Letter to the Editor

Thoracic epidural blood patch with high volume blood for cerebrospinal fluid leakage of cervical spine (C2–3) complicated with spontaneous intracranial hypotension

**Abstract**

Acute and chronic subdural hemorrhage in a 33 year old woman with severe headache from occipital to frontal regions and dull neck pain was diagnosed on magnetic resonance image, which revealed cerebrospinal fluid leakage at C2–3 with spontaneous intracranial hypotension. Successful treatment was performed by epidural blood patch from the level of T7–T8 with injection of 20 mL of autologous blood.

1. Introduction

Spontaneous intracranial hypotension (SIH) is caused by cerebrospinal fluid (CSF) leakage. Conservative treatment with bed rest, intravenous hydration, and caffeine is the first choice in clinical practice. However, the epidural blood patch (EBP) should be performed if there is no response to conservative management. For treatment of cervical CSF leakage, EBP from the lumbar spine region is not as effective.1 EBP at the site of cervical CSF leakage is more effective.2 However, cervical epidural blood patch must be performed under imaging guidance due to the high risk of spinal cord and root injury.3 We present a case of CSF leakage of the cervical spine (C2–3) with successful treatment by thoracic EBP with high volume blood.

2. Case report

A 33 year old woman had sudden onset of severe headache from occipital to frontal regions. Her headache was accompanied by vomiting and neck stiffness and persisted for 3 weeks. The symptoms worsened when standing and were relatively relieved in the supine position. The magnetic resonance image (MRI) of the cervical and thoracic spine showed CSF leakage of C2–3 in T2 weighted images and CSF leakage of C2–3 complicated with SIH was diagnosed (Figure 1). Conservative treatment of bed rest, adequate hydration and medicine was performed initially, but in vain. Thus, an anesthesiologist was consulted for EBP. After thorough explanation of the benefits and risks of cervical and thoracic approaches, the patient chose the thoracic approach because of safety concerns. To achieve the level of C2–3, a high volume of 20 mL of an autologous blood patch was performed by catheterization in the cephalic direction from the level of T7–T8 (Figure 2). The patient kept the Trendelenburg position for 2 hours after injection, after which her severe headache improved. Follow-up MRI showed resolution of the fluid collection (Figure 3). The patient was successfully treated with epidural blood patch. At 4 weeks follow-up, she reported no headache or neck stiffness.

3. Discussion

In anesthetic practice, EBP at the site of leakage is the treatment of choice if conservative measures have failed for SIH. Other treatments have been suggested with different success rates, including intrathecal fluid infusion, epidural saline infusion, epidural infusion of dextran, epidural injection of fibrin glue, CSF shunting, and surgical repair of the leak.4 Cousins et al5 suggested that placement of the EBP close to the site of CSF leakage is important. The proposed mechanism is that the injected blood seals the dural defect and stops the leakage. The other theory is that the injected blood causes an epidural tamponade effect over the leakage site. It would seem sensible to target the treatment at the site of the leakage to maximize the chances of success, but there is no significant evidence to support targeted EBP, and randomized clinical trials are unlikely to be feasible given the low incidence of the condition.

To the best of our knowledge, this is the first report where thoracic EBP with high blood volume by catheterization in the cephalic direction was successfully used for cervical CSF leakage. Nipatcharoen and Tan2 reported four cases of CSF leakage. Two cases involved leakage at the cervical spine and were resolved by EBP from the cervical spine. The other cases involved leakages at the thoracic spine and were successfully treated by EBP from the thoracic spine.
thoracic spinal region. Rai et al. reported that the imaging-guided precise placement of the blood patch at the mid-C2 level for cervical spine leakage is safe. It was thought that a lumbar blood patch away from the leakage site would be ineffective. Although most SIH are from thoracic spine CSF leakages, our case involved C2–3 leakage. The imaging-guided cervical approach may be the first choice. But after explanation of the benefits and risks of cervical and high- and mid-thoracic approaches, the patient chose a mid-thoracic approach because of safety concerns. We calculated the blood volume for each level of thoracic and cervical epidural space, which were 1.5 mL and 1.0 mL, respectively. Thus, injection of 20 mL of blood from T7–8 can reach C2–3 to seal the leak or to cause an epidural tamponade effect and then stop the leakage. The ineffectiveness of lumbar spine blood patch for cervical spine leakage may be because the injected blood (maximum 20 mL) is not enough to reach the leak in the cervical spine.

We present this case of C2–3 leakage with successful treatment by EBP with high volume (20 mL) blood injection from the T7–T8 region. Although performing EBP at the site of the suspected leakage is more effective, this technique might be a viable alternative modality for treatment of SIH.

4. Conclusion

In our case report, we demonstrated that thoracic EBP with high volume blood injection and maintenance of the Trendelenburg position for 2 hours are effective treatments for high cervical CSF leakage with spontaneous intracranial hypotension.

References


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