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Successful Treatment of Intractable Postherpetic Neuralgia with Endoscopic Spinal Nerve Root Dissection: A Case Report

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Abstract

Postherpetic Neuralgia (PHN) is a common severe complication of herpes zoster, characterized by chronic neuropathic pain. The protracted disease course is difficult to cure and frequently accompanied by emotional and sleep disorders, leading to a significant deterioration in the patient's quality of life. Current treatment methods for PHN primarily include pharmacological intervention and physiotherapy, with surgical intervention often necessary when conservative treatments prove ineffective. Here, we present the case of a patient diagnosed with PHN, treated using Endoscopic Spinal Nerve Root Dissection. The patient exhibited significant pain relief following the procedure. This case underscores the potential use of Endoscopic Spinal Nerve Root Dissection in the treatment of PHN. However, given its invasive nature, it should be considered a measure of last resort.

Introduction

Herpes Zoster (HZ) is precipitated by the reactivation of the dormant Varicella-Zoster Virus (VZV) in the dorsal root ganglia, while PHN, a severe complication of HZ, triggered by the reactivation of the latent VZV situated in the dorsal root ganglia. PHN is defined as the persisting pain, characterized by hyperalgesia and allodynia, that extends a month or more after the healing of the Herpes Zoster rash. This form of chronic neuropathic pain has a protracted, difficult-to-treat course, often accompanied by emotional and sleep disturbances, leading to a significant decline in the patient's quality of life. In China, the prevalence of HZ and PHN is 7.7% and 2.3% respectively, with 29.8% of HZ patients progressing to PHN¹. The incidence of both conditions increases with age, posing a considerable impact on patients' quality of life and socio-economic circumstances, necessitating the intensification of preventive and therapeutic measures². The objective in treating PHN is to manage neuropathic pain, enhance quality of life, and minimize complications and side-effects. Treatment strategies should be individualized, considering factors such as age, drug allergy history, and potential drug interactions, along with regular assessments of treatment efficacy and safety, and adjustments based on patient responses and needs³.

Case report presentation

The patient, a 63-year-old retired male, experienced the sudden onset of erythematous rash accompanied by pain in the right thoracodorsal area two months ago without apparent provocation. The rash manifested as vesicular and zosteriform, without crossing the midline (Figure 1). The pain, characterized as persistent, akin to a piercing or slashing sensation, disrupted his sleep. Initially seeking medical attention at a local clinic, his thoracic MRI showed no abnormalities. Based on clinical manifestations, the physician diagnosed him with Herpes Zoster. The patient, having a medical history of tuberculosis for over 30 years, was currently on anti-tuberculosis treatment with Rifampicin,

Ethambutol, and Isoniazid. Upon admission, various supplementary examinations were conducted, including complete blood count, urine routine, stool routine, blood biochemistry, erythrocyte sedimentation rate, coagulation function, ECG, and chest X-ray, all of which revealed no significant abnormalities.

Similar to the majority of neuropathic pain conditions, prior to surgery, our first line of defense was medication like Pregabalin for pain control. However, the patient's neuropathic symptoms persisted, accompanied by adverse reactions such as dizziness. Consequently, we performed pulsed radiofrequency of the right T7, T8, and T9 spinal nerve roots under local anesthesia (Figure 2A) to treat the patient's PHN. Regrettably, the patient's pain remained intense, seemingly localized within the right T8 and T9 nerve distribution area. Hence, we administered right T8, T9 bipolar radiofrequency thermocoagulation (Figure 2B) on the fourth day post pulsed radiofrequency. Nevertheless, the patient's pain persisted at preoperative levels.

In light of these findings, we deemed a more thorough nerve destruction necessary and attempted to sever the spinal nerve roots corresponding to the patient's painful skin area under endoscopy, aiming to alleviate the patient's pain symptoms. The surgical procedure and methodology were as follows:

1. Preoperative preparation: Upon the patient's entry into the operating room, an intravenous access was established and vital signs were monitored.
2. Puncture site localization and disinfection: Under C-arm fluoroscopy, the T8/9 and T9/10 intervertebral disks were located. The puncture site was about 6-7 cm from the right side of the located point, which was disinfected and draped.
3. Local anesthesia and surgical site localization: Following layer-by-layer infiltration anesthesia with 0.75% Lidocaine, a needle was slowly advanced from the puncture site under C-arm monitoring. The lateral X-ray indicated the needle tip at the upper 1/3 of the intervertebral foramen, while the AP view showed the needle tip at the lateral margin of the pedicle, indicating the proper location.
4. Placement of the endoscope: Gradual dilatation was performed using dilating sheaths (Figure 3). Once dilatation was completed, the working cannula was inserted and connected to the endoscope and irrigation fluid.
5. Nerve root severing (Figure 4): Under endoscopic surveillance, the right T8 nerve root was exposed by clamping part of the soft tissue. The nerve root was severed, and bipolar radiofrequency coagulation was performed at the severed nerve root for hemostasis. The same procedure was followed for the right T9 nerve root.



Figure 1: The area of the patient's skin affected by herpes zoster.

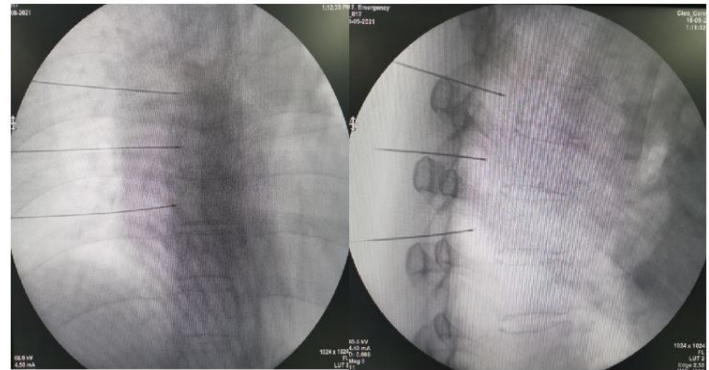


Figure 2A: Pulsed radiofrequency of the right T7, T8, and T9 spinal nerves.

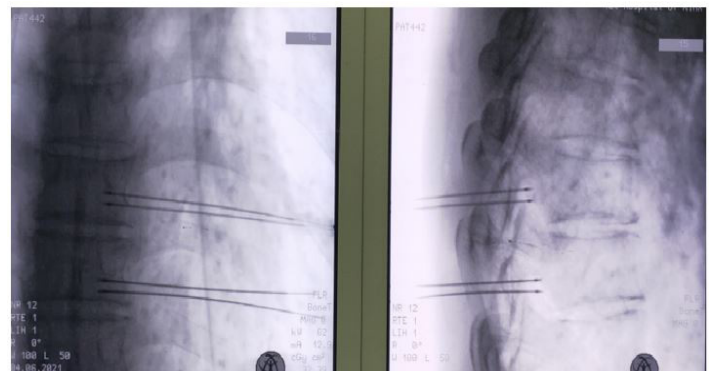


Figure 2B: Bilateral radiofrequency thermocoagulation of the right T8 and T9 spinal nerves..

Postoperatively, the patient's pain subsided immediately, and he resumed medication: Gabapentin 0.300g orally thrice daily, and Lidocaine gel patch 700mg topically twice daily. The Visual Analogue Scale was utilized to assess the patient's pain level preoperatively and postoperatively (Table 1). Upon two years of follow-up, the patient reported no recurrence of pain or any adverse reactions.

Discussion

PHN is a prominent severe complication that ensues post HZ infection, embodying one of the intractable neuropathic

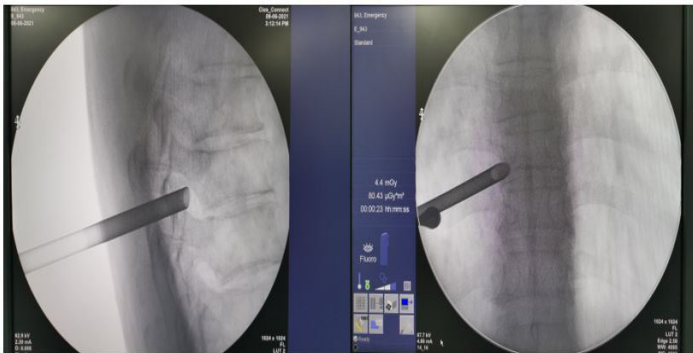


Figure 3: The final position of the dilating sheath is determined by the C-arm X-ray lateral view, which shows the distal end of the sheath located at the upper 1/3 of the intervertebral foramen, while the anteroposterior view demonstrates the distal end of the sheath positioned at the outer edge of the pedicle.

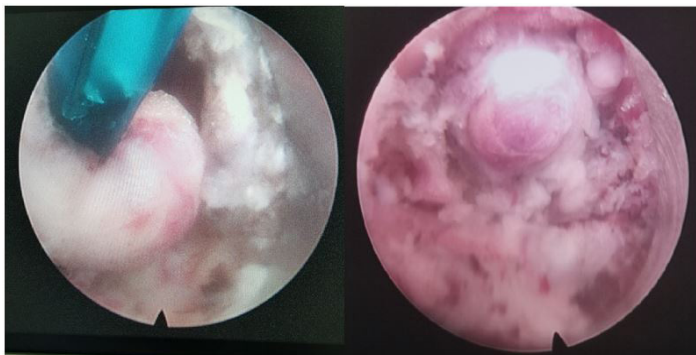
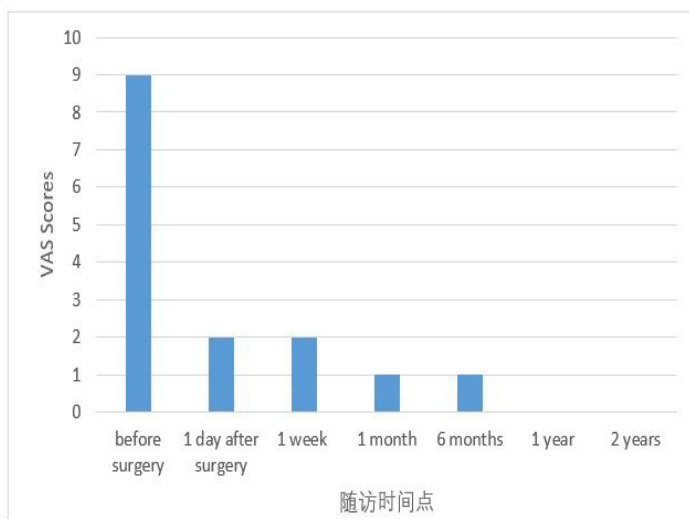


Figure 4: Endoscopic Spinal Nerve Root Dissection: the left image depicts the pre-transection state, while the right image represents the post-transection state.

Table 1: Results of pain in follow-up using Visual analogue scale (VAS)



pain conditions for which no panacea exists⁴. While treatments ranging from pharmaceutical interventions, neural blockades, to physical therapies can ameliorate symptoms, a total cure remains elusive⁵.

Pharmaceutical intervention stands as the first line of defense against PHN, but its efficacy often leaves much to be desired^{6 7}. Moreover, when patients are subjected to a plethora of drugs, adverse reactions such as somnolence and dizziness—commonly precipitated by gabapentin—escalate dose-dependently, particularly among the elderly demographic⁸. Due to the limited reach of radiofrequency, along with factors like the varying proximity of the radiofrequency needle to the target nerve, spinal nerve root pulse radiofrequency and radiofrequency thermocoagulation might not always effect complete blockade, rendering the current patient's pain symptoms inadequately alleviated.

In our clinical practice, we adopted Endoscopic Spinal Nerve Root Dissection under local anesthesia, which exerted minimal physiological impact on the patient. The patient was discharged the day after surgery, boasting rapid and satisfactory recovery. By severing the nerve root at the intervertebral foramen level, all incoming pain signals originating from the nerve root were successfully blocked.

However, Endoscopic Spinal Nerve Root Dissection is not without its demerits. Generally, it is believed that the development and perpetuation of neuropathic pain, consequent to nerve injury, relates to heightened sensitivity and excitability of primary sensory neurons in the peripheral nervous system (peripheral sensitization), and damaging neurons in the spinal cord and brain in the central nervous system (central sensitization) ⁹. However, spinal nerve root severing can only obstruct the influx of peripheral pain signals. If the patient has already developed central sensitization, this method may not be applicable anymore. The linkage between chronic pain and suicidal tendencies suggests that the current gold standard treatments are still suboptimal¹⁰. Therefore, our pursuit of minimally invasive interventions should not compromise the efficacy of the treatment.

In this case, the patient experienced no adverse reactions, and their quality of life improved significantly compared to their pre-operative condition. Following a two-year follow-up, no recurrence of pain or any other adverse reactions were observed in the patient.

Conclusion

In summation, through our clinical practice, we corroborated the feasibility and efficacy of Endoscopic Spinal Nerve Root Dissection as a minimally invasive approach for the treatment of PHN. As an invasive procedure, Endoscopic

Spinal Nerve Root Dissection should be regarded as a last therapeutic strategy for PHN.

Competing interests: None

Authors' contributions: Chief Physician Yu Liang diagnosed and treated the patient with Endoscopic Spinal Nerve Root Dissection, Hu Yuzhong conducted the follow-up and documentation, while Hu Yuzhong and Deng Jiayi collaborated in drafting and finalizing this manuscript.

Acknowledgements : We extend our profound gratitude to the patient for their trust and support, their participation in this study, and their consent for the publication of this case report.

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