

Outcome of Primary Intracerebral Hemorrhage: A Study in Tertiary Care Center

Jagat Narayan Rajbanshi¹, Pankaj Raj Nepal¹

¹Department of Neurosurgery, B and C Medical College Teaching Hospital and Research Center, Birtamode, Jhapa.

Correspondence:

Dr. Jagat Narayan Rajbanshi,
Department of Neurosurgery,
B and C Medical College Teaching Hospital and Research Center, Birtamode, Jhapa, Nepal
Phone number: +9779818101187
Email: sergiorajbanshi@gmail.com

Background: Intracerebral hemorrhage (ICH) is an irreversible phenomenon inside the brain parenchyma resulting in mild to severe neurological deficit. Based on etiology it is broadly divided into primary and secondary. Primary ICH is usually due to the rupture of Charcot-Bouchard aneurysm and chronic hypertension. Charcot – Bouchard aneurysms are supposed to get formed due to lipohyalinosis. With the aim to evaluate the outcome of primary ICH admitted to our institute this study is performed. **Materials and methods:** This is a prospective analytical study, where all the consecutive patients of the primary ICH were collected. Quantitative variables like age, the volume of hematoma, midline shift, GCS, and systolic blood pressure (SBP) were presented as mean and standard deviation (S.D). Whereas, qualitative variables like gender, site, and side of hematoma, type of treatment, best motor response were presented in frequency and percentage. The outcome of the patient was measured using the Glasgow outcome scale (GOS) and the association between qualitative/quantitative variables and GOS was done using the chi-square test or Fischer exact test whenever applicable in SPSS20. **Results:** There were a total of 31 patients with a mean age of 59.81(S. D 15.8) year and male predominance (74%). The mean volume of hematoma was 40 ml. Similarly, midline shift ranged from zero to 14 mm. The majority of primary ICH were located in basal ganglia (35%) and on the right side (52%). The mean GCS at presentation was 12.1 (S.D 2.166). Mean Systolic blood pressure was 163.77 mmHg (S.D 34.6 mmHg) with maximum SBP up to 240mmHg. There was a 14% mortality in this study group with favorable outcome (GOS 4 and 5) in 82%. GOS was significantly associated with the volume of hematoma and midline shift. **Conclusion:** The outcome of primary ICH is strongly associated with the volume of hematoma and midline shift. They were generally associated with hypertension with a mean systolic blood pressure of >160 mm Hg.

Key words: Glasgow outcome scale, Intracerebral hemorrhage, Midline shift, Outcome.

Intracerebral hemorrhage (ICH) is an irreversible phenomenon inside the brain parenchyma resulting in mild to severe neurological deficit.¹ Based on etiology it is broadly divided into primary and secondary.^{2,3} Primary ICH is usually due to the rupture of Charcot-Bouchard aneurysm and chronic hypertension. Charcot – Bouchard aneurysms are supposed to get formed due to lipohyalinosis.^{4,5} Secondary ICH are due to trauma, tumors, AVM, AVF, aneurysms, coagulopathy, amyloid angiopathy, drug-induced, and so on.³ Controversy still exists in the management of primary ICH. Its

management range from conservative to various surgical treatment.⁶⁻¹¹ Treatment is also based on the patient's GCS, age, amount of hematoma, site, and side of the hematoma.^{6,8,9} With the aim to evaluate the outcome of primary ICH admitted to our institute this study is performed.

Methods and Materials:

Type of study: Prospective analytical study

Sampling technique: Non-probability consecutive sampling

Sample size: 31 patients

Duration: 4 months

Site of study: B&C Medical College Teaching Hospital and Research Centre, Birtamode, Jhapa, Nepal.

Data collection and analysis: All the consecutive patients of the primary ICH were collected during the study period and data collection was done in preformed Performa. Quantitative variables like age, the volume of hematoma, midline shift, GCS, and systolic blood pressure (SBP) were presented as mean and standard deviation (S.D). Whereas, qualitative variables like gender, site, and side of hematoma, type of treatment, best motor response were presented in frequency and percentage. The outcome of the patient was measured using the Glasgow outcome scale (GOS) and an association between qualitative/quantitative variables and GOS was done using a chi-square test or Fischer exact test whenever applicable in SPSS 20.

Results:

There were a total of 31 patients among which three patients left treatment against medical advice, the mean age of the total patients was 59.81(S. D 15.8) years (Table 1).

Table 1: Mean and standard deviation of quantitative variables.

	N	Minimu m	Maximu m	Mea n	Std. Deviation
Age	31	26	84	59.81	15.800
Volume	26	5	90	38.60	23.250
Midline shift	31	0	14	4.13	4.248
SBP	31	110	240	163.71	34.640
Presenting GCS	31	7	15	12.10	2.166

There were 74% male and 26% female (Figure 1).

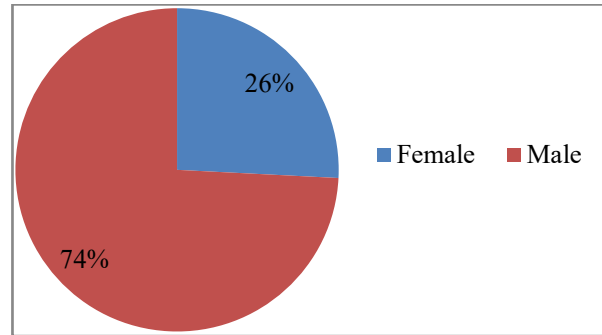


Figure 1: Distribution of gender

The volume of the hematoma in this study ranged from five to 90 ml with a mean volume of 40 ml. The majority of the amount of volume was below 50 ml (Figure 2).

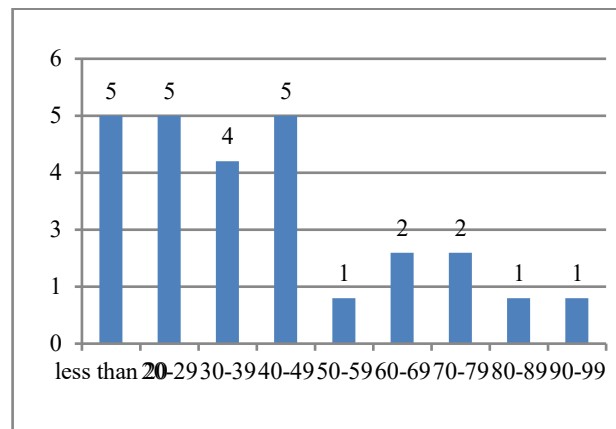


Figure 2: Frequencies of patients with different groups of the volume of blood.

Similarly, midline shift ranged from zero to 14 mm (Table 1). The majority of primary ICH were located in basal ganglia (35%) followed by lobar (29%) (Figure 3) and most of them on the right side (52%) (Figure 4).

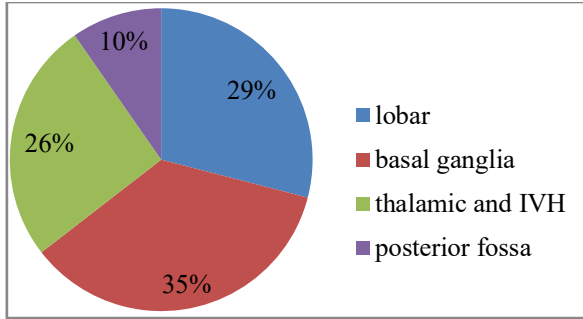


Figure 3: Distribution of ICH in different locations

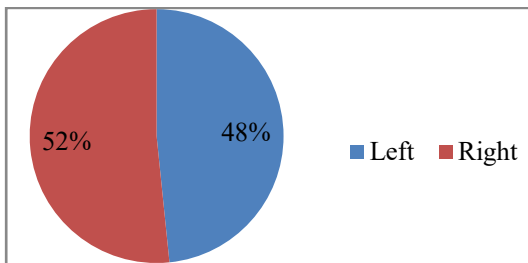


Figure 4: Distribution of ICH on different sides.

The mean GCS at presentation was 12.1 (S.D 2.166). Out of a total of 31 patients three patients left treatment against medical advice, nine patients underwent surgical evacuation of hematoma and 2 patients underwent external ventricular drainage for intraventricular bleed with hydrocephalus; however, rest of them were managed conservatively.

The majority of the patients had the best motor response of 5 and 6 with GCS maintaining 11 and above at the time of presentation (Figure 5 and Figure 6).

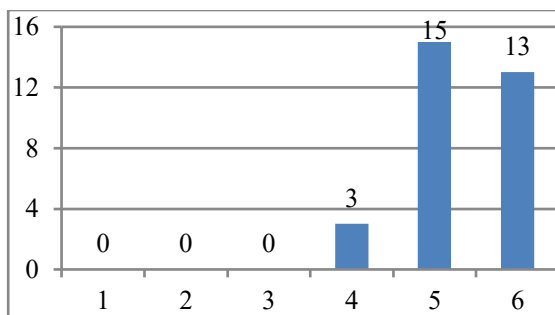


Figure 5: Frequencies of best motor response at the time of presentation.

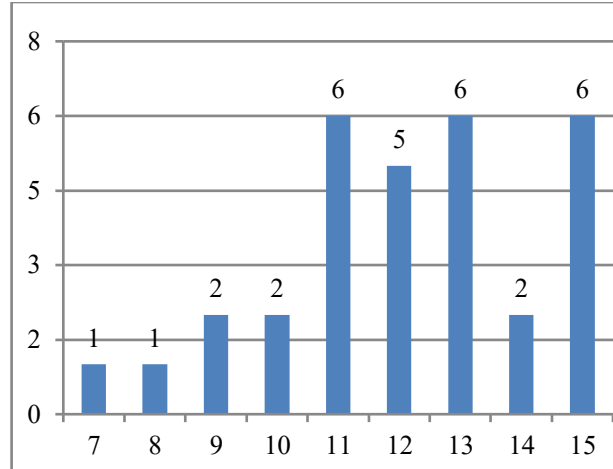


Figure 6: Frequencies of total GCS at the time of presentation.

Mean Systolic blood pressure was 163.77 mmHg (S.D 34.6 mmHg) with maximum SBP up to 240mmHG (Table 1). There was a 14% mortality in this study group with favorable outcome (GOS 4 and 5) in 82% (Figure 7).

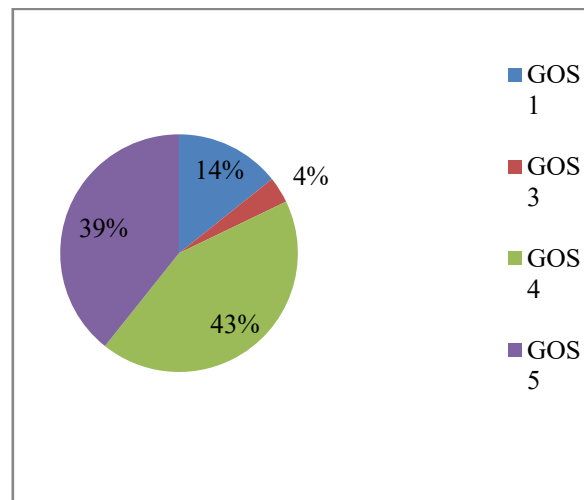


Figure 7: Glasgow outcome at 3 months

GOS was significantly associated with the volume of hematoma and midline shift, where smaller volume was associated with better outcome and greater midline shift with poor outcome (Table 2 and Table 3).

Table 2: Association of different continuous variables with the outcome

One-way ANOVA for the continuous data				
	N	Mean	Std. Deviation	PValue
Age	31	59.81	15.8	.427
Volume	26	38.6	23.25	.000
Midlineshift	31	4.13	4.248	.023
SBP	31	163.71	34.64	.992
GCS	31	12.1	2.166	.108

Discussion:

Primary intracerebral hemorrhage is a pathology carrying a grave prognosis with no promising outcome throughout the world.^{6,7} Despite a large randomized trial conducted to find the best treatment strategy, they still seem to be non-satisfactory. In the bigger trial, the mortality rate of primary ICH is around 40-60% with different treatment modalities.^{6,7,12,13} In this study the poor outcome was around 18%, this finding seems to be less than the bigger trials which might be due to the small sample size and maximum numbers of patients with bleed less than 50%. However, the volume of hematoma seems to be significantly associated with the outcome of the patient which is consistent with previous studies,

midline shift which is the marker of ongoing herniation is a good tool in prognosticating the clinical outcome of the patient in the previous study, midline shift of more than 5 mm are considered significant in a clinical setting.^{6,7,14,15} In our study, a maximum of 14 mm midline shift was noted with a mean of 4.13 mm and it was significantly associated with poor outcome of the patient.

Conclusion:

The outcome of primary ICH is strongly associated with the volume of hematoma and midline shift. They were generally associated with hypertension with a mean systolic blood pressure of >160 mm Hg.

Table 3: Association of different categorical variables with the outcome.

		GOS				Total	PValue
		1	3	4	5		
gender	female	0	1	5	2	8	0.162
	male	4	0	7	9	20	
volume category	less than 20	0	0	0	4	4	0.002
	20-29	0	0	1	4	5	
	30-39	0	0	2	2	4	
	40-49	2	0	3	0	5	
	50-59	0	0	1	0	1	
	60-69	0	0	2	0	2	
	70-79	0	0	1	0	1	
	80-89	0	1	0	0	1	
	90-99	1	0	0	0	1	
	site of Lesion	lobar	1	1	2	5	
basal ganglia		2	0	6	2	10	
Thalamicand IVH		1	0	4	2	7	
posterior fossa		0	0	0	2	2	
Side of lesion	Left	1	1	6	5	13	0.765
	Right	3	0	6	6	15	
Motor response on presentation	4	1	0	0	1	2	0.600
	5	1	1	7	5	14	
	6	2	0	5	5	12	
Treatment provided	Conservative	1	0	7	9	17	0.166
	EVD	1	0	1	0	2	
	surgical evacuation	2	1	4	2	9	

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