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Impact of Botoulinum Toxin-A on Complex Regional Pain Syndrome Type 2; A Case Report

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ABSTRACT

CRPS is a very debilitating disorder. Pain (sensory) motor & autonomic changes are the main stream manifestation of this disorder. In this case study we employed Botoulinum Toxin-A along with routine pharmacotherapy to observe its Impact on patient's pain intensity along with quality of life. On McGill pain scale and SF-36 QoL result showed improvement after 2nd week till 12th week. Change in each variable was significant over 12 weeks interval.

Keywords: BoNT-A, CRPS, McGill pain Scale, SFQOL

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Introduction

CRPS, a clinical condition in which patient experiences pain disproportionately to the inciting stimulus. The clinical manifestation of complex regional pain syndrome differs in patients with respect to its subtypes.[1] The acronym "STAMP" (Sensory, Topic, Autonomic, Motor, Pain) is used for the sign and symptoms along with changes.

CRPS is most commonly observed in females as compared to males. The prevalence of this condition is around 26 patients among 100000 individuals in general population. In females, ratio is around 2-3.5:1 to 4:1 as compared to men. Pain in CRPS individuals is sympathetically maintained pain (SMP) in the initial stages which normally responds to nerve blocker injections. But then this alters into SIP (sympathetic independent pain) which is difficult to diagnose and manage.[2] In 2003, Budapest Criteria was invented for the diagnosis of CRPS which resolved the previous confusion. It's sign & symptoms were then clarified as allodynia, hyperalgesia, continuous pain in the affected area along with sudomotor changes & skin alteration.[3]

In year 2007, the Budapest criteria was further simplified due to over diagnosis of CRPS by clinicians. Now, this Criteria include the 1 out of all category symptoms during history taking of patient and 1-2 symptoms during clinical examination of patients out of following categories i.e. skin changes, sweating changes, motor & sensory changes etc.[4] In year 2010, a scientist name Halen along with his coworkers formulated 17 various symptoms on the basis of severity of CRPS which in year 2017 was validated for diagnosis purpose.[5]

In literature there are different treatment protocols for the management of patients with CRPS. Most commonly prescribed drugs are gabapentin, tramadol, Ca^{++} channel blockers, steroids, ketamine and anti-depressants along with vitamin C and B-12. Pallative treatment include spinal cord stimulation, nerve decompression, neuroma resection and psychological (CBT, Coping strategies) & Rehabilitation (Edema reduction, ROM maintenance, acupuncture, Biofeedback & Motor relearning).[6]

The purpose of or study was to demonstrate the effects of BoNT-A along with conventional pharmacotherapy in $CRPS_2$ patient who was suffering from this condition from last 2 years and had more involvement of lower extremity as compared to upper limb.

Case Report

A 37 years old male presented with lower limb excruciating pain in private clinic had got fracture of both tibia and fibula 2.5 years ago due to road traffic accident. Fracture was reduced by intramedullary nailing of tibia. He started to feel numbness $4^{1/2}$ month later. Intensity of pain kept on heightening. First pain was dull then changed into lacerating and excruciating type along with skin dryness, loss of sweating, swelling, Sensory and motor

Table I: Outcome variables results at different Week intervals

Variable	Baseline	2nd Week	4th Week	8th Week	12th Week
McGill Total Score	69	65	54	41	23
SFQoL Total Score	32.56	35.89	47.25	68	78.40

changes along with worsening of pain. He was taking gabapentin 50mg in BD along with vit B_{12} and tricyclic antidepressant, Baclofen & ibuprofen. But his pain was not managed effectively by any of these medications.

Over examination, we observed hypersensitivity of foot, Allodynia, leg and foot edema, skin dryness and Intermittent spasm of leg with limited movement of distal part of leg due to pain. There was also coldness and skin discoloration over the affected area. On McGill pain Scale, he rated his recent pain as 69 when pain is high. His quality of life was very poor.

Patient was treated with Botox type A along with routine medication (Gabapentin, Vit B12, Baclofen). Botox was injected in peroneus longus and anterior compartment leg muscles (Extensor digitorum longus, Extensor hallucis longus and tibialis anterior). 15 units of Botox were injected on 4th day in each muscle after the initial 3 days physiotherapy. The outcome measures were taken at baseline and at 2nd, 4th, 8th week and at 12th week. Short form 36 item Quality of life Scale was used along with McGill pain questionnaire for outcome measures were used. All outcome measures are explained in table I.

Discussion

This case report showed that botulinum toxin type-A along with conventional rehabilitation protocol have marked improvement in patient pain threshold and quality of life of the patient. Our case study is of novel type because no such intervention has been used by any scientist on lower limb CRPS so far.

A similar study conducted in year 2010 by Delaram Safarpour et al on $CRPS_1$ and myofascial pain syndrome of upper extremity following Carpel tunnel syndrome surgical intervention. They used BoNT-A 20 units/point on different cervical muscles and after 12 months' evaluation they found that BOTOX type -A has remarkable effects on patient pain level. This study supports our result that BoNT-A has profound effects on patient allodynia, hypersensitivity & discoloration of leg and foot.[7]

Another research was conducted by Arash Salardini et al on allodynia of CRPS patients after injecting them with botulinum type-A toxin. They recruited 22 participants in their study and injected them with high dose of BOTOX (40-200/unit) intra muscularly and subcutaneously at allodynia sites. They evaluated patients at 2 months interval and used different scales such as Mcgill pain questionnaire, quantitative skin test (for sensory system) and global satisfactory Scale, Sleep satisfactory scale.[8] But their results showed no marked improvement in pain which contradicts from our study. In our study we used low dose of BoNTA (15/unit) along with rehabilitation and routine medicine which could be the cause of our improvement.

Lucie Lessard et al conducted a study on 20 patients of CRPS with upper limb involvement. They used 10units of botox over various intervals and evaluated the patients pain level before and after the treatment. They found that there was significant improvement in patients pain level along with other symptoms.[9] This study also supports our results that treatment with type A BoNT is effective for patient's pain.

Conclusion

BoNT type A is found to be effective for the management of pain in CRPS type II of lower limb along with conventional pharmacological intervention.

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