

LATE-TERM CONTINUOUS EPIDURAL INFUSION TREATMENT FOR TREATMENT-RESISTANT COMPLEX REGIONAL PAIN SYNDROME

Oktay Faysal Tertemiz, MD¹, Can Eyigör, MD¹, and Erkan Özduran, MD²

Background: There are many different treatment methods available in terms of complex regional pain syndrome (CRPS). In patients who do not respond to medical treatments, treatment is first started with sympathetic blocks and somatic nerve blocks are added when necessary. Epidural catheter applications can be practised if sufficient results cannot be obtained from the blocks in very few patients. Continuous epidural block application allows both sympathetic and somatic nerve block, allowing the patient to recover, as well as pain palliation, and adequate physical therapy and rehabilitation.

Case Report: In this case report, although partial pain palliation was provided with sympathetic and somatic blocks in a female patient with a diagnosis of CRPS for a long time, especially in physical therapy and rehabilitation applications, due to the inadequate response due to pain, even in the late period, a subcutaneous tunnel epidural catheter was used .

Conclusion: We present the use of continuous epidural block application in treatment successfully.

Key words: Catheters, complex regional pain syndromes, epidural block, physical therapy modalities

BACKGROUND

Complex regional pain syndrome (CRPS) is a condition that often presents with post-injury pain and is characterized by limitation reflected in every aspect of life (1). CRPS is a systemic condition that includes the central and peripheral components of the neuraxial system and shows a relationship between the immune and nervous systems (2,3). It is manifested by disturbances in the functioning of pain, changes in skin color and temperature, edema, vasomotor and sudomotor changes, motor system dysfunction, and trophic changes (4,5). Physical therapy and pharmacological approach are preferred in primary treatment of CRPS. In case of conservative treatment failure, interventional treatments (6), such as sympathetic blocks, neuraxial anesthesia, and neu-

romodulation, come to the fore. In persistent cases, continuous epidural local anesthetic infusion is among the effective alternative treatments (7).

An epidural block is a form of block practiced either continuously or intermittently with a single injection through an epidural needle or an infusion pump through an epidural catheter (8). Although it is mostly applied in the lumbar region, it can also be applied in the thoracic and cervical regions. Complications of percutaneous epidural catheter placement include hematoma, infection, epidural abscess, meningitis, hypotension, respiratory depression, urinary and fecal dysfunction, catheter misplacement, occlusion, and displacement.

Cervical epidural anesthesia is a suitable method

From: ¹Department of Algology, Tepecik Research and Training Hospital, Saglik Bilimleri University, Izmir, Turkey; ²Department of Physical Medicine and Rehabilitation, Dokuz Eylul University, Izmir, Turkey

Corresponding Author: Erkan Ozduran, MD, E-mail: erkanozduran@gmail.com

Disclaimer: There was no external funding in the preparation of this manuscript.

Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.

Accepted: 2021-09-10, Published: 2021-11-30

for regional anesthesia of the upper extremity. Cervical epidural anesthesia appears to be beneficial for pain relief in the case of prolonged pain in the shoulder area or both upper extremities, and when the patient is asked to be able to actively move the affected joints during rehabilitation. However, there is limited information in the literature regarding the use of continuous epidural analgesic in the management of CRPS (7).

CASE

The patient provided permission for publication of this case report. A 37-year-old woman presented for continuous epidural infusion for management of worsening CRPS of the right upper extremity. Edema in the hand, low skin temperature, allodynia, limitation of hand finger and wrist joint motions, and pain radiating to the hand and shoulder, which started about 2 years ago after pouring hot water to her right hand. After burn treatment, medical treatments, such as opioids, antidepressants, and antispasmodics, were used for the patient's CRPS symptoms. In addition, physical therapy modalities were used intermittently for a total of 6 months after the burn injury. The patient, who did not benefit from these treatments, underwent a total of 8 right stellat ganglion blockages, once a week. However, she also had short-term relief from the stellat ganglion blockages. As her complaints continued, a cervical epidural catheter was placed under fluoroscopy. Then, the catheter was tunneled (Fig. 1).

After the test dose was administered through the catheter, medical treatment was arranged as a continuous infusion. Thereafter, an epidural infusion of 40 cc 0.05% bupivacaine, 160 cc isotonic with morphine 10 mcg/mL was started at a continuous rate of 2 mL per hour. Oral home medications were also continued including pregabalin 100 mg twice a day, prednisolone 16 mg, escitalopram 15 mg, mirtazapin 15 mg, quetiapine 25 mg, and hyoscine butyl bromide 10 mg once a day. After the application of the continuous epidural block, a rapid decrease in pain and a feeling of warmth in the hand appeared (Fig. 2). The patient was discharged on the same day after the patient and patient's relative training was completed. The patient was checked every 3 days in the first week and then once a week. The patient tolerated the therapy well and reported a decrease in pain from 9/10 to 4/10 on the Visual Analog Scale (VAS), as well as less muscle spasms and better range of motion. It was planned to increase life quality by providing physical therapy after the procedure.

The catheter of the patient, who received intermittent catheter care, was removed 2 months later. No complications were encountered during the procedure and during the follow-up.

DISCUSSION

A cervical epidural catheter was inserted and continuous bupivacaine and morphine were practiced to the patient who developed CRPS in the right hand, which did not respond to conservative methods and medical treatments. This patient with CRPS responded well to continuous epidural infusion under favor of a cervical catheter. Her symptoms resolved gradually, and she was able to resume daily life without pain.

CRPS is a chronic pain condition characterized by autonomic and inflammatory features. A limb fracture is a clinical condition that occurs acutely in approximately 7% of patients as a result of limb surgery or other injuries. Most cases resolve within the first year, and a smaller group progresses to the chronic form. It is known that environmental and central mechanisms that differ between individuals and, over time, are involved in the chronicity process. Possible contributors include peripheral and central sensitization, autonomic changes and sympathetic-afferent matching, inflammatory and immune changes, brain changes, and genetic and psychological factors. The chronic form of the syndrome also often lacks effective treatment management (9). A wide variety of treatment strategies for CRPS have also been reported. These include pharmacological, psychological, physical, and interventional therapies. However, the evidence base for the therapeutic benefits of each treatment is still relatively scarce (10). Although physiotherapy and mobilization are initially recommended treatment modalities after CRPS, interventional treatment modalities have an effective role in pain management and promotion of physical therapy (10).

Local anesthetic sympathetic blockage is useful in controlling pain due to the sympathetic system; however, due to the relatively short duration of action of local anesthetics, frequent repetition of the block is required to break the pain cycle and allow rehabilitation program. An alternative to repeated injections is the continuous infusion of local anesthetics along the sympathetic chain. However, peripheral catheter techniques are difficult to hold in place and have a high risk of repositioning and dislocation. On the other hand, continuous epidural infusion, which is applied with the addition of opiates to local anesthetics, is an

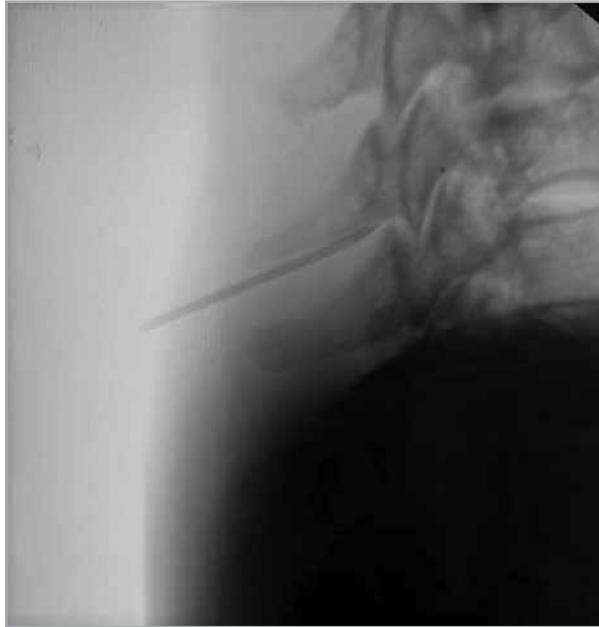


Fig. 1. Epidural Catheter Placement.

advantageous option to provide better analgesia. The complications of this approach (e.g., motor block, respiratory depression, hypotension and urinary retention, etc) can be prevented by careful titration of infused drugs, frequent observation, and adequate patient and family education (11).

Continuous epidural infusion, which has been observed to give more effective results in the first year after CRPS, is applied for up to 14 days, in most cases, but has different application times from a few days to 12 weeks (11). However, this case presented to our clinic in the second year after CRPS. Although 2 years have passed, we found that cervical epidural continuous blocks applied for 8 weeks provided a decrease in symptoms after the procedure and was effective with physical therapy methods.

In the literature, it has been reported that age and gender have no effect on treatment success in patients with CRPS undergoing continuous epidural infusion (12), but CRPS itself has a better prognosis in young people compared to adults (11). We observed in our 37-year-old female patient, pain regressed rapidly and the life quality increased after the procedure. Although considered very safe, serious complications can occur with 0.1-1 per 10,000 epidural injections. The most common complications are cardiovascular or neurological. The spectrum of neurological complications includes



Fig. 2. We observe that the patient's hand fingers can be opened after the procedure.

transient neurological deficits, permanent nerve root damage, myelopathy, and arachnoiditis. Epidural hematoma is among the most serious damage causing neurological damage (13). Another serious complication of epidural block is epidural abscess. Despite its low incidence, risk factors and symptoms related to epidural anesthesia and analgesia, and its cause, should be well known (14). We followed our patient closely and informed her about the possible complications. In our case, we did not encounter any complications during our treatment.

CONCLUSIONS

Combination therapy with continuous epidural block and rehabilitation is a treatment method that provides dramatic reduction in symptoms. In our case, this method improved CRPS symptoms. However, epidural infusion of local anesthetics with opioids is not the primary treatment modality. Conservative methods and medical treatments should be tried before this treatment. Cervical epidural drug infusions should be considered as a choice for patients who do not benefit from conservative methods and medical treatments. The success rate of continuous epidural infusion is highest if administered shortly after the onset of CRPS symptoms. Continuous epidural infusion should be considered in interventional treatment algorithms in patients with CRPS.

Author Contributions

OFT designed the study. CE, EO, and OFT reviewed the articles and provided the data. EO analyzed the data. EO contributed the analysis tools. CE and OFT authored and

reviewed drafts of the paper. OFT prepared the figures. EO and OFT approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

REFERENCES

1. Noori SA, Gungor S. Spinal epidural abscess associated with an epidural catheter in a woman with complex regional pain syndrome and selective IgG3 deficiency: A case report. *Medicine (Baltimore)* 2018; 97:e13272.
2. Marchand F, Perretti M, McMahon SB. Role of the immune system in chronic pain. *Nat Rev Neurosci* 2005; 6:521-532.
3. Watkins LR, Maier SF. Immune regulation of central nervous system functions: From sickness responses to pathological pain. *J Intern Med* 2005; 257:139-155.
4. Harden RN, Bruehl S, Galer BS, et al. Complex regional pain syndrome: Are the IASP diagnostic criteria valid and sufficiently comprehensive? *Pain* 1999; 83:211-219.
5. Bruehl S, Harden RN, Galer BS, et al. External validation of IASP diagnostic criteria for Complex Regional Pain Syndrome and proposed research diagnostic criteria. International Association for the Study of Pain. *Pain* 1999; 81:147-154.
6. van Eijls F, Stanton-Hicks M, van Zundert J, et al. Evidence-based interventional pain medicine according to clinical diagnoses: Complex regional pain syndrome. *Pain Pract* 2011; 11:70-87.
7. Tsui BC, Bateman K, Bouliane M, Finucane B. Cervical epidural analgesia via a thoracic approach using nerve stimulation guidance in an adult patient undergoing elbow surgery. *Reg Anesth Pain Med* 2004; 29:355-360.
8. Bredahl C. Smertebehandling via cervikalt epiduralkateter [Treatment of pain via a cervical epidural catheter]. *Ugeskr Laeger* 1998; 160:3885-3888.
9. Bruehl S. Complex regional pain syndrome. *BMJ* 2015; 351:h2730.
10. Harden RN, Oaklander AL, Burton AW, et al. Complex regional pain syndrome: Practical diagnostic and treatment guidelines. *Pain Med* 2013; 14:180-229.
11. Moufawad S, Malak O, Mekhail NA. Epidural infusion of opiates and local anesthetics for complex regional pain syndrome. *Pain Pract* 2002; 2:81-86.
12. Saito Y, Baba S, Takahashi A, et al. Complex regional pain syndrome in a 15-year-old girl successfully treated with continuous epidural anesthesia. *Brain Dev* 2015; 37:175-178.
13. SreeHarsha CK, Rajasekaran S, Dhanasekararaja P. Spontaneous complete recovery of paraplegia caused by epidural hematoma complicating epidural anesthesia: A case report and review of literature. *Spinal Cord* 2006; 44:514-517.
14. Kindler CH, Seeberger MD, Staender SE. Epidural abscess complicating epidural anesthesia and analgesia. An analysis of the literature. *Acta Anaesthesiol Scand* 1998; 42:614-620.