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

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ABSTRACT

Complex regional pain syndrome (CRPS) type 1 of the upper limb is a painful and debilitating condition. Interscalene brachial plexus block (ISB) in conjugation 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]

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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, parasthesia, 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 rhumatological 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, allodynic 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 characterized by pain, sensory, autonomic, trophic and motor abnormalities.[7] 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 CPRS 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.[8-10] 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.[3,10]

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).[11-14]

Our regional technique for treatment of CRPS has been previously tried. Wong and Wilson[8] 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.[14] 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.[14] Kingery[15] 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.[4] Furthermore, Azad *et al*.[5] 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.[16] In our case, the myofacial 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.

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