found to be 25.6% (Table 2). As per the NIHSS scoring, it was found that a majority of the patents were in moderate category of stroke (60.5%) followed by mild stroke (23.3%) (Table 3). The mortality was found to be higher in those with mean arterial pressure of less than 100 mm Hg (33.3%) and more than 140 mm Hg (25.0%).

However, the differences in the prognosis levels by mean arterial pressure ranges were however not found to be statistically significant ($P=0.35$; NS) (Table 4). The prognosis was found to be lower in those cases with cerebellar location of haemorrhage than pontine location. The case fatality rate was found to be higher in cerebellar haemorrhage cases (23.8%) compared to pontine haemorrhage cases (19.1%). However the differences in the prognosis levels by location of the haemorrhage were not found to be statistically significant ($P=0.19$; NS) (Table 5).

DISCUSSION: In the present study, it was found that out of 255 cases of intracerebral haemorrhage, 83.1% were supratentorial location while only 16.9% were infratentorial in location. A similar low

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proportion of 9.8% of infratentorial haemorrhage was reported in AIIMS (All India Institute of Medical Sciences), New Delhi.⁽¹¹⁾ While the case fatality rate of infratentorial haemorrhage cases in the present study was found to be 25.6%, New Delhi study, ⁽¹¹⁾ reported an overall mortality rate of 32.7% which was found to be associated with low Glasgow coma scale, higher haemotoma volume and need for ventilatory assistance. The 30-day case fatality rate of hospital patients in Athens, ⁽¹²⁾ was estimated to be 31.9%. This study has found a 5.5 fold increase in the odds ratio of mortality in cases of infratentorial cases of haemorrhage.

This study has also found that Glasgow coma scale on admission, infratentorial location of haemorrhage, intraventricular extension of haemorrhage and size of the haematoma were independently associated with high case fatality rate. In a hospital based study in Argentina,⁽¹³⁾ the 30-day mortality was found to be 34.6% while 38.6% had good functional outcome. Thus spontaneous intracerebral haemorrhage has high case fatality rate despite modifications in the treatment practices. Blood pressure reduction, osmotherapy, ultra haemolytic therapy were not found to be proven methods of benefit to patients.^(14,15) Several models for predicting prognosis of intracerebral haemorrhage have been proposed like ICH score, MRS score GCS (Glasgow Coma) scale and NIHSS scoring. Other predictors of high mortality were elaborated as intraventricular haemorrhage, neuroimaging findings, clinical & laboratory parameters, infratentorial location of haemorrhage and hydrocephalus.

As per the NIHSS score, majority of the patients in the present study were in moderate category of stroke (60.5%) followed by mild stroke (23.3%) while as per the Modified Rankin Prognosis score, majority of them were in first category (37.2%) and second category (23.4%). The New Delhi study,⁽¹¹⁾ found that majority of the patients were in category 5(32.2%) followed by category 4 (31.8%).

In the management of intracerebral haemorrhage, ventilatory support is the first priority especially for those with decreasing level of consciousness. Intubation is reserved for certain cases with hypoxia. Blood pressure reduction is more aggressive than in cases of ischemic type of stroke.⁽¹⁶⁾ The aggressive treatment however may decrease the cerebral perfusion pressure and may worsen brain injury. Hence special writing group of stroke council, American stroke association,⁽¹⁷⁾ recommends that blood pressure reduction should be aimed in such a way that the mean arterial pressure is less than 130 mm Hg. Another treatment protocol is aimed to keep the intracranial pressure below 20 mm Hg through osmotherapy and controlled hyperventilation. Those patients with deteriorating level of consciousness require continuous monitoring of intracranial pressure.⁽¹⁸⁾

At the same time, electrolyte imbalance and fluid balance should be maintained in order to correct any acidosis or alkalosis. Seizures can result in worsening of the brain injury. Hence they should be treated by usual anticonvulsive therapy. Additionally, prophylactic anticonvulsive therapy with phenytoin for 1 month should be considered. Hyperactivity in agitated cases can be treated by judicious use of short acting benzodiazepines. In addition, other drugs like analgesics and neuroleptics can be administered based on clinical status of individual patients.

In the present study, the guidelines of American stroke association were followed with 88.3% undergoing treatment for reduction of cerebral edema, 83.7% for prevention of seizures, 81.4% for reduction of systemic hypertension while 39.5% being given ventilatory support.

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CONCLUSION: The proportion of infratentorial type of haemorrhage is comparatively less common type than supratentorial type and ischaemic type of cerebral stroke. The case fatality rate was found to be 25.6% which was similar to other studies. There is a need for further studies on infratentorial haemorrhage.

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Sl. No.	Type of management	No. of Patients (%)
1.	Anti-cerebral edema measures	38 (88.3)
2.	Antiepileptic measures	36 (83.7)
3.	Antihypertensive measures	35 (81.4)
4.	Antibiotic therapy	34 (79.0)
5.	Ventilatory support	17 (39.5)

Table 1: Type of management of Infratentorial hemorrhage cases (N=43)

Prognosis score	No. of Patients (%)
0	0 (0.0)
1	16 (37.2)
2	10 (23.4)
3	2 (4.7)
4	2 (4.7)
5	0 (0.0)
6 (Dead)	11(25.6)
Unknown	2 (4.7)

Table 2: Overall prognosis of cases based on Modified Rankin Prognostic Score (N=43)

Sl. No.	NIHSS category	No. of Patients (%)
1.	Mild stroke	10 (23.3)
2.	Moderate stroke	26 (60.5)
3.	Severe stroke	7 (16.3)
	Total	43 (100.0)

Table 3: NIHSS (National Institutions of Health Stroke) Scale categorization of cases (%)

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Modified Rankin Prognosis Score	No. of Cases (%) in Mean Arterial Pressure Range		
	Less than 100	101 - 140	141 & above
1	5 (27.8)	9 (42.9)	2 (50.0)
2	6 (33.3)	4 (19.0)	--
3	--	1 (4.8)	1 (25.0)
4	--	2 (9.5)	--
5	--	--	--
6	6 (33.3)	4 (19.0)	1 (25.0)
Unknown	1 (5.6)	1 (4.8)	--
Total	18 (100.0)	21 (100.0)	4 (100.0)

Table 4: Mean arterial pressure range by Modified Rankin Prognosis Score (N=43)

* $\chi^2=2.10$; P=0.35; NS

* Adjacent rows and columns were combined to make up a minimum value of 5 for calculation of Chi-square test.

Modified Rankin Prognosis Score	Radiological classification of Cases (%)	
	Pontine	Cerebellar
1	11 (52.4)	5 (23.8)
2	1 (4.8)	9 (42.9)
3	2 (9.5)	--
4	3 (13.6)	1 (4.8)
5	--	--
6	4 (19.1)	5 (23.8)
Unknown	1 (9.5)	1 (4.8)
Total	22 (100.0)	21 (100.0)

Table 5: Radiological classification of cases by Modified Rankin Prognostic Score (N=43)

* $\chi^2=3.32$; P=0.19; NS

* Adjacent rows and columns were combined to make up a minimum value of 5 for calculation of Chi-square test.

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