Cephalad Lead Migration Following Spinal Cord Stimulator Implantation

Paul J. Christo, MD, Kai McGreevy, MD, Bret M. Bahn, MD, Kayode A. Williams, MD
The Johns Hopkins University School of Medicine

Introduction
Spinal cord stimulation (SCS) has emerged as an efficacious and cost-effective treatment modality for various neuropathic pain conditions, such as failed back surgical syndrome (FBSS) and complex regional pain syndrome. Randomized controlled trials have supported its use for these conditions and have shown that it leads to improved quality of life, increased activities of daily living, and reduced healthcare costs.

Complications of SCS have been reported at a rate of 30–40%. Lead migration (LM) is among the most common complications of SCS, with reported incidences ranging from 13.2% to 22.6%. LM is defined as displacement of the wire from its original desired location; it is caused by mechanical stress on the SCS component and results in loss of effective stimulation.

Discussion
We believe that this represents the first report of significant cephalad LM following SCS lead implantation and should be observed in order to prevent injury. LM is among the most common complications of SCS. The literature shows that LM is most likely to occur in the first several weeks after implant, before tissue encapsulation of the system has fully formed, and if the patient has subjected the system to large displacements from vigorous activity.

More recently, novel approaches to lead security include mechanical locking anchors using a twist-lock mechanism and a torque-wrench mechanism that does not require the use of sutures.

Successful lead revision was carried out using a single paramedian incision to place extra sutures for lead security and a “figure-of-eight” SRL (Image 3). Our patient derived significant pain relief (>70% on NRS) and functional improvement from SCS revision, with absence of LM confirmed by surveillance fluoroscopy at 8 weeks.

Conclusion
This case is presented to: 1) remind readers of the challenges of LM faced by implanters; 2) illustrate the first report of significant cephalad LM following SCS lead implantation; 3) raise awareness that cephalad LM may occur despite standard techniques; 4) illustrate how to detect LM should it occur; 5) postulate why this LM might have occurred; 6) present trouble-shooting that occurred while limiting revision to one incision; 7) suggest the potential protective value of SRL on longitudinal lead migration in general; and 8) introduce an alternative SRL configuration that warrants further investigation.

Further prospective investigation into the mechanism of action, mechanism of complications, optimization of surgical techniques, and long-term efficacy is warranted in order for SCS to become a widely accepted mainstream treatment.

References

Loop Size and Displacement

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Figure 1