

Management of Resistant CRPS-I with T2-T3 Sympathetic Block: A Case Report

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Abstract

Sympathetic system is thought to be involved in causation of symptoms of Complex Regional Pain Syndrome (CRPS). Stellate ganglion blockade (SGB) is effective in management of upper limb CRPS-I and may help in pain relief and functional rehabilitation of the affected limb. However; due to presence of nerve of Kuntz SGB may not be effective in few patients. The effective sympathetic block of upper limb is possible by blocking thoracic sympathetic chain at T2 and T3 level. We report a case where SGB and somatic block with axillary plexus block were ineffective and T2/T3 block ameliorated the symptoms of left hand CRPS-I.

Keywords

Complex Regional Pain Syndrome (CRPS); CRPS-I; nerve of kuntz; stellate ganglion block; T2/T3 sympathetic block

Introduction

Complex regional pain syndrome (CRPS) is a painful debilitating condition association with sensory, vasomotor, sudomotor, motor and trophic changes [Table-1] commonly affecting the limb [1]. Etiopathogenesis is still elusive however; it is now accepted that multiple mechanisms are involved which include alterations in cutaneous innervations, central and peripheral sensitization, altered function of the sympathetic nervous system and psychological factors [2]. The most prominent mechanism appears to be the inflammatory process because all the classic signs of inflammation (oedema, redness, hyperthermia, and impaired function) are obvious in the early stages of CRPS [3]. The treatment for CRPS involves a multidisciplinary approach to control pain, restore limb function and prevent complications [4]. Interventions in the form of sympathectomy play a role in multimodal treatment in cases in which sympathetically mediated pain is a major component of the pain [5]. Sympathetic nervous system blockade is widely used to treat CRPS type I as sympathetic blockade is found to be effective in controlling pain by decreasing abnormal hyperactive sympathetic tone [6, 7]. Studies have shown that Stellate ganglion blockade (SGB) is effective in management of upper limb CRPS-I [7,8] and have suggested that timely administered interventions may help in pain relief and facilitate functional rehabilitation of the affected limb [4]. We present a case of upper limb CRPS- I who was resistant to multimodal regimen including SGB and axillary plexus block. He was managed successfully with thoracic sympathetic block at T2 & T3 level.

Case Presentation

A 67 years old male presented with severe burning pain and swelling of left hand after 3 months of fracture distal end radius. His initial injury was managed with close reduction and plaster cast for 6 weeks. After removal of plaster patient continued to have swelling, pain, and burning sensation in affected hand. He was initially managed with Non-steroidal anti-inflammatory drugs (Paracetamol 750mg 8hrly, Naproxen 500mg 8hrly), physiotherapy, and drugs for neuropathic pain (amitriptyline 25mg at bed time + pregabalin 150 mg/day in two divided doses.) Intervention was done in view of progressing symptoms with poor drug compliance of patient and side effects like over sedation and severe constipation. Moreover, medical optimization was limited due to his co-existing medical condition of chronic obstructive pulmonary disease and acid peptic disease. He was a known and treated case of bipolar disorder and was off drugs for last 3 years. Patient was referred to pain clinic when symptoms of pain and swelling were aggravated with insomnia, apathy and abnormal behavior regarding routine activities (not taking bath, soiling clothes with urine). Psychiatric consultation was done who suggested that his abnormal behavior is due to acute depression with attention seeking. He suggested that once pain is controlled his behavior may become normal. On examination patient was oriented and able to communicate his complaints but personal hygiene was very poor. He accepted that due to severe pain he is unable to take care of himself (lack of family support was also one of the reason). On examination left hand showed (swelling, allodynia, long brittle nails, thin and shiny skin and loss of hair with severely restricted movements of hand and arm) all features of CRPS-I (Figure-1) according to Budapest criteria [9] (Table-1). Pain and functional assessment was done by visual analogue scale (VAS; 0=no pain, 10= maximum pain) and DASH (Disability assessment score for shoulder and hand; 0=no disability, 100= totally disabled). Pain was 9/10 on VAS and DASH score was 93/100.

After taking informed consent, left SGB with 6ml 1% lidocaine and 40mg Methyl prednisolone (Depomedrol® Pfizer Limited) was given under fluoroscopic guidance every week for 3 consecutive weeks [8] (Figure-2A, 2B, 2C,). With every intervention patient was also advised graded physical therapy along with analgesics (Tramadol 50mg and Paracetamol 500mg 8hrly) and Vitamin-C 500mg/day. After 3 weeks burning sensation disappeared and pain was reduced by 30%. Patient regained normal sleep, appetite and started taking care of his hygiene. During 2nd and 3rd week left axillary brachial block with 20 ml of 0.25% bupivacaine was also given to facilitate physiotherapy but only marginal improvement in swelling and moments was noticed. After 3rd week, there was 30-40% improvement in hand movements but moderate pain was still persisting (>50%). After 3 consecutive SGB and two axillary blocks, T2-T3 block (thoracic sympathetic block at thoracic second and third level) was given with 2mL 1% lidocaine and 20mg Depomedrol at each level. Procedure was done in prone position under fluoroscopic guidance. After squaring the endplates at T2 and T3 vertebra in 15-degree ipsilateral oblique position, needle was inserted at about 4 cm away from midline and guided towards posterior 1/2 of body of vertebra keeping continuous close contact with the bone. Needle position was checked in lateral view before drug injection (Figure-3A, 3B, 3C). After 1wk pain was reduced to >95% (VAS 3/10) with significant improvement in movements (DASH score 11) (figure- 3D). During next 4 weeks' drugs were gradually tapered off. Patient was followed up for next 2 months and there was complete relief of symptoms without recurrence.

Discussion

Diagnosis of CRPS-I is done on the basis of defined criteria (Table-1). Many studies have shown that sympathetic system plays an important role in pathogenesis of CRPS-I and SGB is an effective treatment for CRPS-I [6,7, 10]. Sympathetic supply of upper limbs is done through sympathetic ganglion cell bodies originate in the intermediolateral horn of the spinal cord from level T2 to T9[11]. Preganglionic fibers through white rami communicantes reaches up to sympathetic chain and synapse with postganglionic fibers at the level of T2, T3, stellate ganglia (SG) and in the middle cervical ganglia. As SG becomes the major synaptic station, entire sympathetic supply for the upper limbs can be blocked by SGB [11]. However, at times SGB may not be effective in CRPS of upper limb. This may be due to presence of Kuntz nerves where sympathetic supply of upper limb bypasses the SGB [12]. These anomalous pathways bypass the stellate ganglia and so pure stellate ganglion block will not produce complete sympathetic denervation of the upper extremity. As the sympathetic supply to the upper limb passes through the second and occasionally the third thoracic ganglia, these are the key relay stations which have to be blocked to produce sympathetic blockade for the upper extremity [13]. In our case also, patient had only partial relief with SGB and axillary block however, responded well to T2/T3 block. We used axillary block with second and third SGB because the somatic plexus block with SGB sometimes gives better relief [14].

Till date no single definitive treatment of CRPS is known and multimodal regimen which includes all possible methods of treatment; pharmacological, non-pharmacological, psychological etc. have been used with variable success and level of evidences [15]. Whether, sympathetic block itself has any role is also debatable. However, it is very much accepted practice to use SGB as diagnostic-cum-therapeutic intervention. In our case there was partial relief in pain and movement but significant improvement in sleep and morale after SGB which signifies reduction in sympathetic component of pain. We used 3 consecutive SGB in this patient because 3 SGB each at weekly interval have been suggested by Yucel I et al [7] and also have shown significant success in past experience [8]. Axillary block has been used to treat CRPS-I [16] we used axillary block to facilitate early physiotherapy which was not possible due to pain during movements. Physical therapy and analgesics were continued because principal of treatment is still multimodal and sympathetic or somatic blocks are all works as components of that multimodal regimen.

Conclusion

We present a case of resistant CRPS-I of left hand after fracture of distal end radius. Stellate ganglion block and axillary plexus blocks were not effective to control the symptoms of CRPS-I. However, thoracic sympathetic block at T2 and T3 level was effective to treat the symptoms. This case report highlighted and suggested that, whenever SGB response is inadequate while treating patients with CRPS-I, presence of Kuntz nerve should be suspected and thoracic sympathetic block at T2 and T3 should be given.

Figures



Figure 1: Affected hand showing features of CRPS-I

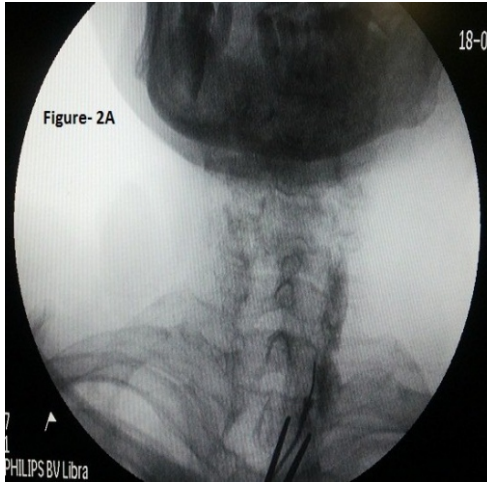


Figure 2A: Needle position during left side SGB (AP View)

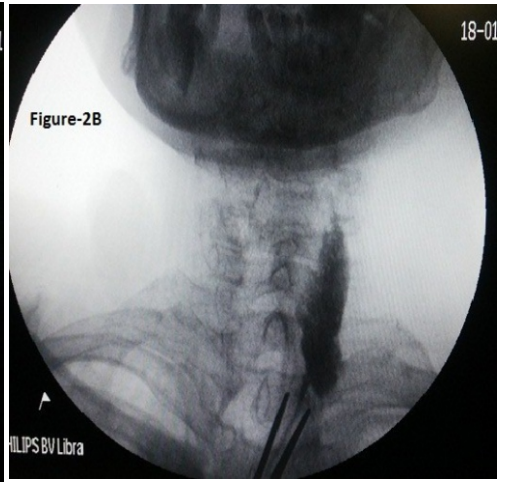


Figure 2B: Contrast spread during left side SGB (AP View)

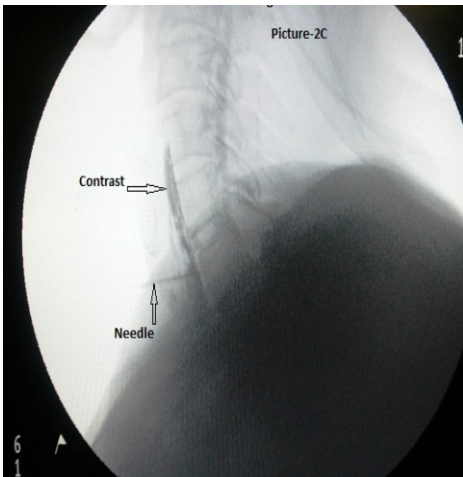


Figure 2C: Contrast spread during left side SGB (Lateral view)

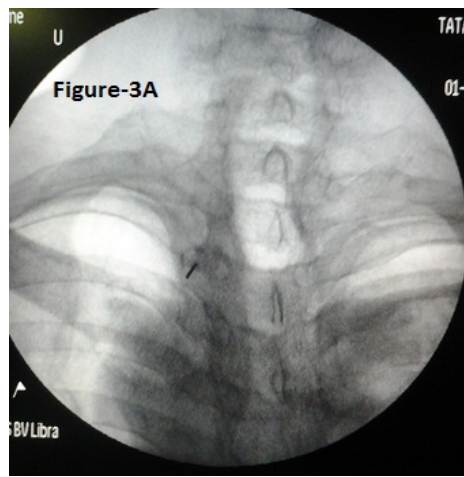


Figure 3A: Needle position during left side T2/T3 block (AP view)

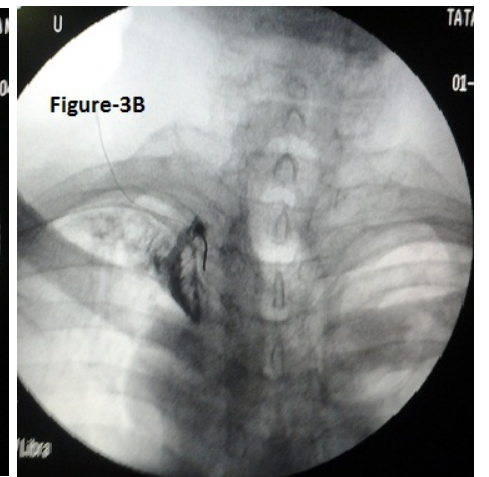


Figure 3B: Contrast spread during left side T2/T3 block

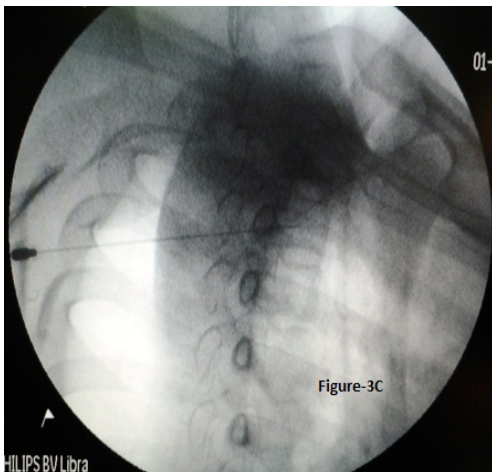


Figure 3C: Contrast spread during left side T2/T3 block



Figure 3D

Table

Table 1: Budapest Clinical Criteria of CRPS

1) Continuing pain, which is disproportionate to any inciting event
2) Must report at least one symptom in <i>three of the four</i> following categories Sensory: Reports of hyperalgesia and/or allodynia Vasomotor: Reports of temperature asymmetry and/or skin color changes and/or skin color asymmetry Sudomotor/Edema: Reports of edema and/or sweating changes and/or sweating asymmetry Motor/Trophic: Reports of decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair, nail, skin)
3) Must display at least one sign at time of evaluation in <i>two or more</i> of the following categories Sensory: Evidence of hyperalgesia (to pinprick) and/or allodynia (to light touch and/or deep somatic pressure and/or joint movement) Vasomotor: Evidence of temperature asymmetry and/or skin color changes and/or asymmetry Sudomotor/Edema: Evidence of edema and/or sweating changes and/or sweating asymmetry Motor/Trophic: Evidence of decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair, nail, skin)
4) There is no other diagnosis that better explains the signs and symptoms

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