

LETTERS TO THE EDITOR

Seizures and Transient Neurological Deficits During Epiduroscopy in a Patient with Failed Back Surgery Syndrome

Dear Editor:

Although epiduroscopy is a minimally invasive technique, reports pertaining to its clinical use and complications are incomplete [1]. We herein present a case study of a patient who experienced seizure and transient neurological deficits during epiduroscopy.

A 42-year-old male patient was admitted to an algology clinic with bilateral back and leg pain that was more pronounced in the right leg. According to his medical history, the patient underwent lumbar stabilisation operations in February 2009, but the pain returned following the operations and continued to increase (Figure 1). By the time we saw the patient, his visual analog scale (VAS) pain rating was 9/10. The patient's straight leg-raising test performance was normal. There was no neurological deficit, but neuropathic symptoms, including constant burning and tingling, were present especially in the right leg. The patient, whose complaints did not abate despite the use of 300 mg/day pregabalin and 200 mg/day tramadol, did not benefit from physical therapy. Therefore, a fluoroscopy-guided caudal epidural steroid injection was administered. Epiduroscopy was undertaken when the patient's complaints, which decreased for a month through this procedure, returned to a similar level of severity, with a VAS pain rating of 6/10.

The intervention site was cleaned with an iodine-based antiseptic solution in the prone position. Conscious sedation was achieved via 1–2 mg midazolam, 25–50 mg fentanyl, and 30 mg/kg propofol. The intervention site, skin, and subcutaneous tissue were anaesthetised with 3 mL 2% lidocaine. A disposable endoscopic catheter (Epiduroscopy, Epi-C®, Gouda, The Netherlands) was placed into the sacral hiatus according to the Seldinger method. Epidurography was performed with 10 mL non-ionic contrast material (Iomeron 300, Patheon, Italia SpA) to determine pain-associated pathological structures. As a result of the epidurography, radiopaque material did not exceed L5 levels, and there was no output from foramina. A filling defect was observed in the right side of L5-S1. To get a vision during epiduroscopy, saline was injected at between 0.15 and 0.2 mL/s rates. When volume of saline reached at 100 mL, the following situations were observed; hypertension, decreased oxygen saturation, respiratory arrest, and loss of consciousness during the 10th minute of the procedure, epiduroscopy was immediately terminated. Then mask ventilation was initiated, with the patient in the supine position. A short-term, generalised tonic-clonic seizure was observed. Spontaneous breathing returned and consciousness was

regained after approximately 35 minutes. The patient was taken to a postanaesthetic care unit. Complete motor and sensory loss in both of the lower extremities was detected after the patient regained consciousness. It subsequently became clear that the patient's right lower extremity recovered more quickly than the left lower extremity. Brain magnetic resonance imaging results were judged to be normal, and the patient was returned to the service. The patient was discharged after next-day follow-up, during which the lower extremity motor power was normal, VAS pain was rated as 2/10, and neuropathic symptoms were reduced.

Physiologically normal intracranial pressure is at the level of 5–10 mm Hg at rest. Following extradural injection of 10 mL, intracranial pressure increased to between 11 and 63 mm Hg [2]. This increase in pressure occurs within seconds of injection, and may continue to increase pressure for approximately 45 seconds. Increased intracranial pressure has been shown to return to normal levels between 2 minutes, 20 seconds and 5 minutes, 50 seconds [2]. This increase in pressure may be greater in patients with a priori above-average intracranial pressure; 10 mL epidural injection can cause a more serious increase in pressure, up to approximately 300 mm Hg [1]. In the present case, another contributing factor to the seizure was the amount of 0.9% saline infusion used during epiduroscopy. The average amount of cerebro-spinal fluid (CSF) in humans is 130–150 mL. When CSF flow is blocked, or the amount of CSF increases, pressure will increase more markedly with the addition of fluid to the system (because the system can be extended only marginally). Therefore, the amounts of steroid, hyaluronic acid, radiopaque substance, and 0.9% saline administered during epiduroscopy should be calculated precisely, and the presence of headache should be assessed intermittently, where headache is an indicator of increased intracranial pressure in patients under sedoanalgesia. If a headache develops, the intervention should be terminated. During the World Initiative on Spinal Endoscopy (WISE) conference, held in Graz, Austria, between March 3, 2006 and March 4, 2006, the amount of liquid used during epiduroscopy was discussed; it was emphasised that this amount should not exceed 200 mL [3]. Schütze reported using substantially less liquid, at an average of 85 mL [1]. In a systematic review published in 2013, application of liquid in amounts exceeding 100 mL increased epidural hydrostatic pressure [4]. Gill and Heavener reported that epidural injection should be administered at a low speed of 1 mL/s: a volume of 100 mL/60 min should not be exceeded, and an infusion rate of 0.03 mL/s is appropriate [5]. In the present case, 100 mL

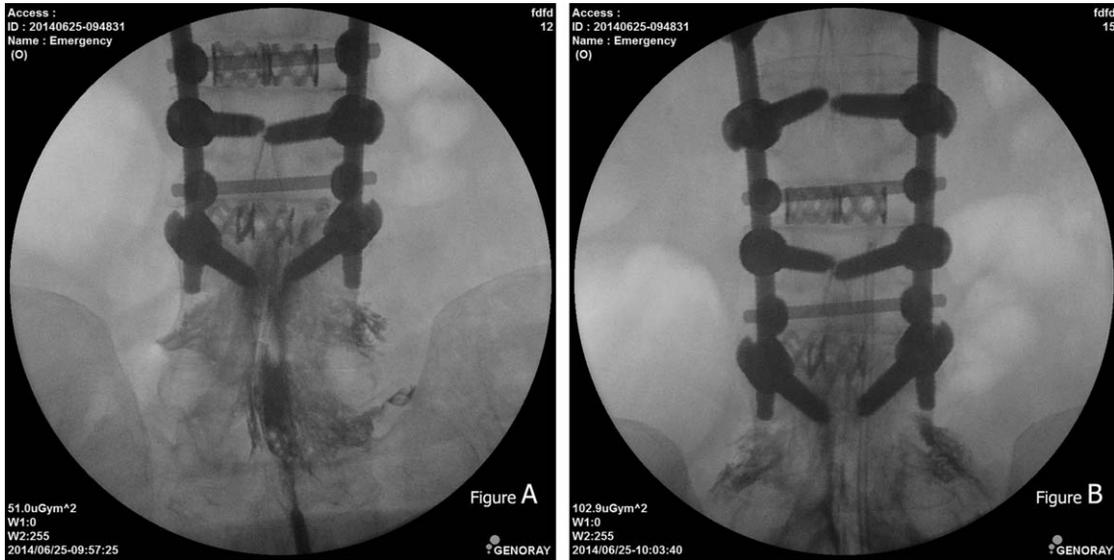


Figure 1 A: Distribution of the radiopaque substance in epidural space following delivery of the radiopaque substance. The substance was not observed above the L4 level. The filling defect was observed at the L5-S1 level. B: Epiduroscopy cannula was observed above the L4 level.

saline was infused with 10 mL radiopaque substance. The speed of the liquid infusion, at the onset of the 10 min procedure, may have engendered a rapid increase in epidural pressure. Moreover, the administration of 110 mL liquid in a short period of time increased the pressure in the epidural space, thereby facilitating the opening of pain-causing adhesions.

In 2011, Popescu et al. [6] conducted a literature review of the neurological problems observed following epidural injection. A total of 16 neurological cases were reported: paresis or plegia were observed in 10 patients, and seizure was observed in one patient in the form of grand mal epilepsy. The seizure patient received hyperbaric oxygen therapy following the operation [7].

Epiduroscopy is becoming increasingly prevalent. Although it is a safe, minimally invasive technique, the rates of complications resulting from epiduroscopy will increase commensurate with its increasing usage. On the basis of the present case, we believe that the amount of all types of liquids delivered to the spinal canal should be calculated precisely during implementation of the epiduroscopy procedure, and that unnecessary fluid and drug administration should be avoided. Finally, injections of drug or radiopaque substances should be administered slowly and carefully.

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