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Acute Cervical Hematoma after Interlaminar Cervical Epidural block

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Abstract | **Case Report**

In this report, we describe a case of cervical epidural hematoma presenting after epidural block of C6-7 level in a 62-year-old female. We suggest that, even with successful cervical epidural block under fluoroscopic guidance, epidural hematoma and neurologic symptoms might occur few hours later which necessitates surgical intervention.

Keywords: Interlaminar Acute Cervical Hematoma Interlaminar.

INTRODUCTION

Cervical herniated intervertebral disk(HIVD) is a common condition that many pain clinicians face in daily practice and cervical translaminar epidural block is one of the most reliable methods of treating variety of chronic benign pain syndromes, including cervical radiculopathy, cervicalgia, postlaminectomy syndrome, compression fractures, postherpetic neuralgia[1]. Although most of these procedures are performed safely without serious complications under fluoroscopic or ultrasound guidance [2], we experienced an unusual case of epidural hematoma. In this report we will tell the clinical course of the patient and discuss the possible explanations how the complication resulted from the procedure.

CASE REPORT

A 62-year-old female was first diagnosed with cervical herniated intervertebral disk of C6-7 level in 2017(Figure 1). Since then, she repeatedly visited our pain clinic by both outpatient and inpatient way when she suffered from neck or radiating arm pain. Both medical and interventional treatment (translaminar cervical epidural injection) options have been applied to this patient since the first diagnosis. The patient did not show any side effects or complications after 9 times of translaminar cervical epidural injection during this period.

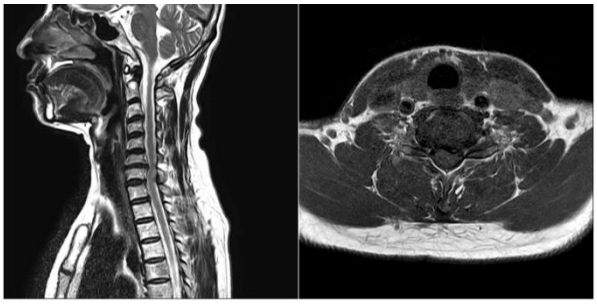

Fig-1

Since no other diagnosis has been made for her, she has not taken any anticoagulant, antiplatelet or vasodilating drugs. Routine laboratory tests including complete blood count, coagulation, platelet function test and CRP were performed both at the time of diagnosis and during follow-up period, which were all within normal range.

On 2021 April, the patient visited our office for radiating pain and tingling sensation of her right arm and we performed translaminar cervical epidural injection of right C6-7 level under fluoroscopic guidance (Figure 2). After locating the entry site, we injected 2ml of 2% lidocaine for local anesthesia and inserted 22G tuohy epidural needle. Repeating fluoroscopic imaging, the needle engaged toward the epidural space from lateral to more medial side. Just before reaching spinolaminar line on lateral imaging, we stopped inserting the needle and advanced more gently and cautiously by loss-of-resistance technique. On feeling loss of resistance, we stopped inserting the needle and injected contrast media. The spread of

contrast media showed the patient's epidural space clearly, so we confirmed that the needle tip is in the right place to inject saline and local anesthetic. The combination of 1ml of 2% lidocaine and 9ml of normal saline was injected in the epidural space and washout of the contrast media was confirmed by fluoroscopy (Figure 2). During the entire procedure, aspiration of blood was not detected and the needle was removed from the patient. Sterile bandage was applied and the patient was sent to recovery room. After 1 hour, she did not feel any neurologic change or pain, so she was sent home with medications.

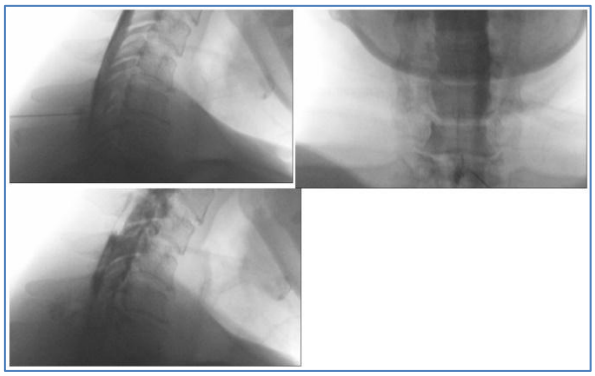

Fig-2

After 6 hour, she abruptly felt right-sided neck pain and limited range of motion when rotating her neck. The patient also told us that she could not move her right arm and right leg freely and urinate or defecate. She came back to our office and thorough neurologic examination was carried out. Right side weakness of motor grade 4 and voiding difficulty were detected. Suspecting spinal epidural hematoma, we injected 10mg of dexamethasone intravenously and went down to MRI suite with the patient for emergency imaging. Just before entering the MRI suite, the patient urinated and defecated, but motor grade was still unchanged.

Spinal epidural hematoma extending from right C2 to T1 level was confirmed on the MRI (Figure 3) and emergency decompressive laminectomy was immediately scheduled with neurosurgery department. C5-6 total laminectomy and C7 upper laminectomy with hematoma removal was carried out with microscopy (Figure 4). On postoperative day 1, we checked her motor function and confirmed complete recovery of her neurologic symptoms and neck pain, except mild incision site pain. Few days later, the patient was discharged and regular outpatient follow up is now going on.

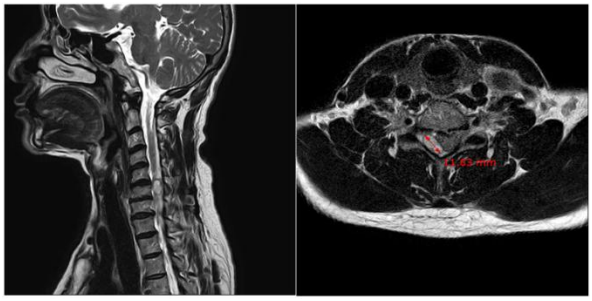

Fig-3

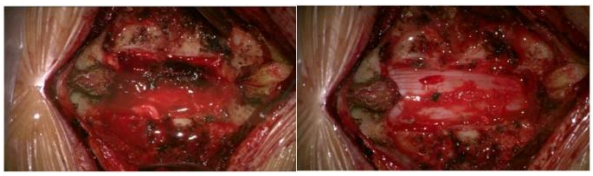

Fig-4

DISCUSSION

In epidural space, venous plexus without a primitive type valves, areolar tissue, fat tissue, and lymphatic vessels are distributed, among which venous plexus is most abundantly distributed anatomically. Statistically, Intravenous placement of the epidural needle occurs in about 0.5% to 1% of patients undergoing cervical epidural anesthesia. If the misplacement is unrecognized and local anesthetic is injected directly into an epidural vein, significant local anesthetic toxicity will result [1]. Also, Needle trauma to the epidural veins may result in self-limited bleeding, which may cause postprocedure pain. If such bleeding is not spontaneously absorbed, the released blood may form an epidural hematoma in the confined space of the spinal canal, which, according to statistical analysis conducted by Tryba, was estimated to occur at 1 per 150,000 cases after epidural block [5]. As the epidural hematoma grows larger, it may directly compress the cauda equina and spinal cord, causing neurological deficit due to vascular insufficiency and ischemia [4]. Although significant neurologic deficit secondary to epidural hematoma after cervical epidural block is exceedingly rare, this devastating complication should be considered whenever there is rapidly developing neurologic deficit after cervical epidural nerve block [1].

It has been reported that spinal surgery, epidural catheter insertion, and perioperative anticoagulant therapy account for about 73% among the various causes of epidural hematoma [6]. And the incidence of this complication is increased in patients with distended epidural veins, such as parturient women and patients with a large intra-abdominal tumor mass. Anticoagulant therapy and coagulopathy are absolute contraindications to cervical epidural nerve block because of the risk of epidural hematoma [1]. This risk is higher in patients with inherited and acquired coagulation disorders, but it can occur in patients

without any history of anticoagulant medication use or other risk factors [7-10]. Therefore, considerable caution is required during the procedure.

Typical symptoms of epidural hematoma include localized acute back pain, accompanied by abnormalities in motor and sensory functions, radiating pain, and dysuria, while some cases with epidural hematoma may not manifest pain at all[11]. The duration of spinal cord compression by the hematoma is known to be a significant factor influencing the prognosis of neurological deficits [12], emphasizing the importance of early detection through continuous monitoring and neurological examination from the time of the procedure to 24 hours after the catheter removal [9]. Magnetic resonance imaging (MRI) is the most useful radiological tool for diagnosis and emergency decompressive laminectomy is required when impairments in neurological function are suspected.

In addition to direct needle injury, the cause of epidural hematoma may relate to vessel damage due to increased pressure in the epidural space [3]. In the case reported by KIM et al., they believe that the cause of hematoma formation of their patient was the increased pressure after epidural injection, rather than direct needle injury to nearby vessels. In their case, epidural hematoma was located in T11-L1, but the epidural needle advanced through right intervertebral foramen of L2-3 level. This patient also did not take any anticoagulants and was not related to any bleeding tendencies. In our case, when we injected total 10ml of saline and local anesthetics in the epidural space, the patient complained of pain and we felt increased pressure to push the syringe compared to other cases. Although it is assumed that the amount of drug injected into the epidural space and the pressure exerted at the time of injection are not always correlated, there is a possibility that the additional drug injection after a substantial filling of epidural space is completed may cause increased pressure of epidural space in patients with spinal stenosis or severe degenerative changes in surrounding anatomies.

Reviewing the literatures comparing the vertebral spreading segment according to the amount of drug injected into the cervical epidural space, it is found that 5ml injection at level of C7-T1 could be an optimal volume for distribution to the lower and upper cervical spine in Lee et al., which had compared 2.5ml, 5ml, and 10ml injection [13, 14]. And 2ml injection at level of C6-C7 were effective in distributing drugs widely to C3 level in Jo et al., which had compared 2ml and 4ml injection [15]. The range of drug distribution in the epidural space may vary in clinic according to the injection rate, the severity of degenerative spinal disease and anatomical variation of each patient, suggesting the necessity of further studies, but findings from previous studies may suggest that with lesion confined to the cervical region, appropriate adjustment of the injection dose for each patient is necessary to prevent an increase in pressure during injection.

So our conclusion is that even though there are not any risk factors such as anticoagulant medications, bleeding diathesis, old age, severe spinal stenosis, and increased epidural pressure may cause epidural hematoma. As a result, cautious and slow advancement of needle and injection of fluid is crucial in preventing epidural hematoma. Excessive amount of fluid injected into the epidural space may also cause increased pressure, though exact quantity is still to be further investigated.

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