

Mortality and Functional outcome in hypertensive intracerebral hemorrhage in surgically treated patients

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Abstract

Primary Intracerebral hemorrhage (ICH), i.e. spontaneous extravasation of blood into the brain parenchyma.¹After the onset, bleeding may continue and the hematoma grow for several hours, leading to progressive clinical deterioration of the patient's condition. Computed tomography (CT) soon after the onset of symptoms is crucial for the diagnosis. Urgent emergency procedures and intensive care are often needed. ² The present study is designed to study the mortality and Functional outcome in hypertensive intracerebral hemorrhage in surgically treated group.

Introduction

Primary Intracerebral hemorrhage (ICH), i.e. spontaneous extravasation of blood into the brain parenchyma.¹After the onset, bleeding may continue and the hematoma grow for several hours, leading to progressive clinical deterioration of the patient's condition. Computed tomography (CT) soon after the onset of symptoms is crucial for the diagnosis. Urgent emergency procedures and intensive care are often needed. ² The present study is designed to study the mortality and Functional outcome in hypertensive intracerebral hemorrhage in surgically treated group.

AIMS AND OBJECTIVES- This study was done to assess the efficacy of selective Criteria decided for surgical intervention and to correlate the surgical outcome in relation to timing of surgery from onset of ictus and type of surgery.

MATERIAL AND METHODS- A Prospective study was conducted for a duration of December 2018 to August 2020 in Department of Neurosurgery, J.A. Group of Hospital and G. R. Medical College, Gwalior (M.P.). Patients having evidence of spontaneous lobar ICH and large basal ganglia hemorrhage on CT scan and between 25 to 65 yrs of age, having large volume of hematoma >30 ml causing mass effect were included in the study. Those having glasgow coma score >5 were included. Intracerebral hemorrhage caused by a brain tumor, aneurysm, vascular malformation, hematological malignancy, coagulation disorder, or head trauma were excluded.

The onset of ICH was typically followed by a rapid decline of consciousness and progression of neurological symptoms. All patients who were considered for study on the basis of inclusion and exclusion criteria had CT scan with intracerebral hematoma. In the non-contrast computed tomographic (NCCT) scan of the head, the hematoma volume, midline shift, location (deep or superficial), and intra-ventricular extension were noted. Written witnessed informed consent of patients relative were obtained. Early evacuation of the haematoma by the method preferred by the treating neurosurgeon, usually craniotomy or craniectomy performed. Further information about the post operative progress were collected. patients also had an postoperative CT scan at about five days to assess the residual and Recurrent Hematoma, surrounding edema ,hydrocephalus or any other changes. In Post operative period standard medical therapy included maintaining the airway by placing a nasopharyngeal tube, an endotracheal intubation, or a tracheostomy as and when required, O₂ by mask or ventilator support, head end elevation by 30°, hydration with input-output charting, control of blood pressure, reduction of intracranial pressure (ICP) using mannitol and furosemide, prophylactic antiepileptic therapy to prevent seizures, prophylactic antibiotics, appropriate feeding, physiotherapy, and management of any associated morbidity, if present. All the patients were kept in the intensive care unit (ICU) with close monitoring of vital parameters .Favourable and unfavourable outcomes were assessed at 6 month follow up. Patients were categorized on the basis of Glasgow outcome scale as having a favourable outcome GOS 4 or 5 and

unfavourable outcome GOS 1 to 3. Patients data were filled in the master chart and analysed via statistical method.

Observation And results

30 patients were included in the study. Surgical intervention was done on the basis of radiological and clinical finding. Most of patients in our study were above 45 yrs of age (67%). Good outcome was better in age group 25-45 yrs (40%) compare to 46-65 yrs (15%). In our study 67% were male and 33% female, so male female ratio was 2:1. Female had good outcome 4(40%) compare to male 3 (15%). In our study, Right side involvement in 17(56.66 %) and Left side involvement in 13(43%). Right side hematoma had good outcome in 5(29.41%) of cases compare to left side 2(15.38%). Most common presenting complaint was Hemiparesis and altered sensorium respectively. All patients had Effaced Ventricle and more than 5mm midline shift [Table 1]. In our study, Lobar hematoma had Good outcome 4(50%) compare to Basal ganglia hematoma 3(13.63%). [Table 2]. Craniotomy performed in 20(66.66%) and Decompressive craniectomy in 10(33.33%) of patients. Craniotomy and Decompressive craniectomy had almost similar outcome. [Table 3] Most of patients in our study had ICH Score 3 and had poor outcome in (91.66%) of cases. In patients with ICH score (<3) had good outcome 5(83.33%) compare to ICH score 3(8.33%). [Table 4] Most of patients 18 (60%) operated after 72 hour of ictus and had poor outcome (83.33%). Patients operated with in 72 hour of ictus had good outcome in 33.33% compare to more than 72 hour (16.66%). [Table 5] In our study Mortality was 66.66%. [Table 6] In our study, 15 (75%) patients were expired after second post operative day. [Table 7] In our study, Patients of younger age group (25-45yrs) had (40%) mortality that was half compare to the older age group (46-65yrs). Patients undergoing Craniotomy and Decompressive Craniectomy had (65% and 70%) mortality respectively that was almost same. Patients operated with in 72 hour of ictus had less mortality(50%) compare to late operation (77.8%). [Table 8] In our study, Patients with age group 25 to 45 yrs had average hospital stay 12 days, that was less compare to older age 46 to 65yrs. Patients of Craniotomy and Decompressive Craniectomy had almost same average hospital stay. Patients presented early (<72hour) after ictus had Average hospital stay 10days ,that was less compare to late(>72hour) presentation. [Table 9] At the time of discharge 10% patients had good outcome and after 3 months data remain unchanged. After 6 months follow up percentage of good outcome was 23.33%. In 6 months follow up 4 patients improved to good functional status and 3 patients remain in the vegetative state. [Table 10]

Discussion

Morbidity and mortality in spontaneous ICH was high as most previous study. Recent report have shown that the surgical methods which mainly includes craniotomy, catheter drainage, neuroendoscopy and neuronavigation assisted surgery for ICH are safe and effective. Craniotomy is a standard approach especially for hematoma volume more than 30 ml. It can be performed with Craniotomy with evacuation of hematoma and decompression with bone flap in abdomen. Intra-ventricular hemorrhage, midline shift, Large Volume of hematoma in Pre-operative CT is poor outcome factor^{3,4}.

Arterial hypertension is known as the most common risk factor for spontaneous intracerebral hemorrhage^{5,6}. In present study , however, hypertension was present in all patients in our study. Uncontrolled hypertension is the one of the cause of higher mortality rate in our study.

Primary ICH is considered to be a disease of the elderly, mean age of the study group in Hemphill et al.'s landmark paper was 66 years⁷. mean age of patients in our study was 55 , and as per age criteria in our study was upto 65 yrs of age, comparatively younger age of incidence has been reported uniformly across India and appears to be a characteristic feature of Indian subcontinent studies^{8,9,10,11}. Increasing age associated with increased morbidity and mortality, Patients above 45 years had poor outcome (80%). Patients below 45 yrs of age had good outcome(40%) compare to older age(15%). No statistical significant (P value-0.127) association between age and outcome in our study. Several authors have shown that older adults with acute ICH experienced the worse outcomes compared with their younger counterparts, including death, dependency, and overall quality of life^{12,13} Following with in 72 hour of ictus surgery in 12 patients, 4(33.33%) patients had good outcome (GOS 4-5) and surgery after 72 hour in 18 patients, 3 (16.66%) had good outcome. It was found that surgery had some improvement in outcome among patients who are young and surgery done with in 72 hour of ictus but this relationship between timing of surgery since ictus and outcome is no statistical significant (P value-0.249). Various authors, including Bogousslavsky et al, Bozzola et al, Portenoy et al, and Sacco et al reported a mortality rate varying from 20% to 70%¹⁴. Although the mortality is strongly dependent on haematoma size and to a lesser extent, location, the overall mortality rate varies between 25% and 60%¹⁵. According to Flaherty et al, death at 1 year varies by location, 57% for lobar, 51% for deep ganglionic¹⁶. The mortality rates reported for lobar haemorrhage have been between the extremes of 11.5% (Ropper & Davis,

1980) and 32%(Kase et al., 1982), in comparison with 42% basal ganglionic and thalamic ICH, (Steiner et al., 1984). However in large series of patients comparisons of mortality lobar and deep hemispheric ICH have shown no significant differences (Massaro et al., 1991). These authors reported a 30-day fatality rate of 27.7% for patients with lobar haemorrhage, and 31.8% with deep haemorrhages. These differences in mortality among series of lobar and deep ICH may reflect variation in haematoma size and mass effect more than superficial vs. deep location¹⁷. According to Ropper et al, the prognosis of lobar ICH is relatively better than that of other forms of ICH and mortality ranges from 11% to 29%. According to Helweg et al, the functional outcome for survivors of lobar haemorrhage also tends to be better. In our study, though number is less, had poor outcome of Lobar haemorrhage (50%) compared to Basal ganglia (86.36%), and slight better outcome in lobar hematoma compare to basal ganglia, but this difference in outcome in lobar and basal ganglia is not statistical significant (P value-0.269). This higher occurrence of poor outcome, because of low admission GCS, Large volume of hematoma and intra-ventricular extension.

Conclusion

The efficacy of surgical hematoma evacuation for patients with basal ganglia and lobar hemorrhage compared to medical therapy remains an open debate. In Selective Group of patients in our study had high mortality and poor functional outcome. Functional outcome was improve in survived patient in our study after 6 months follow up. Patients of younger age group (25-45yrs), female, GCS more than 8, ICH score less than 3, volume of hematoma 30-50cc, less than 10mm midline shift, right sided involvement, without intraventricular extension of hematoma and operation with in 72 of ictus had better outcome in our study.

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TABLES-

Table 1 :NCCT Head Finding

CT Finding	No.of Patients	Percentage
Midline shift >5 mm	30	100%
Intra-ventricular extension	24	80%
Effaced ventricle	30	100%
Volume >50	20	67%
Hydrocephalus	12	40%

Table 2 :Location of Hematoma and outcome

Location of hematoma	No of patients	Poor Outcome 3 or <3	Good Outcome GOS- >3	P value
Basal ganglia	22(73.33%)	19(86.36%)	3(13.63%)	0.269
Lobar hematoma	8(26.6%)	4(50%)	4(50%)	
Total	30(100%)	23(76.66%)	7(23.33%)	

Table 3 :Type of Procedure and outcome

Type of Procedure	No of Patients	Poor Outcome GOS 3 or <3	Good outcome - GOS >3	P value
Craniotomy	20(66.66%)	16(80%)	4(20%)	0.542
Decompressive Craniectomy	10(33.33%)	7(70%)	3(30%)	
Total	30(100%)	23(76.66%)	7(23.33%)	

Table 4 :Outcome in relation to ICH Score

ICH Score	No of patients	Poor Outcome GOS 3 or <3	Good Outcome GOS >3	P Value
<3	06(20%)	1(16.66%)	5(83.33%)	0.0001
3 or >3	24(80%)	22(91.66%)	2(8.33%)	
Total	30 (100%)	23(76.66%)	7(23.33%)	

Table 5- Timing of operation since ictus and outcome

Timing since ictus	No. of patients	Poor outcome GOS 3 or <3	Good outcome GOS >3	P value
<72 hour	12(40%)	8 (66.6%)	4 (33.33%)	0.290
>72 hour	18(60%)	15 (83.33%)	3 (16.66%)	
Total	30(100%)	23 (76.66%)	7 (23.33%)	

Table 6:Mortality

Outcome	No of Patients	Percentage
Survived	10	33.33%
Expired	20	66.66%
Total	30	100

Table 7:Post- operative mortality in relation to time since operation

Time since operation	No of patients expired
<2 days	5(25%)
2-30 days	15(75%)

Table 8 :Mortality in relation to age, type of operation and time

Patients Parameter	No of patients	No of patients expired	Percentage of mortality
Age	25-45 yrs	10	40%

	46-65yrs	20	16	80%
Type of operation	Craniotomy	20	13	65%
	Decompressive Craniectomy	10	07	70%
Time of operation since ictus	<72 hour	12	06	50%
	>72 hour	18	14	77.8%

Table 9: Median Hospital Stay

Patients parameter		Minimum hospital stay in days	Maximum hospital stay in days	Average days
Age group	25-45yrs	4	15	12
	46-65yrs	2	25	16
Type of operation	Craniotomy	5	25	16
	Decompressive Craniectomy	2	20	14
Time of Operation since ictus	<72 hour	4	20	10
	>72 hour	6	25	18

Table 10: Functional Outcome

Glasgow outcome scale	No. of Patients			
	Mortality (GOS-1)	Poor outcome except mortality (GOS-2 or 3)	Good Outcome (GOS >3)	Percentage Good Outcome(GOS >3)
At the time of discharge	20	07	03	10%
At 3 months	0	07	03	10%
At 6 months	0	03	07	23.33%