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Hypertensive supratentorial intracerebral hemorrhage: Surgery or conservative management?

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Abstract

Background: Spontaneous intra cerebral hemorrhage is defined as bleeding in brain parenchyma which is lethal at times. Various factor affect the outcome of patient with intra cerebral hemorrhage.

Objective: Aim of this study is to study the clinical outcome of hypertensive supratentorial intra cerebral hemorrhage and influence of medical and surgical management and to compare the results with literature and assess the volume and location of the hemorrhagic lesion and to correlate with clinical picture and prognosis.

Method and materials: The present study conducted at VS hospital, SVP Hospital and NHL Municipal Medical College during the period from December 2018 to December 2020.

100 patients with intra cerebral hemorrhage diagnosed by clinical examination and CT scan and included.

Result: The maximum incidence of patients was found in age group between 40 and 70 years, with Male preponderance. 50% were treated with medical management while 50% were treated with surgical management. Morbidity and mortality were higher in patients with low values of GCS and large volume of hemorrhage.

Conclusion: Patients with higher GCS and low volume of hemorrhage at time of presentation are benefited by medical treatment while patients with low GCS and larger hemorrhage with signs of raised ICT are benefited by surgical management.

Keywords: SICH, Intra cerebral haemorrhage, hypertension, supratentorial

Introduction

Spontaneous intra cerebral hemorrhage (SICH) is defined as bleeding into brain parenchyma without immediately preceding trauma. It may be primary as in case of hypertension or secondary caused by variety of congenital or acquired conditions ^[1]. Intra cerebral hemorrhage accounts for 10%-30% of all stroke admissions to hospital, and leads to catastrophic poor outcome ^[2]. The worldwide incidence of spontaneous intra cerebral hemorrhage is between 11% and 15% of all strokes. In India this figure varies from eight% to 15% in different studies ^[3]. With advent of better management in the form of hypertension, vigorous pulmonary care, prevention and treatment of hydrocephalous, maintenance of fluid and electrolyte balance, surgical intervention whenever needed the outlook for patients has improved ^[1]. We have reviewed the historical aspect, analyzed the data and discussed the outcome with results present in the literature.

Aim of this study is to assess the clinical outcome of hypertensive supratentorial intra cerebral hemorrhage and outcome of medical and surgical management and to compare the results with literature.

Material and methods

The present study conducted at VS hospital, SVP Hospital and NHL Municipal Medical College during the period from December 2018 to December 2020 with 100 cases.

Inclusion Criteria

Patients with hypertensive supratentorial intra cerebral hemorrhage confirmed by CT.

Exclusion criteria

Patients with head injury, primary or secondary brain tumors, aneurysms, infratentorial location and arteriovenous malformations cortical vein thrombosis or on anticoagulation therapy will be excluded from the study.

History was obtained either from patients or close relatives with special reference to presenting symptoms such as headache, vomiting, giddiness and fall, paresis, seizures and altered sensorium and significant past history. Associated neurological examination was done in all patients. Level of consciousness at time of admission was assessed by Glasgow Coma Scale.

Examination for cranial nerve deficit and detailed motor examination carried out.

Blood investigations were done in all patients. X ray chest and ECG were also done. CT scans were done in all patients. CT scans were thoroughly evaluated for locations, volume of hematoma, intraventricular extension, mass effect and hydrocephalous. Volume of each hematoma was calculated by using the formula $ABC/2$ [4]. This was calculated from CT scan slice with largest area of hemorrhage. Where A is greatest diameter in centimeters, B is the diameter in centimeters 90 degree to A and C is number Of CT scan slices multiplied by thickness of slice in centimeters. Depending on clinical conditions and size of hematoma, patients were subjected either to-medical or surgical management. Patients having volume of hematoma less than 40cc and GCS more than ten at time of admission were subjected to conservative management. Patients having volume of hematoma more than 40cc and GCS less than ten at time of admission or in whom GCS deteriorated after hospital admission were subjected to surgical management.

Patients having poor G.C.S at admission and intraventricular extension with developing hydrocephalus were treated with external ventricular drainage. In the medical group patients were treated with antiedema and antihypertensive measures and other supportive care as required. In the surgically treated group open craniotomy with corticotomy and evacuation of hematoma was done. The outcome of patients who were discharged was graded according to activity of daily living score (ADL) as suggested by Matsumoto and Hando [5].

We have compared the outcome of surgically and medically treated patients.

Result

100 cases of spontaneous intra cerebral hematomas were studied at single institute during time period from December 2018 to December 2020 at SVP hospital, NHLMMC.

In this series the youngest patient admitted was 20 years old and the oldest was 89 years old with mean age of 57 years. The maximum incidence was observed in sixth Decade. In this series out of 100 patients, 70 were male and 30 were female patients. Male to female ratio was 2.3:1.

Table 1: Symptomatic presentation

Symptom	Patients
Headache	14
Giddiness	66
Weakness	48
Altered sensorium	80
Vomiting	36
Seizures	16
Dysphasia	10

Table one represents the symptom spectrum which suggests that altered consciousness is being most common symptom in this study.

The patients were divided in to three groups based on GCS at admission.

GCS three-six: 30cases

GCS seven-ten: 34 cases

GCS 11-15: 36 cases

Patients having G.C.S. less than ten were 64 (64%) and patients having G.C.S. more than ten were 36 (36%). The maximum incidence of hematoma was present in thalamic region 44 cases, followed by ganglionic 36 cases, lobar 20

cases. 54 cases had associated with intraventricular extension. Total number of patients having volume of hematoma less than 40cc were 46(46%) and volume more than 40cc was seen in 54 cases.

The percentage of patients receiving different management was identical. Conservatively treated patients (n=50) received antihypertensive and antiedema measures. Patients subjected to surgery (n=30) underwent open craniotomy with evacuation of hematoma and decompression. Patients (n=20) treated with external ventricular drainage (E.V.D) were having intraventricular extension of hematoma in 17 cases and three cases had hydrocephalous.

Out of 100 patients, 50% patients were discharged with varying degree of neurological deficit, favorable outcome (ADL1,2,3) was seen in 38 cases (38%), unfavorable outcome was seen in 12 cases (12%) and 50 patients expired. The mortality was high among the patients with low GCS at admission. Patients having GCS less than ten (n=64) had mortality in 42 cases (65.62%). Out of 36 Patients having GCS more than ten, eight patients expired (22.2%).

Out of total 100 cases, 50 cases were treated by medical management, eight patients of lobar hematoma, out of which five (62.5%) showed favorable outcome three (37.5%) expired. Out of 22 patients with thalamic hemorrhage, nine (41%) showed favorable outcome, 12(54%) expired. Out of 20 patients with ganglionic hematomas, eight (40%) had favorable outcome and two (10%) had unfavorable outcome and ten (50%) expired. In our series 30 patients were treated with surgical management. Out of 11 patients with lobar hematomas, five (45.5%) showed favorable, two (18.2%) showed unfavorable outcome and four (36.3%) patients expired. Out of ten patients with thalamic hematoma, three (30%) showed favorable outcome, three (30%) showed unfavorable outcome and four (40%) expired. In nine cases of ganglionic hematoma, three (33.3%) showed favorable outcome two (22.2%) showed unfavorable outcome and four (44.4%) expired. 50 patients were treated medically. In this group, 18 cases were having GCS \geq ten at the time of admission, 13(72.2%) showed favorable outcome, three (16.6. %) expired, and unfavorable outcome was seen in two (11.2%). A total of 32 patients were having GCS<ten, of which nine (28.1%) had favorable outcome, one (3.1 %) had unfavorable outcome and 22 patients expired.

30 patients were treated with surgical management. 13 were present with GCS \geq ten. Out of these eight (61.5%) had favorable and five (38.5%) had unfavorable outcome. 17 were presented with GCS<10. In this group three (17.6%) showed favorable outcome, two (11.7%) showed unfavorable outcome and 12(70.7%) expired.

20 patients were treated with external ventricular drainage (E.V.D.) 15 patients had GCS<ten, 12 (80%) expired, two (13.3%) had favorable and one (6.6%) had unfavorable outcome. five were having GCS \geq ten, one (20%) expired and three (60%) had favorable and one (20%) had unfavorable outcome.

In medically treated 50 patients, 30 were having hematoma volume<40cc, 20(66.6%) had favorable outcome, two (6.6%) had unfavorable outcome and eight (26.8%) expired. 20 had hematoma volume>40cc (40%), 17(85%) expired and two (10%) showed favorable and one (5%) had unfavorable outcome. In surgically treated 30 patients, 13 had hematoma volume<40cc, two (46.15%) showed favorable outcome, two (15.4%) showed unfavorable outcome and five (38.5%) expired. 17 patients had hematoma volume>40cc, five

(29.4%) had favorable outcome, five (29.4%) had unfavorable outcome and seven (41.2%) expired.

In our study, 54 patients had hemorrhage with intraventricular extension. 12 were surgically managed, five (41.6%) had favorable outcome, two (16.7%) had unfavorable outcome and two (41.6%) expired. 30 were medically managed, eight (26.7%) showed favorable outcome, two (6.6%) showed unfavorable outcome and 20 (66.7%) expired. 12 patients were treated with EVD, two (16.6%) showed favorable outcome and ten (83.4%) expired.

Discussion

Spontaneous intra cerebral hematoma has worldwide incidence around 11-15% of all strokes [6]. In different studies done in India this figure is 8-15% [7]. In spite of all extensive research regarding its management over the past century, the mortality rate still remains unacceptably high over 50% [1] and more than 75% of the survivors are left with deficit to a lesser or greater extent [8]. This is due to herniation, brainstem compression or development of hydrocephalous [1].

It is observed that maximum patients was present between age group of 40 to 69 years with mean age of 57 years. In Perth Community Stroke study Register out of 56 patients mean age was 68 with a range of 23-93 [9]. Nagpal reported high incidence in fifth and sixth decade, as well as Gambhir showed similar results, which are corroborative with our study [10, 11]. This is because of high incidence of hypertension & atherosclerosis in this age group. In the present study male to female ratio is 2.3:1 while Nagpal observed around 2:1 [11] whereas Gambhir found this ratio to be 2.3:1 [10]. In the Perth Community Stroke Registry, 52% patients were male. This is similar to other studies and suggest male predominance.

To understand problems of intra cerebral hematomas one should know about the pathophysiology of SICH. In cases of chronic hypertension, vasculopathy affects the perforating arteries. These vessels have diameter of 100 to 400 micro meter. These arteries arise at right angle from large trunks to enter the brain. These arteries are end arteries. The change in the blood pressure is directly reflected in these arteries. There occurs accumulation of lipid and proteinaceous material in the wall of these arteries causing scarring and focal necrosis. These vessels are not able to compensate the changes in the blood pressure and bleeding occurs. When auto regulation is compromised bleeding occurs secondary to rise in the blood pressure. This was first described in 1868 by Charcot and Bouchard [18].

Most patients had an acute onset of neurological symptoms. Anderson's series reported motor deficit (87%) to be the most common presenting symptom whereas in our series motor deficit was in 48%. In our series altered sensorium (80%) was the most common presenting symptom. we found giddiness in 66% cases in contrast to Anderson study (12%) headache & seizures were not common in both the series [9].

Table 2: Comparison as per GCS at time of admission

GCS	Seppo	Imielinski	Present study
Less than 9	42.3%	47.6%	60%
More than 9	57.7%	52.4%	40%

GCS at presentation is compared with Seppo [12] and Imielinski [13] in table two which suggest present study includes more critical patient.

Table 3: Comparison according to site of hemorrhage

Site	Dhamija	Kazui	Present study
Lobar	28%	17%	20%
Ganglionic	32%	34%	36%
Thalamic	21%	33%	44%
Cerebellar	5%	5%	-
Brainstem	14%	5%	-

The CT scan done in all patients revealed site, volume of hematoma, presence of intraventricular extension, and hydrocephalous. [1] We have compared hemorrhage site with other studies done by Dhamija [14] and Kazui [15] in table three which shows ganglio-thalamic being most common site.

In the present study patient's outcome was graded according to Activities of Daily Living (ADL) Score. Total mortality is 50% and favorable outcome (ADL one, two & three) was seen in 38 (38%) cases. Unfavorable outcome (ADL four & five) was seen in 12 (12%) cases. Dhamija study showed that mortality rate was 35%. [14] In the Perth community stroke Registry overall fatality was 35%. [9] We have observed that level of consciousness, GCS, size of hematoma and ventricular extension are the most important predictors of outcome. The clinical manifestations depend upon the speed of formation of hematoma, volume of hematoma and site of hematoma. A small hematoma can just dissect tissue planes giving rise to minimal neurological disability where as large hematomas destroy large amount of surrounding brain tissue. The intracranial pressure rises and herniation of normal parts of brain occurs under the falx, through the tentorial incisura or through the foramen magnum [1].

B.L. Imielinski and W. Kloc suggested that surgery should be considered in case with

Progressive neurological deficit, functional impairment lasting longer than week and development of intracranial hypertension. Surgery is not indicated in case of deep coma, absence or regression of neurological deficit and vegetative state [13].

In this study out of 50 conservatively treated patients, 44% patients had favorable outcome, 6% showed unfavorable outcome and 50% was the mortality. Where as in 30 surgically managed patients favorable outcome was seen in 36.7%, unfavorable outcome was seen in 23.3% and 40% was the mortality. The higher mortality in conservatively treated patients in our series can be contributed to the fact that the most of the patients in this group had low G.C.S. at admission. Similar observations are made by Imielinski in his series of 145 patients [13]. F. John, Gilinham concluded that, patients with massive hematomas or with intraventricular extension should be left alone because of high mortality irrespective of mode of treatment [16]. STICH trial concluded that early surgery for ICH is feasible. A modest early mortality benefit for surgery is possible but long term benefit for surgery was not established [17]. Similarly in our study we have found that early surgical intervention in patients with ICH without intraventricular extension with impending neurological deterioration would be beneficial. Cases with intraventricular extension and hematoma volume more than 40 cc showed higher mortality both in surgically and conservatively treated patients. It is seen that patients having poor GCS at admission has poor outcome after treatment [18].

Conclusion

On based on current study and its comparison with other studies we can conclude that in cases of Hypertensive

supratentorial intracerebral hemorrhage, patients having initial G.C.S. between 11 and 15 with no signs of raised intracranial pressure and hematoma volume less than 40cc should be treated with complete bed rest, medications to lower the blood pressure and correction of dehydration. In patients with deteriorating consciousness, signs of raised intracranial pressure and herniation, surgery is indicated. Early management with precise intervention results in better outcome whether it is surgical approach or medical management. Mortality and morbidity is higher with hematoma volume more than 40cc, intraventricular extension and GCS < ten and thalamic region involvement.

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