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ORIGINAL RESEARCH

# Evaluation of surgical treatment outcomes cerebral hemorrhage due to cerebrovascular accident at Viet Tiep Hospital

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**ABSTRACT**

**Objective:** To evaluate the results of cerebral hemorrhage surgery due to cerebrovascular accident at Viet Tiep Hospital. **Patients and methods:** The study included 31 patients diagnosed with cerebral hemorrhage due to cerebrovascular accident, who were treated with surgery at Viet Tiep Hospital from January 2023 to June 2023. **Results:** Average age: 61.29 ± 12.66 years, Gender: male/female ratio is 1.21. Patients with hypertension accounted for 83.87%. The GCS score at the time of admission ≤ 8 accounted for 64.5%. The most common hematoma was in the temporal lobe with 45.16%, the majority of patients had a single cerebral hemorrhage (accounting for 77.4%), and the average midline compression was 6.45 mm ± 4.77 mm. Treatment results: the rate of patients recovering after surgery is 77.4%, the mortality rate is 22.6%. In the group of patients recovering from surgery, there was a Karnofsky scale of 58.33 ± 8.681 points. **Conclusion:** Surgery plays an important and highly effective role in the treatment of cerebral hemorrhage due to cerebrovascular accidents, helping to reduce the mortality rate and improve the quality of life of patients.

***Keywords:*** Cerebral hemorrhage, cerebrovascular accident, ICH

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## INTRODUCTION

Cerebral hemorrhage (ICH) is a common disease, the third leading cause of death in most countries. In addition, cerebral hemorrhage is also at the top of the causes of severe disability for patients. Every year, about 4.61 million people die from cerebral hemorrhage, accounting for about 9.5% of patients who die overall. Cerebral hemorrhage is a disease with a high mortality rate, leaving many severe sequelae, and the cost of treatment and care is very expensive. Therefore, after the examination, it is necessary to give an early and timely diagnosis and treatment direction for each patient.

Risk factors for cerebral hemorrhage include advanced age, race, smoking, alcohol consumption, low blood cholesterol levels, of which advanced age is the most important factor, the disease rate increases significantly in older patients.

Among the causes of cerebral hemorrhage, hypertension is the leading cause and accounts for the highest rate, other less common causes such as powdery vascular disease, brain tumor, blood clotting disease, or drug treatment, or addictive substances.

Regarding the treatment of cerebral hemorrhage, there are 2 schools of thought given: surgical intervention and classic medical treatment. So far, there is no clear evidence of a difference in the benefits of these two treatments. Therefore, we conducted this research to evaluate the results of surgical treatment of cerebral hemorrhage due to cerebrovascular accident at Viet Tiep Hospital.

## PATIENTS AND METHODS

### Patients

A total of 31 patients diagnosed with cerebral hemorrhage based on clinical stroke diagnosis standards of the World Health Organization, with cerebral hemorrhage images on cranial CT scans, hospitalized from January 2023 to June 2023 with surgical indications and operated at Viet Tiep Hospital were recruited.

Patients with trauma, brain tumors, blood diseases, rupture of arteriovenous deformities or aneurysms, patients who are taking anticoagulants, and bleeding after infarction were excluded.

### Methods

A prospective observational study was conducted. A total sample collection was done.

Indications for surgery were cerebral parenchymal hematoma, with dilated pupils on the same side. There is a brain hernia manifested on cranial CT imaging by midline displacement. The surgery was to remove the hematoma and stop the bleeding.

### Data collection method

The patient was assessed for treatment after 1 month of discharge from the hospital based on the Karnofsky scale. A CT scan assessed the patient's condition at 3 days after surgery, at discharge from the hospital, and 1 month after surgery.

The data collected included: age, gender, previous underlying pathology, Glasgow coma score (GCS), hematoma location, hematoma volume, midline deviation, and patient status 1 month after discharge.

## RESULTS

The mean age of patients was 61.29 ± 12.66 years. Men accounted for 54.8%, women accounted for 45.2%. Most of the patients had a history of hypertension (84%). The mean preoperative GCS score was 6.85 ±1.2, of which 64.5% of patients had a GCS score of less than 8 points. The time from hospitalization to operation was 204.81 ± 68.03 minutes. (Table 1)

***Table 1**. Clinical characteristics of patients with cerebral hemorrhage (n=31)*

| **Characterics** | **Value (%)** |
|---|---|
| Age (mean ± SD) | 61.29 ± 12.66 years |
| Male: female ratio | 17: 14 |
| History of hypertension | 26 (83,87 % |
| Mean Glasgow Points Before Surgery:<br>+ ≤ 8 points (n = 20) | 6.85 ± 1.2<br>64,5 % |

| | |
|---|---|
| + > 8 points (n =11) | 35,5 % |
| Time from admission to surgery | 204.81 ± 68.03 minutes |

The most common hematoma was in the temporal lobe (45.16%). Hematoma volume < 30 ml was most frequent (41.94%) The prevalence of single cerebral hemorrhage was 77.4%, of which 58.3% were in the left hemisphere of the brain. Hemorrhage from 2 or more locus accounted for 22.6%. The average midline thrust was 6.45 ± 4.77 mm. (Table 2)

***Table 2.*** *Cranial CT scan*

| **Character** | **Value** | **Percentage (%)** |
|---|---|---|
| Hematoma location: | | |
| + Frontal lobes | 9 | 29,03 % |
| + Apical lobe | 5 | 16,13 % |
| + Temporal lobe | 14 | 45,16 % |
| + Back pit | 3 | 9,68 % |
| Hematoma volume: | | |
| + Grade 1 (<30 ml) | 13 | 41,94 % |
| + Grade 2 (30 – 60 ml) | 10 | 32,26 % |
| + Level 3 (≥ 60 ml) | 8 | 25,8 % |
| Single cerebral hemorrhage: | 24 | 77,4% |
| + Left hemisphere | 14 | 58,3% |
| + Right hemisphere of the brain | 10 | 41,7% |
| Multiple focal cerebral hemorrhage: | 7 | 22,6% |
| Midline pressure level (mm) | 6.45 ± 4.77 | |

Regarding treatment results, 77.4% of patients recovered after surgery while 22.6% died. The Karnofsky quality of life score of the postoperative recovery group was 58.33 ± 8.681 points. The mortality rate of patients with hypertension accounted for a higher proportion than that of patients without hypertension (23.1% versus 20%, p = 0.04). The mortality rate of patients with hematoma volume ≥ 60 ml on CT scanner was 37.5%, while the mortality rate in patients with hematoma volume < 30 ml was 15.4% (p =0.6). (Table 3). Patients with a longer time from hospitalization to operation, higher preoperative Glasgow score, and more midline compression on CT were more likely to die than those who did not have these factors. (Table 3)

***Table 3.*** *Factors related to surgical outcomes (n =31)*

| **Variables** | | **Living groups (n = 24)** | | **Death group (n = 7)** | | **P** |
|---|---|---|---|---|---|---|
| | | n | % | n | % | |
| **Hypertension** | Yes | 20 | 76.9 | 6 | 23.1 | 0.04 |
| | No | 4 | 80.0 | 1 | 20.0 | |
| **Hematoma volume** | Level 1 | 11 | 84.6 | 2 | 15.4 | 0,6 |
| | Level 2 | 8 | 80.0 | 2 | 20.0 | |
| | Level 3 | 5 | 62.5 | 3 | 37.5 | |
| **Glucose (mmol/L)** | | 9.8 ± 3.49 | | 11.75 ± 3.4 | | 0.07 |

| | | | |
|---|---|---|---|
| **Time from hospitalization to operation (mins)** | 196.2 ± 54.1 | 234.3 ± 103.0 | 0.04 |
| **Preoperative Glasgow score** | 7.2 ± 1.4 | 5.0 ± 0.5 | 0.049 |
| **The degree of midline compression** | 6.2 ± 5.0 | 7.4± 4.2 | 0.02 |

## DISCUSSIONS

In our study, the mean age of the patients was 61.29 ± 12.66 years of which the lowest was 31 years and the highest was 82 years. The mean age of patients with cerebral hemorrhage in our study was lower than the results in foreign studies. The reason for this difference may be due to advanced countries such as the United States and France, which have an older population than our country and on the other hand, their awareness and conditions of care and protection of their health are better in our country.

In terms of sex, the male/female ratio is 1.21. This result is not significantly different from other domestic and foreign studies. Perhaps men have more risk factors for cerebral hemorrhage than women such as smoking and alcoholism.

Regarding hypertension: In our study, the proportion of patients with hypertension accounted for 83.87% (26 patients). Thus, it can be seen that the proportion of patients with cerebral hemorrhage with a history of hypertension in our study is no different when compared to some domestic and international studies. Thus, hypertension is not only a risk factor for cerebral hemorrhage but also a factor that aggravates the condition of patients with cerebral hemorrhage.

In terms of the average preoperative blood glucose concentration, in this study, the average blood glucose concentration was 10.23 mmol/L. In the group of patients who died, the blood glucose concentration was higher than in the group of patients recovering from surgery (11.75 ± 3.45 compared to 9.78 ± 3.49). Thus, high blood glucose levels before surgery are one of the severe prognostic factors. This result is also similar to some studies of other authors in the country.

Preoperative Glasgow score: We recorded a patient's average preoperative Glasgow score of 6.85 ± 1.2 points, the proportion of patients with a Glasgow score ≤ 8 points was 64.5%, which is higher than other studies, which means that the proportion of severe patients in our study is more than in other studies, The reason is that in our study, we mainly took patients in the emergency department and the intensive care unit. Moreover, due to the peculiarity of Viet Tiep Hospital as a front-line hospital in Hai Phong City, it can accommodate serious patients transferred from lower-level hospitals.

A GCS score of less than 8 is a prognostic factor for death in patients with cerebral hemorrhage. The results of our study were the same as those of other authors, patients with a GCS ≤ of 8 points had a higher mortality rate than patients with a GCS score above 9 points, and this difference was statistically significant with a P < of 0.05.

Regarding the characteristics on the cranial CT scan of the patient with cerebral hemorrhage:

On the cranial CT scans of the patients in our study, the most common location of hematoma was the temporal lobe with 45.16%, the volume of hematoma < 30 ml had the highest rate with 41.94%, the rate of patients with single cerebral hemorrhage

accounted for 77.4%, including 58.3% in the left hemisphere, 41.7% in the right hemisphere, hemorrhages from 2 or more foci accounted for 22.6%. The average midline compression was 6.45 mm ± 4.77 mm. The midline compression on the CT-scanner of the deceased patient group was greater than that of the patient group recovering after surgery with a $P < 0.05$. According to a study by Do Ho Van at An Giang Provincial General Hospital, the author believes that there is no difference in mortality rate between right and left hemorrhage, hematoma accumulation, midline deviation, and intraventricular hemorrhage are independent prognostic factors for in-hospital mortality of patients with cerebral hemorrhage. Mitra D et al. found that hematoma volume ≥ 30 cm3 and midline deviation of ≥ 3 mm were independent prognostic factors for in-hospital mortality of cerebral hemorrhage. Thus, the results of our study are also similar to those of the above authors.

Regarding the surgical treatment of cerebral hemorrhage:

In our study, the time from hospital admission to the time of operation of the group of patients who died was greater than that of the group of patients who recovered from surgery. Thus, the sooner the patient is operated on, the higher the recovery rate after surgery.

Almost all domestic studies have very little mention of surgery in patients with cerebral hemorrhage, in our study performed surgery on 31 patients with cerebral hemorrhage, and the rate of patients recovering after surgery was 77.4% (22 patients) of which 7 patients died. The group of patients recovering from surgery have a relatively high Karnofsky quality of life scale (58.33 ± 8.681 points). To assess the quality of life of patients after surgery, we rely on the Karnofsky scale.

In our country, there have not been many studies to evaluate the quality of life of patients after cerebral hemorrhage surgery. From the results of the study, we found that the majority of postoperative patients have a good recovery rate, can take care of their own personal activities, and sometimes need family support. However, there are still some patients with postoperative sequelae such as paralysis, loss of consciousness, and inability to live on their own but need medical attention.

The decision to operate on a patient with cerebral hemorrhage is still controversial, moreover, the surgery depends on the views of neurosurgeons, human resources, and equipment at the hospital. Many patients in our study came to the hospital because they were transferred by family members or by lower-level hospitals in a very serious condition. Therefore, we see the need to improve primary health care for people and improve resuscitation at the lower level before transferring patients to the upper line.

## CONCLUSIONS

Hypertension, high blood sugar levels, Glasgow score before surgery, the degree of midline compression on the cranial CT scan, and the time of early surgery are factors affecting the surgical outcomes. In addition, surgery to treat cerebral hemorrhage due to cerebrovascular accident plays an important role in this condition, helping to reduce the mortality rate and improve the patient's quality of life.

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## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

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None.

## CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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