

# Subarachnoid Haemorrhage after Stereotactic Catheterization of Intracerebral Hematoma

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## Abstract

The authors report the complication that occurred after stereotactic catheterization in a 71-year-old patient with a spontaneous intracerebral hematoma (ICH). After stereotactic catheterization, a subarachnoid haemorrhage (SAH) was found in the post-operative CT scan. An SAH is a rare complication related with stereotactic catheterization. We investigated the cause and reported about a newly occurring SAH after stereotactic catheterization.

**Keywords:** Intracranial haemorrhage; Stereotactic techniques; Hematoma; Complication

## Introduction

Blood pressure control [1], hemostatic therapy [2], Intracranial pressure (ICP) control [3], anti-convulsant therapy [4], and blood glucose control [5] are needed to treat intracerebral hematoma (ICH). In addition, neurosurgical operation may be considered depending on mental state, the location and amount of the hemorrhage, and neurological symptoms.

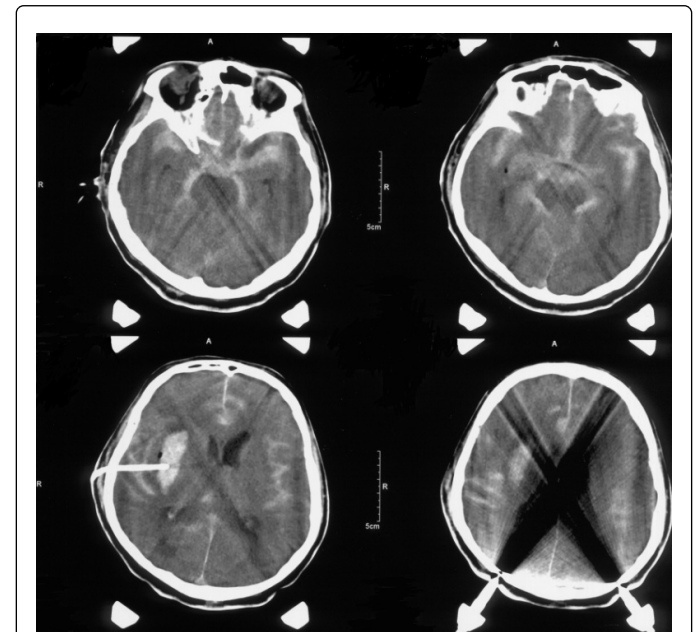
There are several surgery methods such as craniotomy, burr hole aspiration and stereotactic aspiration. Among such surgical modalities, stereotactic aspiration is the least invasive and most effective surgery for ICH patients. Stereotactic aspiration requires only a short operation under local anaesthesia, and there is little risk of damage to normal brain tissue [6]. Furthermore, catheters can be inserted precisely into the hematoma. However, they can cause complications, such as re-bleeding, infection, epidural hematoma, and neurological symptoms. The purpose of this case study is to report the cause of a subarachnoid hemorrhage (SAH) after stereotactic aspiration.

## Case Study

This 71-year-old patient came to the hospital due to mental deterioration and left side weakness. His score on the Glasgow Coma Scale (GCS) was 12 points, and his left side extremities showed hemiparesis with a poor motor grade. He had smoked for 25 years and he had been treated for prostatic cancer one year ago. In addition, he had been admitted to the hospital due to infarction and hypertension, and he was still taking anti-hypertension medicines.

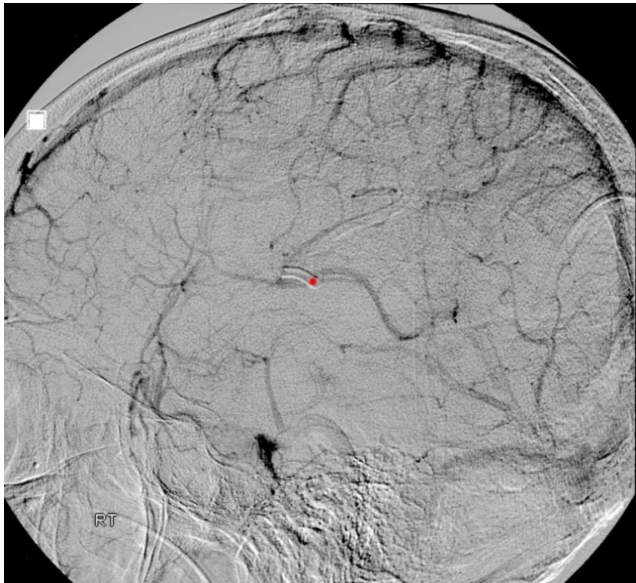
On brain CT, there was an almost 25 ml ICH on the right basal ganglia. Stereotactic aspiration using a Leksell stereotactic frame was planned via the shortest approach (i.e., through the temporal area). Coordination was calculated with Surgiplan (Elekta, Stockholm, Sweden). Local anesthesia was done with lidocaine. Then, a burr hole was made for catheter passage, and through a 7-Fr silicon catheter, a roughly 5 ml blood clot was extracted and the catheter was fixed on the scalp.

On post-operative CT, a newly occurring SAH (Fisher grade 3) was found (Figure 1).



**Figure 1:** Immediate post-operative brain CT. The patient had a spontaneous ICH and was treated with stereotactic aspiration. In the post-operative brain CT scan, a newly occurring SAH (Fisher grade 3) was found. In addition, the silicon catheter was inserted into the middle of the hematoma.

We tried to find any vascular abnormalities by transfemoral cerebral angiography, but there were no remarkable abnormalities. We only found that there was a cortical vein in the course of the inserted catheter (Figure 2).



**Figure 2:** Cerebral angiography. To determine the cause of the newly occurring SAH, trans femoral cerebral angiography was performed. The catheter was inserted into cortical vein (red spot).

Therefore, we suspected that cortical vein injury during stereotactic aspiration caused the SAH. The catheter was kept in place as it was. Because the ICH and SAH were reduced on the following brain CT, the catheter was removed after two weeks after checking almost all of the ICH and SAH had been absorbed. In the third week following the CT, there was no remnant ICH or SAH and the patient's mental status was improved with a GCS score of 13.

## Discussion

According to Fujitsu, there are some indications for operation such as a hematoma larger than 3 cm, a GCS score of 6-12, and neurological deterioration [7]. Moreover beginning the operation less than 6 hours from the occurrence of the ICH can cause re-bleeding because of the low compressive pressure of bleeding [8-11].

Generally, in the case of lobar, shallow ICH, craniotomy could be considered, but in the case of cortical or deep-seated ICH, stereotactic aspiration reduces brain tissue damage and show a better prognosis than craniotomy [6,12]. Re-bleeding was seen in 7% of the 97 patients in Niizuma's study and 11% of the 569 patients in Kanaya's study [13,14].

Since aneurysms or AVM were found in 48% of patients younger than 45 without hypertension, 49% of lobar ICH patients, and 65% of

Intraventricular hemorrhage (IVH) patients, preoperative angiography or planning with enhanced CT images might help to reduce vessel injury [8].

## Conclusion

An SAH during the stereotactic aspiration of ICH is very rare. In this case, a cortical vein injury that occurred during catheter insertion was suspected to have caused the SAH.

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