Successful management of complex regional pain syndrome type 1 using single injection interscalene brachial plexus block

Summayah M. A. Fallatah
Department of Anesthesia and Pain Management, College of Medicine, University of Dammam, Dammam, Al-Khobar, Saudi Arabia

ABSTRACT
Complex regional pain syndrome (CRPS) type 1 of the upper limb is a painful and debilitating condition. Interscalene brachial plexus block (ISB) in conjunction with other modalities was shown to be a feasible therapy with variable success. We reported a case of CRPS type 1 as diagnosed by International Association for the Study of Pain criteria in which pharmacological approaches failed to achieve adequate pain relief and even were associated with progressive dysfunction of the upper extremity. Single injection ISB, in combination with physical therapy and botulinum toxin injection, was successful to alleviate pain with functional restoration.

Keywords: Botulinum toxin type A, complex regional pain syndrome, interscalene brachial plexus block

INTRODUCTION
Complex regional pain syndrome (CRPS) type 1 is a chronic pain condition that commonly affects an arm or a leg but can also affect any part of the body. It is usually generated by an aberrant response to minor tissue injury with clinical features of pain, edema, skin discoloration, trophic changes, allodynia and/or hyperalgesia and joint stiffness.[1-3]

Conventional management that includes medications, physical, occupational and psychological therapies might not be quite effective in controlling the symptoms of CRPS. Moreover, permanent disability could be a sequel. Brachial plexus catheter placement with an infusion of bupivacaine[4] or morphine[5] has been tried with variable outcome. Furthermore, botulinum toxin type A (BTX-A) intramuscular injection has been described to alleviate the symptoms of proximal myofacial pain syndrome (MFPS) that often develop in the ipsilateral side of the affected limb.[6]

In our case, we successfully controlled the symptoms of both CRPS and associated MFPS using single interscalene injection in combination of physiotherapy and BTX-A.

CASE REPORT
The present case report is about a 34-year-old female patient who presented to the emergency room in King Fahad Hospital of the university, Al Khobar, Saudi Arabia with severe pain, paraesthesia, swelling, weakness of the left hand and wrist and limitation of movement in the left shoulder with subsequent difficulty in performing her daily activities. These symptoms had been there for 5 months and were of insidious onset. She didn’t recall any precipitating factor. Her past medical history is significant only for Crohn’s disease with moderate severity, maintained on human monoclonal antibody in rheumatoid arthritis 40 mg every other week. Patient was admitted to the hospital and was given titrated doses of intravenous morphine up to 10 mg to control the pain. She was started on Lyrica (pregabalin) 300 mg/day, prednisolone 40 mg daily, non-steroidal anti-inflammatory drugs (ibuprofen 1200 mg/day initially which was changed later to lornoxicam 16 mg/day) and amitriptyline 25 mg once daily, with no help. Deep venous thrombosis was excluded with Doppler ultrasound. The neurologist could not rule out a suspected diagnosis of carpal tunnel syndrome because the patient due to allodynia did not tolerate the nerve conduction study. In rheumatology clinic, full rheumatological work-up came
out to be unremarkable. The rheumatologist made initial
diagnosis of CRPS type 1. Magnetic resonance image (MRI)
and bone scan of the left upper limb was requested and
the patient was referred to the pain clinic.

In the pain clinic, patient gave a pain score of 9-10 out of
10. Examination revealed a middle-aged lady showing pain
behavior protecting her left upper limb with the right one.
She looked in a low and angry mood. Left hand looked pale
and edematous, alldynic to touch, cool and clammy. All
left wrist and shoulder ranges of motion were reduced with
decrease in power (Grade 3). Adson’s test was not possible
to perform due to pain; she had tenderness in the shoulder
joint and muscle spasm in the trapezius muscle. Laboratory
investigations revealed normal blood picture, mildly
elevated erythrocyte sedimentation rate and C-reactive
protein (explainable by the inflammatory bowel disease)
and negative rheumatoid factor. Radiographs of left wrist
and forearm revealed mild generalized osteopenia. Bone
scan showed increased activity in the metacarpals and carpal
bones. MRI of the whole upper limb was unremarkable.
Based on the clinical presentation and the above findings,
a diagnosis of CRPS type 1 was made.

Oral oxycodone 5 mg 3 times a day was added to her
previous medications and she was given an appointment
to have a series of ISBs combined with physiotherapy as
an outpatient. At 2 days later, patient reported again to the
clinic complaining that the treatment helped mildly and
only for short period of time and hence she was advised
to double the dose of oxycodone as needed until the
scheduled block day.

At 3 days later, the ultrasonic (US)-guided ISB was
performed (MicroMaxxTM; SonoSite, Bothell, WA, USA)
with a total of 30 ml bupivacaine 0.25% as a single shot.
Physiotherapy for the whole upper limb started 1 h after
ISB and she was given an instruction to continue on the
medications and on the exercises as much as she can
tolerate to break the pain-immobility cycle.

At 1 week later, the patient reported complete pain relief
and gradual functional recovery of her left hand, however,
she complained of pain in the neck that was explained by
spasm in the trapezius muscle related to the protective
posture taken to avoid pain. Trigger points injection was
given with lidocaine 2% infiltration and a Transelectrical
nerve stimulator applied for 20 min, after which she
reported complete improvement. She was then instructed
to continue physiotherapy.

At 2 weeks later, she came with persistent neck pain.
Another trigger points injection using BTX-A 100u was
given. Repeated follow-up for 3 month showed complete
pain relief with full recovery of limb function. Patient
was given an open visit to the pain clinic for long-term
follow-up.

**DISCUSSION**

In our case, we were able to alleviate pain of CRPS type 1
of the upper extremity by means of a single injection ISB
complemented by BTX-A injection.

CRPS is a disease of the central nervous system
categorized by pain, sensory, autonomic, trophic and
motor abnormalities. It is classified according to the
International Association for the Study of Pain in two
types; 1 and 2. CRPS type 1 previously known as reflex
sympathetic dystrophy, which is differentiated from CRPS
type 2 previously known as causalgia, by the absence of
nerve injury, although this remains to be established,
whereas both types have similar pathophysiological
pathways and response to treatment. Different
mechanisms have been implicated in the pathophysiology
of CRPS; exaggerated inflammatory response, vasomotor
dysfunction and maladaptive neuroplasticity. Those
multiple underlying mechanisms may contribute to the
clinical heterogeneity of the disease.

Multimodal approach is the main stay of treatment that might
include simple analgesics, anticonvulsants, antidepressants
and corticosteroids for the inflammatory component and
interventional approaches in form of various sympathetic
blocks and peripheral nerve blocks to facilitate the physical
therapy to restore the functional component. Brachial plexus
blockade mainly with bupivacaine with different additives as
morphine, or methylprednisolone was used for intractable
pain from CRPS as a series of single block or through
continuous infusion in a catheter as long as 3 weeks (level
4 evidence).

Our regional technique for treatment of CRPS has been
previously tried. Wong and Wilson placed brachial plexus
catheter using the axillary approach in a patient with severe
CRPS type 2 that developed 30 days after carpal tunnel
release using bupivacaine infusion of 0.1% at 2.5 ml/h and
reported excellent analgesia with dense sensory and motor
block, in the next 24 h the concentration was reduced to
0.05% bupivacaine then the continuous infusion stopped
and a patient controlled dose initiated at a bolus dose of
1 ml every 15 min. The patient had continued good analgesia
with no motor block and the catheter was kept in place for
1 week for continuous physical therapy. Furthermore,
ISB was used for the treatment of chronic upper extremity
pain where seventeen out of the 20 patients had less pain
after ISB and fourteen had increased range of motion of
the affected limb. ISB was compared with stellate ganglion block (SGB) and seemed to be as effective as SGB for treatment of CRPS. Kingery used an infusion pump of bupivacaine (0.5%, 3 ml/h) in six patients, with three patients had a good response. The treatment period varied from 3 to 6 months and the time between diagnoses and treatment lasts between 2 and 7 months for five patients with one patient lasted for 25 months. Furthermore, Azad et al. in their study have reported the use of morphine through continuous infusion in nine patients with upper limb CRPS using axillary approach to brachial plexus accompanied with physiotherapy for an average duration of 17 days as an inpatients their follow-up visits at 5 months revealed a reduction in visual analogue scale at rest and during motion of 50%. In our case, the patient showed dramatic full improvement after one injection of ISB and this may be attributed to the early recognition and intervention that could abort the vicious circle of the disease.

The MFPS could be a cause or a sequel of prolonged immobilization of a limb, it was reported that the use of BTX-A could be of value in the management of proximal MFPS, which might be an important factor in vicious cycle of disease and must not be ignored. In our case, the myofascial trigger points in the trapezius was managed effectively initially by the lidocaine infiltration as a diagnostic and therapeutic tool and later by the administration of BTX-A.

**CONCLUSION**

Single injection ISB and BTX-A injection were successful in the treatment of CRPS type 1 and its associated MFPS.

**REFERENCES**

1. Shearer HM, Trim A. An unusual presentation and outcome of complex regional pain syndrome: A case report. J Can Chiropr Assoc 2006;50:20-6.
2. Ribbers GM, Geurts AC, Rijken RA, Kerkkamp HE. Axillary brachial plexus blockade for the reflex sympathetic dystrophy syndrome. Int J Rehabil Res 1997;20:371-80.
3. Marinus J, Moseley GL, Birklein F, Baron R, Maihöfner C, Kingery WS, et al. Clinical features and pathophysiology of complex regional pain syndrome. Lancet Neurol 2011;10:637-48.
4. Buchanan D, Brown E, Millar F, Mosgrove F, Bhat R, Levack P. Outpatient continuous interscalene brachial plexus block in cancer-related pain. J Pain Symptom Manage 2009;38:629-34.
5. Azad SC, Beyer A, Römer AW, Galle-Röd A, Peter K, Schöps P. Continuous axillary brachial plexus analgesia with low dose morphine in patients with complex regional pain syndromes. Eur J Anaesthesiol 2000;17:185-8.
6. Safarpour D, Jabbari B. Botulinum toxin A (Botox) for treatment of proximal myofascial pain in complex regional pain syndrome: Two cases. Pain Med 2010;11:1415-8.
7. Jäniç W, Baron R. Complex regional pain syndrome is a disease of the central nervous system. Clin Auton Res 2002;12:150-64.
8. Wong GY, Wilson PR. Classification of complex regional pain syndromes. New concepts. Hand Clin 1997;13:319-25.
9. Stanton-Hicks M, Jäniç W, Hassenbusch S, Haddox JD, Boas R, Wilson P. Reflex sympathetic dystrophy: Changing concepts and taxonomy. Pain 1995;63:127-33.
10. Bruehl S, Harden RN, Galer BS, Saltz S, Backonja M, Stanton-Hicks M. Complex regional pain syndrome: Are there distinct subtypes and sequential stages of the syndrome? Pain 2002;95:119-24.
11. Martin DP, Bhalla T, Rehman S, Tobias JD. Successive multisite peripheral nerve catheters for treatment of complex regional pain syndrome type I. Pediatrics 2013;131:e323-6.
12. Marjić K, Pirc J. The treatment of complex regional pain syndrome (CRPS) involving upper extremity with continuous sensory analgesia. Eur J Pain 2003;7:43-7.
13. Wang LK, Chen HP, Chang PJ, Kang FC, Tsai YC. Axillary brachial plexus block with patient controlled analgesia for complex regional pain syndrome type I: A case report. Reg Anesth Pain Med 2001;26:68-71.
14. Gibbons JJ, Wilson PR, Lamer TJ, Elliott BA. Interscalene blocks for chronic upper extremity pain. Clin J Pain 1992;8:264-9.
15. Kingery WS. A critical review of controlled clinical trials for peripheral neuropathic pain and complex regional pain syndromes. Pain 1997;73:123-39.
16. Zhang T, Adatia A, Zarin W, Moiiri M, Vijenthira A, Chu R, et al. The efficacy of botulinum toxin type A in managing chronic musculoskeletal pain: A systematic review and meta analysis. Inflammopharmacology 2011;19:21-34.

**How to cite this article:** Fallatah SM. Successful management of complex regional pain syndrome type 1 using single injection interscalene brachial plexus block. Saudi J Anaesth 2014;8:559-61.

**Source of Support:** Nil, **Conflict of Interest:** None declared.