

# Chronic Encapsulated Intracerebral Hematoma: Endoscopic Removal as Minimally Invasive Surgery for a Patient with Alcoholic Cirrhosis

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Chronic encapsulated intracerebral hematoma (CEIH) is a rare cerebrovascular disease. Here, we describe a case of a patient with alcoholic cirrhosis and an abnormal coagulation state that was treated with minimally invasive endoscopic hematoma removal. A 54-year-old man presented with a 2-week history of incoherent speech, incontinence, and repeated stumbling. Laboratory analysis showed thrombocytopenia and the prolongation of prothrombin time due to alcoholic cirrhosis. Computed tomography and magnetic resonance imaging showed a large mass in the left parieto-occipital lobe suggesting a hematoma. Minimally invasive endoscopic hematoma removal was then performed. CEIH was diagnosed from the intraoperative findings of serous hematoma, a thin yellowish capsule, and old clots. The postoperative course was uneventful and there was no hematoma recurrence. In conclusion, endoscopic hematoma removal may be one of the options for the treatment of CEIH in patients with cirrhosis and an abnormal coagulation state.

**Keywords:** chronic encapsulated intracerebral hematoma, endoscopy, minimally invasive surgery

## Introduction

Chronic encapsulated intracerebral hematoma (CEIH) is a rare cerebrovascular disease first described in 1978.<sup>1)</sup> Surgical resection by craniotomy is recommended for this type of lesion.<sup>2)</sup> Endoscopic surgery for hematoma removal has been refined in recent years since Auer et al. first reported in 1985.<sup>3)</sup> This technique is considered safer and less invasive due to the development of neurosurgical instruments. However, the endoscopic hematoma removal of CEIH has not been reported in English literatures.

Liver dysfunction in surgical patients makes a risk of morbidity and mortality high.<sup>4)</sup> It is also applied to the neurological surgery. Liver dysfunction in a surgical patient could range from an incidental finding of mildly raised liver enzymes to severe dysfunction as seen in a patient with acute liver failure or decompensated cirrhosis. Since, in severe dysfunction, potentially every organ system may be affected, minimal invasive surgery is required for such

patients.<sup>5)</sup> Here, we described less-invasive endoscopic hematoma removal for CEIH in a patient with a coagulopathy and discuss the usefulness of endoscopic hematoma removal.

## Case Report

A 54-year-old man presented with a 2-week history of incoherent speech, incontinence, and repeated stumbling. He had a history of alcoholic cirrhosis and frontal lobe contusion. A physical examination showed neither ascites nor the symptoms of encephalopathy. A neurological examination on admission revealed motor aphasia, a right homonymous hemianopsia, and right hemiparesis. Laboratory analysis showed thrombocytopenia (platelet count: 10,000/ $\mu$ l) and the prolongation of prothrombin time (International Normalized Ratio: 1.44). Total bilirubin and albumin were 2.63 mg/dL and 3.7 g/dL, respectively. The Child–Pugh score was 6, class A.

Computed tomography (CT) showed a heterogeneous hyperdense mass in the left parieto-occipital lobe and a low density area showing previous contusion in the bilateral frontal lobe (Fig. 1A). T<sub>1</sub>- and T<sub>2</sub>-weighted magnetic resonance imaging (MRI) revealed the lesion was iso- and hyperintense, respectively, with perifocal edema (Fig. 1B and C). T<sub>2</sub>\*-weighted gradient echo imaging revealed the lesion to be a high-intensity mass with a low-intensity rim suggesting hemosiderin deposition (Fig. 1D). The preoperative differential diagnosis was hemorrhage, including CEIH.

Minimally invasive endoscopic hematoma removal was performed under general anesthesia. All procedures were performed with the spine in the lateral head position. A linear skin incision was made with 5 cm length and small burr hole was perforated with 3 cm diameter. First, we confirmed that there was no cortical vein that might be injured on corticotomy. After incising the brain surface, serous hematoma flowed out. When removing the hematoma, a thin yellowish capsule and old clots were identified (Fig. 1E). No abnormal vessels were observed. Because this patient had a coagulopathy, we did not remove the capsule for histological examination. CEIH was diagnosed based on preoperative and intraoperative findings. The postoperative course was uneventful and the patient's symptoms improved. The MRI showed no recurrence of the lesion at the two-month follow-up (Fig. 1F).

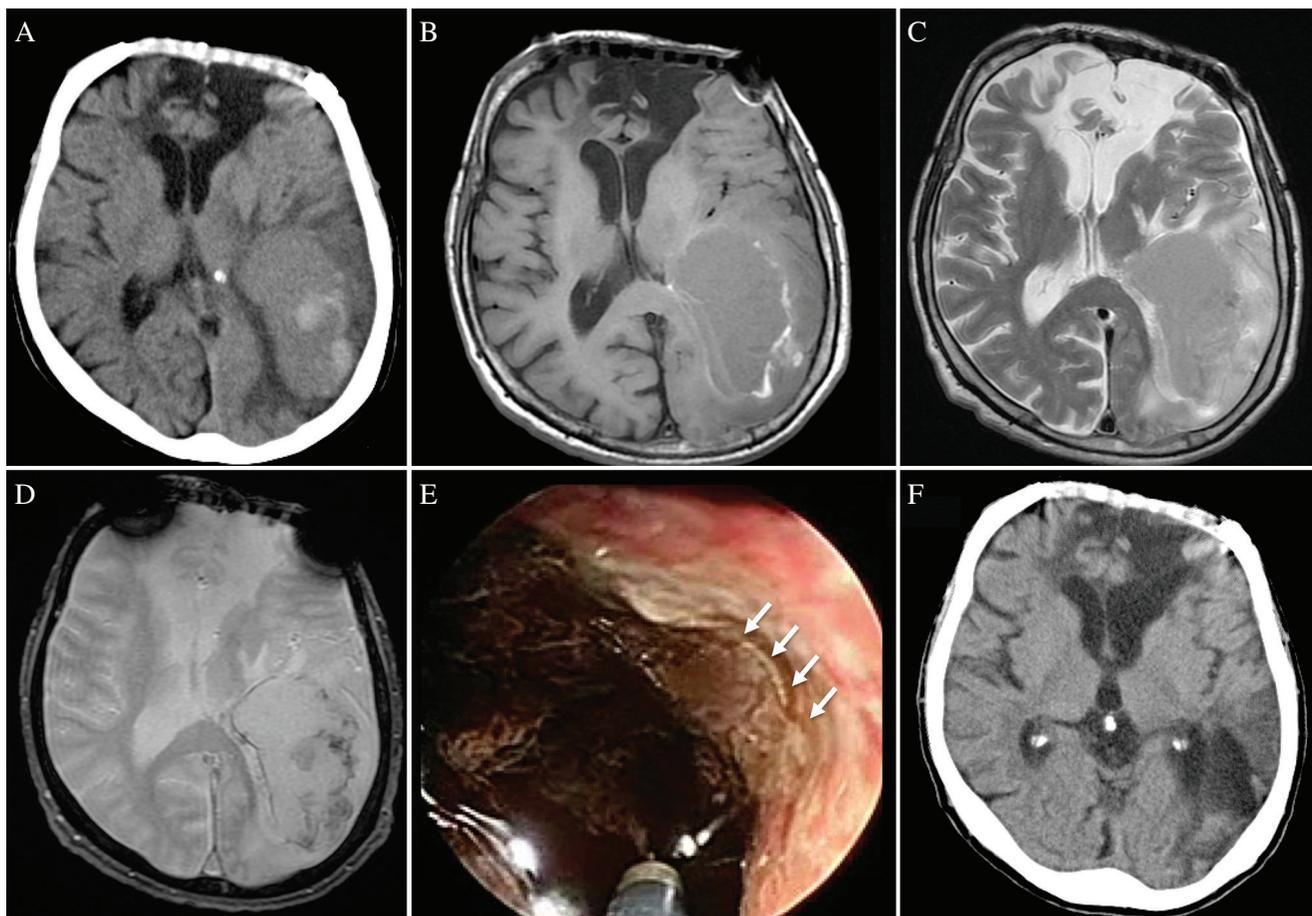
## Discussion

CEIH is a unique intracranial hematoma first described by Yashon et al. in 1978.<sup>1)</sup> This lesion was defined as a

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**Fig. 1** (A) Computed tomography (CT) scan shows a hyperdense mass in the left parieto-occipital lobe. (B,C) T<sub>1</sub>- and T<sub>2</sub>-weighted magnetic resonance imaging (MRI) revealed the lesion was iso- and hyper-intense, respectively. (D) T<sub>2</sub>\*-weighted gradient echo imaging revealed the lesion was hyper-intense with low-intensity rims. (E) Intraoperative endoscopic view showed a thin yellowish capsule (white arrows) and old clots. (F) Follow-up MRI showed no recurrence of the lesion.

slowly-expanding hematoma with a fibrotic capsule. The formation mechanism is thought to be repeated bleeding from new blood vessels within the capsule.<sup>6)</sup> So far, about 60 cases have been reported in the literature.<sup>2)</sup>

As for surgical treatment, it is controversial whether the removal of the capsule is necessary. Although the removal of the capsule has been recommended to prevent the recurrence of CEIH,<sup>7)</sup> Yashon et al. demonstrated that removing only the hematoma without the capsule could lead to a good prognosis.<sup>1)</sup> Considering this, careful follow-up is necessary due to the possibility of recurrence if the capsule remains.

As for the surgical approach, craniotomy was performed in most cases of CEIH. We found Japanese literature reporting the endoscopic removal of CEIH in a patient with a normal coagulation state.<sup>8)</sup> Endoscopic surgery has been recently developed and is considered a safer technique. We can perform minimally invasive removal of a hematoma with a small burr hole, short operative time, and minimal brain exposure, and we can control bleeding within a visible range by using endoscopy. On the other hand, in the case of craniotomy, we have to make large craniotomy, take longer operative time, and wide brain exposure, which have a high risk of bleeding. As a demerit

endoscopy, the control of bleeding without a visible range is difficult. Cautious manipulation during hematoma removal should be performed, and preparation for craniotomy is needed in the case of massive bleeding. CT-guided stereotactic aspiration, which was introduced in 1978 by Backlund and von Holst, could also be an option for hematoma removal requiring minimal invasiveness.<sup>9)</sup> Although stereotactic aspiration has some advantages such as a smaller hole for brain access and the precise planning of the trajectory, it could leave more hematoma, which may lead to a recurrence of CEIH.<sup>10)</sup> Furthermore, stereotactic aspiration has a poor control of bleeding site. Considering these drawbacks, endoscopic surgery is better suited for CEIH removal than stereotactic aspiration.

There is no report that describes how we should treat CEIH cases in patients with cirrhosis, especially due to alcoholism. Predictors of complications in patients with cirrhosis undergoing surgery are Child–Pugh class B or C, ascites, the etiology of cirrhosis other than primary biliary cirrhosis, elevated creatinine, preoperative infection, chronic obstructive pulmonary disease, preoperative upper gastrointestinal bleeding, invasiveness of the surgical procedure, and the American Society of Anesthesiologists physical status 4–5.<sup>4)</sup>

The cumulative effect of these risk factors increases the probability of developing a perioperative complication. There is a 9.3% chance of complications with 1 risk factor, a 14.5% chance with 2 factors, 33.5% with 3 factors, 63% with 4 or 5 factors, 73.3% with 6 factors, and 100% with 7 or 8 factors.<sup>11)</sup> To reduce the possibility of complications, it is necessary to consider the invasiveness of the surgical procedure. Considering these facts, the endoscopic removal of CEIH could be used for patients with cirrhosis.

In our case, the patient had alcoholic cirrhosis and the Child–Pugh score was 6, class A. Furthermore, because the patient had a tendency for bleeding due to alcoholic cirrhosis, we were concerned about massive intraoperative bleeding. For these reasons, we did not perform a craniotomy for hematoma removal, but endoscopic removal instead. For the same reason, the hematoma capsule was intentionally left in place. We gently removed the hematoma and did not perform a biopsy of the capsule because we feared further bleeding. This was the first case with a coagulopathy due to alcoholic cirrhosis, and was treated by minimally invasive endoscopic hematoma removal. Careful follow-up is necessary to monitor for hematoma recurrence.

In conclusion, endoscopic hematoma removal may be one of the options for the treatment of CEIH in patients with cirrhosis and an abnormal coagulation state.

#### Conflicts of Interest Disclosure

None.

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