INTRODUCTION

Chronic subdural hematoma (CSDH) is a common disease in the neurosurgical field, particularly in the elderly. The most common cause of chronic subdural hematoma is head trauma; other causes include coagulopathy, anticoagulant therapy, metastatic tumor, vascular malformations, and alcoholism. Symptoms vary, including headache, motor weakness, amnestic deficit, and lack of concentration.

Surgical treatment of CSDH in symptomatic patients is still the "gold standard" of therapy because it enables immediate decompression of the space-occupying lesion and significantly improves outcome. Nonsurgical treatment of CSDH could be administered in situations such as poor general condition or elderly patients who favor nonsurgical treatment.

The reasons for spontaneous resolution of CSDH are unclear. Herein, we report on a case that showed spontaneous resolution of a large CSDH and review the literatures on spontaneous resolution and nonsurgical treatment of CSDH.

CASE REPORT

An 87-year-old woman presented with confused mentality and right side weakness of motor grade II for 10 days. She had a history of head trauma one month ago. She had no history of alcoholism or anticoagulant therapy. After visiting a local hospital and undergoing computed tomographic (CT) scan, she was diagnosed as CSDH and transferred to our hospital for surgery.

When she visited our hospital, her Glasgow coma scale score was 14, mental state was light drowsy, motor grade was right hemiparesis of grade II, and Mini-Mental State Examination score was 11/30.

She had no underlying disease and a previously healthy state. Initial laboratory studies and vital signs were all within normal range.

The initial CT scan showed a 22 mm thick low density lesion located in the left fronto-temporo-parietal region with midline shift (12 mm) which required emergency decompression. However, because she and her family did not want surgery, she was followed up in the outpatient clinic. Five months later, follow up brain CT showed that the CSDH had disappeared and the patient became neurologically normal. The reasons for spontaneous resolution of CSDH remain unclear. We discuss the possible relation between mechanisms of physio-pathogenesis and spontaneous resolution of a large chronic subdural hematoma (CSH) in an elderly patient.

Key Words: Chronic subdural hematoma · Craniotomy · Burr hole · Observation.
RESULTS

We performed the following operations to relieve the symptoms of the patient and to reduce the size of the subdural hematoma.

1. Anticonvulsant therapy: The patient was prescribed anticonvulsant therapy (valproate sodium) without other medication.

2. Observation: The symptoms of the patient improved over time.

3. Medication: The patient was administered medication to relieve the symptoms of the patient.

4. Follow-up: The patient was monitored for a period of time after the treatment.

5. Imaging: Imaging studies were performed to monitor the progression of the subdural hematoma.

Discussion

In the literature, spontaneous resolution of CSDH has rarely been reported and the reason for spontaneous resolution of CSDH remains unclear. However, several theories have been proposed to explain the mechanisms of resolution of CSDH.

According to Nakamura et al., the decreased fibrinolytic activity of the hematoma and its capsule might have caused spontaneous resolution. Kawano and Suzuki investigated the possibility that presence of smooth muscle cells in the outer membrane of hematoma might play a role in the resolution of CSDH. Glover and Labadie demonstrated a reduced rate of membrane formation in an animal model with corticosteroid treatment in which the effect of dexamethasone was thought to be anti-inflammatory or antiangiogenic.

Several non-operative treatments have been described, including observation only, mannitol and ACE inhibitors or corticosteroids, however justification for treatment using ACE inhibitors or steroids has mainly been theoretical, and further research is clearly warranted. In a recent study, Kageyama et al. suggested that Tranexamic acid might simultaneously inhibit the fibrinolytic and inflammatory (kinin-kallikrein) systems, which might consequently lead to resolution of CSDH. In our patient, we prescribed only anticonvulsant (valproate sodium) without other medication.

Fig. 1. A: Initial brain CT scans showed thick crescent low density lesions in left fronto-temporo-parietal regions with midline shift. B: Follow-up CT scan 1 month later showed a decreased amount of subdural hematoma. C and D: Follow-up CT scan 2 and 3 months later showed gradual resolution of the hematoma. E: Follow-up CT scan 5 months later showed disappearance of the hematoma.
Some case reports on CT characteristics of spontaneous resolution of chronic subdural hematoma showed that the hematoma density becomes low with decreasing size\(^4\)\(^,\)\(^5\)\(^,\)\(^6\). Nakamura et al.\(^7\) reported that every CSDH that resolved without surgery showed low density on follow-up CT and these authors also indicated that the fibrinolytic activity of low density hematomas decreased with regression of the thickness of the cavity.

In the previously reported cases, radiologic characteristics of spontaneously resolved CSDH were small size of subdural hematoma, low or iso density of hematoma\(^7\)\(^,\)\(^6\), and absence of midline shifting or severe mass effect\(^6\), and its clinical characteristics were asymptomatic and mild transient headache\(^6\)\(^,\)\(^7\). The radiologic and clinical characteristics of our case are completely different from those of the previously reported cases. In our case, the subdural hematomas were large and the midline shifting was more than 12 mm. In addition, the patient showed severe hemiparesis clinically (Table 1).

**CONCLUSION**

This is a previously unreported rare case of spontaneous resolution of a large CSDH which required surgical decompression with hemiparesis and severe midline shift. Surgical treatment is still the gold standard and the first option in large CSDH with ventricular compression with mid-line shift having a distinct neurologic deficit. The possibility of conservative treatment is not indicated, however, there is probably another chance of spontaneous recovery as in our case. Persistent and close follow up of the patient is required in such CSDH cases.

- **Acknowledgements**
  This work was supported by the research grant of the Chungbuk Na-