

## Endoscopic surgery for intracerebral hemorrhage: A case report

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### ABSTRACT

**Objective:** To report the outcome of endoscopic surgery in the treatment of intracerebral hemorrhage through a clinical case.

**Subjects and methods:** Description of a clinical case of hypertensive intracerebral hemorrhage treated by endoscopic evacuation. **Results:** The patient showed significant clinical improvement, postoperative imaging revealed significant reduction in hematoma volume and the patient recovered well after surgery. **Conclusion:** Endoscopic surgery for intracerebral hemorrhage is a novel, effective approach that promotes recovery and shortens hospitalization time.

**Keywords:** Endoscopic surgery, intracerebral hemorrhage

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Received: May 24, 2025

Reviewed: May 26, 2025

Accepted: June 15, 2025

### 1. Introduction

Intracerebral hemorrhage (ICH) accounts for approximately 10–15% of all strokes in Europe, the United States, and Australia, and 15–20% in Asia. Globally, an estimated 2.2 million people suffer from ICH each year [1]. Recent studies estimate the global incidence of ICH to be 12–15 cases per 100,000 population [2], more common in elderly males and in specific populations. The highest incidence is seen in Asia, intermediate in Black populations, and lowest in White populations [3]. While overall stroke incidence has declined over time, the rate of ICH from 2008 to 2018 has not significantly decreased.

Surgical intervention is indicated when increased intracranial pressure due to hemorrhage is unresponsive to medical treatment. Recent reports suggest that decompressive craniectomy combined with hematoma evacuation and ventricular drainage in cases of mass effect can markedly reduce mortality. Traditional wide-open craniotomy allows effective bleeding control and decompression. In recent years, major neurosurgical centers in Vietnam, such as Bach Mai Hospital and 108 Military Central Hospital, have introduced endoscopic surgery for hematoma evacuation in ICH. However, there remains limited published data on the efficacy of this method.

We report a clinical case of hypertensive intracerebral hemorrhage treated with endoscopic surgery at the Department of Neurosurgery, Viet Tiep Friendship Hospital, in January 2025.

### 2. Case report

**Medical history:** A 68-year-old male presented with left hemiplegia one hour after onset. While watching television, the patient suddenly felt dizzy, collapsed, and became unable to move the left side of his body, with associated urinary incontinence. He was transported to Viet Tiep Hospital. He had a two-year history of hypertension but was non-compliant with treatment.

**Clinical findings:** On admission, the patient was drowsy, Glasgow Coma Scale (GCS) 13, spontaneous breathing, pupils 2 mm equal/reactive, left hemiplegia, pulse 78 bpm, blood pressure 170/90 mmHg.

**Imaging:**

Initial non-contrast CT brain revealed a 5x3 cm right basal ganglia hemorrhage, surrounding edema, intraventricular hemorrhage, and no vascular abnormalities.



**Figure 1.** First CT scan of the brain  
(The red arrow denotes the site of intracerebral hemorrhage on the cranial CT scan)



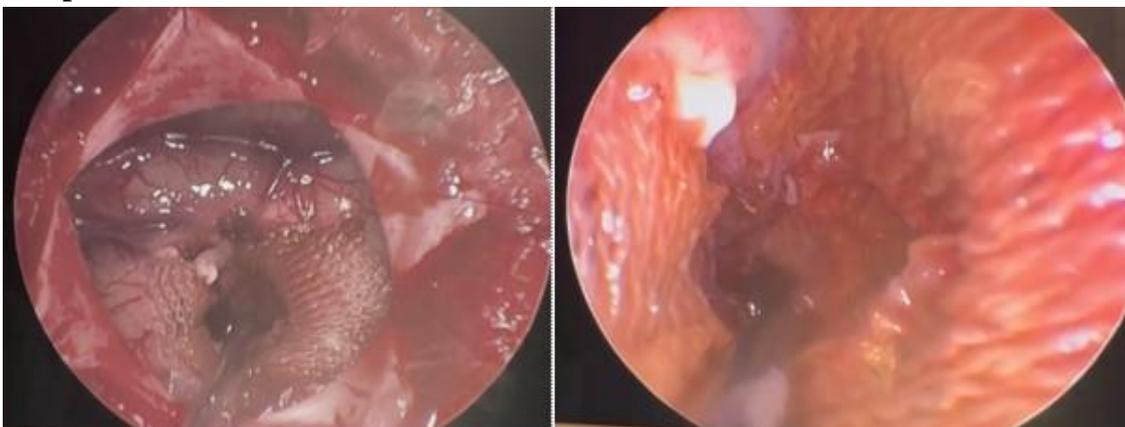
**Figure 2.** Second CT scan of the brain  
(The yellow arrow denotes the intracerebral hemorrhage, which has enlarged compared with the prior cranial CT scan)

The patient received intensive care including hemostatic therapy, anti-edema treatment, blood pressure control, and close monitoring.

After 2 days without clinical improvement, follow-up CT showed increased hyperdense lesion in the right basal ganglia and internal/external capsule with surrounding hypodensity (~60x40 mm), subarachnoid hemorrhage, intraventricular bleeding, and worsening edema.

Given clinical deterioration and radiological evidence of increased bleeding, surgical hematoma evacuation was indicated. Endoscopic surgery was performed via a minimally invasive approach. The procedure was uneventful, and the patient was transferred to the ICU postoperatively.

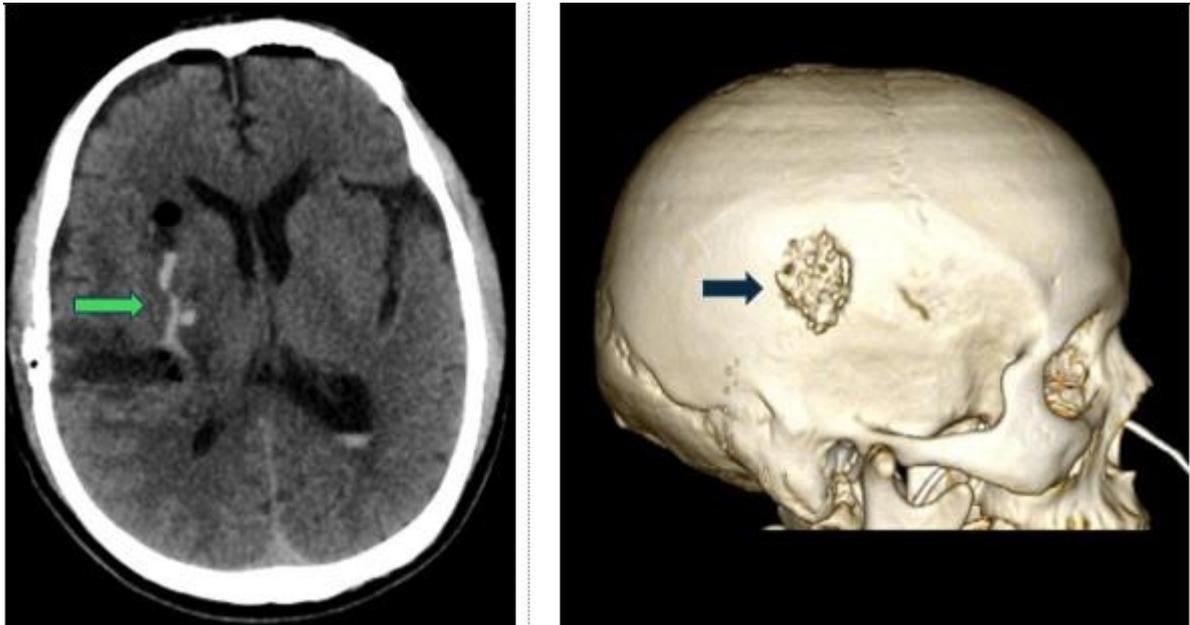
**Postoperative course:**



**Figure 3.** Images during surgery

On postoperative day 1, the patient was alert, obeyed commands, and was clinically stable. Follow-up CT revealed a significant reduction in hematoma volume in the right basal ganglia and capsule areas.

By postoperative day 10, the patient was fully conscious, with improved left-sided motor function, dry incision site, and all stitches removed. The patient was discharged with instructions for home-based rehabilitation.



**Figure 4.** CT scan of the brain after surgery

(The blue arrow denotes the location of the intracerebral hemorrhage that was evacuated during the surgical procedure, and the black arrow indicates the craniotomy site used to approach the hematoma)



**Figure 5.** The patient's incision is 5cm long

### 3. Discussion

Intracerebral hemorrhage (ICH) is a common condition and ranks as the third leading cause of death worldwide. It is also the leading cause of long-term disability. ICH causes approximately 4.61 million deaths annually, accounting for 9.5% of all deaths. Its high

mortality and morbidity rate, coupled with the substantial treatment and care costs, make timely diagnosis and management crucial.

According to Nguyen Thi Ngoc Tuyen (2020) [2], the mean age of ICH patients was  $54.14 \pm 10.06$  years, ranging from 35 to 80 years, with the 50–59 age group being the most common (39.22%). Males predominated (70.59%), with a male-to-female ratio of ~2.4. Hypertension was present in 90.2%, with 9.8% previously undiagnosed. Dang Quang Tam reported similar findings: mean age 59.34 years, male-to-female ratio 2.3:1, hypertension in 97.24%, including 77.06% with known and 20.18% newly diagnosed hypertension.

Most authors [1,3] agree that spontaneous ICH typically affects individuals over 50 years of age with a history of hypertension.

The patient in our study was a 68-year-old male with a two-year history of hypertension but irregular treatment adherence, consistent with known epidemiological and risk factors.

Risk factors for ICH include advanced age, ethnicity, smoking, alcohol use, low cholesterol levels, with age being the most significant [4]. Hypertension remains the leading cause [7], followed by less common etiologies such as cerebral amyloid angiopathy, tumors, coagulation disorders, medications, and drug abuse.

#### **Diagnosis:**

In addition to clinical examination, imaging plays a central role in diagnosing ICH. Non-contrast CT is the first-line modality due to its high sensitivity in detecting acute hemorrhage in the brain parenchyma, subarachnoid space, or ventricles. CT determines hematoma size, location, volume, and signs of raised intracranial pressure, aiding in severity classification and treatment planning. However, CT may be less sensitive in chronic or small bleeds.

MRI, especially with T1, T2, GRE, or SWI sequences, is sensitive across hemorrhage stages and helpful in differentiating mimics such as tumors or hemorrhagic infarcts. Digital subtraction angiography (DSA) remains the gold standard for evaluating vascular malformations and aneurysms. Less invasive CTA and MRA are increasingly used due to shorter acquisition time, though potentially less accurate than DSA.

Additional tests such as coagulation profiles, hematology, and biochemistry support identifying underlying causes (e.g., coagulopathy, thrombocytopenia) and guiding treatment.

In this case, the patient presented with left hemiplegia and was diagnosed via CT as having a right basal ganglia hemorrhage with ventricular extension. Initial medical management was attempted; however, due to clinical deterioration and increased hemorrhage on imaging, surgical intervention was indicated.

#### **Surgical management:**

Traditionally, open craniotomy with decompression and hematoma evacuation has been the mainstay for surgical treatment. Recently, endoscopic techniques have emerged as a minimally invasive alternative, offering several advantages: smaller incision, reduced trauma to surrounding brain tissue, lower risk of postoperative complications, and faster recovery [6].

Modern endoscopic systems provide high-definition visualization, enabling precise hematoma localization and removal, as well as bleeding control. Minimally invasive approaches reduce postoperative brain edema, hospitalization time, and improve functional outcomes, particularly in elderly patients or those with comorbidities.

In our patient, the decision for endoscopic evacuation was based on a GCS of 12, moderate hematoma volume, mild midline shift, and localized bleeding without deep coma — all favorable for a minimally invasive approach.

#### **Outcomes:**

On day 1 post-op, the patient was alert, followed commands, and showed stable vital signs without signs of raised ICP. Post-op CT showed marked hematoma reduction and no new complications. By day 10, the patient was fully conscious with improved motor strength, healed incision, no infection signs, and was discharged with outpatient rehabilitation instructions.

#### **4. Conclusion**

Initial results at Viet Tiep Hospital demonstrate promising outcomes using endoscopic surgery for ICH. This technique offers minimal invasiveness, enhanced visualization, effective hematoma evacuation, reduced complications, shorter hospital stays, and quicker functional recovery. With advances in surgical technology, endoscopic surgery is becoming an increasingly viable and effective option for selected ICH cases.

#### **Acknowledgements**

The authors thank patients and colleagues who kindly supported this study.

#### **Conflict of interests**

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

#### **Sources of funding**

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.

#### **REFERENCES**

1. Nguyen Quang An, Nguyen Huy Ngoc (2024). Evaluation of surgical outcomes in patients with ICH at Phu Tho General Hospital Stroke Center. *Vietnam Medical Journal*, 538(3). doi:10.51298/vmj.v538i3.9571
2. Nguyen Thi Ngoc Tuyen (2020). Clinical and subclinical characteristics and surgical treatment outcomes of spontaneous ICH. *Can Tho Journal of Medicine and Pharmacy*, 30, 173–178.
3. Dang Quang Tam & Nguyen Van Phong (2016). ICH situation at Can Tho General Hospital. *Ho Chi Minh City Medical Journal*, 20(1), 63–69.
4. Nguyen Van Thong (2020). Surgical treatment of hypertensive ICH. Medical Publishing House, pp.151–163.
5. Fred Rincon S. A. M. (2015). Clinical review: Critical care management of spontaneous ICH. *Critical Care*, 12: 237–252.
6. Qureshi A. T. S., Broderick JP, et al. (2020). Spontaneous ICH. *New England Journal of Medicine*, 344: 1450–1460.
7. Takahashi O. (2019). Risk stratification for in-hospital mortality in spontaneous ICH: A CART Analysis. *Q J Med*, 11(99), 743–750.
8. Hu Y. Z. (2018). Epidemiological and clinical characteristics of 266 ICH cases in Hangzhou, China. *Journal of Zhejiang University–Science B*, 14(6), 496–504.