

Outcome of Surgical Management in Spontaneous Supratentorial Intracerebral Hemorrhage Patients: A Randomized Control Trial

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Abstract

Background: Management of spontaneous supratentorial intracerebral hemorrhage is crucial. **Objective:** The purpose of the present study was to compare the outcome of surgery in relation to conservative management of spontaneous supratentorial intracerebral hemorrhage. **Methodology:** This was a single centred, parallel randomized control trial which was conducted in the Department of Neurosurgery at Dhaka Medical College and Hospital from January 2010 to October 2011 for a period of one year and ten months. All hypertensive patients with spontaneous supratentorial intracerebral hemorrhage who were admitted within 48 hours of stroke in Neurosurgery Department during the study period were considered as a study population. Patients underwent surgery was considered as group I and patients those who did not give the consent for operation were treated conservatively was considered as group II. Surgery and conservative groups were matched in age. **Result:** A total of 31 patients were enrolled in this study. Fourteen (14) patients underwent surgical evacuation while seventeen (17) patients those who didn't give consent for operation were selected for conservative therapy. The distribution of the study patients according to GOS (30 days) that 6(42.9%) and 10 (58.8%) patients in surgery and conservatively managed patients were dead respectively; however, 4(28.6%) patients in surgery and 3(17.6%) patient in conservative group had good recovery. Besides, 2(14.3%) surgery patients and 3(17.6%) conservative patients were severe disabled. Moreover, 2(14.3%) surgery patients and 1(5.9%) conservative patients were moderately disabled. **Conclusion:** In conclusion surgical evacuation of spontaneous supratentorial intracerebral hemorrhage has a benefit on outcome compared to conservative medical treatment. [Journal of National Institute of Neurosciences Bangladesh, 2017;3(1): 37-41]

Keywords: spontaneous; supratentorial; intracerebral hemorrhage; surgical outcome

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Introduction

Combining all types of stroke it is the third leading

cause of death in adult population i.e. over 40 years of age after ischemic heart disease and cancer in

developed country and the first leading cause of disability¹. The high rate of morbidity and mortality has prompted investigations for new medical and surgical therapies for ICH. According to WHO stroke may be defined as rapidly developing clinical signs of focal disturbance of cerebral function, lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin².

The initial management of all patients with spontaneous ICH consists of acute medical intervention, followed by either surgical or conservative treatment. The goals of acute medical treatment include control of hypertension, reduction of increased intracranial pressure, prevention of seizure and deep venous thrombosis prophylaxis. Elevated blood pressure is seen in 46 to 56% of patients with ICH³. It remains unclear if elevated blood pressure directly causes hematoma expansion but studies have shown elevated systolic, diastolic, and mean arterial pressure are associated with a poor outcome in ICH⁴⁻⁵.

Proper timing of surgical intervention is also very important. Small hematomas whether superficial or deep are preferably treated best by wait and watch policy⁶. Infratentorial hemorrhages seem to benefit from early surgery. Most neurosurgeons believe cerebellar hemorrhages greater than 3 centimeters benefit from early surgical intervention because of the significant risk of brainstem compression and obstructive hydrocephalus within 24 hours⁷.

In context of Bangladesh, surgical management in certain cases of spontaneous primary ICH (SPICH) group revealed better early outcome of surgery than that of conservative group. As the controversy in the management strategy still remains, "surgically treated patients had just significant outcome in comparison to the conservatively managed group" in SPICH⁸. In this context this present study was undertaken to compare the outcome of surgery in relation to conservative management of spontaneous supratentorial intracerebral hemorrhage.

Methodology

Study Population and Settings: This was a single centred, parallel randomized control trial which was conducted in the Department of Neurosurgery at Dhaka Medical College and Hospital from January 2010 to October 2011 for a period of one year and ten months. All hypertensive patients with spontaneous supratentorial intracerebral hemorrhage who were admitted within 48 hours of stroke in Neurosurgery Department during the study period were considered as a study population.

Randomization and Blinding: The study population was divided into two groups designated as group A who were treated with surgical management and group B who were treated conservatively. Patients who didn't give consent for operation were selected for conservative therapy. Prior to commencement of this study, the research protocol was approved by ethical committee. The inclusion criteria of study population were patient admitted within 48 hours of ictus, CT-scan evidence of spontaneous supratentorial ICH, only lobar hematoma was included in this study, hematoma volume more than 30 ml in CT-scan, hematoma causing mass effect like midline shift, GCS score 6 to 12, age 40 to 70 years and only hypertensive cases were included in this study. The exclusion criteria of study population were patient after 48 hours of ictus, ICH other than spontaneous, posterior fossa (cerebellum) and deep seated (thalamus, putamen) hematoma, hematoma with ventricular extension, GCS score <6 and >12, patient with co morbid disease as diabetes, ischemic heart disease, COPD and patient taking any anticoagulant (as warfarin) and drugs that inhibit platelet aggregation (as aspirin).

Study Procedure: This study was done on admitted patients with a brain CT scan confirmed spontaneous supratentorial ICH fulfilling all selection criteria. All these patients were evaluated on the basis of detailed history and clinical examination. Surgical treatment: After giving the consent, patients selected for surgical treatment were taken to the operating room as soon as possible. All surgical cases underwent either decompressive craniotomy or craniectomy under general anesthesia. Medical treatment: Medical treatment included osmotherapy, blood pressure control, seizure prophylaxis, deep venous thrombosis prophylaxis, intravenous fluids, H2 blockers and early nutritional support⁹.

Follow up and Outcome Measures: The patients of both groups were continuously followed up by observing the GCS score at 7th day and 30th days Glasgow outcome scale (GOS). A check list was prepared by the researcher considering the variables such as age, volume of haematoma, GCS and GOS. The check list was tested first in the department of Neurosurgery of Dhaka Medical College and Hospital and then finalized. The data was collected by the researcher himself. On admission, detailed history from the attendants was taken. General and neurological examination of patients was done. Findings of CT scan were recorded carefully. GCS and GOS were also recorded.

Statistical Analysis: Data was collected and edited manually. A master sheet was prepared and data was analyzed by SPSS (Statistical package for social science). Unpaired t-test, paired t-test, correlation and Chi square (χ^2) test were performed. The level of significance considered p value <0.05. The summarized data was then presented in tabulated form.

Results

A total of 60 patients having stroke within 48 hours with spontaneous supratentorial ICH were selected. Out of these 29 patients were not included in the study due to unable to fulfill the selection criteria. Fourteen (14) patients underwent surgical evacuation while seventeen (17) patients those who didn't give consent for operation were selected for conservative therapy. Therefore a total of 31 patients were enrolled in this study. The mean \pm SD age were 53.29 ± 6.92 years and 52.47 ± 7.51 years in surgery and conservative patients respectively. Half of the surgery patients were in between 40 to 50 years of age group. Besides, in conservative patients maximum 7(41.2%) number was found in both 40 to 50 years and 51 to 60 years. Mean age difference was not statistically significant ($p>0.05$) (Table 1).

Table 1: Age distribution of the study patients (n=31)

Age Group	Surgery (n=14)	Conservative (n=17)	p-value
40 to 50 Years	7 (50.0%)	7 (41.2%)	
51 to 60 Years	5 (35.7%)	7 (41.2%)	
More than 60 Years	2 (14.3%)	3 (17.6%)	
Mean \pm SD	53.29 ± 6.92	52.47 ± 7.51	0.758 ^{ns}
Range (min-max)	(45-65)	(40-65)	

ns = not significant; P value reached from unpaired t-test

Table 2 shows the distribution of the study patients according to type of surgery and observed that craniotomy was 8 (57.1%), craniectomy 6 (42.9%).

Table 2: Distribution of the study patients according to types of surgery done (n=14)

Surgery	Frequency	Percentage
Craniotomy	8	57.1
Craniectomy	6	42.9

ns = not significant; P value reached from unpaired t-test

The patients were considered according to GOS (30 days). In this study 6(42.9%) and 10 (58.8%) patients in surgery and conservatively managed patients were dead respectively; however, 4(28.6%) patients in surgery and 3(17.6%) patient in conservative group had good recovery. Besides, 2(14.3%) surgery patients and

3(17.6%) conservative patients were severe disabled. Moreover, 2(14.3%) surgery patients and 1(5.9%) conservative patients were moderately disabled (Table 3).

Table 1: Age distribution of the study patients (n=31)

GOS (30 days)	Surgery	Conservative	Total
Dead	6 (42.9%)	10 (58.8%)	16
Severe disabled	2 (14.3%)	3 (17.6%)	5
Moderate disabled	2 (14.3%)	1 (5.9%)	3
Good recovery	4 (28.6%)	3 (17.6%)	7
Total	14	17	31

Discussion

This comparative study was carried out with an aim to compare the outcome of surgery in relation to conservative management of spontaneous supratentorial intracerebral hemorrhage. A total of 31 patients with spontaneous supratentorial ICH, evaluated by brain CT scan were included in the study, in the Department of Neurosurgery of Dhaka Medical College and Hospital, Dhaka during January 2010 to October 2011. Fourteen patients underwent surgery was considered as group I and 17 patients those who did not give consent for operation were treated conservatively was considered as group II and subsequently followed up by monitoring GOS (at 30 days).

In this present study it was observed that the mean \pm SD age was 53.29 ± 6.92 years and 52.47 ± 7.51 years in surgery and conservative group respectively, which was almost similar between two groups, no statistical significant ($p>0.05$) difference was observed. A half (50.0%) of the surgery patients were in 5th decade. Besides, in conservative group maximum (41.2%) patients were found in 5th and 6th decade. Similarly, Mourad et al⁹ have observed the mean age of the patients having spontaneous supratentorial ICH was 56.65 ± 11.47 years in surgery group and 49.60 ± 15.28 years in conservative group and the difference was not statistically significant ($p>0.05$), thus support the present study. Whereas in Bangladesh, Tarikul¹⁰ has shown mean age was 55.70 years and in Pakistan, Ahmed et al¹¹ have shown the mean age was 58.8 years in patients having spontaneous intracerebral hemorrhage, which is comparable with the current study.

Craniotomy was done by Sun et al¹², Mendelow et al¹³, Prasad et al¹⁴ and Pantazis et al¹⁵. In another study, Broderick et al¹⁶ recommended that craniotomy has been the standard approach for removal of ICH. Its major advantage is adequate exposure to remove the clot. More complete clot removal may decrease

elevated ICP and local pressure effects of the blood clot on the surrounding brain mentioned by Broderick et al¹⁶. The major disadvantage is that it may lead to further brain damage. In this study it was observed that craniotomy was done in more than a half (57.1%) of the patients and craniectomy was done in 42.9% of the patients. Similarly, Rahman¹⁷ and Tarikul¹⁰ showed craniotomy was more common in their study, whereas craniectomy were done 24.0% and 10.0% respectively, which are comparable with the current study.

According to GOS in this current series it was observed that 42.9% surgery patients and 58.8% conservative treatment patients were dead. Auer et al (1989) reported mortality rate of 42.0% in the surgical group and 80.0% in the medical group but their follow up duration was six months. Similar mortality rate was also made by Teernstra et al¹⁸ (56% in surgery and 59% in medical group), Pantazis et al¹⁵, Miller et al¹⁹ and Zuccarello et al²⁰. In Bangladesh Barkatulla⁸ found mortality rate 38.8% and 73.2% in surgery and conservative group respectively. But Kurtsoy et al²¹ showed mortality was 14.3% in surgery and 50% in conservative group. Their low mortality in surgery group may be due to early evacuation of clot within 24 hours. Rahman¹⁷ showed 17.2% and 22.2% in surgery group and conservative treatment group respectively, which was higher in conservative group. All these investigators have observed higher mortality rate in patients who received conservative treatment, which is consistent with the present study. On the other hand in this current study, it was observed that 28.6% and 17.6% patients had good recovery in surgery and conservative group respectively, which is similar with Rahman¹⁷. Besides, 14.3% in surgery and 17.6% in conservative patients were severe disabled. Moreover, 14.3% surgery patients and 5.9% conservatively managed patients were moderately disabled. No significant ($p>0.05$) difference was found between two groups. These results agreed with Morgenstern et al²², where Good outcome (good recovery or moderate disability on the Glasgow outcome scale) was significantly better in those treated with surgery, but there was no difference in overall survival.

Conclusion

This study concludes that surgical evacuation of spontaneous supratentorial intracerebral hemorrhage has a benefit on outcome compared to conservative medical treatment. Death occurs more in the conservative than surgical group. Furthermore good recovery is found in the surgical group over conservative group. Further large scale study should be carried out to see the real scenario.

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