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Advancing Pain Management: Examining the Role of Spinal Cord Stimulation in CRPS 1 of the foot

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Abstract
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Abstract

Introduction

Complex regional pain syndrome (CRPS) is a debilitating condition characterized by unilateral continuous pain, allodynia, trophic changes, and dysfunction of the sudomotor and vasomotor systems. It is classified into two types: CRPS 1 lacks nerve injury while CRPS 2 has evidence of it. Diagnosis is typically based on clinical symptoms using the Budapest Criteria.

Treatment includes oral medications (anticonvulsants, antidepressants, opioids, NSAIDs, steroids, calcium channel blockers), topical treatments (lidocaine or capsaicin), intramuscular bisphosphonates, intranasal calcitonin, and recently botulinum toxin type A. Psychotherapy and interventional therapies like sympathetic nerve blocks and neurolytic sympathetic blockade are also utilized.

New invasive treatment options for CRPS include spinal cord stimulation (SCS) and dorsal root ganglion stimulation (DRG). These techniques are based on the principle of neuromodulation, with SCS targeting the dorsal column of the spinal cord and DRG stimulation modulating pain signal pathways at the dorsal root level.

Both SCS and DRG stimulation are recommended for CRPS, with recent evidence suggesting that DRG stimulation may be more effective for lower limb CRPS in terms of pain reduction and quality of life.

Case presentation

70-years-old female with CPRS 1 of the right foot since 2 years, with right plantar foot hypoesthesia and excruciating spontaneous pain in the medial surface of the right ankle.

CPRS 1 was caused by arterial thrombosis of the femoro-popliteal axis treated with tibial vessels PTA, complicated with compartmental syndrome and multiple bone infarcts, followed by right femoropopliteal bypass and long term anticoagulant treatment.

Average daily pain NRS was 7 at rest, 10 at movement. DN4: 6. The patient was treated with pregabalin 150 mg/die and oxycodone 20 mg/day with poor pain control.

At physical examination: tactile and thermal hypoesthesia, no allodynia and digital ulcers involving 4^{th} and 5^{th} fingers. Impossibility to walk for more than 100 mts and need of a walker.

MR imaging: multiple bones infarcts in distal tibia, hindfoot and midfoot associated with osteonecrotic fracture of the anterior talus.

The patient was scheduled for a SCS implantation for a severe kyphoscoliosis.

A single paramedian octopolar catheter was inserted with the tip located at T9-T10 for a paresthetic coverage of the foot.

After SCS implantation the patient reported: average daily pain NRS of 3 at rest and 3 at movement; DN4: 2; ability to walk up to 1000 mts without support. Two months after final implantation a marked improvement

of digital ulcers was observed.

Conclusion

SCS can be a valuable treatment option for drug-resistant and chronic CRPS 1 with neuropathic pain. SCS provides pain relief, functional improvement, and the potential to reduce anticoagulant drugs doses. While DRG stimulation is preferred for lower limb CRPS, this case suggests that traditional SCS can be equally effective in achieving pain control and restoring peripheral perfusion.

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