

## Successful Cervical Epidural Blood Patch as a Treatment of Spontaneous Intracranial Hypotension - A Case Report

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### Abstract

### Case Report

**Background:** Spontaneous intracranial hypotension can be a source of headache due to a continuous cerebrospinal fluid leakage. **Case:** A 33-year-old male patient with unremarkable history was presented with a headache, accompanying posterior neck stiffness and tinnitus lasting for 4 days. The opening pressure from cerebrospinal fluid tapping was 60mmH<sub>2</sub>O. Magnetic resonance imaging of the neck showed fluid collection at right C1-2 level, suggesting spontaneous intracranial hypotension. The headache did not respond to conservative treatments. Epidural blood patch was performed at C4-5 level. On postoperative day 1, remnant headache was only 20 percent and patient was discharged the day after. **Conclusions:** In spontaneous intracranial hypotension with leakage site at high cervical level, an epidural blood patch at a different cervical level can be safely performed to relieve the symptoms.

**Keywords:** Blood Patch, Epidural; Cerebrospinal Fluid Leak; Headache, Primary; Intracranial Hypotension.

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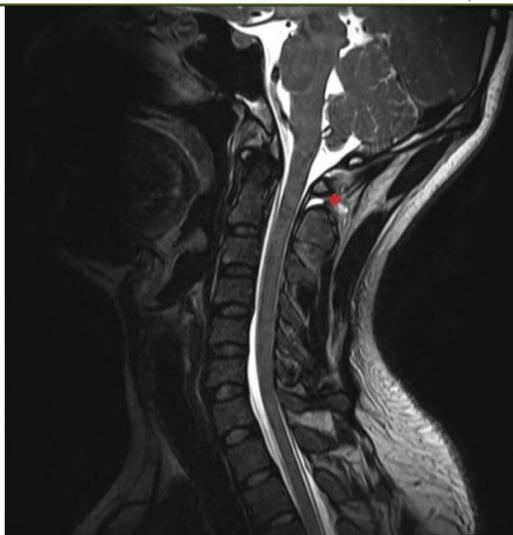
## INTRODUCTION

Headache resulting from low cerebrospinal fluid (CSF) volume is well recognized and commonly encountered following dural puncture [1]. However, spontaneous intracranial hypotension (SIH), a state of spontaneous CSF leakage, can also result in a low-CSF-volume headache. SIH is characterized by orthostatic headache which subsides when lying down, and other clinical manifestations of SIH include various neurologic symptoms [2, 3]. Initial treatments of SIH consist of mainly conservative measures, and epidural blood patch (EBP) can be an option in SIH refractory to conservative treatments [4]. Here, we would like to share a case of successful treatment of SIH using cervical epidural blood patch.

## CASE REPORT

Written informed consent was acquired for the publication of this report. A 33-year-old male patient (weight, 78 kg; height, 167 cm) with ulcerative colitis remission and otherwise unremarkable past history, visited emergency department due to a headache lasting for 4 days. The patient did not experience a persistent headache before and, the headache showed characteristics of holocephalic pain, aggravation with

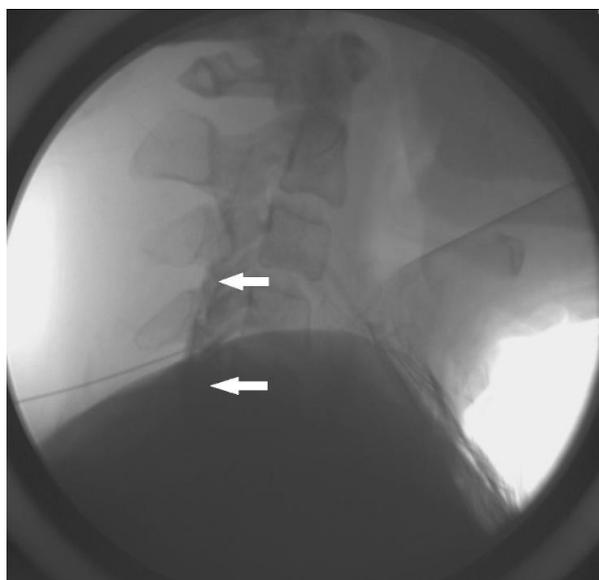
standing, and relief with lying down. The patient experienced accompanying symptoms of posterior neck stiffness, non-spinning type dizziness, tinnitus, and nausea. There were no signs of infection or focal neurologic deficit. The opening pressure from CSF tapping performed at the emergency department was 60mmH<sub>2</sub>O. The laboratory results from CSF showed no pleocytosis, with high glucose (96.2 mg/dL) and protein (137.8 mg/dL). Other results from laboratory tests, electrocardiography, and chest radiography were unremarkable. The patient was admitted to neurology department under impression of spontaneous intracranial hypotension and underwent magnetic resonance imaging to identify CSF leakage. Magnetic resonance imaging of the head and neck showed thickening of epidural space with engorgement of epidural veins, compatible with intracranial hypotension, and focal fluid collection in C1-2 interspinous space with right more dominant, suggestive of leakage site (Fig 1). A day of conservative therapy, with bed rest, non-steroidal anti-inflammatory drugs, and intravenous fluid hydration did not yield satisfactory results, and a consultation to pain medicine department was sought. After evaluation, the decision to perform EBP at cervical level was made.



**Figure 1: Sagittal T2-weighted magnetic resonance image of fluid collection at C1-2 level (red asterisk)**

Review of laboratory data and imaging studies were done prior to patient arrival at the operation room. The patient was placed in prone position, and draped aseptically. Fluoroscopy was adjusted to obtain an optimal view, and skin was infiltrated with 1% lidocaine. An epidural needle was inserted at C4-5 interspinous level and was advanced to reach the epidural space under fluoroscopic guidance using loss of resistance technique. After appropriate position of the needle was confirmed by antero-posterior and lateral fluoroscopic view, contrast solution

(Omnipaque® 300, GE healthcare Korea, Korea) diluted with normal saline was injected. The distribution of contrast was visualized from C4 to C6 levels to confirm epidural space (Fig 2). Venous access from right arm was achieved with 20-gauge angiocatheter, and 8ml of sterile whole blood was collected. The collected autologous blood was slowly injected into the epidural space. Dressing was applied to infiltration sites, and patient was delivered to recovery room without complications.



**Figure 2: Fluoroscopic image of contrast distribution in epidural space at C4-6 levels (white arrows)**

The patient reported that 60 percent of pain was relieved on the day of blood patch procedure, and 80 percent of pain was alleviated on the following day. It was decided that remnant pain was to be treated on outpatient basis and patient was discharged 2 days after cervical epidural blood patch procedure. On outpatient follow up 1 week after discharge, patient reported of minimal remnant pain and the case was concluded.

## DISCUSSION

SIH is a clinical condition with low volume of CSF due to spontaneous leakage of the CSF. This loss of CSF leads to displacement of cerebral structures, resulting in a headache and other symptoms. In SIH, although CSF pressure measured by lumbar puncture manometry may be normal, it is often below the normal

limit (6 – 25 cmH<sub>2</sub>O, or 4.4 – 18.4 mmHg), and use of the term ‘hypotension’ continues [3].

The diagnosis of SIH is made when symptoms and signs meet the criteria from third edition of International Classification of Headache Disorders (ICHD-III). The ICHD-III criteria for SIH include, headache due to low CSF pressure without a traumatic event during the prior month, either or both of low CSF pressure (<60mmH<sub>2</sub>O) or evidence of CSF leakage from imaging modality, [5]. The identifiable causes for the CSF leaks include dural tear or ectasia, meningeal diverticula, and CSF-venous fistula [3]. The headache from SIH is usually described as an orthostatic headache which alleviated with recumbence. Other common symptoms include posterior neck pain, fatigue, and neurologic symptoms such as dizziness, cognitive impairment, and facial paresthesia [2, 3]. SIH is considered as rare, with an estimated incidence of 2 to 5 in 100,000 individuals every year, and women of 30 to 50 years of age are frequently affected [4, 6, 7]. Although SIH is rare, it has become a relatively well-recognized clinical condition recently [4]. Despite its recent recognition, the rarity of SIH and variability in clinical presentation continues to make its diagnosis difficult [3].

Although there are not enough data from randomized trials are unavailable, initial approach in treatment of SIH consist of conservative measures, such as bed rest, administration of caffeine, theophylline or analgesics, hydration, and application of abdominal binder [3, 8]. A previous Cochrane meta-analysis, although currently withdrawn for being out of date, stated that lack of evidence exist for autologous EBP, however EBP is considered as a treatment of choice in SIH refractory to conservative measures [4, 8, 9]. The effect of EDP is considered to be achieved from two mechanisms. Immediate relief of headache, obtained in some cases, is thought to be achieved by immediate rise in CSF pressure from epidural hematoma [3]. The lasting effect of EDP is thought to come from sealing of leakage site as blood clots and scar forms [10]. Theoretically, EDP is considered to be more effective when blood is delivered closer to the CSF leakage site, however as blood can extend to distant levels, punctual EDP at leakage level is not necessary [3, 10-12].

In our case, anatomical complexities at C1-2 levels made it difficult to deliver EBP at leakage site, and decision to perform EBP at other spinal levels seemed reasonable, as it has been safely demonstrated before [12]. We could not visualize the extent of injected blood, as we did not mix the autologous blood with contrast. However, considering the alleviation of

the patient symptoms, it was assumed that the blood successfully traveled to the leakage site and sealed it.

## CONCLUSION

We have demonstrated that in SIH with leakage site at high cervical level, an epidural blood patch at a different spinal level can be a safe and effective treatment.

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