The Treatment of Neuropathic Pain and Functional Limitations Associated with Multiple Sclerosis Using an MRI Compatible Spinal Cord Stimulator: A Case Report and Literature Review

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Abstract

Introduction: Individuals with Multiple Sclerosis (MS), a chronic demyelinating disease, often suffer functional limitations. Debilitating acute and chronic pain occurs with prevalence estimates greater than 75% (1). Previous reports suggest spinal cord stimulation (SCS) may assist in MS pain management; however, its utilization is limited secondary to the MRI safety of SCS systems and the need for follow-up MRIs to monitor disease progression.

Case: A 68-year-old male with MS associated neuropathic pain, functional limitations (sensory, ataxic gait), and decreased sensation in the lower extremities underwent a SCS trial. Prior to SCS treatment, he reported pain of 9/10 on the Numerical Rating Scale (NRS) and consumed opioid medications (105 milligrams of morphine equivalents per day). Following permanent implantation at T9 near a demyelinating lesion, the patient has noted significant improvement in pain relief, ambulation, sleep, tactile sensation, and spasticity levels.

At 10 months follow-up, pain decreased by 77% (NRS: 2/10) and opioid use decreased by 99% (5 milligrams of morphine equivalents per month). In addition, he started dimethyl fumarate, which slows MS advancement and requires an MRI compatible SCS system to track lesion progression.

Literature Review: A literature review was conducted from 1947 to June 2014 using the PubMed database. 33 papers reporting on 744 MS patients were identified. Patients experienced improvements in pain control, functional outcomes, and bladder control.

Discussion: We report the successful treatment of MS induced pain with SCS. At 10 months follow-up, SCS has resulted in improved pain control, quality of life, and function.

Conclusions:

• Discuss the successful treatment of MS induced pain with SCS

• Literature Review

Published Database:

- Key words: Multiple Sclerosis, spinal cord stimulation, dorsal column stimulation
- 40 articles selected of 377 results
- 34 articles pertaining to the clinical treatment of MS with SCS
- Reported main benefits of SCS included improvements in: Pain scores, functional outcome, urodynamic function, quality of life
- 30/34 (88%) papers support clinical use of SCS for MS

Results

Case Report

Patient History:
- 68-year-old male diagnosed with MS by MRI 27 years ago
- Symptoms of MS for 46 years

Pre-Trial:
- Neuropathic bilateral lower extremity pain
- Numerical Rating Scale: 9/10
- Medications insufficient for pain control
- Medications: 105 milligrams of morphine equivalents per day

SCS Trial Period:
- Greater than or equal to 75% pain relief
- Utilized stimulator 78% of the time
- Increased sensation in feet

SCS Implant:
- 77% reduction in pain
- Numerical Rating Scale: 2/10
- Greater than 99% reduction in opioid use
- Medications: 5 milligrams of morphine equivalents per month
- Improved:
  - Pain relief, ambulation, sleep, tactile sensation, and spasticity levels

Conclusions:

• 10 months follow-up
  - Marked clinical improvement:
    - Significant and continued pain relief
    - Functional improvement
    - Reduced opioid requirements
  - Advantages of an MRI compatible SCS system:
    - Monitoring for response to pharmacological management
    - Dimethyl fumarate - may slow MS progression
  - Literature Review
    - SCS is a viable treatment for MS
    - Improvement required for SCS complication profiles

Literature Cited


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