CASE REPORT

Spinal abscess after epidural block and radiofrequency ablation in a patient with post-herpetic neuralgia

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Abstract

A 67-year-old man was admitted due to a two-week history of pain on the right side of his chest, upper back, and armpit, and progressive lower-limb weakness. The results of Magnetic Resonance Imaging and colour ultrasound supported the diagnosis of spinal abscess. The patient underwent a series of debridement and antibacterial treatments, but no obvious recovery of muscle strength was observed. This case highlights the potentially serious complications of invasive analgesic therapy.

Keywords: Case report, Epidural block, Spinal abscess, Post-herpetic neuralgia, Radiofrequency ablation.

Core Tip: The patient exhibited no signs of infection before the treatment, and the abscess appeared after the treatment, indicating that it was iatrogenic. The patient received radiofrequency thoracic nerve impulses the day after continuous epidural block surgery, significantly increasing the risk of treatment-related infection.

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Introduction

Epidural anaesthesia and Pulse Radiation Frequency (PRF) are widely used, effective forms of treatment for various types of complex pain. Generally, these two therapies are associated with a low risk of serious complications, such as spinal cord or spinal nerve injury, epidural haemorrhage, haematoma formation, and infection.

Herein, we describe a recent case of Postherpetic Neuralgia (PHN) in a patient who was transferred to Guangdong Hospital of Traditional Chinese Medicine, Guangzhou, Guangdong, China due to thoracic epidural infection and incomplete paraplegia, which developed after treatment with a continuous epidural block and RFA at another hospital.

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Case Report

In May 2019, a 67-year-old man presented with pain on the right side of his chest, upper back, and armpit for three weeks, as well as progressive weakness in both the lower limbs that had developed over the preceding two days. Although he had a history of diabetes, he reported that his blood glucose was well controlled, and his latest glycosylated haemoglobin result was 5.7mmol/L.

The patient previously developed a superficial rash accompanied by pain on the right side of the chest, back, and underarms, following which he was diagnosed with herpes zoster at another hospital (Shenzhen Hospital of Peking University, Shenzhen, Guangdong, China) in mid-April 2019. The rash resolved after approximately two weeks, although he continued to experience paroxysmal piercing pain. When asked to report his pain along a Visual Analogue Scale (VAS), the patient provided a rating of 7.5. At the end of April 2019, a continuous epidural block was performed at the T4–T5 level using an 18 G puncture needle without any device guidance. Lidocaine (150mg), Dexamethasone (1.5mg), and saline were mixed together to achieve a total volume of 250ml, and it was infused at a rate of 5ml per hour. The patient provided a VAS rating of 5.0. On the next day, the patient underwent pulsed radiofrequency ablation of the upper thoracic spinal nerve at T4–T6, which resulted in relief of pain. His VAS score at that time was 2.5. However, 10 days later (May 07, 2019), the pain in the original area intensified and was accompanied by fever and weakness in both the lower limbs. His maximum body temperature was 38.4℃, and his back pain gradually intensified (VAS score: 5.5), following which he presented to our hospital (Guangdong Hospital of Traditional Chinese Medicine, Guangzhou, Guangdong, China) for treatment. On presentation, the patient exhibited poor mental status, was unable to walk, and required a wheelchair for mobility.

After admission, the patient underwent a colour Doppler

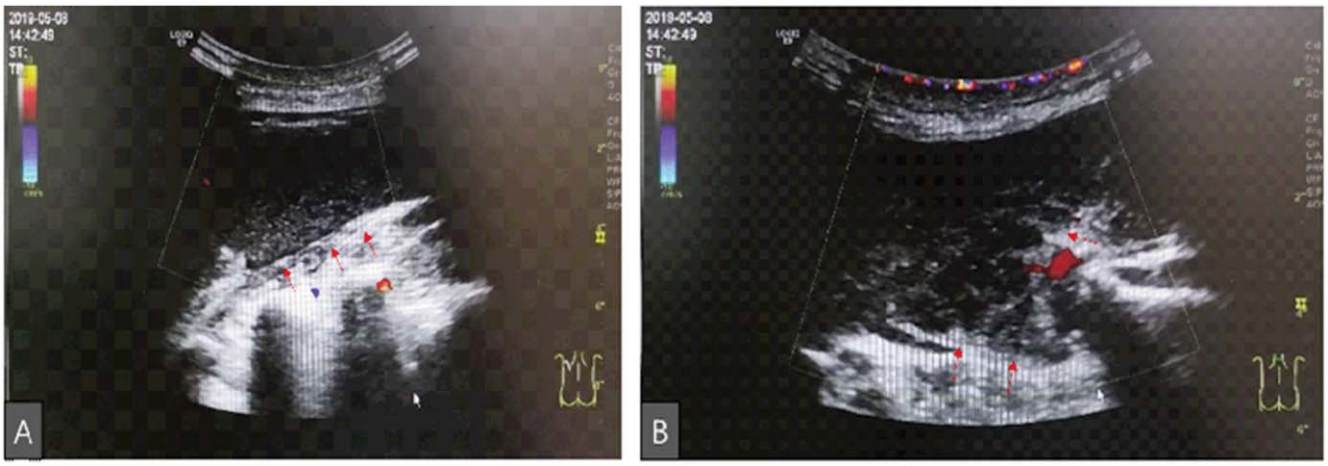

Figure-1: Colour Doppler ultrasound of the upper chest and back.
The area indicated by the arrow shows a subcutaneous abscess. Beneath the skin there was a large, irregular, circular echo region, which had a range of 245 mm × 175 mm × 56 mm. The boundary was not clear and extended to the front of the scapula (A). With a change of body position, a weak echoic accumulation of flocculent appeared (B). The colour Doppler flow imaging indicates that the blood flowed around the mixed echo region.

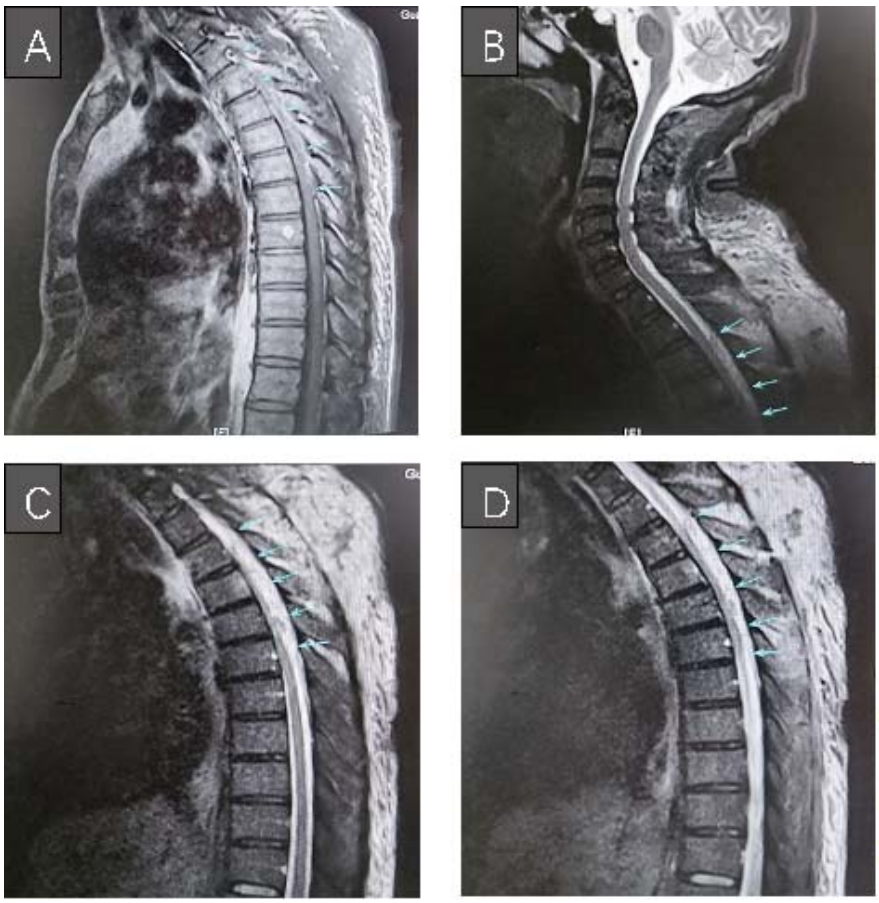

Figure-2: Plain magnetic resonance image of the cervical and thoracic spine acquired at admission (A: T1-weighted, cerebrospinal fluid shows low signal; B, C, D: T2-weighted, cerebrospinal fluid shows high signal).
The area indicated by the arrow shows an abscess in the spinal canal (direction indicated by the green arrow). High signals are observed in the subcutaneous tissue of the dorsal T2–T8 area on both T1WI and T2WI, which were thought to reflect soft tissue infection and abscess formation spreading to the epidural space of the spinal column, leading to local stricture of the thoracic spinal cord. The erector spinae muscles of the upper thoracic segment were also infected on both sides.

ultrasound, which revealed a 245 × 175 × 56mm abscess under the skin of the chest and back (Figure 1). Thoracic Magnetic Resonance Imaging (MRI) revealed a soft tissue infection and abscess formation at the vertebral T2–T8 level, which had spread to the epidural space in the spinal canal, local thoracic spinal canal stenosis, and frank compression of the thoracic spinal cord (Figure 2).

It was recommended that the patient should undergo spinal decompression at T3–T7 and soft tissue debridement surgery at T2–T8. The final diagnosis was spinal abscess caused by S. aureus at T3–T7. The patient was treated with an intravenous infusion of anti-infectives: Piperacillin sodium/Sulbactam sodium (4.5 g, q. 12 h) and Linezolid (0.6 g, q. 12 h). Thoracic spinal canal decompression and debridement of the soft tissues of the back were performed on the day after admission. Vacuum sealed drainage pipe and sealing membrane were placed for continuous negative pressure drainage after the operation. Two weeks later, a second soft tissue debridement procedure was performed. Postoperatively, the patient was treated with neurorestoration, anti-infection, and blood glucose control. Multiple laboratory and imaging examinations conducted after the treatment revealed no abnormalities (Figure 3).

The patient experienced no significant recovery of muscle strength following the surgery or during the hospitalisation period. The patient was eventually discharged after one month, at which time he had weakened muscle tone without paraesthesia in the lower limbs. Muscle strength of both the lower limbs at discharge was consistent with what was before the operation (grade I).

Six months postoperatively, the patient had no pain in the initial area of PHN (VAS score: 0). The patient had recovered general sensation, and muscle strength had returned to grade IV in both the lower limbs. The patient was able to get out of bed, ambulate more than 10 steps with the help of crutches, and had mild incontinence. His condition was relatively the same at one-year postoperative follow-up.

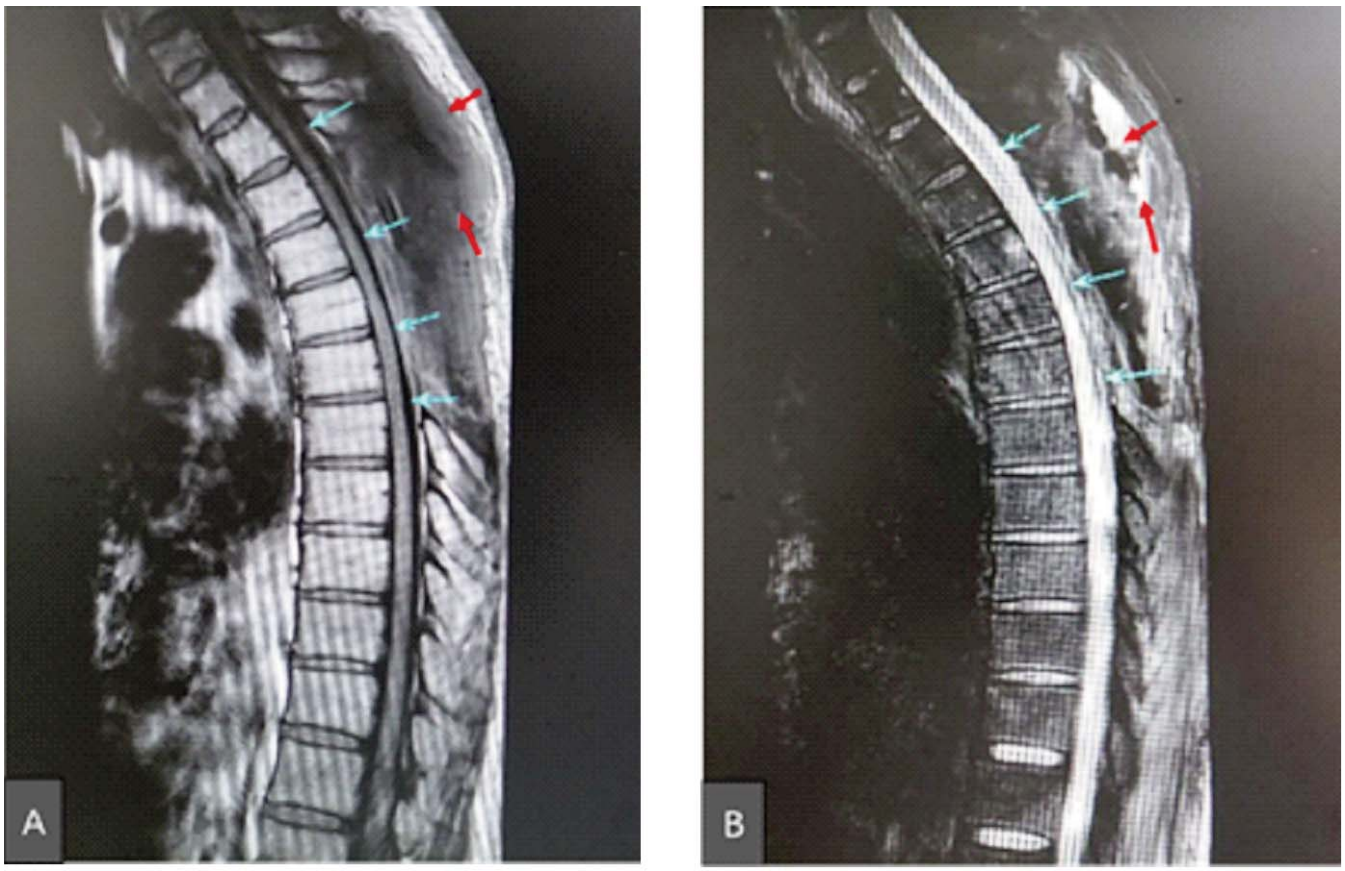

Figure-3: Planar magnetic resonance images of thoracic spine after thoracic spinal cord decompression and T3–T7 spinal debridement. There was a small amount of effusion in the back soft tissue at the T3–T7 level, and the compression of the thoracic spinal cord at the T3–T7 level was reduced (A: T1-weighted; B: T2-weighted). The blue arrows point to the preoperative involved spinal canal, and the red arrows point to the subcutaneous tissue effusion (A: T1-weighted; B: T2-weighted).

Discussion

PHN occurs more frequently in older than younger patients. In some cases, pain symptoms are severe at presentation, and treatment is difficult[1]. Current evidence indicates that PRF and continuous epidural block can help to alleviate severe pain and prevent further progression of PHN to chronic intractable pain[2-4].

Clinically, primary spinal abscesses are extremely rare and often occur secondary to related medical procedures, although they may also present as complications of certain injuries and diseases[3]. There are multiple possible reasons for neurological complications after continuous epidural block therapy. If paraplegia is a serious adverse reaction, the presence of epidural haematoma or nerve root injury should be considered first; if paraplegia occurred after treatment[5], it should be evaluated whether it is due to the placement of epidural catheters, puncture needles, or the toxicity of local anaesthetics. Finally, this is an invasive treatment measure and infection definitely needs to be considered. Due to paraplegia, the symptoms in this patient occurred about 10 days after the invasive treatment, and the patient also developed premonitory symptoms of fever for three days. Based on the MRI results of this patient, the authors agree that the paraplegia was caused by spinal infection.

The infection may be due to the patient's physical condition or it can be iatrogenic. Although this patient had a history of diabetes, there were no related infections before the onset of the symptoms, and his condition was presumed to be related to the continuous epidural block and pulsed radiofrequency ablation treatments performed before the onset.

The consideration was whether the operating apparatus or operating process could not meet the sterile requirements[6]. With the development of technology, the devices used in clinical practice are all disposable. The physician was consulted and he agreed that the materials including needle are tightly packed and within the expiry date. Therefore, the biggest possibility is that the sterilisation requirements during the operation were not met or that the postoperative care for the surgical site did not fulfil the requirements. The patient denied the possibility of contaminating the surgical site after the treatments such as the wound coming in contact with contaminated objects or wet contaminated dressings. It is believed that the most likely reason for the infection in this case was that the sterilisation procedure did not meet the requirements, and the short period of multiple invasive treatments made the infection severe and widespread.

Suppurative myelitis can be caused by an acute suppurative infection, and it can also be transferred to the bloodstream and lymphatic vessels by pathogenic bacteria from a distant infection source. There are relatively few cases involving Staphylococcus aureus in elderly patients[7]. Common causes of purulent myelitis include open infectious wounds of the spinal cord, intrathoracic infections, periodontal abscesses, purulent meningitis, and iatrogenic infections. In this case, clinical manifestation of purulent myelitis occurred at the treatment site (T3–T7). These findings support the notion that the patient's condition resulted from invasive treatment[8]. Staphylococcus aureus is a microorganism resident in the skin and nasal membranes[9]. If the aseptic techniques are insufficient to prevent bacteria in the environment or skin from contaminating the puncture device, two invasive treatments in a short period of time may increase the risk of iatrogenic bacterial infection. Such a treatment plan also increases the risk of infection for subsequent minimally invasive treatments. Therefore, it is believed that purulent myelitis was most likely caused by an iatrogenic infection in this patient.

However, an important question, in this case, was whether the infection began following the epidural block or the radiofrequency ablation treatment. The ability to answer this question can aid in treating and preventing such complications. Unfortunately, because 10 days had already passed since the treatment, the patient had clear symptoms of infection and nerve damage in the spinal canal. Moreover, the infection had spread both inside and outside the spinal canal, and it was impossible to determine the initial site of the infection.

Certainly, as this was a retrospective case analysis; it was not possible to confirm the correlation or causal relationship between suppurative myelitis and invasive analgesia.

Spinal abscess is a rare complication of interventional therapies such as continuous epidural block and pulsed nerve root radiofrequency ablation. Research has indicated that nearly all patients achieve significant or complete neurological recovery when surgical treatment is performed immediately[10,11]. However, in this patient, the site of infection was high and wide. Therefore, although the patient's condition was diagnosed and surgically treated within three days after the onset of fever, some significant nerve damage persisted.

Conclusion

In conclusion, the present report highlights the potentially serious complications of consecutive invasive treatments. The advantages and disadvantages of

surgical treatment should be carefully weighed, and patients should undergo diligent observation of symptoms, nursing care, and follow-up. Also, visualised epidural catheterisation can improve the analgesic effect of continuous epidural block and avoid short-term combination of multiple invasive analgesic treatment[12].

Ethical Considerations: The authors certify that they have obtained all appropriate patient consent forms. The patient provided informed consent for the publication of his images and other clinical information. The patient understands that his name and initials will not be published, that due efforts will be made to conceal his identity, but that anonymity cannot be guaranteed. The ethics committee of our institution approved the publication of this report.

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