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SEVERE TACTILE ALLODYNIA FOLLOWING SPINAL CORD INJURY: A CHALLENGING CASE OF NEUROPATHIC PAIN MANAGEMENT

Rizaldy Taslim Pinzon[1,2*], Rida Ayu Kusuma Cahyani[2], Petra Gusti Parikesit[2]
[1]Neurology Department Bethesda Hospital, Yogyakarta, Indonesia
[2] Duta Wacana Christian University School of Medicine, Yogyakarta, Indoensia

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Corresponding Author:
E-mail: drpinzon17@gmail.com

ABSTRACT

Background: Pain management in spinal cord injury (SCI) patients remains a significant clinical challenge, particularly in cases of neuropathic pain and severe tactile allodynia. Despite adherence to standard treatment guidelines, many patients experience inadequate pain relief, leading to reduced quality of life. Tactile allodynia, an exaggerated pain response to non-painful stimuli, is a rare but debilitating manifestation of SCI-related neuropathic pain. Effective management requires a multimodal approach, integrating pharmacological and non-pharmacological interventions. **Case Presentation:** We present a case of a 52-year-old female with central cord syndrome following a cervical SCI caused by a road traffic accident. Despite surgical decompression and stabilization, she developed severe neuropathic pain characterized by burning sensations and profound tactile allodynia at the injury level. Initial pharmacological treatment with pregabalin and amitriptyline provided minimal relief. Due to persistent pain, the patient was hospitalized and managed with a multimodal approach, including gabapentin, tramadol, baclofen, cognitive behavioral therapy (CBT), and transcutaneous electrical nerve stimulation (TENS). This combination led to significant pain reduction, allowing discharge with an acceptable pain level. **Conclusion:** This case highlights the complexity of managing severe tactile allodynia in SCI patients. A tailored multimodal treatment approach combining pharmacological therapy with CBT and TENS proved effective in achieving substantial pain relief. Future studies should explore individualized treatment strategies to improve outcomes for patients with refractory SCI-related neuropathic pain.

INTRODUCTION

People who have suffered a spinal cord injury (SCI) frequently experience pain. Pain manifests in two thirds of these patients and can be categorised as nociceptive or neuropathic pain. Neuropathic pain affects nearly half of spinal cord injury (SCI) patients, often presenting at or below the injury site and posing significant challenges in clinical management. [1] Level SCI pain is characterized by pain extending one dermatome rostral and three dermatomes caudal to the injury level, while below-level pain occurs beyond three dermatomes caudal to the lesion. [2] At-level pain from SCI is more prone to retaining some sensory functionality. In addition to spontaneous and chronic pain, the nature of the pain frequently involves allodynia, or discomfort in reaction to non-painful stimuli such mild touch. [2,3] Tactile allodynia is an uncommon manifestation of neuropathic pain. Allodynia of neuropathic pain below the level of injury is considered a central pain disorder among individuals with spinal cord injury. [2,4] Allodynia of level pain may comprise both peripheral and central components, which can be challenging to differentiate. Herein, we present a distinctive case of severe mechanical-tactile allodynia in patients following spinal cord injury.

CASE PRESENTATION

The neurology clinic received a referral for a 52-year-old female patient in order to receive treatment

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for severe, intractable post-spinal cord injury pain. The patient had been diagnosed with central cord syndrome, a condition resulting from incomplete spinal cord injury (SCI), following a road traffic accident five months prior to the present consultation. The mechanism of trauma was flexion and hyper-extension. Immediate hospitalization, high dose steroid, and immediate consultation to the spine surgeon have been performed. The medical history showed that the central cord syndrome include four limb weakness with muscle strength 4 from 5 in Medical Research Council (MRC) scale. The hand grip power was significantly diminished. The sensory abnormality was revealed in the level of C6-C7 and below. The MRI showed multiple disc protrusion and central cord oedema resulting from flexion and hyperextension mechanism (fig. 1).

The pain was reduced and muscle strength improved following the decompression and stabilization procedure. Two months later, when physiotherapy commenced, the patient reported pain in both hands and arms and lower limbs. Initially, this pain was described as a burning sensation with an intensity that was moderate. However, after one month, the pain evolved and became more intense, taking the form of a pricking and burning sensation.The patient also exhibited severe tactile allodynia at the level of the injury, which had a significant impact on their daily activities. The administration of physiotherapy and the application of baths resulted in an escalation of pain and the onset of limb paraesthesia. Severe muscle wasting in thenar eminence muscle was observed (fig. 2). The patient was treated with pregabalin 75 mg and amitriptyline 10 mg bed times, and only give non-significant reduction of pain relief.

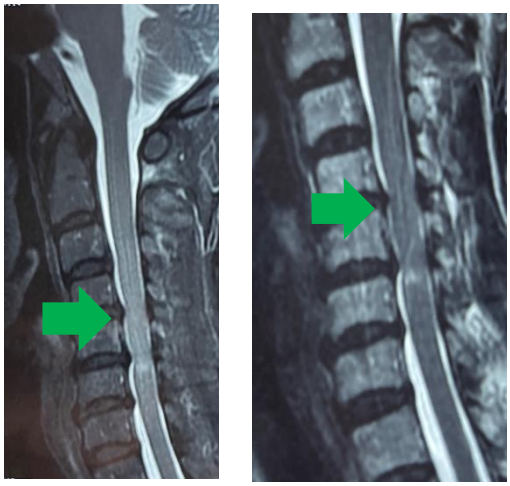

Figure 1. Initial MRI showed multiple disc herniation with significant oedema in spinal cord (arrow) at level C5-6

The patient was referred to our neurological clinic. Initial evaluation showed four limb weakness with MRC 4 from 5 in either upper and lower limbs. The pain intensity was 8 in numeric pain scale and increase to 9-10 in numeric pain scale when the finger and palm was touched (severe tactile allodynia). The pain nature was either nociceptive from spasticity and muscle spasm and also neuropathic (burning, tingling, numbness, and allodynia). The patient was hospitalized because of the severe pain. The combination of tramadol in infusion pump, gabapentin 300 mg two times daily and low dose baclofen give significant reduction of pain. The combination of relaxation, CBT, and TENS for the limbs give pain reduction. Following each therapeutic session, the duration of pain reduction increased. The patient's pain intensity score dropped to a level that was deemed acceptable (4-5 points numeric pain scale). The patient was discharged from hospital with the following prescriptions: tramadol 50 mg twice daily, gabapentin 300 mg twice daily, low-dose baclofen and paracetamol. The mean numeric pain scale score was 3-4 on a daily basis.

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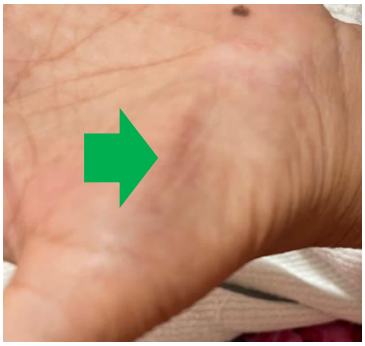

Figure 2. Significant thenar muscle atrophy and severe tactile allodynia either in fingers and palm (arrow)

DISCUSSION

We hereby present a case of severe allodynia and neuropathic pain in the setting of SCI. Previous studies have demonstrated that intractable pain may also result from SCI, with individuals afflicted with spinal cord injuries often experiencing a multitude of pain types, including musculoskeletal, visceral, and neuropathic, frequently exhibiting concurrent manifestations of diverse pain modalities. Previous reviews have indicated that the majority of SCI patients characterise their pain as being of moderate or severe severity. [4] This pain condition can have a profound impact on patients' quality of life, mood and sleep.

The pain in the present case was located at the level of injury as well as beneath it. Burning pain and accompanying cutaneous hypersensitivity at the site of injury are hallmarks of peripheral neuropathic pain. [5] Tactile allodynia was severe in our case. In our case, there was also burning and numbness in four extremities. The phenomenon of neuropathic SCI pain below the level of the spinal cord can emerge as a direct outcome of a disturbance in sensory processing, ranging from peripheral sensation to conscious perception, occurring at the level of the injury or below. [5]

The immediate high-dose steroid injection and decompression-stabilization procedure in our case did not relieve the pain. The pharmacological intervention for neuropathic pain in SCI is challenging. [5,6] The efficacy of the adjuvant medication group in the treatment of neuropathic spinal cord injury pain was evidenced by a paucity of research. In our case the combination of gabapentin and tramadol can give significant relief of the pain. It is recommended that treatment for SCI be informed by these findings, whilst also considering medications that have proven efficacy in other neuropathic pain scenarios, particularly those involving central pain. [6,7] The presence of multiple pain-generating mechanisms, each amenable to specific drug groups, is a well-documented phenomenon. However, there is currently insufficient evidence to support the positive response of certain medications to incomplete injuries, as evidenced by the presence of allodynia. [6,7] In our case, we choose combination of gabapentin and tramadol. It lead to more than 50% pain reduction without significant side effects.

The management of pain in SCI poses significant challenges, as evidenced by the paucity of treatments that have been assessed in randomised, controlled trials. As a result, a lot of management is based on case reports, and SCI patients may not benefit from medications that work for other pain populations. Some reviews propose that the pharmacological approach to SCI pain management should be tailored to the specific symptoms exhibited by the patient, with the potency of oxcarbazepine, an anticonvulsant that blocks voltage-gated sodium channels, depending on the presence or otherwise of evoked pain. Gabapentin and pregabalin have shown superior efficacy in patients without evidence of SCI pain. [6] Nevertheless, in patients with elicited pain, the shooting pain, allodynia and thermal hyperalgesia features are more effectively targeted by pregabalin/gabapentin, in contrast to the greater efficacy of oxcarbazepine on burning and stinging sensations. The other consideration in choosing a therapy is safety. The visceral distention that can be induced by opiates and anti-depressants - such as amitriptyline - has the potential to cause autonomic dysreflexia. Neuropathic pain in SCI is difficult to treat and often results in disappointing and ineffectual results. Studies have looked into the effectiveness of non-pharmacological treatments for neuropathic pain, such as cognitive-behavioral therapy, supportive psychotherapy, transcutaneous electrical nerve stimulation (TENS), and percutaneous electrical nerve stimulation (PENS). [6,7] The multimodal approach, incorporating pharmacological management in conjunction with TENS and CBT, has been demonstrated to result in a substantial reduction in pain levels in such cases. This finding suggests that a multimodal management strategy may be advantageous in patients with SCI.

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CONCLUSION

We describe a unique case of severe tactile allodynia that occurred after a spinal cord injury. Significant pain reduction might result from a thorough evaluation and appropriate medication selection.

ETHICAL APPROVAL

There is no ethical approval.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTIONS

RTP was the main author in the investigation and writing of the original draft, as well as conceptualization. RAKC and PGP participated in reviewing and editing. All authors read and approved the final manuscript.

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